



25/4/2011

Mass Crisis Communication with the Public

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**FINAL WORK PACKAGE THREE REPORT  
ON  
COMMUNICATION CHANNELS  
FOR USE IN CRISES**

(WP3 - Crisis Communication Development, improved existing media and new media)



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# Contents

<b>SUMMARY</b>	<b>4</b>
<b>ACRONYMS AND DEFINITIONS</b>	<b>7</b>
<b>INTRODUCTION</b>	<b>9</b>
DESCRIPTION	10
AIM	10
OBJECTIVE	10
<b>SCOPE</b>	<b>10</b>
<b>STATE-OF-THE-ART</b>	<b>10</b>
TECHNICAL SYSTEMS USED AT PRESENT	10
PROBLEMS	11
PRACTICAL EXPERIENCES	11
ONE WAY COMMUNICATION CONSEQUENCES	11
PEOPLE WITH PARTICULAR NEEDS	11
OVERVIEW OF AVAILABLE COMMUNICATION CHANNELS	12
<b>COMMUNICATION CHANNELS</b>	<b>13</b>
<b>SERVICE DEMANDS ON THE COMMUNICATION CHANNELS</b>	<b>14</b>
SPEED, PRIORITY AND CAPACITY	15
Speed	15
Priority	15
Capacity	16
GEOGRAPHIC PRECISION	16
NUMERIC PRECISION	17
INDIVIDUALS OR GROUPS OF PEOPLE WITH PARTICULAR NEEDS	17
SECURITY AS REGARDS DELIVERY	18
SECURITY AS REGARDS AUTHENTICATION (SPAM)	18
ROBUSTNESS AS REGARDS SUPPLY AND OTHER DISTURBANCES	19
TRACEABILITY	19
AVAILABILITY	20
ABILITY OF REACHING MANY PEOPLE	20
CONFIRMATION AND POSSIBILITIES FOR PROVIDING A RESPONSE MESSAGE	21
SUMMARY OF THE CHANNELS AND THEIR SERVICE REQUIREMENTS	21

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<b>THE TWO TASKS OF THE CCC</b>	<b>23</b>
THE RELATIONSHIP BETWEEN THE 112 EMERGENCY CALL NUMBER AND THE CCC	24
SERVICE REQUIREMENTS ON THE MESSAGE FORMAT	24
CAP MESSAGES	25
<b>THE CCC COMMUNICATION SYSTEM</b>	<b>27</b>
CCC WARNING	27
Speed, priority and capacity	27
Geographic precision	27
Numeric precision	27
Individuals or groups of people with particular needs	28
Security as regards delivery	28
Security as regards authentication (SPAM)	28
Robustness as regards electricity supply and other disturbances	28
Traceability	28
Availability	28
Ability of reaching many people	28
Confirmation and possibilities for providing a response message	28
CCC INFO	29
Speed	29
Individuals or groups of people with particular needs	29
Robustness as regards electricity supply and other disturbances	29
Traceability	29
Availability	29
<b>THE SYSTEM FOR PRESENTATION OF INFORMATION</b>	<b>30</b>
DISSEMINATION OF MESSAGES	30
ROUTINES IN THE CCC FOR MESSAGE DISSEMINATION TO THE PUBLIC	30
CHANNELS FOR CALLS FROM THE PUBLIC	32
UP-SCALING	32
<b>REFERENCES</b>	<b>32</b>



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## Summary

It is difficult to define the service levels only by setting the minimum requirements on the lowest service level of the communication channels. Many requirements for service depend on what service is provided in the central handling the communication and the amount of operators that are available. There is also a difference between the demands on a communication channel depending on whether it is a matter of disseminating a warning message or giving opportunities for the public to search for or provide information. In this report, the requirements gathered from the users of a crisis communication system and the requirements on the communication channels regarding different service levels and the system to be implemented to handle these have been compiled and are presented.

There are a number of demands on the communication system that have to be fulfilled to handle one way or two way communication between authorities and the public including an information number and for disseminating warning and information messages to the public within a particular limited geographical area. These demands are made by both the public and the authorities and include general requirements on robustness, which can be put on a system for crisis communication. The requirements which have been identified are the following to this are added examples on what communication channels that can fulfil the requirements:

1. **Speed:** Fixed telephony, Mobile telephony (speech and CB), Radio and TV.
2. **Priority:** Fixed telephony, Radio and TV.
3. **Capacity:** Mobile telephony (CB), Radio, TV and Internet (E-mail, IP telephony, Website, RSS feeds, Twitter, Facebook and Youtube).
4. **Geographic precision:** Fixed telephony and Mobile telephony (Speech, SMS, MMS and CB).
5. **Numeric precision:** Fixed telephony, Radio and TV.
6. **Individuals or groups of people with particular needs:** All channels can fulfil this service requirement.
7. **Security as regards delivery:** Radio, TV, Fixed telephony and Mobile telephony (CB).
8. **Security as regards authentication (SPAM):** Mobile telephony (CB), Internet (Website, RSS feeds and Facebook)<sup>1</sup>, Radio and TV.
9. **Robustness as regards electricity supply and other disturbances:** Fixed telephony, Radio, TV and Internet (E-mail, IP telephony, Website, RSS feeds, Twitter, Facebook and Youtube)

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<sup>1</sup> There is always a risk for these channels being taken over even if the security level is high, which means that also these channels sometimes cannot fulfil the required service level.

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10. **Traceability:** No channels fulfil this service requirement.
11. **Availability:** Radio and TV.
12. **Ability of reaching many people:** Mobile telephony (CB), Radio, TV and Internet (Website, RSS feeds, Twitter, Facebook and Youtube).
13. **Confirmation and possibilities for providing a response message:** This service requirement is not relevant for communication channels as all channels that can manage a two way communication fulfil this requirement.

A more detailed presentation of the requirements in respect to the service and the systems can thus be found in the report which also contains a detailed overview of the service requirements that will make the communication channels possible to use. The report presents communication channels that fulfil the service requirements and under what conditions these can be applied.

It is difficult to define the service levels only by setting the minimum requirements on the lowest service level of the communication channels. Many requirements for service depend on what service is provided in the central handling the communication and the amount of operators that are available. There is also a difference between the demands on a communication channel depending on whether it is a matter of disseminating a warning message or giving opportunities for the public to search for or provide information.

