Deliverable reference:	Date:	Responsible partner:	
D 13.2	27 June 2012	RAKOS	Version 8

Bridging Resources and Agencies in Large-Scale Emergency Management

BRIDGE is a collaborative project co-funded by the European Commission within the Seventh Framework Programme (FP7-SEC-2010-1)
SEC-2010.4.2-1: Interoperability of data, systems, tools and equipment
Grant Agreement No.: 261817
Duration: 1 April 2011 – 31 March 2015

www.sec-bridge.eu

Title:

End-User Advisory Board: First Meetings and Scenarios

Editor(s):
Eivind L. Rake

Approved by:
Andreas Zimmermann

Classification:
Public

Abstract / Executive summary:

In order to guarantee active end-user involvement during the project, BRIDGE has established an advisory board of national and regional end-user organisations, representing different areas and nations within emergency management. The End User Advisory Board (EUAB) convenes at least every 6 months and the EUAB consists of eight members and a chairman.

Some of the problems described by the EUAB on-scene are lack of information, information overload, uncertain quality of information, poor understanding of structure of buildings, the triage process of tagging victims, unreliable system for the registration of injured victims, logistics, weak reliability of supporting IT, fragile interoperability between emergency agencies from different countries, and difficulties relating to modeling of critical infrastructures.
The EUAB members have also pointed out a number of important issues to be dealt with, e.g.; (1) communication network break downs, (2) social media users ability to provide information to first responders, (3) information exchange and communication interoperability between different agencies and (4) how to do real time observation on incident sites in order to provide a common operational picture.

Different concepts, or front end components, are developed to support the incident commander and responder's on-scene. These concepts are ranging from new ways to visualize the information to have a common operational picture of the crisis and an overview of available resources and the risks involved with various decisions.

The overarching scenario describes a constructed emergency where the use and interaction of different front end components, procedures, simulations etc. from the BRIDGE project will be demonstrated. The aim of the scenario description is to provide a realistic storyline that helps us explain how the collaboration technologies we envision for BRIDGE could support the first responders and the incident commanders during a real disaster.

Document URL:
http://www.sec-bridge.eu/deliverables/...

Table of Contents

Version History

Version	Description	Date	Who
1	First draft release	22.1.2012	Eivind L. Rake
2	Second draft release incorporating results of the first review	16.2.2012	Eivind L. Rake
3	Final draft release	18.3.2012	Eivind L. Rake
4	First review	26.3.2012	Peter Wahlgren
5	Second review	20.4.2012	Ragnhild Halvorsrud
6	Approved version	27.6.2012	Eivind L. Rake
7	Final version	09.7.2012	Eivind L. Rake
8	PCC Approval version		Andreas Zimmermann

Contributing partners

RAKOS
Universitetsykehuset i Stavanger
4068 Stavanger
Norway

Eivind L. Rake
eivind.rake@lyse.net

Svein Arne Hapnes
svein-arne.hapnes@sus.no

PLUS
University of Salzburg
5020 Salzburg
Austria

Friedrich Steinhäusler
Friedrich.steinhaeuslr@sbg.ac.at

Fraunhofer FIT
Fraunhofer Institute for Applied Information Technology FIT
User-Centered Ubiquitous Computing
Department, Schloss Birlinghoven
53754 Sankt Augustin
Germany

Leonardo Ramirez
leonardo.ramirez@fit.fraunhofer.de

SINTEF
Forskningsveien 1
0314 Oslo
Norway

Jan H. Skjetne
jan.h.skjetne@sintef.no

1 Introduction

The goal of BRIDGE is to increase safety of citizens by developing technical and organisational solutions that significantly improve crisis and emergency management. BRIDGE develops a system to support interoperability – both technical and social – in large-scale emergency management. The system shall serve as a bridge between multiple first responder organisations in Europe, contributing to an effective and efficient response to natural catastrophes, technological disasters, and large-scale terrorist attacks.

