

The Mass Crisis Communication with the Public Project (MASSCRISCOM)

MASSCRISCOM BACKGROUND DOCUMENT (FINAL WORK PACKAGE 2 REPORT)



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Report, year and number: 2011/1

Name of the Report: MASSCRISCOM Background Document
(Final Work Package 2 Report)

Editor: The Mass Crisis Communication with the Public Project (MASSCRISCOM)
JLS/2008/CIPS/009.

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Photo: Flooding in central Uppsala, Sweden.

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Preface

The Mass Crisis Communication with the Public Project (MASSCRISCOM) has a duration of only two years (10 May 2009 – 9 May 2011) and is quite limited in size. During the Project, a number of very significant events requiring mass crisis communication have occurred in or are affecting the partner and neighboring countries or are still fresh in memory. These include pandemic diseases, storms and flooding, exceptional severe winters with heavy snow and a volcanic eruption with consequences for many European countries. There has also been the deepest financial crisis since the 1930ties and the largest political changes in a very large geographical area bordering the EU since the end of the Cold War with enormous human suffering and an immensely difficult transition process.

In the partner countries there have been or are on-going important structural changes of the public administration which affect crisis management and communication. MASSCRISCOM has also been under strong influence of the immense paradigm shift of crisis communication which has taken place, from the traditional way governmental organizations have worked with crisis communication, which is becoming more and more obsolete. This is due to globalization, the technological development, a new media landscape, new communication needs and demands and increased transparency, which leads to a need to rethink on how to conduct the communication. There has been a move from one radio channel to both direct and indirect communication through multiple channels, i.e. media, web sites, telephone services, social media, etc.

This is a background document to the presentation of MASSCRISCOM results, i.e. a coherent generic crisis communication model based on an all-hazards approach and existing conditions. The document contains an account of some of the experiences of crisis communication in recent years, including organizational aspects, from Estonia, Finland, the Åland Home Rule, Iceland and Sweden. A requirement specification was created based on points of view as well as experiences gathered from both crisis management experts and the public. Major sources of information for MASSCRISCOM were a qualitative study made from a citizens' perspective of the alarm function in the mobile communication scenario, which was to focus on the problems related to over-loading of the 112 Emergency Call Number, a web poll distributed to a number of experts within authorities and organizations, involved in rescue planning, emergency response and evaluation, studies of literature and research reports as well as experiences exchanged within MASSCRISCOM. A conceptual model was used to identify, explore and discuss various challenges and needs. The model is divided into three major phases, Information Gathering, Managing Situation Awareness and Channel-Based Mass Communication and outlines the connectedness and dependencies that exists between these. Finally, some conclusions on needs to be addressed in MASSCRISCOM are presented.



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Content

PREFACE	5
CONTENT	7
OBJECTIVES OF MASSCRISCOM	11
INTRODUCTION	12
EXPERIENCES OF CRISIS COMMUNICATION IN RECENT YEARS, INCLUDING ORGANISATION ASPECTS	16
Estonia	16
<i>Thunderstorm Derecho in August 2010</i>	16
Finland	19
The Åland Home Rule	20
Iceland	22
<i>Earthquake in May 2008</i>	24
<i>Eyjafjallajökull Vulcano Eruption in 2010</i>	24
Sweden	27
<i>Storm 4–6 December 1998 leaving 1.5 m deep snow in Gävle, Sweden</i>	29
<i>Gas accident in Borlänge in April 2000</i>	31
<i>Breakdown of telecommunications in Uppland in October 2002</i>	32
<i>The storm Gudrun 8–9 January 2005</i>	33
<i>Flooding on 5 July 2007 in the Southern Swedish Province of Scania (Skåne)</i>	35
<i>Bus accident in Dalecarlia (Dalarna) on 3 January 2008</i>	36
<i>Flooding of the SOS Alarm Centre in Gothenburg on 2 March 2008</i>	36
<i>A minor earthquake in Scania (Skåne) on 16 December 2008</i>	38
<i>Experiences of "The Information Service" in connection with the Bird Flu and the New Influenza (Swine flu) in 2009</i>	38
<i>Collaboration Methods</i>	40
<i>Construction of the Frequently Asked Question(s) (FAQ) Database</i>	40
<i>Flow description of the answering process</i>	41
<i>Quality Requirements and Monitoring</i>	41
<i>Outreach activities and more examples</i>	42
<i>Economy</i>	42
<i>Conclusion</i>	42
<i>The use of Social Media during the New Influenza (Swine Flu)</i>	43