**Channels for one way communication and their service requirements**

	Radio & TV	Cell Broadcast	RSS-Feed	YouTube
Speed	X	X	X	
Priority				
Capacity			X	X
Geographic precision		X		
Numeric precision	X			
Delivery	X	X		
Large groups	X	X	X	X
Robustness	X	X	X	X



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**Channels for two way communication using telephony and their service requirements**

	<b>Fixed phone</b>	<b>Mobile Speech</b>	<b>Mobile SMS/MMS</b>	<b>Mobile Apps</b>
Speed	X	X		X
Priority				
Capacity				X
Geographic precision	X	X	X	
Numeric precision	X			
Particular needs	X	X	X	X
SPAM				X
Availability	X			
Large groups				X
Robustness	X			
Confirmation	X	X	X	X

**Channels for two way communication using Internet and and their service requirements**

<b>Internet</b>	<b>E-mail</b>	<b>IP-telephone Skype</b>	<b>Web-page</b>	<b>Twitter Facebook</b>
Speed				
Priority				
Capacity			X	X
Geographic precision				
Numeric precision				
Particular needs	X	X	X	X
SPAM			(X)	(X)
Availability	X	X	X	X
Large groups			X	X
Robustness	X	X	X	X
Confirmation	X	X	X	X



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A more detailed description of the requirements regarding service level and the systems is presented in two reports elaborated within the MASSCRISCOM Project, WP3 Service Requirement which indicates what required service is to be provided by the communication channels and WP3 System Requirement which presents what communication channels fulfil the service requirements and under what circumstances they can be implemented.

## Acronyms and definitions

### Fixed Telephony

By fixed telephony is meant telephony conducted through cable connection i.e. a traditional telephones, picture telephone, fax, etc.

### Mobile Telephony

By mobile telephony is meant all services conducted through non cable telephony, i.e. speech or sent message such as SMS, MMS or CB.

### APP

APP is an application software, also known as an application or an "APP", or a small programme providing special functions in the so called smart telephones. An APP for handling warnings and information messages is intended to maintain contact with a special place where messages are made available and if there are new messages here then the telephone will behave in a particular way. The APP will for example give a special signal, indicating that there is a message, and vibrate and show the message in the telephone. These APPs can also have integrated in them possibilities for responding, links and numbers for obtaining more information.

### Internet

By Internet is meant all communication which is made in accordance with an Internet protocol, for instance e-mail, a website, RSS-flows, Twitter, Facebook, Youtube, etc. Non cable communication with Wlan, Wimax, IP-telephony (such as Skype) and similar types also belongs to this group as these are always connected to Internet in order to receive the information.

### RSS

RSS (Really Simple Syndication) is used for showing an abstract of for instance a website together with a permanent link to the original site which is called a syndication. In order to follow RSS flows, there are special web-based programmes, which are installed either in the mobile telephone or computer. These software programmes are called RSS readers and keep up automatically with the RSS flows, to a subscription is made, and present the information in a simple and aggregated way.

### Twitter

Twitter is a social network service requiring a subscription and micro-blog website which makes it possible for the user to send and read messages so called tweets. The messages are text based and are limited to consist of no more than 140 characters. They are presented openly on the profile page of the user.



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## **Facebook**

Facebook is a social network service which is open for registered users for exchanges of messages. The users may create a personal profile and add other users as friends, and join common interest user groups, etc. Facebook was founded on 4 February 2004 and was estimated to have more than 600 million users in January 2011.

## **YouTube**

YouTube is a video sharing website on which registered users can upload, share and view any amount of videos. These videos are open to watch by unregistered users. Most of the content has been uploaded by individuals but enterprises, authorities and organisations are using YouTube for advertising and disseminating information to the public. YouTube is a subsidiary of Google Inc.

## **WLAN**

WLAN is a wireless local area network linking two or more local devices using some wireless distribution method, and usually providing a connection through an access point to the wider internet (should not be mixed up with VLAN which is a technology within data communication giving a user group access to their own net which is only virtual and shares the same physical net). WLAN gives users the mobility to move around within a local coverage area and still be connected to the network.

## **WiMAX**

WiMAX is a telecommunications protocol that provides fixed and mobile Internet access (World-wide Interoperability for Microwave Access) and has the benefit that this technology is designed to provide wideband access for the users consisting of individuals, enterprises, etc. This is not the case with for instance WLAN.

## **Radio**

By radio is meant both analogue and digital radio transmission.

## **TV**

By TV is meant both analogue and digital ground based transmission of TV programmes. Satellite transmitted TV is not included as these frequently are transmitted from outside the national territory and therefore can be difficult to use for specific national transmissions.

## **Capacity of the channel**

By the capacity of the channel is meant its conditions and ability for transmitting messages to the receivers. The time for executing the transmission will depend on the type of channel which is used for sending the message and the amount of receivers it is addressed to. The channels are either of the type one-to-one (single cast) or one-to-many (multi cast). If there is a need for sending many messages on a channel with limited capacity, then the consequences will be that the transmission takes a long time during which other communication on this channel will be blocked. On the other hand if the channel is of the type on-to-many, then the burden on the channel will be limited.



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### CAP

CAP is a Common Alerting Protocol and standard from the Organization for the Advancement of Structured Information Standards (OASIS) and is a simple, flexible data interchange format or template for collecting and distributing “all-hazard” safety notifications and emergency warnings over information networks and public alerting systems. CAP allows a consistent warning message to be disseminated simultaneously over many different warning systems, thus increasing warning effectiveness while simplifying the warning task.

### CCC

A Crisis Communication Centre (CCC) Model is proposed to be established by MASSCRISCOM to improve communication between authorities and the public and media as a common contact point and to manage crisis communication efficiently also when sudden crises occur. The CCC sends warnings to the public and has access to a system for handling all available communication channels and a geographic information system (GIS) to select areas to which the message is to be sent. The CCC handles all communication to the public and answers to questions from the public.

## Introduction

Within Europe, radio broadcasting, television and sirens are at present used for warning and informing the public about dangerous situations. People have, besides the situations when it is appropriate to make a 112 emergency call, very limited possibilities for providing information about an incident and in most such cases people do not know where to call. Nowadays, a very large amount of different communication channels are available for both disseminating information and for providing information and also for receiving information from the public. In the following, these existing communication channels are presented and also in what applications they are useful for both disseminating warning messages and conducting two way communication to provide the public with information.

This Report is based on the results of the EU Sixth Framework Programme (FP 6) on Information Society Technologies (ICT) for Environmental Risk Management Projects CHORIST<sup>2</sup> (Integrating Communications for enHanced enviroNmental RISk management and citizens safeTy) and REACT<sup>3</sup> (Reaction to Emergency Alerts using voice and Clustering Technologies). Matters related to providing warning and information on websites through Internet, in e-mails and through some of the largest social channels in use at present have also been taken into account in the course of the work.

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<sup>2</sup> CHORIST addresses Environmental Risk Management in relation to natural hazards and industrial accidents and proposes solutions to increase rapidity and effectiveness of interventions following a major natural and/or industrial disaster in order to enhance citizens' safety and communications between rescue actors.