BRIDGE aims to support rapid decision making during a large-scale, multinational crisis response. The results should:

- Enable more efficient performance than to day
- Reduce workload for emergency management teams and first responders
- Improve quality and efficiency of situation assessments, decision making, timeliness, effectiveness of communications and coordination cross national boarders as well as between emergency services
- Optimize the use of resources
- Strengthen competitiveness of EU technology and service providers in knowledge-based economies and the public sector

In order to guarantee active end-user involvement during the whole project, BRIDGE has established an advisory board of national and regional end-user organisations representing different areas and nations within emergency management. This expert-level group aims to reflect the BRIDGE objectives and achievements in particular with regards to

- Requirements definition and specification
- Review of intermediate and final results
- Support for evaluation
- Contribution to implementation and exploitation strategy

Important part to reach the BRIDGE goal and to improve the responses is to develop technical solutions. Such solutions are called Front end components. Ideas and components under development are described in section 3. The Front end components will be demonstrated and tested in regular realistic demonstrations and exercises.
The final exercise will take place near Cologne. Section 4 describes the accordant incident scenario.

This deliverable includes descriptions of

- The End User Advisory Board, the structure, tasks, conducted meetings and workshops. A number of problems and challenges during emergency responses and on-scene activity, are identified and presented
- Front end components, which are to be used on-scene by the first responders and will be demonstrated at the final exercise
- The scenario in which different aspects of an incident will illustrate the use and interaction of different components, procedures, simulations etc. from the BRIDGE project. The scenario takes place near Cologne where an explosion occurs at a large chemical factory

2 End User Advisory Board (EUAB)

The EUAB is assigned to ensure that the project remains aligned with end-user needs and technology trends during the course of its execution and that the project results remain beyond state-of-the-art and are aligned with the newest end-user trends. The use of an end user advisory board represents a bottom-up perspective on the whole complex of the addressed domain. Furthermore, it provides important organizational high-level requirements that are collected and refined in the iterative research and development process.

The EUAB consist of eight members and a chairman. A list of the members is enclosed, see Table 1 in Chapter 6. (One of the members resigned in November and will be replaced.)
The EUAB is chaired by a representative of RAKOS. The EUAB will not make any decisions on behalf of the project, but can make recommendations to the Technical Coordination Committee. The Technical Coordinator will secure that recommendations from the EUAB are properly recorded and communicated to the work package leaders. The Chairman may organize external peer reviews of project deliverables by members of the EUAB. The End User Advisory Board convenes at least every 6 months. If needed, the Chairman can call more frequent meetings. The Chairman decides the agenda for the meeting. The technical Coordinator and the Project Coordinator participate in the meetings.

2.1 First EUAB meeting

The first meeting took place in Salzburg, Austria in June 2011.

The agenda at the first meeting included presentation of the EUAB members, presentation of the project and planning of the EUAB involvement and work.

In order to learn more about the problem space and usage context of the BRIDGE project, and the end-user's needs, focus groups discussed problems the board members had experienced during responses. The result was presented and discussed in plenum. The open discussion was recorded on video and transcripted. The discussion ended with a documentation of suggestions and requests to be used in the BRIDGE project and/or on–scene.

Summary of problems:

- *Lack of information*
  - Information about the incident site is not available in the beginning, such as e.g.
    - What is the weather like, e.g. wind speed and direction?
    - What chemical substances are leaking?
    - Whom do we need to call?
    - What is the intervention plan of the fabric?
- *Active pull of information*
  - Information needs to be actively requested and sought.
- *Questionable Trustworthiness of information*
  - First responders are currently not able to assess the trustworthiness of incoming posts about the incident submitted via Facebook or Twitter.
  - How can such social media be fed into the strategic process?
- *Lack of understanding of structure of buildings*

    - How did the destructed infrastructure look like and how did the explosion proceed?
- *The triage process of tagging victims is done differently on a European level*
    - The labeling of victims is done using red, yellow, green, or A, B, C.
- *Logistics*
    - Evacuation and transport of victims reveals difficult due to traffic jams, cascading effects and media
- *Weak reliability of supporting IT*
    - Paper, board and pen are always the fallback position
    - IT devices tend to stop working, e.g. due to a breakdown of the communication
    - First responders start to play around with IT, and thus, loose the perspective for the operational picture of *the incident*
- *Information overload*
- *Unreliable registration system of injured victims*
    - There is always a differing number of victims depending on who is asked
    - Hospitals send a fax back to the command post about how many people they already host.

