



European Project N<sup>o</sup>: **614154**  
Brazilian Project N<sup>o</sup>: **CNPq-490084/2013-3**  
Project Acronym: **RESCUER**

Project Title: **Reliable and Smart Crowdsourcing Solution  
for Emergency and Crisis Management**

Instrument: **Collaborative Project**  
European Call Identifier: **FP7-ICT-2013-EU-Brazil**  
Brazilian Call Identifier: **MCTI/CNPq 13/2012**

## Deliverable D2.3.2 Mechanisms for Group Target Follow-up Interaction 2

Due date of deliverable: PM 16  
Actual submission date: April 30, 2016



Start date of the project: **October 1, 2013 (Europe) | February 1, 2014 (Brazil)**

Duration: **30 months**

Organization name of lead contractor for this deliverable: Fraunhofer IESE (Fraunhofer)

Dissemination level		
PU	Public	✓
PP	Restricted to other program participants (including Commission Services)	
RE	Restricted to a group specified by the consortium (including Commission Services)	
CO	Confidential, only for members of the consortium (including Commission Services)	

## **Executive Summary**

### **Mechanisms for Group-Target Follow-up Interaction 2**

This document presents Deliverable D2.3.2 (Mechanisms for Group-Target Follow-up Interaction 2) of the project FP7-614154 | CNPq-490084/2013-3 (RESCUER), a Collaborative Project supported by the European Commission and MCTI/CNPq (Brazil). Full information on this project is available online at <http://www.rescuer-project.org>.

Deliverable D2.3.2 provides the results of the second iteration of Task 2.3 (Group-Target Follow-up Interaction). In this task, we investigate how the command centre, after receiving initial information about an emergency situation, can demand further information from people at the place of the emergency (eyewitnesses or formal responders) in order to clarify a piece of information or check its reliability. The task focuses on the prototype of suitable mechanisms for group-targeted follow-up interaction with the Mobile Crowdsourcing Solution, so that the command and control centre can collect new information about the emergency situation as long as necessary, not only about the status of the situation per se, but also about the execution of response measures.

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# 1. Introduction

## 1.1. Purpose

The RESCUER project aims at developing a smart and interoperable computer-based solution for supporting emergency and crisis management, with a special focus on incidents in industrial areas and at large-scale events. The RESCUER solution is composed of four main components, namely the Mobile Crowdsourcing Solution, the Data Analysis Solution, the Emergency Response Toolkit and the Communication Infrastructure. This deliverable provides the specification of the Mobile Crowdsourcing Solution (also called RESCUER app) with regards to the follow-up interaction support. Its main goals are to: (1) indicate the possible purposes of a follow-up interaction, (2) present the set of questions (question catalogue) that was defined to guide follow-up interactions, (3) specify both the representation of the different questions and the rules for combining them in information requests, and (4) specify the flow of screens for the implementation of follow-up interaction in the RESCUER App.

## 1.2 Changes Log

Table 1 summarizes the changes performed in D2.3.1 (Mechanisms for Group-Target Follow-up Interaction 1) to give rise to D2.3.2 (Mechanisms for Group-Target Follow-up Interaction 2).

**Table 1: Change log from D2.3.1 to D2.3.2**

Change Location	Change Description
Section 2.1	<ul style="list-style-type: none"> <li>Improvement of the question catalogue for information request.</li> </ul>
Section 2.2	<ul style="list-style-type: none"> <li>Improvement of the rules for group-targeted follow-up interaction.</li> </ul>
Chapter 4	<ul style="list-style-type: none"> <li>Improvement of the data model used for information request.</li> </ul>

## 1.2. Partners' Roles and Contributions

Fraunhofer was responsible for the conception and prototyping of the follow-up interaction mechanisms with the crowd during an emergency.

## 1.3. Document Overview

The remainder of this document is structured as follows:

- Chapter 2 introduces the mechanisms for supporting follow-up interaction in RESCUER, which is based on a question catalogue and a strategy for group-targeted follow-up interaction.
- Chapter 3 presents the specification of the RESCUER app.
- Chapter 4 presents the data model that supports group-targeted follow-up interaction.
- Chapter 5 presents the conclusions of Task 2.3 (Group-Targeted Follow-up Interaction).

## 2. Mechanisms for Supporting Follow-up Interaction

The RESCUER app enables people involved in an incident to contribute to its response by using their smartphones to send information to the command and control centre on a voluntary basis as well as to receive some information requests from them in a follow-up interaction. This chapter presents approaches and interaction concepts to be implemented in the RESCUER app for the follow-up interaction with the crowd, which includes civilians, supporting forces or workforces.

To this end, a series of workshops were performed together with the workforces and supporting forces in order to identify the need for communication with the crowd and the information demand of the command centre in the two different contexts (i.e., large event and industrial incident). A detailed description of the workshops can be found in Deliverable D2.1.2 (Conceptual Model of Mobile User Interaction in Emergencies 2).

From the point of view of the command centre, the main reasons for starting a follow-up interaction are:

1. **Acquiring missing information**
2. **Clarifying contradictory information**
3. **Investigating potential problems**
4. **Continuously evolving information**
5. **Getting status update of tasks in execution (from workforces)**
6. **Identifying demands for resources or tasks (from workforces)**

Considering the dynamics of a command centre in an emergency situation, the participants of the workshops agreed that the interaction with the people in the crowd should occur in a more structured way, e.g. with the help of a question catalogue, in order to save time in the command centre and also to allow better communication with the crowd. Based on that, typical information requests were identified that can be potentially sent to the people in the crowd in the context of the scenarios of the RESCUER project. In addition to a set of fixed questions, the command centre can also send ad-hoc questions, because it is not possible to foresee every detail and every issue in an emergency situation.

The next section presents the question catalogue to be used in information requests from the command centre to the crowd (Section 2.1) and the strategy for group-targeted follow-up interaction (Section 2.2).

### 2.1. Question Catalogue

The current question catalogue comprises 76 questions. Some of them are already considered in the current types of standard reports, which are presented in Deliverable D2.2.2 (Information Gathering 2). Most questions of the different types of standard reports can be used in follow-up interactions too. This will potentially happen when the respective information has not been provided yet or there is conflict in the information received from different people, which cannot be solved by

the analysis of multimedia data. The question catalogue includes predefined answers taking into consideration the specific profiles defined in Deliverable D1.1.3 (Requirements Specification 3), which are civilians, workforces and supporting forces. There are also open questions that allow free text answers. There are four types of answers:

- Single-choice: questions with predefined answers from which the user can choose only one answer.
- Multiple-choice: questions with predefined answers from which the user can choose more than one answer. In this case, there is no possibility for free-text communication.
- Photo/video: request for taking photos or videos with predefined maximum quantity and size.
- Free text: chat-like open questions from the command centre.