<sup>3</sup> REACT aims at reducing risks to citizens and the environment by enhancing the interactivity of citizens with Emergency Services and by providing added value to integrated information coming from disparate sources.



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## **Description**

In the following, there will be a description of how the different communication channels can be used for both disseminating warning messages to the public and of the channels which can be used for exchange of information with the public. Also how these channels can be handled in a communication centre will be described. The handling will be different depending on whether it is a warning message to be sent through a number of different channels or if it is a matter of disseminating information in general to the public. Which channels which are to be used will depend on what the needs are which will also be presented in this report.

## **Aim**

The aim of the report is to provide guidance on a selection of the most common existing communication channels which are available at present and under which conditions these channels are appropriate to use. Guidance will also be given on how these matters can be handled in a communication centre.

## **Objective**

The objective is to provide the actors within EU with a good guidance on how to introduce and establish warning and information centres and make proposals on appropriate communication channels to allow the public to be reached in the best possible way.

## **Scope**

This report only investigates in this chapter the means of communication between the public and an information centre and how the channels of communication are handled in this centre. The communications within the centre, gathering of information and communication between the centre and authorities are not included in this chapter of the report. There is a very large number of communication channels available nowadays but only the most used and those with the largest and most widespread are considered in the report i.e. radio, TV, telephony (fixed and mobile) and a number of channels on Internet (e-mail, IP-telephony, websites, RSS flows, Twitter, Facebook and YouTube).

## **State-of-the-art**

### **Technical systems used at present**

The technical systems available and used presently in most EU countries are as a rule mostly focused on conducting communication to the public over the radio and TV. For the purpose of warning the public directly, sirens are used to a considerable degree in certain areas. The sirens cannot however normally provide supplementary information, unless they are equipped with a loud speaker. This makes it necessary when the public wants to know what has happened and how this affects their situation to be able to seek more information about the event. Most of the technical systems used at present are thus only applicable for one way communication.



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### Problems

A major problem is how to establish an efficient way of reaching the public with information and make it possible for the public to provide information about an event that has occurred. More or less all EU countries face this problem. On the other hand, a very much larger amount of communication channels are nowadays available for this purpose than what is actually used by the communication systems. Many people are looking for and very much wish to receive information on the existing new media such as Twitter, Facebook, websites, SMS, etc.

As the public does not know how and where it has access to more information about an event, a problem arises in all the countries, when the public instead calls the emergency call number 112 to get this information. The consequence is that there is a long waiting time for the emergency call number to be answered and that the burden on the number can become so heavy that in the worst situations it will become completely blocked. Important emergency calls will then not be responded to.

### Practical experiences

The channels used at present for getting and providing information are not appropriate and do not cover the needs. Many warnings to the public are disseminated on radio and TV, but these channels have more limited access to the public in general than previously. Many people use their computers to look at TV programmes and listen to alternative radio programmes than the regular national ones on Internet and these people will most probably not be reached by the messages and information which is transmitted on the radio and TV channels.

### One way communication consequences

The public on the site of an event will often have much more important information than what is available to those responsible for responding to the event and at present it is difficult for the public to provide this information and on the other hand for the responders to gather this information from the public. These limitations are frequently due to a lack of knowledge amongst the public of how to take contact to render this information. The communication channels available for this purpose are also very limited and often only consist of the telephone.

### People with particular needs

A large part of the public has significant difficulties in receiving the regularly disseminated warnings and information due to hearing impairment. This makes it necessary to use the media which this group of people normally uses for their communications to meet their particular needs. Also people who do not have the national language as their mother tongue can be reached through the media channels which they normally use and the information can be disseminated in several languages on these channels.



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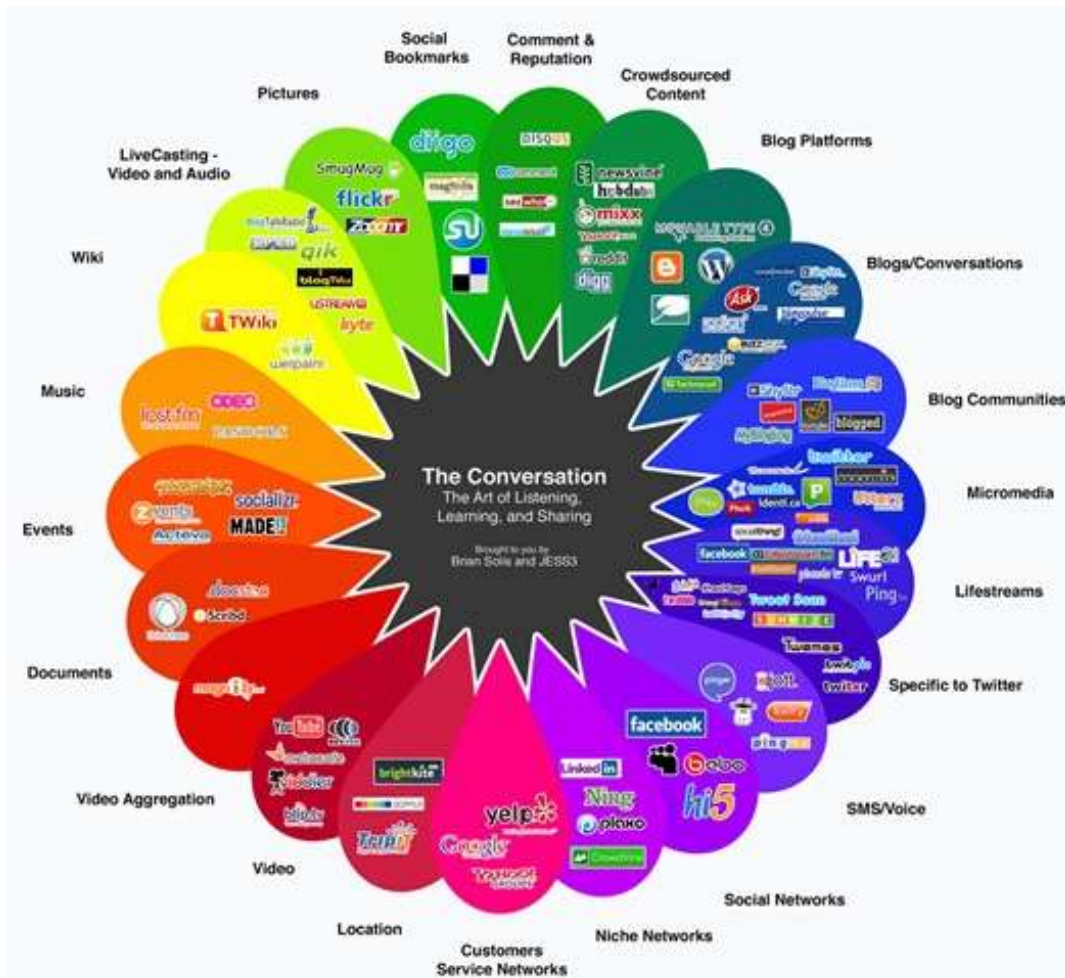
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## Overview of available communication channels



A very large amount of communication channels are nowadays available, so large that it is more or less impossible to present all of them that can be found on Internet, in particular as new ones are appearing constantly and all the time.