Summary of comments regarding communication

- *Cell phone communication*
    - In the UK cell phone communication is not a critical infrastructure, but in other country it is
    - In Norway the rescue workers are totally dependent on the cell phone network
    - In Germany and other countries the intervention forces have phones working on priority frequencies
- *All means of communication are used*
    - Satellite
    - Walkie-Talkies
    - Loudspeakers on cars
- *Some rescuing vehicles are equipped with a WiFi Hot Spot*
- *Communication operators cut data traffic in this affected area and increase voice traffic*
- *Weak interoperability exists between countries*
- *Good experience with short wave radio*
    - Use stations of amateur short wave radio for communication

Summary of suggestions and wishes:

- *Modelling of critical infrastructure*
    - A searchable database with 3D models of infrastructure with potential capability of matching *before* and *after event*-scenarios
- *View on the operational scene*
    - Aggregation of information from a lower level to an upper level
- *Intelligent digging for information*

  - assisting in the description of the incident
- *Information gathering device for improved decision-making support*
  - Device should be capable of sampling and recording of information
  - Device should be robust and simple
  - Device should allow a memorization/record of what a first responder have done and felt or experienced
  - Device should be reliable also if the communication system is unavailable
- *Intelligent combination of information*
  - Platform that allows access to information at hand at all times
  - All types of information would be helpful, even information provided by the press
  - Methods of bringing social media to the command post

2.2 Second EUAB meeting

The second meeting was held in Flums, Switzerland, in November 2011.

There, the status of work packages (WP) was presented and discussed.
The EUAB members pointed out some important issues to be dealt with;

- Communication networks breaking down
- Allowing users of social media to provide information to first responders
- Make communication and information exchanges interoperable between different agencies
- How to do real time observation on incident sites and provide a common operational picture

A workshop discussed what the first responder(s) need on –scene and also identified areas of improvement within technical solutions and common procedures - cross emergency services and cross borders. See chapter 2.3 *Workshops* for results.

A proposal of the final scenario at the Explo-Chemco plant, see chapter 3 *Overarching scenarios*, was presented and the EUAB provided input to the further work.

2.3 Workshops

The goal of the workshops in the BRIDGE project is to:

- Learn about existing cross country agency collaboration in different countries
- Identify challenges
- Determine the first responders thoughts about new solutions
- Evaluate the BRIDGE concepts

The workshops with domain experts, as the EUAB members, are central in BRIDGE, both for acquiring a deep understanding of the emergency response domain, and for involving those experts directly in the design process.

Two workshops were held in conjunction to the EUAB meetings.
The workshop at the second EUAB meeting discussed what the emergency services need on –scene and identified areas of improvement cross emergency services and cross borders.

Three co-design user workshops were arranged in Oslo, Norway, Delft, Netherlands and Lancaster, UK.

At the first co-design workshop in Oslo, the EUAB was represented by one of its members together with domain experts, especially on-scene experts/first responders, from the fire department, the police and the paramedics. Three of the first responders were deeply involved at the Oslo explosion and the Utøya terror attack the 22.July 2011. The work shop aimed to identify important challenges regarding the situational awareness on – scene.

In this respect the domain analysis and the workshops, both in Oslo and at the EUAB-meetings, have identified several challenges during responses of multi emergency units and/or cross border responses.

The most important examples of such challenges are;

- Plans and situated actions
  - *All plans may be unknown to all the combat participants or may be missing. The plan from the industrial plant can be hard to find*
  - *"The things you can handle in your everyday work you can also handle during crisis" (Statement from the Oslo workshop)*
  - *Hugh variations in practice according to province*
  - *General lack of experience, training and competence*
- Media
  - *The challenge is that the public don't see the response. But the media are there and they'll (maybe) be there before the response units. The public base their information upon the media including social media.*
- Need for information
  - *It is a very manic information problem at the beginning of a response. The information may be*
    - ✓ *unreliable*
    - ✓ *missing*
    - ✓ *overloaded*
    - ✓ *must be interpreted.*
- Unexpectedness
  - *We are planning for the expected, but we meet the unexpected.*
- Reporting
  - *Information exchange between the different agencies can in some disasters be assumed to be politically sensitive*
  - *What is to be reported and when? To whom?*
- Standards
  - *There is a lack of standards cross countries and cross emergency service. An examples is a standardised scheme for triage*
- Lack of staff and resources
  - *Initially and in critical parts of a response there may be insufficient resources available, e.g. medical personnel and smoke divers*
  - *It is difficult to make priorities*
- Systems and procedures; everyday use ←→ emergency