For clarity's sake, excerpts from the question catalogue are presented in this deliverable in three separate tables (Table 2 to Table 4). Each table presents the questions and predefined answers for a specific profile (civilians, workforces and supporting forces), once some questions can only be answered by people with a specific profile/sub-profile and there are profile-specific answers too. The information about which incident types the questions apply to is included in the question catalogue, but it is omitted in this deliverable.

**Table 2: Question Catalogue Excerpt - Questions and Predefined Answers for CIVILIANS**

Questions	Answers Civilians	Can be answer by	Answer Type	Scenario
Could you take pictures and/or a video?	<ul style="list-style-type: none"> <li>• 2 photos</li> <li>• 1 video</li> </ul>	all civilians	multimedia	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you see injured people?	<ul style="list-style-type: none"> <li>• injured people</li> <li>• nobody injured</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you see flames and smoke?	<ul style="list-style-type: none"> <li>• flames and smoke</li> <li>• just smoke</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
What is the color of the smoke?	<ul style="list-style-type: none"> <li>• light grey</li> <li>• dark grey</li> <li>• other color</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you notice any turmoil or panic?	<ul style="list-style-type: none"> <li>• turmoil or panic</li> <li>• peaceful</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Did you hear anything before the explosion?	<ul style="list-style-type: none"> <li>• noise</li> <li>• nothing</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
What happened after the explosion?	<ul style="list-style-type: none"> <li>• splinter</li> <li>• fire</li> <li>• smoke</li> <li>• other</li> </ul>	all civilians	multiple choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Are there any damages in the physical structure?	<ul style="list-style-type: none"> <li>• apparent damages</li> <li>• no damages</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Are you feeling any kind of irritation?	<ul style="list-style-type: none"> <li>• eyes</li> <li>• skin</li> <li>• airway</li> <li>• mucosa</li> <li>• none</li> </ul>	all civilians	multiple choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>

Questions	Answers Civilians	Can be answer by	Answer Type	Scenario
Do you smell something in the air?	<ul style="list-style-type: none"> <li>fishy</li> <li>pungent</li> <li>chlorine</li> <li>other</li> </ul>	employees	single choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>
Is there a colored cloud?	<ul style="list-style-type: none"> <li>grey</li> <li>red brown</li> <li>yellow</li> <li>none</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>
Is there any damage to life?	<ul style="list-style-type: none"> <li>people</li> <li>plants</li> <li>animals</li> <li>none</li> </ul>	all civilians	multiple choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>
Is there any colored fluid in the water or on the floor?	<ul style="list-style-type: none"> <li>substance visible</li> <li>no substance visible</li> <li>I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>
How many people are involved?	<ul style="list-style-type: none"> <li>0</li> <li>1-5</li> <li>6-15</li> <li>16-30</li> <li>30+</li> <li>unknown</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> </ul>
Are there people who are badly injured?	<ul style="list-style-type: none"> <li>0</li> <li>1-5</li> <li>6-15</li> <li>16-30</li> <li>30+</li> <li>unknown</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> </ul>
Are people involved in vandalism?	<ul style="list-style-type: none"> <li>vandals</li> <li>nobody</li> <li>I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> </ul>
Do you see people collapsing?	<ul style="list-style-type: none"> <li>people collapsing</li> <li>nobody collapsing</li> <li>I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> </ul>
How many people are collapsing around you?	<ul style="list-style-type: none"> <li>0</li> <li>1-5</li> <li>6-15</li> <li>16-30</li> <li>30+</li> <li>unknown</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> </ul>
Do you see people stealing?	<ul style="list-style-type: none"> <li>person stealing</li> <li>nobody stealing</li> <li>I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> </ul>
Do you see looting?	<ul style="list-style-type: none"> <li>looted properties</li> <li>intact properties</li> <li>I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> </ul>
How many injured people are there?	<ul style="list-style-type: none"> <li>0</li> <li>1-5</li> <li>6-15</li> <li>16-30</li> <li>30+</li> <li>unknown</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Was there an explosion?	<ul style="list-style-type: none"> <li>explosion</li> <li>no explosion</li> <li>I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>

Questions	Answers Civilians	Can be answer by	Answer Type	Scenario
Do you see flames escaping from the building?	<ul style="list-style-type: none"> <li>• visible flames</li> <li>• no flames</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>
Are you injured?	<ul style="list-style-type: none"> <li>• injured</li> <li>• unharmed</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Are you trapped?	<ul style="list-style-type: none"> <li>• trapped</li> <li>• unobstructed</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
What is the direction of the smoke?	<ul style="list-style-type: none"> <li>• up</li> <li>• down</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Are there people who have difficulty moving?	<ul style="list-style-type: none"> <li>• impaired people</li> <li>• everybody fit</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Is the incident in an enclosed area?	<ul style="list-style-type: none"> <li>• enclosed area</li> <li>• open area</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you notice any water leakage?	<ul style="list-style-type: none"> <li>• water leakage</li> <li>• no water visible</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you need medical support?	<ul style="list-style-type: none"> <li>• need medical care</li> <li>• feel fit</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you have problems finding the exit?	<ul style="list-style-type: none"> <li>• can't find exit</li> <li>• exit known</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Are you receiving help?	<ul style="list-style-type: none"> <li>• help received</li> <li>• need help</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Are you alone?	<ul style="list-style-type: none"> <li>• alone</li> <li>• accompanied</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Can you see electrical wires?	<ul style="list-style-type: none"> <li>• visible electrical wires</li> <li>• no electrical wires</li> <li>• I don't know</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Which kind of support do you need?	<ul style="list-style-type: none"> <li>• (open answer)</li> </ul>	all civilians	free text	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
How many people are there who have difficulty moving?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all civilians	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Send an information request (free text)	<ul style="list-style-type: none"> <li>• (open answer)</li> </ul>	all civilians	free text	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>