As mentioned earlier, in this report only the most used and those with the largest and most widespread are considered, i.e. radio, TV, telephony (fixed and mobile) and a number of channels on Internet (e-mail, IP-telephony/Skype, websites, RSS flows, Twitter, Facebook and YouTube).



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## Communication Channels



In the following are presented the studied two way communication channels for transmission of information to and from the public:

Channels for two way communication:

### Fixed telephony

- Mobile telephony
- Speech
- SMS
- MMS

### APP to smart telephones

- Internet
- E-mail
- IP-telephony/Skype
- Website



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- Twitter
- Facebook

Also channels for one way communication are included for example if a warning is sent to mobile telephones in an area by using cell broadcast. The public will not be able to respond to this message but must be referred to another communication channel to receive more information or provide information. Such a channel can for instance be a telephone number to and information centre, an Internet website presenting information, etc.

### **Channels which can only handle one way communication:**

- Mobile telephony
- CB
- Internet
- RSS-flöden
- YouTube
- Radio
- TV

## **Service demands on the communication channels**

The demands of the users of a crisis communication system and requirements in respect to the lowest level of service to be provided by the communication channels are applicable to both the issuing of warning messages and the public's communication to and from the Crisis Communication Centre (CCC). The demands on the service of the communication channels will however not be similar for different actors. The requirements on a message to the public will also differ from the demands that the public puts on the service level for the communication channels used by the public for providing or getting information. The considerations of the service levels can therefore be divided into the following three different parts depending on which actors are making the service and how the channels are handled by the CCC:

Warning and information from the authorities to the public – this service level presents the communication going out from an authority to the public within a specific geographical area

Incoming and outgoing channels for communication from the public to the CCC – this service level describes the communication from and to the public within a specific geographical area

How the channels can be handled by the CCC – this service level describes the interface of the communication channels between the CCC and the public within a specific geographical area

The following requirements for the communication system able to handle two way communication with the public and an information number have been identified and are presented in the Background Document. These requirements, which are based on needs expressed by the public and authorities and include the general demands in respect to security and robustness that must be put on a system for crisis communication, are as follows:



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- Speed, priority and capacity
- Geographic precision
- Numeric precision
- Individuals or groups of people with particular needs
- Security as regards delivery
- Security as regards authentication (SPAM)
- Robustness as regards electricity supply and other disturbances
- Traceability
- Availability
- Ability of reaching many people
- Confirmation and possibilities for providing a response message

## Speed, priority and capacity

### Speed

By speed is meant that a message is transmitted to as many people as possible and as quickly as possible in situations that require this. In these situations, speed is more important than how many people are reached by the message. An example of a scenario in which this is the case is a dangerous gas cloud spreading in over a habited area.

In respect to warning messages, speed is of the utmost importance. Such a message must reach the receiver of the message as quickly as possible and any delay in the warning system from when the message is sent until the message reaches the receivers among the public must be as small as possible.

Channels which fulfill the service requirements:

- Fixed telephony
- Mobile telephony (Speech and CB)
- Radio
- TV

Channels which do not fulfill the service requirements:

- Internet (E-mail, IP-telephony, Website, RSS-flows, Twitter, Facebook and YouTube)
- Mobile telephony (SMS and MMS)

### Priority

If priority can be made in the communication channels, then this must be possible to implement when warning messages are transmitted. It is of the utmost importance that a warning message reaches the receiver as quickly as possible and it must therefore be given priority. This can lead to



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other important actions having to be set aside for a certain time. But as the dissemination of a warning message has a very temporary character, this transmission will only affect other actions to a minimal degree.

Channels which fulfil the service requirements:

- Fixed telephony
- Radio
- TV

Channels which do not fulfill the service requirements:

- Internet (E-mail, IP-telephony, Website, RSS-flows, Twitter, Facebook and YouTube)
- Mobile telephony (Speech, SMS, MMS and CB)

### **Capacity**

By capacity of the channel is meant its quality and ability to communicate a certain volume of messages to the receivers. The time for the transmission will depend on the conditions of the channel used and how many people that are to receive the message. The channels are either one-to-one (singlecast) or one-to-many (multicast). If many messages are going to be sent on a channel with limited capacity (one-to-one), then this will lead to the transmission taking a long time and other communication on this channel being blocked during a certain time. If on the other hand is of the one-to-many type, the burden on the channel will be limited.

Channels which fulfill the service requirements:

- Mobile telephony (CB)
- Radio
- TV
- Internet (E-mail, IP-telephony, Website, RSS-flows, Twitter, Facebook and YouTube)

Channels which do not fulfill the service requirements:

- Fixed telephony
- Mobile telephony (Speech, SMS and MMS)

### **Geographic precision**

By geographic precision is meant that it must be possible to define with considerable accuracy areas in which people are to be warned and informed. In this situation, defining accurately the areas for disseminating the message is more important than the speed. A possible scenario is an accident leading to spreading of a dangerous gas within a limited area. The gas will however due to the prevailing weather conditions affect a habitation area. In this situation, the warning and information must reach people in the wind direction but not others who will not be in an area of risk.



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Channels which fulfill the service requirements:

- Fixed telephony
- Mobile telephony (Speech, SMS, MMS and CB)

Channels which do not fulfill the service requirements:

- Radio
- TV

Channels which cannot be defined for this level of service:

- Internet (E-mail, IP-telephony, Website, RSS-flows, Twitter, Facebook and YouTube)

## Numeric precision

By numeric precision is meant that focus is put on reaching every person in the area of risk when the evolution of the incident is slow. A possible scenario is a radiological incident with a release of radioactive substances which are spreading slowly in a certain direction. In this situation it is important to be able to warn and inform every individual in the affected area and to ensure that everybody has received the message. The service level of the communication channel in respect to numeric precision is that the message reaches everybody within a limited but defined area irrespective of external circumstances.

Channels which fulfill the service requirements:

- Fixed telephony
- Radio
- TV

Channels which do not fulfill the service requirements:

- Mobile telephony (Speech, SMS, MMS and CB)

Channels which cannot be defined for this level of service:

- Internet (E-mail, IP-telephony, Website, RSS-flows, Twitter, Facebook and YouTube)

## Individuals or groups of people with particular needs

There are requirements that need to be fulfilled to reach individuals or groups of people with particular needs. People with hearing impairment and groups of people who do not have Swedish as their mother tongue or have cognitive problems, such as reading and ability to understand impairment, etc., belong for example to these groups. The service level required for people with particular needs is that they will receive warning messages on the channels that they use every day and which have the ability of providing a message in the format needed to allow the receiver to understand it.