  - *The "disaster" systems are not often used because everyday accidents are so small scale that these systems are left behind waiting for the mass casualty*
  - *A success criteria of the BRIDGE project is that the technical systems and procedures must be a part of the daily response system*
- Communication t(ri)angles
  - *We have normally three different dispatch centres and systems within a country, and it's hard to communicate effectively between the centres*
  - *Cross boarder communications is even harder*
  - *Lack of information exchange between agencies*
  - *We have to establish a sort of communication triangle, or circle, on-scene and share information*
  - *We have to seek out information because it is not automatically transferred*
  - *We need a common language*
  - *"Communication is always a challenge" (Statement from the Oslo workshop)*
- Networks break down
  - *It doesn't matter how well you are prepare. You have to expect the communication [networks] to break down*
- View of the situation – situation assessment
  - *To have a common view of the situation that can be edited by everyone in the response group is difficult*
  - *It is important to bring the information from the ground up to the highest level with the aggregation of information so that we don't have the failures of transcribing information from one level to the other*
- Tools for shared situational awareness
  - Emergency response related functionality/information
    - ✓ *Common operational picture*
    - ✓ *Plans, routines and check lists*
    - ✓ *Information about objects*
    - ✓ *Overview of resources*
    - ✓ *Maps with positional tracking of resources, especially personnel and equipment*
    - ✓ *Activities/task for units/personnel*
    - ✓ *Common logging and logging system*
    - ✓ *Info/results from risk analyses*
    - ✓ *Information and pictures from the call centers*
    - ✓ *From Internet*
    - ✓ *From social media as Twitter and Face book*
  - *Generic (non emergency response specific) functionality/information*
    - ✓ *Filtering mechanism*
    - ✓ *Dictate information that is transformed to text*
    - ✓ *Speech control*
    - ✓ *Live transmission of (moving) pictures, including from bystanders*
    - ✓ *Access to sensor data*
    - ✓ *Video conferences*

- *Other ideas/ needs*
  - ✓ *Patient monitor and health system*
    - *Online medical data base*
    - *Patient monitor (biometric data) + position from GPS*
    - *Integration with triage process*
    - *Allocation to hospital*
  - ✓ *Mobile phone localization and alert system*
    - *Localize mobile phones in a given area and send alerts about the situation to these phones*
  - ✓ *Driverless cars*
    - *Personnel free to do more useful things on the way to the incident*
  - ✓ *Improved networks*

The results from the workshops will be analysed and incorporated in the overall domain analysis.

3 Front end components

This section describes planned technical front end components to be developed in BRIDGE and tested by emergency responders' on–scene, contributing to an effective and efficient response. The anticipated use of these components is described in Chapter 4.

3.1 BRIDGE Master

The BRIDGE Master is a component that provides basic functionality for the incident managers, as the incident commander. Visualization of information and resources are essential part of the BRIDGE Master. Further, the BRIDGE Master allows the integration of other components (as BRIGDE Master plug-ins) that may subscribe to the functionality of the BRIDGE Master.

One of the main functions of the BRIDGE Master is an interactive map of the incident site. This is likely to be predominantly used in on-site and remote incident command centre stations, but also mobile devices will be provided with map functionality. The map has several layers of geo-referenced information, e.g.:

- Location of first responders
- Location of vehicles, fire hydrants, and other resources
- Location of victims

Another main functionality of the BRIDGE Master is the resource management. The BRIDGE Master will enable efficient, collaborative location and allocation of available assets in multi-agency emergency responses - namely, response personnel and equipment. The BRIDGE Master will provide the personnel involved with information on the location and availability of those resources, and to negotiate the distribution of needed assets.

3.2 BRIDGE Resource Manager

The objective of the Resource Manager is to provide drastically improved support for resource management during emergency response operations. It enables the users to identify and announce resources, to view information about resources from different agencies in real time, and to allocate arriving resources to specific tasks and locations. It also monitors the location, state, availability and capabilities of resources.
The Resource Manager is an agent-based distributed system running on mobile devices, as smart phones, laptops, tablets and MDTs, in combination with cloud-based services.