**Table 3: Question Catalogue Excerpt - Questions and Predefined Answers for WORKFORCES**

Questions	Answers Workforces	Can be answer by	Answer Type	Scenario
Could you take pictures and/or a video?	<ul style="list-style-type: none"> <li>• 2 photos</li> <li>• 1 video</li> </ul>	all workforces	multimedia	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you see injured people?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
How big is the fire?	<ul style="list-style-type: none"> <li>• small</li> <li>• medium</li> <li>• big</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you see flames and smoke?	<ul style="list-style-type: none"> <li>• flames and smoke</li> <li>• just smoke</li> <li>• I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
What is the color of the smoke?	<ul style="list-style-type: none"> <li>• light grey</li> <li>• dark grey</li> <li>• other color</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you notice any turmoil or panic?	<ul style="list-style-type: none"> <li>• turmoil or panic</li> <li>• peaceful</li> <li>• I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Did you hear anything before the explosion?	<ul style="list-style-type: none"> <li>• noise</li> <li>• nothing</li> <li>• I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
What happened after the explosion?	<ul style="list-style-type: none"> <li>• splinter</li> <li>• fire</li> <li>• smoke</li> <li>• other</li> </ul>	all workforces	multiple choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Are there any damages in the physical structure?	<ul style="list-style-type: none"> <li>• class 1</li> <li>• class 2</li> <li>• class 3</li> <li>• class 4</li> <li>• class 5</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Are you feeling any kind of irritation?	<ul style="list-style-type: none"> <li>• eyes</li> <li>• skin</li> <li>• airway</li> <li>• mucosa</li> <li>• none</li> </ul>	all workforces	multiple choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>
Do you smell something in the air?	<ul style="list-style-type: none"> <li>• fishy</li> <li>• pungent</li> <li>• chlorine</li> <li>• other</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>
Is there a colored cloud?	<ul style="list-style-type: none"> <li>• grey</li> <li>• red brown</li> <li>• yellow</li> <li>• none</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>
Is there any damage to life?	<ul style="list-style-type: none"> <li>• people</li> <li>• plants</li> <li>• animals</li> <li>• none</li> </ul>	all workforces	multiple choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>
Is there any colored fluid in the water or on the floor?	<ul style="list-style-type: none"> <li>• substance visible</li> <li>• no substance visible</li> <li>• I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>

Questions	Answers Workforces	Can be answer by	Answer Type	Scenario
How many people are involved?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Are there people who are badly injured?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Are people involved in vandalism?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Do you see people collapsing?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
How many people are collapsing around you?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Why are people collapsing?	<ul style="list-style-type: none"> <li>• (open answer)</li> </ul>	all workforces	free text	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Do you see people stealing?	<ul style="list-style-type: none"> <li>• person stealing</li> <li>• nobody stealing</li> <li>• I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Do you see looting?	<ul style="list-style-type: none"> <li>• looted properties</li> <li>• intact properties</li> <li>• I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
What is the product that caused the incident?	<ul style="list-style-type: none"> <li>• (open answer)</li> </ul>	all workforces	free text	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Is there a possibility that it may affect external neighborhoods?	<ul style="list-style-type: none"> <li>• neighborhood reachable</li> <li>• neighborhood unreachable</li> <li>• I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event, industrial park</li> </ul>
How many injured people are there?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
How many dead people are there?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>

Questions	Answers Workforces	Can be answer by	Answer Type	Scenario
Was there an explosion?	<ul style="list-style-type: none"> <li>explosion</li> <li>no explosion</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Did the incident cause any environmental impact?	<ul style="list-style-type: none"> <li>visible impact</li> <li>nothing visible</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Do you see flames escaping from the building?	<ul style="list-style-type: none"> <li>open</li> <li>closed</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>
Are you injured?	<ul style="list-style-type: none"> <li>injured</li> <li>unharmed</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are you trapped?	<ul style="list-style-type: none"> <li>trapped</li> <li>unobstructed</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
How severe is the fire?	<ul style="list-style-type: none"> <li>scorched</li> <li>severe surface burn</li> <li>deep burning</li> </ul>	fire fighters	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
What is the direction of the smoke?	<ul style="list-style-type: none"> <li>up</li> <li>down</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are there people who have difficulty moving?	<ul style="list-style-type: none"> <li>impaired people</li> <li>everybody fit</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Is the incident in an enclosed area?	<ul style="list-style-type: none"> <li>enclosed area</li> <li>open area</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Do you notice any water leakage?	<ul style="list-style-type: none"> <li>water leakage</li> <li>no water visible</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Do you need medical support?	<ul style="list-style-type: none"> <li>need medical care</li> <li>feel fit</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Do you have problems finding the exit?	<ul style="list-style-type: none"> <li>can't find exit</li> <li>exit known</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are you receiving help?	<ul style="list-style-type: none"> <li>help received</li> <li>need help</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are you alone?	<ul style="list-style-type: none"> <li>alone</li> <li>accompanied</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Can you see electrical wires?	<ul style="list-style-type: none"> <li>visible electrical wires</li> <li>no electrical wires</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Which kind of support do you need?	<ul style="list-style-type: none"> <li>(open answer)</li> </ul>	all workforces	free text	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
How many people are there who have difficulty moving?	<ul style="list-style-type: none"> <li>0</li> <li>1-5</li> <li>6-15</li> <li>16-30</li> <li>30+</li> <li>unknown</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Send an information request (free text)	<ul style="list-style-type: none"> <li>(open answer)</li> </ul>	all workforces	free text	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>

Questions	Answers Workforces	Can be answer by	Answer Type	Scenario
Is it necessary to evacuate [name of the company] [buildings identifiers]?	<ul style="list-style-type: none"> <li>evacuation required</li> <li>evacuation dispensable</li> <li>I don't know</li> </ul>	police, firefighters, emergency workers	single choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>
Is it necessary to evacuate the entire industrial park?	<ul style="list-style-type: none"> <li>evacuation required</li> <li>evacuation dispensable</li> <li>I don't know</li> </ul>	police, firefighters, emergency workers	single choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>
Is it necessary to evacuate the [event area]?	<ul style="list-style-type: none"> <li>evacuation required</li> <li>evacuation dispensable</li> <li>I don't know</li> </ul>	police, firefighters, emergency workers	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> </ul>
Is it necessary to evacuate the entire [managed area]?	<ul style="list-style-type: none"> <li>evacuation required</li> <li>evacuation dispensable</li> <li>I don't know</li> </ul>	police, firefighters, emergency workers	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> </ul>
Is it necessary to evacuate the neighborhood [neighborhood name]?	<ul style="list-style-type: none"> <li>evacuation required</li> <li>evacuation dispensable</li> <li>I don't Know</li> </ul>	police, firefighters, emergency workers	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Is any evacuation necessary?	<ul style="list-style-type: none"> <li>building</li> <li>company</li> <li>industrial park</li> <li>monitoring area</li> <li>neighborhood</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>
Is it necessary to block the roads [name of roads]?	<ul style="list-style-type: none"> <li>blocking required</li> <li>blocking dispensable</li> <li>I don't Know</li> </ul>	police, firefighters, emergency workers	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are reinforcements of police officers needed?	<ul style="list-style-type: none"> <li>support required</li> <li>support dispensable</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are reinforcements of firefighters needed?	<ul style="list-style-type: none"> <li>support required</li> <li>support dispensable</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are reinforcements of the rescue service needed?	<ul style="list-style-type: none"> <li>support required</li> <li>support dispensable</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are any reinforcements needed?	<ul style="list-style-type: none"> <li>neighbor company</li> <li>police officers</li> <li>firefighters</li> <li>rescue services</li> <li>helicopter</li> <li>I don't know</li> </ul>	all workforces	multiple choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Is it necessary to evaluate environmental damages?	<ul style="list-style-type: none"> <li>support required</li> <li>support dispensable</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>
Is a helicopter needed?	<ul style="list-style-type: none"> <li>evaluation required</li> <li>evaluation dispensable</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Send a query request (free text)	<ul style="list-style-type: none"> <li>(open answer)</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Has help been provided to people who have difficulty moving?	<ul style="list-style-type: none"> <li>help already provided</li> <li>not yet helped</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Has [name of the company] [buildings/buildings identifiers] been fully evacuated?	<ul style="list-style-type: none"> <li>fully evacuated</li> <li>not yet evacuated</li> <li>I don't know</li> </ul>	police, firefighters, emergency workers	single choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>