Channels which fulfill the service requirements:



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All channels fulfill this service requirement, i.e.:

- Fixed telephony
- Radio
- TV
- Mobile telephony (Speech, SMS, MMS and CB)
- Internet (E-mail, IP-telephony, Website, RSS-flows, Twitter, Facebook and YouTube)

### **Security as regards delivery**

To ensure security as regards delivery requires that the transmitting media guarantees that the message reaches the receiver. This does not include a requirement to ensure that the receiver has read the message. The service level required in this respect is therefore that the channel guarantees that the message arrives irrespective of the prevailing external circumstances.

Channels which fulfill the service requirements:

- Radio
- TV
- Mobile telephony (CB)

Channels which do not fulfill the service requirements:

- Fixed telephony
- Mobile telephony (Speech, SMS and MMS)
- Internet (E-mail, IP-telephony, Website, RSS-flows, Twitter, Facebook and YouTube)

### **Security as regards authentication (SPAM)**

There is a requirement that the receiver is guaranteed security as regards authentication (SPAM) and that the message comes from a secure source. It must be impossible to send false messages i.e. to distort and forward a message, which comes from a secure source. It must furthermore not be possible to transfer SPAM through this medium. The communication channel must guarantee that the message is authentic and comes from a secure source. Otherwise it should not be possible to forward the warning message.

Channels which fulfill the service requirements:

- Mobile telephony (CB)
- Internet (Website, RSS-flows and Facebook)<sup>4</sup>
- Radio
- TV

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<sup>4</sup> There is always a risk for these channels being taken over even if the security is high, which may lead to even these channels sometimes not being able to fulfill the service level demands.



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Channels which do not fulfill the service requirements:

- Fixed telephony
- Mobile telephony (Speech, SMS and MMS)
- Internet (E-mail, IP-telephony, Twitter and YouTube)

## Robustness as regards supply and other disturbances

There is a demand on the channel that is used to maintain robustness as regards supply of energy and against other disturbances. The channel must be able to function for a long time without the supply of electricity from the net until the supply of energy it returns. Robustness in respect to other disturbances is also an important demand and the protection should be maintained against for example disturbances due to electromagnetic pulse (EMP) and external influence on the service due to intentional damage and sabotage.

- Channels which fulfill the service requirements:
- Fixed telephony
- Radio
- TV
- Internet (E-mail, IP-telephony, Website, RSS-flows, Twitter, Facebook and YouTube)

Channels which do not fulfill the service requirements:

- Mobile telephony (Speech, SMS, MMS and CB)

## Traceability

The required service level for traceability is not directly linked to the communication channels but to the system which sees to it that the message is transmitted on the chosen channels. There must be means for tracing messages in the system in order to see if the message has reached the receiver and to check if the receiver has answered to the message. All the information provided when a warning message has been issued must be saved in a log file. The data to be saved shall at least contain the content of the message, the time when it was issued, the name of the authority which issued the warning, the area it was sent to and which channels that were used.

Channels which do not fulfill the service requirements:

- Mobile telephony (Speech, SMS, MMS and CB)
- Fixed telephony
- Radio
- TV
- Internet (E-mail, IP-telephony, Website, RSS-flows, Twitter, Facebook and YouTube)



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## **Availability**

The communication channel must have an availability for dispatching messages of at least 99,7% which means that the time when the channel is not available is not more than 24 hours during a year. This time when it is not available includes time for planned service and maintenance which must be made known well in advance to allow for planning the use of alternative communication channels, should the dissemination of a message be needed in the meanwhile.

Channels which fulfill the service requirements:

- Radio
- TV

Channels which do not fulfill the service requirements:

- Mobile telephony (Speech, SMS, MMS and CB)
- Fixed telephony
- Internet (E-mail, IP-telephony, Website, RSS-flows, Twitter, Facebook and YouTube)

## **Ability of reaching many people**

By the ability of reaching many people is meant that the service level requires that the communication channel must be able to sent a very large amount of messages ( > 100 000 ) to the public within a limited area. This level also requires that the message is distributed within a reasonable time of not more than two minutes.

Channels which fulfill the service requirements:

- Mobile telephony (CB)
- Radio
- TV
- Internet (Website, RSS-flows, Twitter, Facebook and YouTube)

Channels which do not fulfil the service requirements:

- Mobile telephony (Speech, SMS and MMS)
- Fixed telephony
- Internet (E-mail and IP-telephony)

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**Confirmation and possibilities for providing a response message**

The communication channels for issuing warnings and information cannot fulfil this service requirement. On the other hand all communication channels which are appropriate for two way communication will be able to do so.

**Summary of the channels and their service requirements****Channels for two way communication using telephony and their service requirements**

	Fixed phone	Mobile Speech	Mobile SMS/MMS	Mobile Apps
Speed	X	X		X
Priority				
Capacity				X
Geographic precision	X	X	X	
Numeric precision	X			
Particular needs	X	X	X	X
SPAM				X
Availability	X			
Large groups				X
Robustness	X			
Confirmation	X	X	X	X



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**Channels for two way communication using Internet and and their service requirements**

<b>Internet</b>	<b>E-mail</b>	<b>IP-telephone Skype</b>	<b>Web-page</b>	<b>Twitter Facebook</b>
Speed				
Priority				
Capacity			X	X
Geographic precision				
Numeric precision				
Particular needs	X	X	X	X
SPAM			(X)	(X)
Availability	X	X	X	X
Large groups			X	X
Robustness	X	X	X	X
Confirmation	X	X	X	X

**Channels for one way communication and their service requirements**

	<b>Radio &amp; TV</b>	<b>Cell Broad- cast</b>	<b>RSS-Feed</b>	<b>YouTube</b>
Speed	X	X	X	
Priority				
Capacity			X	X
Geographic precision		X		
Numeric precision	X			
Delivery	X	X		
Large groups	X	X	X	X
Robustness	X	X	X	X