3.3 BRIDGE Risk Analyzer

The BRIDGE Risk Analyser is a component that provides support for risk analysis concerning potential follow-on risks. The component supports identification and anticipation of relevant risks, projection of their unfolding and cascading consequences, as well as assessment of risk levels in terms of likelihood and consequence.
The BRIDGE Risk Analyser functionality includes the following:

- A library/data base of ready-made, generic and parameterized risk models for various categories of incidents and structures, such as fire/explosion in chemical or nuclear facilities, subway tunnels, densely populated areas, offshore installations, etc.
- Editor functionality to quickly tailor the risk model to the particular incident/scenario

- Support for identification of the relevant input information needed in order to assess the various risks
- Support for likelihood assessment based on identified input information.
- Support for consequence assessment based on identified input information.

The BRIDGE Risk Analyser is used collaboratively by staff on site and in command centres to make the best possible assessment at the time and integrates with the BRIDGE Master

3.4 BRIDGE Information Aggregator

The BRIDGE Information Aggregator facilitates the aggregation of data collected during a response. It also facilitates the identification of sub-events, i.e. specific hotspots of a crisis. Sub-events describe dominant threats in a crisis that need immediate emergency response.
The framework supports an after the-fact analysis of data related to a crisis.
In case of large-scale emergencies, it is obvious that a huge amount of data is gathered and shared. Manual browsing through this amount of data can be stressful, time demanding and cumbersome task. The aggregator can be seen as a media exploration framework that relieves the user from this manual activity.

3.5 BRIDGE Mesh

In an emergency situation the first network to become unavailable are cellular networks. BRIDGE Mesh will provide the possibility to communicate with devices in an emergency area over different exploitable channel.
Mesh is an ad-hoc network, which is based on deployed Mesh Bridges, which have multiple network interfaces.
As first responders arrive at the incident they carry the Mesh bridges with them and place them at a given distances. The Mesh Bridges create an ad-hoc Wi-Fi network, where data is forwarded over multiple hops. Through this deployment the area gains network coverage and can be used by different emergency forces and services.

3.6 BRIDGE eTriage

The traditional triage procedure refers to the systematic categorization of patients based on the severity of their injuries. The process is mainly designed to define priorities for transport to hospitals, although some emergency treatment is undertaken on site. The BRIDGE eTriage component represents an augmentation of the process, based on tagging victims and environmental features with tags that store victim statuses, timestamps and locations for direct use in the command post.

All medical staff is equipped with a portable device. The device capable of scanning the eTriage tags. The triaging personnel examine the victim and categorise them. When attaching the eTriage tag to the patient, the current position, time and category of the tag, as well as details of the initial diagnosis are saved and sent to the BRIDGE Master. When standing close to a victim, all available information about this victim is displayed in the portable device. Hospital and on site medical staff can use the BRIDGE eTriage device to see the location and category of victims in a map overview and an augmented reality view.

3.7 BRIDGE RescueMe App

The main goal of the application is to provide victims with the means to inform rescue agencies about being in emergency and receive the confirmation that their notifications are registered at the dispatch center.

The RescuMe App use Android operating system and can be used be smart phones supporting the system. Porting the design sketches to Windows phone or iOS devices is also possible.

The EUAB has been involved in the development of some of the components, as the BRIDGE eTriage and the BRIDGE Risk Analyser, at the second End User Advisory Board meeting in Flums, Switzerland.

4 The scenario

This section describes a constructed emergency scenario in which different aspects of the incident is used to exemplify the use and interaction of the different components of the BRIDGE System. The planned components are described in Section 3, *Front end components*. The scenario also aims to include procedures, systems and simulations etc. developed in the BRIDGE project.

Realistic scenarios in real-world environments should lead to four regular demonstrations of the BRIDGE platform under different foci.
The project's exploitation activities and the scenario demonstrations target three groups: emergency management end-user communities in different European countries, industrial BRIDGE partners, and non-BRIDGE technology and solution providers in Europe.