Questions	Answers Workforces	Can be answer by	Answer Type	Scenario
Has the industrial park been fully evacuated?	<ul style="list-style-type: none"> <li>fully evacuated</li> <li>not yet evacuated</li> <li>I don't know</li> </ul>	police, firefighters, emergency workers	single choice	<ul style="list-style-type: none"> <li>industrial park</li> </ul>
Has the neighborhood been fully evacuated?	<ul style="list-style-type: none"> <li>fully evacuated</li> <li>not yet evacuated</li> <li>I don't know</li> </ul>	police, firefighters, emergency workers	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Have these places been fully evacuated?	<ul style="list-style-type: none"> <li>building</li> <li>company</li> <li>industrial park</li> <li>managed area</li> <li>neighborhood</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Have the roads [name of roads] been blocked?	<ul style="list-style-type: none"> <li>blocked</li> <li>not yet blocked</li> <li>I don't know</li> </ul>	police, firefighters	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Have you received reinforcements from the neighbor company?	<ul style="list-style-type: none"> <li>support received</li> <li>still need support</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Have you received reinforcements of police officers?	<ul style="list-style-type: none"> <li>support received</li> <li>still need support</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Have you received reinforcements of firefighters?	<ul style="list-style-type: none"> <li>support received</li> <li>still need support</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Have you received reinforcements of the rescue service?	<ul style="list-style-type: none"> <li>support received</li> <li>still need support</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Have you received reinforcement?	<ul style="list-style-type: none"> <li>neighbor company</li> <li>police officers</li> <li>firefighters</li> <li>rescue services</li> <li>helicopter</li> <li>I don't know</li> </ul>	all workforces	multiple choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Has the helicopter arrived?	<ul style="list-style-type: none"> <li>arrived</li> <li>not arrived yet</li> <li>I don't know</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Has the environmental damage in the area [name of the area] been evaluated?	<ul style="list-style-type: none"> <li>evaluated</li> <li>not evaluated yet</li> <li>I don't know</li> </ul>	fire fighters	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
What is the status of the incident?	<ul style="list-style-type: none"> <li>under control</li> <li>finished</li> <li>unknown</li> </ul>	all workforces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Send a status update request (free text)	<ul style="list-style-type: none"> <li>(open answer)</li> </ul>	all workforces	free text	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>

**Table 4: Question Catalogue Excerpt - Questions and Predefined Answers for SUPPORTING FORCES**

Questions	Answers Supporting Forces	Can be answer by	Answer Type	Scenario
Could you take pictures and/or a video?	<ul style="list-style-type: none"> <li>• 2 photos</li> <li>• 1 video</li> </ul>	all supporting forces	multi-media	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you see injured people?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you see flames and smoke?	<ul style="list-style-type: none"> <li>• flames and smoke</li> <li>• just smoke</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
What is the color of the smoke?	<ul style="list-style-type: none"> <li>• light grey</li> <li>• dark grey</li> <li>• other color</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you notice any turmoil or panic?	<ul style="list-style-type: none"> <li>• turmoil or panic</li> <li>• peaceful</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Did you hear anything before the explosion?	<ul style="list-style-type: none"> <li>• noise</li> <li>• nothing</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
What happened after the explosion?	<ul style="list-style-type: none"> <li>• splinter</li> <li>• fire</li> <li>• smoke</li> <li>• other</li> </ul>	all supporting forces	multiple choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Are there any damages in the physical structure?	<ul style="list-style-type: none"> <li>• class 1</li> <li>• class 2</li> <li>• class 3</li> <li>• class 4</li> <li>• class 5</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Are you feeling any kind of irritation?	<ul style="list-style-type: none"> <li>• eyes</li> <li>• skin</li> <li>• airway</li> <li>• mucosa</li> <li>• none</li> </ul>	all supporting forces	multiple choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>
Do you smell something in the air?	<ul style="list-style-type: none"> <li>• fishy</li> <li>• pungent</li> <li>• chlorine</li> <li>• other</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>
Is there a colored cloud?	<ul style="list-style-type: none"> <li>• grey</li> <li>• red brown</li> <li>• yellow</li> <li>• none</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>
Is there any damage to life?	<ul style="list-style-type: none"> <li>• people</li> <li>• plants</li> <li>• animals</li> <li>• none</li> </ul>	all supporting forces	multiple choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>
Is there any colored fluid in the water or on the floor?	<ul style="list-style-type: none"> <li>• substance visible</li> <li>• no substance visible</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>

Questions	Answers Supporting Forces	Can be answer by	Answer Type	Scenario
How many people are involved?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Are there people who are badly injured?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Are people involved in vandalism?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Do you see people collapsing?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
How many people are collapsing around you?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Do you see people stealing?	<ul style="list-style-type: none"> <li>• person stealing</li> <li>• nobody stealing</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Do you see looting?	<ul style="list-style-type: none"> <li>• looted properties</li> <li>• intact properties</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> </ul>
Is there a possibility that it may affect external neighborhoods?	<ul style="list-style-type: none"> <li>• neighborhood reachable</li> <li>• neighborhood unreachable</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
How many injured people are there?	<ul style="list-style-type: none"> <li>• 0</li> <li>• 1-5</li> <li>• 6-15</li> <li>• 16-30</li> <li>• 30+</li> <li>• unknown</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Was there an explosion?	<ul style="list-style-type: none"> <li>• explosion</li> <li>• no explosion</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Do you see flames escaping from the building?	<ul style="list-style-type: none"> <li>• visible flames</li> <li>• no flames</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• industrial park</li> </ul>
Are you injured?	<ul style="list-style-type: none"> <li>• injured</li> <li>• unharmed</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>