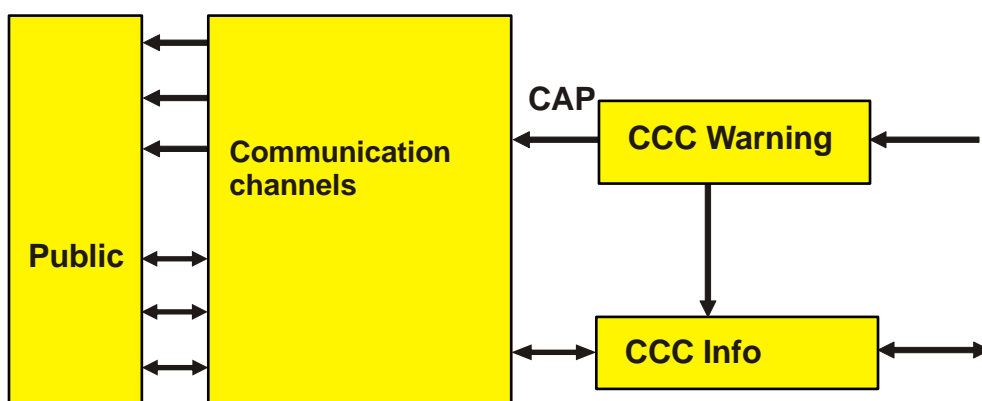
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## The two tasks of the CCC

The tasks of the Crisis Communication Centre (CCC) could be divided systematically into two parts, one of which handles warning and information messages to be sent to the public and the other takes care of the incoming information and answers questions from the public. The two parts which are logically different from each other but do not have to be seen as two completely different organizational functions within the CCC. They are rather two tasks with close relationship to each other and can be handled by the same body and can very well be managed within the same organizational structure, located in one common physical place. The two parts are presented systematically in the figure below.



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By the word authority is meant in this report both the competent authorities and such non-government bodies which have the duty and right to disseminate warning messages. An example of such a duty is the management of the public fresh water supply for which the responsible organisation must be able to issue warnings when the drinking water is unhealthy, due to an increase of the chlorine content of the water that leads to immediate danger for life and health, if the water is drunk.

In a similar way, the CCC will issue warning messages to the public and for this purpose have access to a system to be able to use all available communication channels and a geographic information system (GIS) support to be able to select an area to which the message will be sent. All warning messages and information which come in to the CCC (CCC Info) or are issued by the CCC (CCC Warning) should follow a standard, for example the Common Alerting Protocol (CAP), to facilitate dissemination to many different receivers on a number of channels.

CCC Info thus manages communication to the public and receives questions from the public and answers these if possible on the same communication channel as the questions came on. CCC Info also receives information from the public and transfers this to the decision support system and the decision makers.

## **The relationship between the 112 Emergency Call Number and the CCC**

It must be made possible to transfer and connect a received non-emergency call made on the 112 number to an information service number handled by the CCC. And vice-versa, it must also be possible for the CCC to connect emergency calls, which are made to the information number, directly to the 112 service. These transfers of calls must not lead to the incoming telephone lines being blocked in the meantime. The complete telephone call must therefore, when the transfer is made, be put through to the other centre in such a way that the incoming telephone lines do not remain blocked, when the call is handled by the other centre. How the information which is received during the handling of the calls by the different involved centres is distributed and how this information is made use of is not addressed in this report.

## **Service requirements on the message format**

In order to facilitate and enable the distribution of a warning message on all kinds of communication channels, a standard format or template must be used for instance the Common Alerting Protocol (CAP). This format must be possible to exchange on all available channels and to all receivers available. CAP is a standard from the Organization for the Advancement of Structured Information Standards (OASIS) which is appropriate for use when exchanging security and crisis management messages electronically.

CAP is a simple and flexible format for the electronic exchange of data and the gathering and distributing of information and warning messages on data networks and the public warning systems. Different such systems have been developed to respond to different threats in different geographical places. So far, no way of distributing warnings consistently and simultaneously through all available channels has existed. Neither has any way for monitoring the complete picture of all the different warnings been available at a certain given time.



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CAP provides compatibility or interoperability with all types of warning and information systems, including products for exercising multi language communication with people with particular needs. It also contains geographical elements which enable flexible but exact positioning of warnings. In order to provide additional information, digital images and other binary information can be associated to the messages. CAP will also provide support with different mechanisms to ensure the authenticity, integrity and security of messages as needed.

### CAP messages

A CAP message is based on the XML standard and always contains a number of elements which have to form parts of such a message:

Each CAP message thus contains of an **<alert>** part which can consist of one or more **<info>** parts which each of them can consist of one or more **<area>** parts and one or more **<resource>** parts. The primary objective of CAP is to provide one single entrance to activate all types of alarms and warnings to a number of different information and warning systems as well as ensure that the same information is transmitted to all.

Even if CAP is mainly designed as a standard for use by warning and information systems, a CAP message can be delivered directly to the receivers of warning messages through different networks including transmission of data. If the receiver knows its geographical position, then the content of the message can be used to determine if that message is aimed more precisely at that receiver.

#### **<alert>**

The **<alert>** part contains the general information on the message: its aim, origin and status as well as a unique identification for the message and links to other related messages. An **<alert>** part can be used solely for receipts, cancellations and other system functions but most **<alert>** parts will contain at least one **<info>** part.

#### **<info>**

The **<info>** part contains a description of an expected event or one that has occurred in the terms how urgent it is, the level of severity and safety or security and provides both a categorisation and presentation of the event. In this part, can also be written instructions on appropriate measures and other details (such as technical parameters, contact information, links to further information sources, etc.). Several **<info>** parts can be used to describe different parameters or for obtaining information in different languages.

#### **<resource>**

The **<resource>** part contains an additional reference to supplementary information and there is a picture and sound file.

#### **<area>**

The **<area>** part contains a description of a geographical area or site. The text and geographical references (for instance postal or area code) are given as support but to provide the best presenta-



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tions it is best to use geographical figures (polygons or circles) and if so is requested indications on heights.