During 2011, the first nine months, there have been none demonstrations or exercises. This is according to the project plan.

At the second EUAB-meeting, 28-29 November 2011, at Hagebach Test Gallery in Flums, Switzerland, a scenario based on an explosion at a fictitious chemical plant was presented. The background is an explosion at ' Explo-Chemco', a fictitious large chemical factory near Cologne.

The aim of the scenario description is to provide a realistic storyline that helps us explain how the collaboration technologies we envision for BRIDGE could support the first responders and the incident commanders during a real disaster. The use case describes the information- and communication flow in the initial phase focusing on establishing a Common Operational Picture (COP), examples of risk assessment done by the Incident Command Team and the following initial decision making process. The use-case exemplifies the use and interaction of the different components of the BRIDGE System.

The scenario was discussed by the EUAB members using three separate phases: Initial phase, Establishing phase and Operational phase.

- The Initial phase describes the handling from the alarm has been received at the Emergency Control Centre until the Incident Commander has arrived the incident area
- The Establishing phase is the period from the Incident Commander has arrived the area until the Incident Command Team has established a common operational picture and the Incident Command Team Members is tasked to effectuate their received overall orders
- The Operational phase describes how the overall orders are handled by the different teams and organisations

The scenario is planned to be used at the final demonstration at the end of the BRIDGE project. See D10.4 Real Scale Training and Tests and D07.01 Baseline Emergency Reference Structures for further details. These documents are internal. The scenario will be modified and updated during the project life-time.

4.1 Description of the chemical incident scenario

An explosion occurs at 'Explo-Chemco', a large chemical factory near Cologne. Within seconds, the emergency call centre receives numerous reports from citizens affected by the blast, describing noises, and earthquake like shaking, broken windows, smoke, smells, and fire. A call to Explo-Chemco's operation control centre remains unanswered. The first team to arrive in the scene is the police. On their arrival, they observe that a helicopter from a media broadcaster is

already broadcasting images of a large smoke plume emerging from the plant. Bystanders and victims with minor injuries are scattered on a large space in front of the factory. Some of them use their mobile phones to inform friends and relatives. Almost at the same time of the police arrival, several related hash tags such as #CHEMCO and #explosionInCologne start to trend in twitter. A couple of photos emerge from a victim showing to some extent the level of damage produced by the explosion.

According to existing regulation, the police begin to organize a command structure. Each of the participating agencies assigns an Incident Commander. The incident commander of the police is in charge now of the coordinated response. In the mean time, the technical assistant in charge of the IT Infrastructure of the incident prepared the BRIDGE System, configuring the modules relevant to the situation. As effectives of the different agencies arrive and engage in the intervention, the different devices available on site start to build the BRIDGE Mesh.

The incident commander on scene uses the BRIDGE Master and BRIDGE Information Aggregator to have an overview of all the available information, and to add new bits coming from different sources. He uses his own in situ perceptions and (through communication with command centre staff) citizen accounts, information from CCTV video feeds from the plant monitoring system, and emission surveillance data to plan further steps in the response. The incident commander understands now that there is a large number of injured persons and victims, and that the triage process needs to start as soon as possible. The BRIDGE Risk Analyzer and BRIDGE Master is used by the commander to identify danger spots and to structure the space for organizing an adequate response. Following a common approach, the site is divided into three district zones: the exclusion zone (hot zone), the contamination reduction zone (warm zone) and the support zone (cold zone). At first specialized forces try to approach the hot zone aiming at making it safer for other first responders to enter. The BRIDGE Master displays the emerging district zones of the incident site, as well as resources and personnel, enabling distributed team members (e.g. in command centers) to coordinate local aspects of the emergent response effort and report efficiently to the central command.

The chemical plant houses rather complex industrial process, so external expertise is needed to understand events and potential risks on site. To find adequate information sources and supporting experts, the commanding staff uses the BRIDGE Experts Network Builder as part of the BRIDGE Risk Analyser to alert a team of experts. In collaboration with these experts, the command post explores and assesses potential risks of the situation, using for this the BRIDGE Risk Analyzer. Many of the structures on site are compromised and there is still a high risk of further explosions, structures collapsing, and of harmful emissions being blown into inhabited areas. This makes the task of evacuating the injured extremely urgent. The BRIDGE eTriage visualize the data and, the efforts prioritised, and the responding personnel are notified accordingly.