Questions	Answers Supporting Forces	Can be answer by	Answer Type	Scenario
Are you trapped?	<ul style="list-style-type: none"> <li>trapped</li> <li>unobstructed</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
What is the direction of the smoke?	<ul style="list-style-type: none"> <li>up</li> <li>down</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are there people who have difficulty moving?	<ul style="list-style-type: none"> <li>impaired people</li> <li>everybody fit</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Is the incident in an enclosed area?	<ul style="list-style-type: none"> <li>enclosed area</li> <li>open area</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Do you notice any water leakage?	<ul style="list-style-type: none"> <li>water leakage</li> <li>no water visible</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Do you need medical support?	<ul style="list-style-type: none"> <li>need medical care</li> <li>feel fit</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Do you have problems finding the exit?	<ul style="list-style-type: none"> <li>can't find exit</li> <li>exit known</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are you receiving help?	<ul style="list-style-type: none"> <li>help received</li> <li>need help</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are you alone?	<ul style="list-style-type: none"> <li>alone</li> <li>accompanied</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Can you see electrical wires?	<ul style="list-style-type: none"> <li>visible electrical wires</li> <li>no electrical wires</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Which kind of support do you need?	<ul style="list-style-type: none"> <li>(open answer)</li> </ul>	all supporting forces	free text	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
How many people are there who have difficulty moving?	<ul style="list-style-type: none"> <li>0</li> <li>1-5</li> <li>6-15</li> <li>16-30</li> <li>30+</li> <li>unknown</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Send an information request (free text)	<ul style="list-style-type: none"> <li>(open answer)</li> </ul>	all supporting forces	free text	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Are any reinforcements needed?	<ul style="list-style-type: none"> <li>neighbor company</li> <li>police officers</li> <li>firefighters</li> <li>rescue services</li> <li>helicopter</li> <li>I don't know</li> </ul>	all supporting forces	multiple choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Send a query request (free text)	<ul style="list-style-type: none"> <li>(open answer)</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Has help been provided to people who have difficulty moving?	<ul style="list-style-type: none"> <li>help already provided</li> <li>not helped yet</li> <li>I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>
Have the roads [name of roads] been blocked?	<ul style="list-style-type: none"> <li>blocked</li> <li>not yet blocked</li> <li>I don't know</li> </ul>	security	single choice	<ul style="list-style-type: none"> <li>large-scale event</li> <li>industrial park</li> </ul>



Questions	Answers Supporting Forces	Can be answer by	Answer Type	Scenario
Have you received reinforcements of police officers?	<ul style="list-style-type: none"> <li>• support received</li> <li>• still need support</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Have you received reinforcements of firefighters?	<ul style="list-style-type: none"> <li>• support received</li> <li>• still need support</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Have you received reinforcements of the rescue service?	<ul style="list-style-type: none"> <li>• support received</li> <li>• still need support</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Have you received reinforcement?	<ul style="list-style-type: none"> <li>• neighbor company</li> <li>• police officers</li> <li>• firefighters</li> <li>• rescue services</li> <li>• helicopter</li> <li>• I don't know</li> </ul>	all supporting forces	multiple choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Has the helicopter arrived?	<ul style="list-style-type: none"> <li>• arrived</li> <li>• not arrived yet</li> <li>• I don't know</li> </ul>	all supporting forces	single choice	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>
Send a status update request (free text)	<ul style="list-style-type: none"> <li>• (open answer)</li> </ul>	all supporting forces	free text	<ul style="list-style-type: none"> <li>• large-scale event</li> <li>• industrial park</li> </ul>

## 2.2. Strategy for Group-Targeted Follow-up Interaction

In this section, we present some aspects to be considered when interacting with the crowd. In addition to user profile/sub-profile, RESCUER's strategy for follow-up interactions takes into consideration the position and the movement of the users as well as their previous interaction with the RESCUER App. Table 5 shows the interplay among the aforementioned aspects, specifying the main goal for the interaction in which situation.

**Table 5: Aspects to be considered for Group-Targeted Follow-up Interaction**

Profile	Position	Movement	Previous Interaction	Main Goal
Civilians	Cold zone	Stationary	Already interacted	<ul style="list-style-type: none"> <li>▪ Know personal status</li> </ul>
	Warm zone	-	-	-
	Hot zone	Stationary	Independent of previous interaction	<ul style="list-style-type: none"> <li>▪ Know personal status</li> </ul>
Supporting Forces	Cold zone	Stationary or in movement	Independent of previous interaction	<ul style="list-style-type: none"> <li>▪ Obtain missing information</li> <li>▪ Clarify contradictory information</li> <li>▪ Get status update</li> <li>▪ Identify the need for resources or tasks</li> </ul>
	Warm zone	Stationary or in movement	Independent of previous interaction	<ul style="list-style-type: none"> <li>▪ Obtain missing information</li> <li>▪ Clarify contradictory information</li> <li>▪ Investigate potential problems</li> <li>▪ Get status update</li> <li>▪ Identify the need for resources or tasks</li> </ul>

Profile	Position	Movement	Previous Interaction	Main Goal
	Hot zone	Stationary	Independent of previous interaction	<ul style="list-style-type: none"> <li>Know personal status</li> </ul>
<b>Workforces</b>	Cold zone	Stationary or in movement	Independent of previous interaction	<ul style="list-style-type: none"> <li>Get status update</li> <li>Identify the need for resources or tasks</li> </ul>
	Warm zone	In movement	Independent of previous interaction	<ul style="list-style-type: none"> <li>Investigate potential problems</li> <li>Get status update</li> <li>Identify the need for resources or tasks</li> </ul>
	Hot zone	Stationary	Independent of previous interaction	<ul style="list-style-type: none"> <li>Obtain missing information</li> <li>Clarify contradictory information</li> <li>Investigate potential problems</li> <li>Get status update</li> <li>Identify the need for resources or tasks</li> </ul>

The combination of the aspects listed in Table 5 helped to derive a concrete strategy for conducting group-targeted follow-up interaction. The command and control centre can send information requests to:

TG.R1. Civilians, who have already interacted with the RESCUER app, are located in the cold zone and are not moving in the area, can inform about their personal status.

**RATIONAL:** As soon as workforces and supporting forces are available in the area, there is no need to overload civilians with information requests that are not related to the identification of the health status of the people involved in the incident.

TG.R2. Civilians, regardless of having already interacted with the RESCUER app, who are located in the hot zone and are not moving in the area, should inform about their personal (health) status.

**RATIONAL:** The information request aims at identifying whether the civilian can move alone from the hot zone to a safe (warm or cold) zone, and, based on the answer of the person, sending help or the correct instruction.

TG.R3. Supporting forces, regardless of having already interacted with the RESCUER app, who are located in the cold zone and are moving or staying in the area, can inform missing information, clarify contradictory information, provide the status of performed tasks, as well as identify needs for resources or the execution of tasks.

**RATIONAL:** Supporting forces located in the cold zone can deliver more reliable information related to the impact of incidents than civilians. In addition, they have more availability to inform the status of protective actions taken by supporting forces or workforces involved in the performance of the tasks.

TG.R4. Supporting forces, regardless of having already interacted with the RESCUER app, who are located in the warm zone and are moving or staying in the area, can inform missing information, clarify contradictory information, help in the investigation of potential problems, provide the status of the incident or performed tasks, as well as identify needs for resources or the execution of tasks.

**RATIONAL:** Supporting forces in the warm zone are not directly involved in combatting the incident, but may have a good overview of it. They can provide new information as well as update information related to different aspects of the incident.