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EXPERIENCES AND INTRODUCTION OF AN INFORMATION NUMBER(S)	45
Estonia	45
Sweden	45
CRISIS COMMUNICATION STUDIES	48
Estonian State Officials' perceptions on crisis communication co-ordination	48
Summary of the perceptions on crisis communication of representatives of emergency and crisis management actors in Åland	49
An integrated research study on The patterns of receiving and processing emergency information – cultural experiences and information searching habits	51
When, how and why we are calling SOS? – A citizen's perspective on the alarm feature 112 of the mobile communications landscape	53
<i>Background to the study</i>	53
<i>The aims of the study</i>	55
<i>The outcome of the study</i>	55
<i>Afterword</i>	56
Studies of literature and research reports within the field of the project's scope in collaboration with Jonas Landgren, Ph. D. specialized in Public Safety at the Victoria Institute in Gothenburg	57
<i>Emergency Alerts and Warnings to mobile phones</i>	57
Findings from global studies of location based services (Adoulat et al, 2007)	58
Multiple Channel and Social Media Crisis Communication by Anna Toss, Development Expert, Swedish Civil Contingencies Agency (MSB), and Jonas Landgren, Ph. D. specialized in Public Safety at the Victoria Institute in Gothenburg	60
<i>Crowd sourcing – when many people take responsibility for resolving problems</i>	61
<i>Examples of collaboration between authorities and the public regarding information exchange:</i>	62
<i>Dialogue creates credibility</i>	63
<i>Transparency is more important than which tools are used for communication</i>	63
<i>Old problems, new solutions</i>	64
<i>Three steps on the road to changing the approach to social media</i>	65
CONCLUSIONS ON NEEDS TO BE ADDRESSED IN MASSCRISCOM1	67
General	67
Speed	67
Geographic precision	67
Numeric precision	67
Precision as regards ability to reach individuals with particular needs	67
Security as regards delivery	68
Security as regards authentication	68
Robustness as regards electricity supply	68
Robustness as regards other disturbances	68
Ability to conduct two-way communication and monitor and manage the communication	68

Two-way communication between authorities and the public	69
Communication with persons or groups with particular needs	70
Support for receiving and supplying information	70
Information exchange between the 112, the Centre and national web channels/portals	71
Ability for communication after an early warning	72
Weather warnings	72
Annexes to the Crisis Communication Studies	73
<i>A summary of some results of an integrated research study on The patterns of receiving and processing emergency information – cultural experiences and information searching habits presented by Triin Vihalemm, Tartu University, Institute of journalism and communication</i>	73
<i>Reactions to the simulated warnings</i>	74
<i>Pattern of networking</i>	74
Reactions to the simulated warnings	75
<i>When hearing (simulated) warnings people make calls because they...</i>	75
<i>Sceptical attitude towards instructing information</i>	75
<i>Shock at the time of flooding in Pärnu</i>	76
<i>Storm – ignoring the warning</i>	76
<i>Reactions to the simulated warning message about radiation</i>	76
LITERATURE LISTS OF THE STUDIES	79
When, how and why we are calling SOS? – A citizen’s perspective on the alarm feature 112 of the mobile communications landscape	79
Studies of literature and research reports within the field of the project’s scope in collaboration with Jonas Landgren, Ph. D. specialized in Public Safety at the Victoria Institute in Gothenburg	81



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Objectives of MASSCRISCOM

The concrete target of the Project is to achieve an increased common capability in society to communicate between competent authorities and the public in crises. The communication capability will be a system consisting of such components as warning the public, provision of information to the public and receipt of information from the public, which can contribute to the situation awareness of the authorities. The requirements for the technical support systems will be defined. How the different actors in the crisis communication system can have access to the national capacity for communication with the public and how new media or technology can be utilised for warning and provision of information will be demonstrated, i.e. for warning, information dissemination and communication purposes.

Other objectives are to define how the information from the public can be gathered and analysed and then disseminated to the crisis management actors and how the burden on the 112 Emergency Call Number can be reduced through a so called "Crisis Communication Centre" (CCC) or separate information number(s). The Project will not present new proposals for organisation and coordination of crisis management or the 112 system or develop any new technical system(s) for presentation of situation awareness, etc. Focus will instead be put on process rather than on the organisational matters and the work will build on the competence and practical experiences of the Partners. This includes the practical experiences of management of information to and communication with the public in connection with the recent crises that have occurred. The result will be a coherent generic communication model based on an all-hazards approach and existing conditions. The model will be presented at a demonstration.



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Introduction

New emerging risks and threats, for instance the consequences of climate change, terrorism and organized crime, have brought with them significant challenges for society. They demonstrate a clear need to enhance the protection of the public and infrastructure and to improve for instance the systems for early warning and two way crisis communication between authorities and the public. The present means of communication, i.e. sirens, mobile loudspeakers, radio and television and RDS for disseminating important messages to the public, communication with fixed telephone and cell phone, need further development but they also need to be supplemented with more extensive use of new media, such as SMS and Cell Broadcast, Voice over IP and Internet. But it is also necessary to recognize how so called social media have evolved and consider how these can play an even greater role for crisis communication in the future.