On a sector adjacent to the explosion, a large office complex has collapsed, leaving several buried victims. In some of the collapsed dependencies, some persons are trapped only with minor injuries and are able to use their phones. Due to the presence of steel in the debris, there are problems to establish a connection to a cell of the GSM network. The users, as injured persons and first responders, activate the RescueMe app, which, without a standard signal such as WiFI or GSM, begins the search of some peer to establish a BRIDGE Mesh network. Slowly, one after another, a small group of mobile phones connects to each other using Bluetooth, creating a small network. One of the collaborating phones is close enough to the outside of the structure and manages to connect to the GSM network and the outside world. Using this chance opportunistically, the RescueMe transmits all relevant collected data, such as location, images, extent of damage, etc. through the BRIDGE Mesh network. This information is stored in the information repositories of the BRIDGE Information Aggregator and made available to the

different organizations and across distributed teams by means of the BRIDGE Master and other front ends of the system.

The collection of information offered by RescueMe is not only passive. As one executive of the Explo-Chemco reports from inside one of the collapsed structures, he is contacted directly by an operator from the command post, who asks him for further information about the processes that might have caused the explosion. The executive is asked also for a picture from a particular angle that allows an external expert to assess the level of damage of a large container of chemical residues close to the river. The commanding staff also uses the small ad-hoc network discovered by a BRIDGE assimilator to disseminate information to keep injured persons calmed.

The BRIDGE Risk Analyzer alerts of a growing risk of chemical clouds to move toward near cities in Germany and the Netherlands. A member of staff in the command centre uses the broadcaster to instruct people to go and stay indoors, close their windows and monitor for further information.

5 Conclusion

Some of the problems described by the EUAB on-scene are lack of information, information overload, uncertain quality of information, poor understanding of structure of buildings, the triage process of tagging victims, unreliable system for the registration of injured victims, logistics, weak reliability of supporting IT, fragile interoperability between emergency agencies from different countries, and difficulties relating to modeling of critical infrastructures. The EUAB members have also pointed out a number of important issues to be dealt with, e.g.; (1) communication network break downs, (2) social media users ability to provide information to first responders, (3) information exchange and communication interoperability between different agencies and (4) how to do real time observation on incident sites in order to provide a common operational picture.

The project-internal development of front end components, which shall facilitate the leadership and the operation on-scene an accident are both in the idea stage and some components are under further development and testing. The described concepts can solve part of the problems and issues addressed by the EUAB.

The overarching scenario describes a constructed emergency where the use and interaction of different front end components, procedures, simulations etc. from the BRIDGE project will be demonstrated. The aim of the scenario description is to provide a realistic storyline that helps us explain how the collaboration technologies we envision for BRIDGE could support the first responders and the incident commanders during a real disaster.

6 Members of the End User Advisory Board (EUAB)

No.	Name	FR Category	Position	Country
1.	Eivind L. Rake Chairman	Fire service, Health service	Dr., Deputy Fire chief, Stavanger Project manager, RAKOS Chairman of the EUAB	Norway
2.	Barbra Campbell	Police	Inspector, Project Athena Bedfordshire & Hertfordshire Collaboration Team	UK
3.	Johann Schadwasser	Police	Dr. , Officer of the Austrian Federal Police and Strategic Director of the International Security Competence Centre (ISCC, Vienna-Baden, Austria)	Austria
4.	Heiko Werner		Head of General Affairs Division, Federal Agency for Technical Relief (THW)	Germany
5.	Christian Van De Voorde	Fire service	Fire chief, Fire Brigade Ghent	Belgium
6.	Miguel Segui	Fire service	Fire commander, Madrid	Spain
7.	Sindre Mellesmo	Health service	MD, Director of Emergency dep. St.Olav University Hospital, Trondheim	Norway
8.	Peter Bjørn Hansen	Health service	Head of emergency medical center, Copenhagen. Resigned November 2011. To be replaced	Denmark
9.	Thomas Larsson	Industrial manufacturer	Director Business Development, Saab Security & Traffic Management	Sweden

Table 1 Members of the End User Advisory Board (EUAB)