TG.R5. Supporting forces, regardless of having already interacted with the RESCUER app, who are located in the hot zone and are staying in the area, should inform their personal (health) status.

**RATIONAL:** Because supporting forces are not allowed to stay in the hot zone, the main goal here is to identify if the person can move out of the hot zone alone or need some support (e.g. medical care or instruction) for moving to a safe area.

TG.R6. Workforces, regardless of having already interacted with the RESCUER app, who are located in the cold zone and are moving or staying in the area, can provide the status of performed tasks, as well as identify needs for resources or the execution of tasks.

**RATIONAL:** Workforces located in the cold zone are waiting for combating the incident. They are far away of the incident and cannot provide any update of the current status of the incident. Information requests sent to workforces located in this zone aim at knowing the resources available for emergency response and the status of requested resources or tasks, e.g. arrival of medical material (for rescue services) or water tanks (for firefighters).

TG.R7. Workforces, regardless of having already interacted with the RESCUER app, who are located in the warm zone and are moving in the area, can help in the investigation of potential problems, provide the status of the incident or performed tasks, and identify needs for resources or the execution of tasks.

**RATIONAL:** Workforces located in the warm zone are directly involved in solving the incident, some special roles of the workforces that have the task of controlling and organizing the activities in this area can communicate with the command and control centre for updating the status of the incident or concrete tasks, as well as request new tasks and resources. These roles are moving around the area for getting the overview of the tasks in execution. Workforces involved in executing tasks in the warm zone are most of the time stationary and are not communicating directly with the command and control centre.



TG.R8. Workforces, regardless of having already interacted with the RESCUER app, who are located in the hot zone and are staying in the area can inform missing information, clarify contradictory information, provide the status of the incident or performed tasks, and identify needs for resources or the execution of tasks.

**RATIONAL:** Workforces, who are moving in the hot zone, are most of time involved in solving the incident and will not be able to communicate to the command and control centre. In this case, there are specific roles that are stationary in the hot zone, controlling the operation and providing the command and control centre with the requested information.

### 3. Follow-up Interaction: Interaction Cases

A set of generic interaction cases was designed to support the definition of rules for the representation and composition of questions from the question catalogue (see Section 2.1) in an information request to be received through the RESCUER App. The interaction cases were defined based on the different types of answers to the questions in the question catalogue, which are: single choice, multiple choice, picture, video, and free-text. This means that when the dispatcher of a command and control centre selects a question or a set of questions from the question catalogue and sends them to the crowd, the representation, composition and distribution of those questions should follow the rules described in Table 6.

**Table 6: Representation and Rules per Type of Answer**

Type of Answer	Representation	Rules
Single-Choice Request		<ul style="list-style-type: none"> <li>▪ <b>Up to three questions:</b> one to three questions at the same time</li> <li>▪ <b>Related question:</b> When more than one question, send only correlated questions, e.g., only questions about fire description and not questions about fire descriptions AND about injured people.</li> <li>▪ <b>Randomized question distribution:</b> Sending different questions to different users instead of sending all questions to all users.</li> </ul>
Multiple-Choice Request		<ul style="list-style-type: none"> <li>▪ <b>Up to three questions:</b> one to three questions at the same time</li> <li>▪ <b>Related question:</b> When more than one question, send only correlated questions, e.g., only questions about fire description and not questions about fire descriptions AND about injured people.</li> <li>▪ <b>Randomized question distribution:</b> Sending different questions to different users instead of sending all questions to all users.</li> </ul>



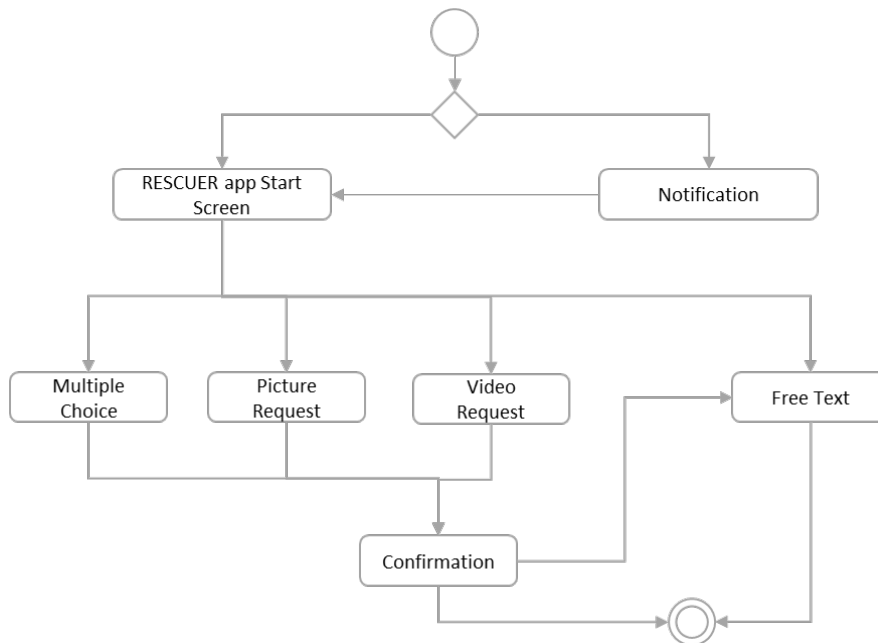
Type of Answer	Representation	Rules
<b>Picture Request</b>		<ul style="list-style-type: none"> <li>▪ <b>Three photos maximum:</b> People can be asked to take a maximum of three photos each time.</li> <li>▪ <b>Randomized request distribution:</b> Sending different requests to different users instead of sending all requests to all users.</li> </ul>
<b>Video Request</b>		<ul style="list-style-type: none"> <li>▪ <b>One video maximum:</b> People can be asked to take a maximum of one video each time.</li> <li>▪ <b>Randomized request distribution:</b> Sending different requests to different users instead of sending all requests to all users.</li> </ul>
<b>Free-Text Request</b>		<ul style="list-style-type: none"> <li>▪ <b>Free questions or dialogue:</b> People can be asked questions in the chat function. Dispatcher can use this function to chat with people in the crowd until issues are clarified.</li> <li>▪ <b>Randomized question distribution:</b> Sending different questions to different users instead of sending all questions to all users.</li> </ul>

Figure 1 shows the possible screen flows for the Rescuer app users when they receive an information request from the command and control centre. People whose RESCUER app is closed are notified about the information request through the smartphone’s standard notification mechanism. When they click on this notification, they are directed to the app, where they can navigate to the information request itself. If the RESCUER app is open, they receive the notification directly through

the app: the notification is shown on the main screen as a notification icon. Through the notification icon, they can navigate to the request itself.



**Figure 1: Interaction Cases for Follow-up Interaction**

### Notification

People whose RESCUER app is closed are informed about an information request through a notification that remains stored in the smartphone's notification queue. With the help of the notification modal dialogue or through the notification in the queue, the user can navigate to the RESCUER app and answer the information request sent from the command and control centre. Figure 2 shows an example of the notification queue with a RESCUER notification.