An example of a CAP message:

```
<?xml version = "1.0" encoding = "UTF-8"?>
488 <alert xmlns = "urn:oasis:names:tc:emergency:cap:1.1">
489 <identifier>KSTO1055887203</identifier>
490 <sender>KSTO@NWS.NOAA.GOV</sender>
491 <sent>2003-06-17T14:57:00-07:00</sent>
492 <status>Actual</status>
493 <msgType>Alert</msgType>
494 <scope>Public</scope>
495 <info>
496 <category>Met</category>
497 <event>SEVERE THUNDERSTORM</event>
498 <responseType>Shelter</responseType>
499 <urgency>Immediate</urgency>
500 <severity>Severe</severity>
501 <certainty>Observed</certainty>
502 <eventCode>
503 <valueName>same</valueName>
504 <value>SVR</value>
505 </eventCode>
506 <expires>2003-06-17T16:00:00-07:00</expires>
507 <senderName>NATIONAL WEATHER SERVICE SACRAMENTO
CA</senderName>
508 <headline>SEVERE THUNDERSTORM WARNING</headline>
509 <description>
AT 254 PM PDT...NATIONAL WEATHER SERVICE DOPPLER RADAR
INDICATED A SEVERE THUNDERSTORM OVER SOUTH CENTRAL
ALPINE COUNTY...OR ABOUT 18 MILES SOUTHEAST OF
KIRKWOOD...MOVING SOUTHWEST AT 5 MPH. HAIL...INTENSE RAIN
AND STRONG DAMAGING WINDS ARE LIKELY WITH THIS STORM.
</description>
513 <instruction>
TAKE COVER IN A SUBSTANTIAL SHELTER UNTIL THE STORM
PASSES.
</instruction>
514 <contact>BARUFFALDI/JUSKIE</contact>
515 <area>
516 <areaDesc>EXTREME NORTH CENTRAL TUOLUMNE COUNTY IN
CALIFORNIA, EXTREME NORTHEASTERN
517 CALAVERAS COUNTY IN CALIFORNIA, SOUTHWESTERN ALPINE
COUNTY IN CALIFORNIA</areaDesc>
518 <polygon>38.47,-120.14 38.34,-119.95 38.52,-119.74 38.62,-119.89
38.47,-120.14
</polygon>
519 <geocode>
520 <valueName>FIPS6</valueName>
521 <value>006109</value>
522 </geocode>
523 <geocode>
524 <valueName>FIPS6</valueName>
525 <value>006009</value>
526 </geocode>
527 <geocode>
```



## Mass Crisis Communication with the Public

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### The CCC communication system

These service requirements describe the management of the communication from an authority to the public, within a geographical area, through both the warning and information parts of the CCC (CCC Warning and CCC Info). As the requirements regarding the handling of these two parts differ, the presentation will be divided into two which will also facilitate the reading of this report and allow the reader's interest to be focused on only one of the parts at the time.

#### CCC Warning

CCC Warning disseminates messages to the public and has access to a system for handling all available communication channels and GIS support for defining area(s) to which messages are to be sent. All warning messages which are received or sent by CCC Warning should follow the Common Alerting Protocol (CAP).

##### Speed, priority and capacity

By speed is meant that a message when it is needed in a certain situation must be disseminated as quickly as possible to as many as possible. It is a matter of both transmitting the warning and having channels to and from the public which do not cause any delay with the transmission.

**Delays of the transmission of messages to the public by the CCC** - The transmission of warnings and information to and from the public without delay is a service requirement on how a warning and information message must be disseminated when it comes in to the CCC. It should be automatic to reduce the transmission time to the shortest possible time.

**Response times and ability to scale up in large events** - The service level for warning messages coming in to the CCC must be that priority must be given to these messages and they must be dealt with immediately. In severe events, the CCC should be able to scale up and seamlessly increase the amount of operators to meet the service requirements.

##### Geographic precision

The service level for geographic precision requires that the operator has GIS support which makes it possible to choose appropriate areas for warning and information within the whole scale of threats from local incidents to a national crisis.

##### Numeric precision

The service level for numeric precision requires that the operator has GIS support which makes it possible to identify all persons who are present in an area (if the chosen channels make this possible) within the whole scale of threats from local incidents to a national crisis.



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### **Individuals or groups of people with particular needs**

The service level for individuals or groups of people with particular needs requires that the system can send messages which these people can understand.

### **Security as regards delivery**

The system must guarantee that all messages can be sent on all channels and indicate if there is any disruption or other disturbance affecting the communication channels.

### **Security as regards authentication (SPAM)**

If the channel cannot guarantee that the message is authentic and comes from a secure source, the system must have a function in it which indicates whether this message is authentic or not and the system must also have the ability to ensure that it cannot be misused by a third party.

### **Robustness as regards electricity supply and other disturbances**

The service requirement in respect to robustness is that there must always be a reserve system available which immediately starts when there is a loss of electric power supply and thus prevents disruptions in the running of the system. There must also be a redundant capacity built into the system which allows for immediate continuation should there be any disruptions in the IT system. Sensitive equipment must be kept in an environment which is protected against EMP effects and where electric power supply is always accessible.

### **Traceability**

The service requirement for traceability is that it is possible, depending on the communication, to track messages. The tracing will be carried out on the basis of which persons have received the message and which answers that have been given when this is possible.

### **Availability**

The service level for availability is that the system is scale-able and adaptable in relation to the current burden on it so that the communication does not get blocked.

### **Ability of reaching many people**

The communication system shall have the ability of reaching many people irrespective of how many receivers that are addressed or how many channels that are used for the dissemination of a message.

### **Confirmation and possibilities for providing a response message**

The service requirement is that the system must be able to handle answers from the receivers and that it will be possible to receive confirmation of the receipt of the message and what reply that has been given.



## Mass Crisis Communication with the Public

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### CCC Info

Only the following service requirements on the CCC Info are relevant in respect to two way communication with the public and the CCC is expected to answer calls from the public seeking information. The service requirements on the CCC in respect to one way dissemination of warning and information have been presented above under CCC Warning.

#### Speed

The CCC system for handling the communication channels providing information to the public should not have any delays and the service level must be defined as being that all contacts with the public are taken care of without any delays. The response times for responding to questions that come to the CCC and providing information shall not be longer than 30 seconds, i.e. before the public gets in contact with an operator. In situations involving extreme strain on the CCC with many calls, the system must be scalable so that the amount of operators can increase seamlessly in order to be able to maintain the required service level.

#### Individuals or groups of people with particular needs

The service level for individuals or groups of people with particular needs requires that the system can receive and respond to questions in the same way as it does to questions from the public in general. The system must thus be able to manage communication in several languages and for instance sign language and use the same technical modes of communication that are used by these people to make the information understandable.

#### Robustness as regards electricity supply and other disturbances

The service requirement on CCC Info in respect to robustness is that there must always be a reserve system available which immediately starts when there is a loss of electric power supply and thus prevents disruptions in the running of the information system. There must also be a redundant capacity built into the system which allows for immediate continuation should there be any disruptions in the IT system. Data base servers should be installed in an environment which is protected against EMP effects and have access always have access to electric power supply.

#### Traceability

The service requirement for traceability is that when possible, depending on the communication channel, be able to track messages. This can be achieved by saving all data regarding incoming requests (the time of the call, means of communication, answer, etc.) and log these with answers, time for responding and communication channel.

#### Availability

The service level for availability is that the system must be scaleable and adaptable in relation to the current burden on it so that the communication does not get blocked.



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## **The system for presentation of information**

### **Dissemination of messages**

Incoming warning messages must be prioritized and taken care of and immediately disseminated or transmitted to the public. This capacity must always be available and must immediately conclude other files, which can be transferred to others as needed, to minimize delays in the CCC to the utmost.