Evenso, further measures will be required to ensure that all persons in a defined affected geographical area can be warned and receive necessary information on adequate action to take and are provided with opportunities to seek information or other necessary help. New media and technology can thus lead to improvement and also enhance reliability of the risk communication but furthermore provide means for reaching vulnerable groups, for instance people with different handicaps or impairment, and when necessary provide information in different languages.

Experiences from different crises indicate that the 112 Emergency Call Number service can become overburdened and blocked which demonstrates the need for a separate call number and centre for information exchange to lessen the burden. The received information from the public through such a communication centre can provide a valuable input to the situation awareness of the involved crisis management authorities. An overall situation awareness will build on compiling and analyzing the received information from different sources and will form the basis for presenting information on consequences and presumed development of events, including priorities of actions to be taken. Each competent authority evaluates how to make use of the common information for its purposes. Requirements for the operational management, presentation and distribution of information from the situation awareness, or parts of it, need to be analysed and identified.

MASSCRISCOM will address, with an all-hazards approach and subject to existing conditions, risk and crisis communication needs in a County with high risk conditions. Information on risks and threats will be integrated with the contingency risk mapping and planning which will also form part of the situation awareness to be used for conducting the risk communication. Advanced information will be distributed through secure channels of communication and general information will be compiled and prepared for distribution to the public through available media channels as well as at common press conferences. Sufficient but limited information will be provided through a system with selected (GIS) base stations to enable the citizen in specific regions to take appropriate action. The future system to be developed will facilitate communication with particularly vulnerable groups and in different mother tongues.

The project work on the system was divided into the following Work Packages (WPs):

WP3 – Crisis Communication Development – will create the specifications of the crisis communication system including service specification, system specification and operational procedures. The results of WP3 will guide the definition of the overall system requirements for a generic crisis communication system which will be presented and demonstrated in WP6.

WP4 – Mass Communication – will create the specifications of the mass communication system including service specification, system specification and operational procedures. The results of WP4 will guide the definition of the overall system requirements for a generic mass communication system. A "Crisis Communication Centre" (CCC) including a proposal regarding a separate information number(s) service will be presented at the demonstration in WP6.

WP5 – Integration with Situation Awareness – will create the basic functions for contribution information to the situation awareness system which will include elements from WP3 and WP4 and be presented at the demonstration in WP6.

WP6 – Demonstration – will present the service components developed in WP3, WP4 and WP5 and resulting in a coherent generic communication model. The demonstration will present the different elements of the model, combined with a seminar to consider and discuss the project results.

A requirement specification was created by a working group with participation of SMHI, MSB, SOS Alarm and the Victoria Institute. Points of view as well as experience were gathered from both crisis management experts and the public. Major sources of information for MASSCRISCOM were:

- A qualitative study made by a team of postgraduate students at Örebro University, supervised by Mats Eriksson, Ph. D., A citizens' perspective of the alarm function in the mobile communication scenario which was to focus on the problems related to overloading of the 112 Emergency Call Number.
- A web poll distributed to a number of experts within authorities, involved in rescue planning, emergency response and evaluation.
- Studies of literature and research reports within the field of the project's scope in collaboration with Jonas Landgren, Ph. D. specialized in Public Safety at the Victoria Institute in Gothenburg.
- Experiences exchanged within the working group, at the MASSCRISCOM Steering Group Meetings and between experts from Finland, Åland, Estonia, Germany (Hamburg), Iceland, Latvia, Norway and Sweden, at the two open thematic seminars (addressing ambulance and disaster medicine management and a communication centre function for handling mass call information exchange respectively) organized by MASSCRISCOM in Mariehamn, Åland, and Tallinn, Estonia.

A conceptual model was used by the working group to identify, explore and discuss various challenges and needs that have been addressed. The process model is divided in three major phases, Information Gathering, Managing Situation Awareness and Channel-Based Mass Communication, **and outlines the connectedness and dependencies that exists between these.**