### RESCUER App Start Screen

Icons that indicate information requests from the command and control centre are shown on the start screen of the RESCUER app (see Figure 3). By touching the icons, people can navigate to the information request itself.

### Single-choice / Multiple-choice Request

A maximum of three questions can be sent to a person at the same time. These questions should also be strong related to each other in order to demand less cognitive capability from the user. Ideally, the command and control centre should randomly send the questions to the crowd to enable people to answer just one question each time. Figure 4 show the screen design for this interaction case.

### Picture Request

As in the standard report, the photo request should offer the possibility of the user to send up to three photos (see Figure 5) in order to guide people during the use of the RESCUER app. These pictures are uploaded in the background when the user touches the "send" field or after 10 seconds

without user interaction with the app. The photos are compressed in the app before being uploaded. The compression requirements are:

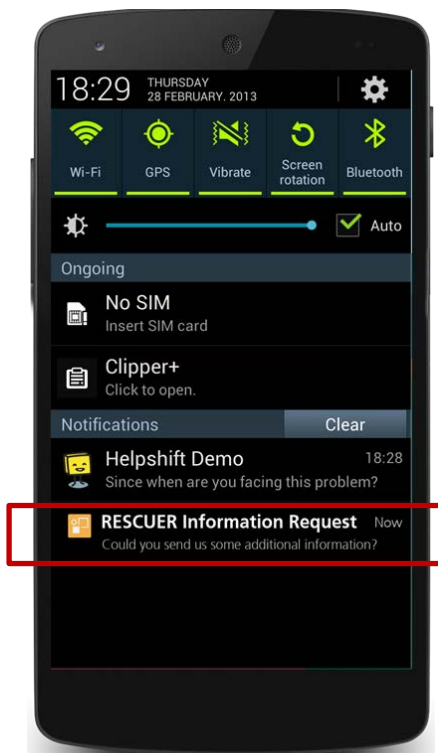
- Minimum resolution: VGA - 640x480, SD - 720x480 (depending on the mobile device specifications)

### Video Request

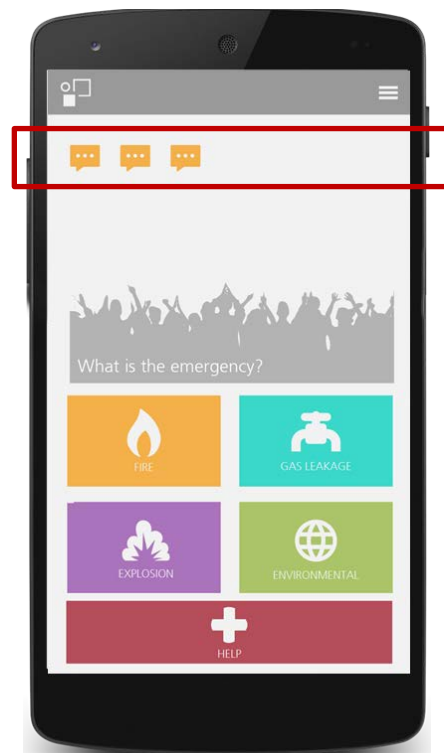
Video requests ask the user to take only one video. Figure 6 shows the screen design for video.

### Confirmation

After sending the report, the RESCUER app shows a confirmation that the requested information was sent. Figure 7 shows the confirmation screen. After sending the report, the user can leave the screen or navigate to the free report to give more information to the command and control centre.



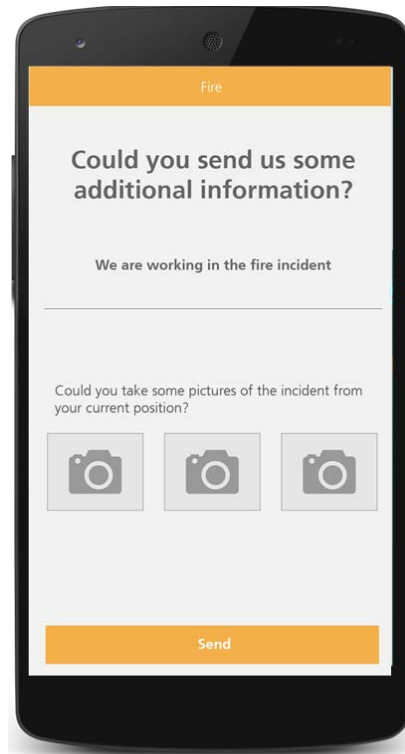
**Figure 2: Follow-up Interaction Notification**



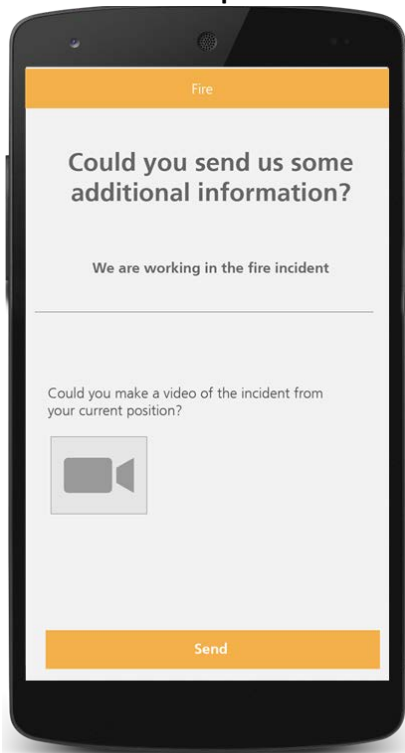
**Figure 3: RESCUER App Start Screen**



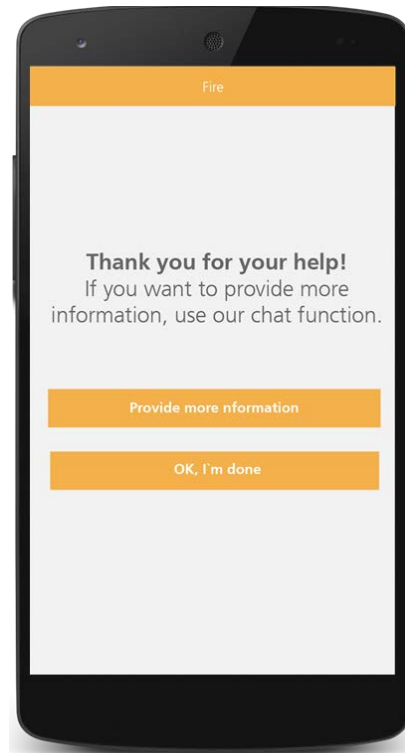
**Figure 4: Single-choice / Multiple-choice Request**