To achieve this, warning messages must have a route of their own into the CCC allowing it to be reached immediately, thereby avoiding the risk for the message not being received due to a too high burden on the incoming channels and the personnel being too busy.

### **Routines in the CCC for message dissemination to the public**

The service requirement to have routines in the CCC for dissemination of messages to the public is related to how a warning and information message is forwarded when it comes in to the CCC. This requirement does not have a direct relevance to the communication channels but sets demands on the handling and user interface of the system that the operator uses when a message is transferred to the relevant communication channels.

When a message arrives at the CCC, a check should be made to ensure that the message is complete in respect to the geographical dissemination and that the message cannot be misunderstood regarding the information about where and when the incident has occurred. The CCC does not have any editing role but is only responsible for transmitting the message to the public in the form the message arrived from the initiator of the warning. The detailed requirements on the handling are not presented in this part of the report.

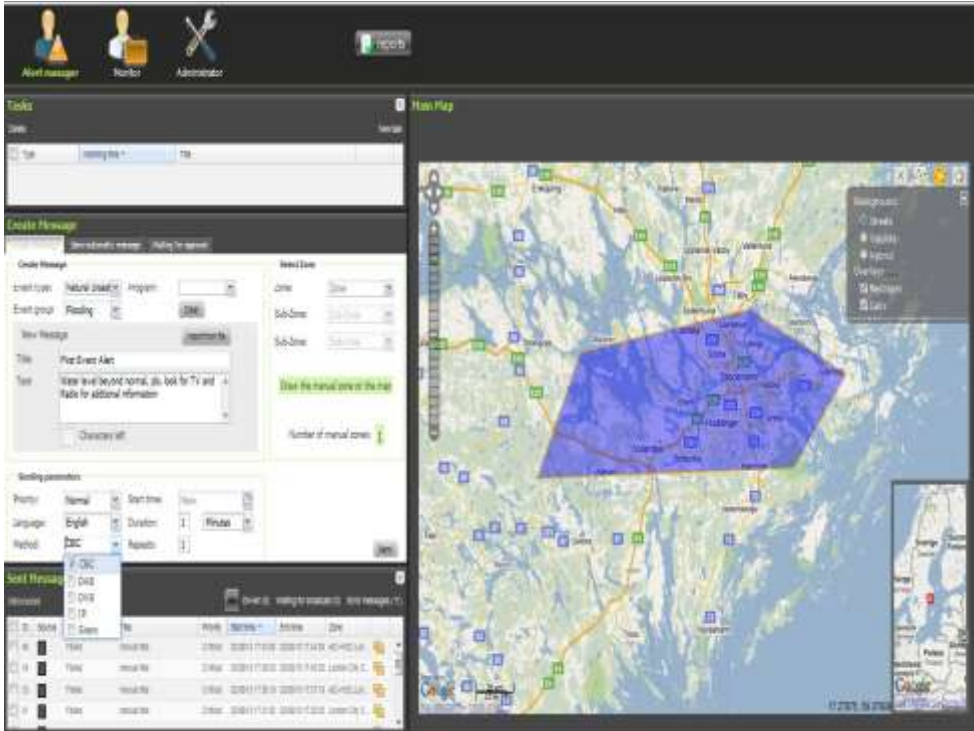
The forwarding or transmission of a warning should be automatically handled to reduce the time needed in the CCC to the shortest possible time. If it is a written message, then it should be handled directly by the system and be sent out on the channels to be used. On the other hand if it is an oral message, then the system should directly handle and take in the message from the operator, who formulates the message in accordance with the wishes of the person responsible for the message and sees to it that it is forwarded to the geographical areas and through the chosen channels.

There are two examples presented below on what the user interface can look like to indicate within which area the message is to be distributed, what the content is and which available channels are to be used.

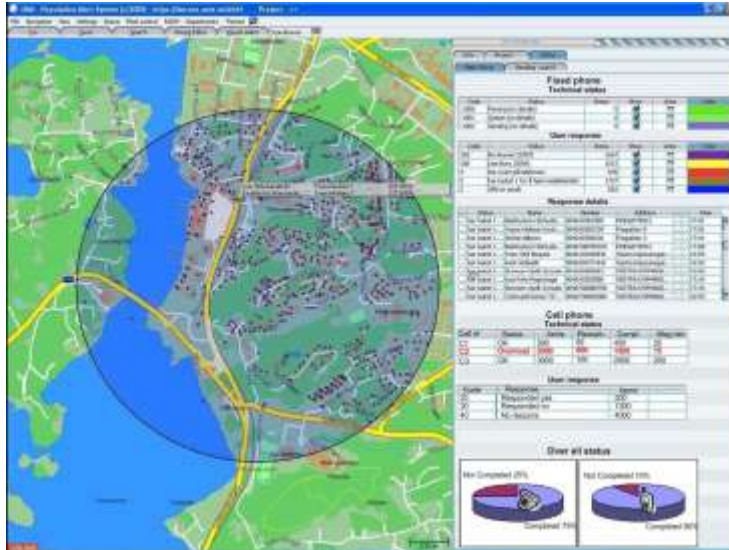


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The first example.



The second example.



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## Channels for calls from the public

In order to manage the burden of incoming communications, there is a need for a system for presenting the burden on each incoming communication channel, both telephony and Internet.

<p><b>Incomming telephone lines</b></p> <p>Queue <b>0156</b> pc    Nr oper <b>14</b> pc    Aver block <b>09</b> min</p>	<p><b>Incomming SMS</b></p> <p>Queue <b>2457</b> pc    Nr oper <b>17</b> pc    Aver block <b>48</b> min</p>
<p><b>Incomming E-mail</b></p> <p>Queue <b>0056</b> pc    Nr oper <b>7</b> pc    Aver block <b>5</b> min</p>	<p><b>Facebook/Twitter</b></p> <p>Comments <b>0156</b>    Nr oper <b>02</b> pc</p>
<p><b>Uniq hits webpage</b></p> <p>Hits <b>0156964</b>    Last hour <b>017614</b></p>	<p><b>FAQ hits</b></p> <p>Hits <b>00034765</b>    Last hour <b>002576</b></p>

## Up-scaling

The system should be possible up-scale when the communication burden is high i.e. more operators should be involved in a simple way to manage a larger burden than normally. The system should be designed so that it is not necessary for all the operators to be in the same location but instead it should be possible to distribute the burden to a number of units in different locations.

## References

### Other EU projects:

- CHORIST    Integrating communications for enhanced environmental risk management and citizens safety    <http://www.chorist.eu/>
- REACT    Reaction to Emergency Alerts using voice and Clustering Technologies    [www.react-ist.net/](http://www.react-ist.net/)

### Standards:

- CAP    [www.oasis-open.org](http://www.oasis-open.org)
- CAP 1.2    <http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.html>