**Figure 5: Picture Request**



**Figure 6: Video Request**

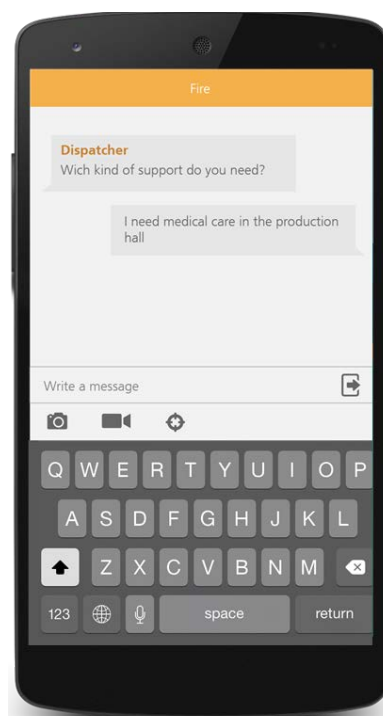


**Figure 7: Confirmation Screen**



### Free-Text Request

Figure 8 shows the screen for free-text requests. As in the free report, this screen behaves like a chat. The dispatcher can write free questions and the user can also report using free text, including pictures and videos for describing the current situation.



**Figure 8: Free Text Request**

## 4. Data Model: Information Request

The data model presented in Figure 9 describes the classes and attributes that compose an information request. Information request can be of four types, namely:

- **Standard:** Information requests that define the standard incident forms (fire, explosion, vandalism, etc.) that support the crowd in sending incident reports. These requests are loaded as standard forms on the RESCUER App as soon as the user enters an emergency management area.
- **Follow-up:** Information requests that can be sent by the command and control centre with the purpose of obtaining missing information, clarifying contradictory information, investigating potential problems and knowing personal status.
- **Status update:** Information requests that can be loaded in the RESCUER app for workforces and supporting forces when they enter in an emergency management area. They can also be sent by the command and control centre to those profiles with the purpose of getting information about the incident status and/or about the status of requested actions.
- **Query:** Information requests that can be loaded in the RESCUER app for workforces and supporting forces to allow them to request specific resources as well as the execution of specific tasks to the command and control centre. They also allow the command centre to offer specific support and resource to the workforces and supporting forces during the incident.

An information request can be **Group Request** and **Actor Request**. A Group Request is sent to specific profiles (*target\_role*) in specific subareas within the emergency management area (*target\_area*). An Actor Request is sent to a specific person in the crowd who sent a previous report to the command and control centre.

Figure 9 comes from Deliverable D7.4 (System Specification). The type Query is not included in Deliverable D7.4, because this deliverable provides a more complete data model for controlling the request of resources and tasks, and the indication of their fulfilment (see Figure A.7: Action Message in that deliverable). However the RESCUER demonstrator at the end of the project will only implement part of this functionality through a special type of information request called Query. Picture Request is named Image Request in Figure 9.

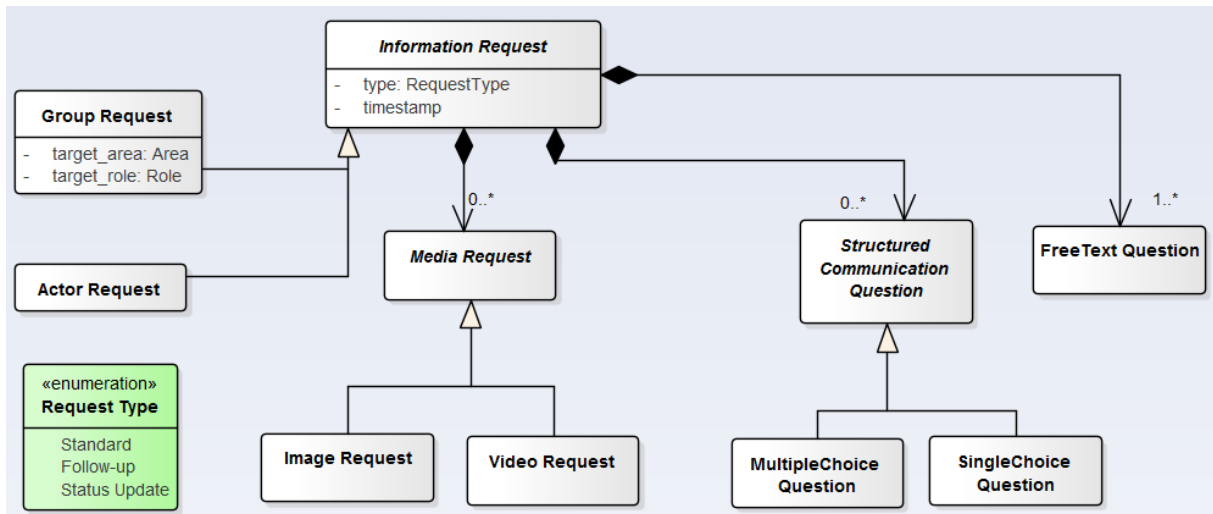


Figure 9: Information Request

## **5. Conclusion**

In this deliverable, we specified the mechanisms to support follow-up interaction in RESCUER from the perspective of the RESCUER App.

Chapter 2 presented the basis for supporting follow-up interaction: 1) a detailed question catalogue to make it easy and fast for the command and control centre to request information from the crowd, and 2) a strategy that defines conditions that are necessary for starting follow-up interactions. The question catalogue can be extended to address new information needs regarding the current set of incident types supported in RESCUER as well as to address new incident types.

Chapter 3 provided 1) the screens for the different interaction cases that can occur in a follow-up interaction and 2) rules for group-targeted follow-up interaction.

All elements of the solution proposed in this deliverable to support follow-up are generic in order to promote the easy extension of the RESCUER app.

The proposed solution should be evaluated in the project from the perspective of the RESCUER app user as well as from the point of view of the command and control centre.

## Glossary

**Command and Control Centre** Group of people assigned to evaluate risks and make decisions in an emergency and/or crisis in an industrial area or at a large-scale event.

**Emergency** Critical situations caused by incidents, natural or man-made, that require measures to be taken immediately to reduce their adverse consequences to life and property.

**Emergency Response Toolkit** Component of the RESCUER platform whose goals are to: 1) get contextual information about the emergency, 2) ask eyewitnesses and formal responders for relevant missing information, 3) give instructions to eyewitnesses, formal responders and potentially affected people or companies, and 4) communicate the emergency to the press, public authorities and the general public in a context-aware way.

**Incident** It can bring damages to life and property and seriously affect the image of the business and/or of the country. The concept of incident as defined here includes the concept of accident.

**Mobile Crowdsourcing Solution** Component of the RESCUER platform whose goal is to support eyewitnesses and formal responders in providing the command and control centre with information about an emergency situation, taking into account the different smartphones that might be used and how people interact with smartphones under stress.

## Abbreviations

**RESCUER** Reliable and Smart Crowdsourcing Solution for Emergency and Crisis Management

**UI** User Interface