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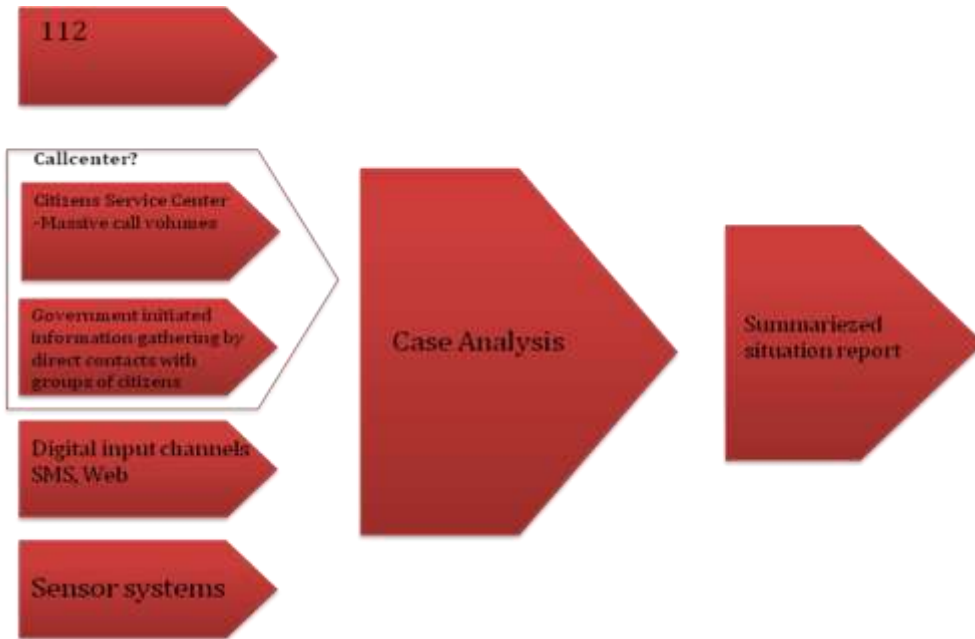
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Each phase of the model is further described in the sub models. Output from one phase serves as input to the next phase. Output from the last phase serves partly as input to the first phase.

Information Gathering



The process model starts with the sub process Information Gathering. This sub process outlines how information is collected via a set of specific input channels. Each input channel has its specific properties. The primary means for gathering information will be through a "Crisis Communication Centre" (CCC). This Centre will answer the large number of incoming calls from the public and log all these calls into a computerized support system. The Centre will also conduct government initiated information gathering by reaching out to selected groups in society in order to collect specific information. From the primary information gathering mechanisms as well as from underlying sensor systems, a rich set of information will be stored for case analysis and finally processed to produce a summarized situation report. The summarized situation report will be the output of this sub process and become input in the next sub process.

Managing Situation Awareness

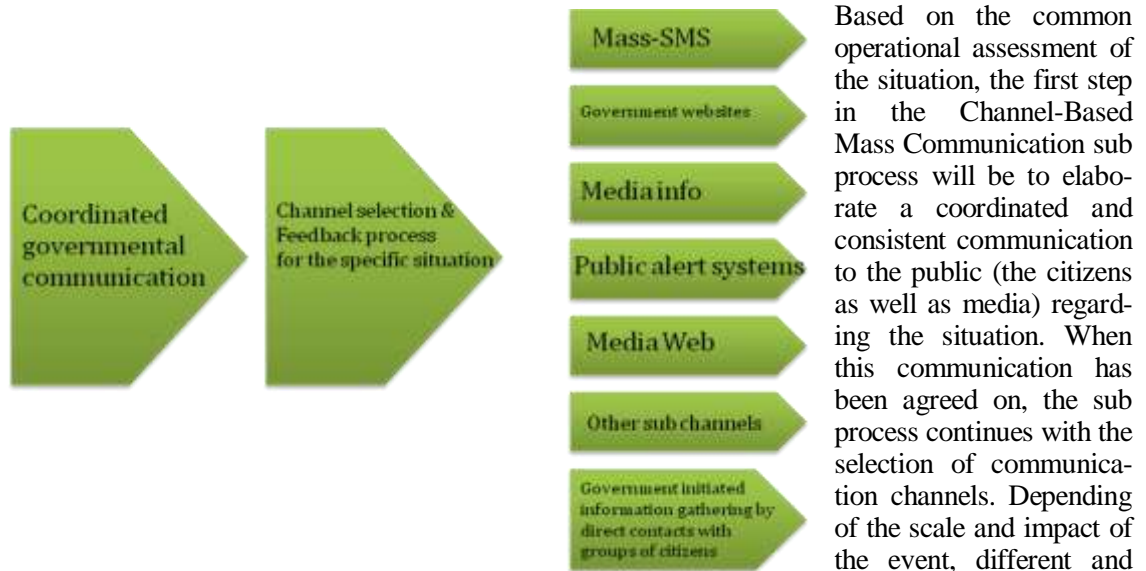


In the Managing Situation Awareness sub process, summarized situation reports will arrive and become analyzed in order to determine which competent authorities should address the

upcoming situation. A key issue will be to mobilize all appropriate authorities on national, regional and local levels. When these are mobilized, the work continues by conducting a collaborative situation analysis. In this analysis, each authority focuses on the situation from its area of competence and

how the different interpretations of the situation might affect the network of the involved authorities. When the authority specific analytical work is completed, the process continues to establish a common operational assessment of the situation which will be the output from this sub process and become an input in the next sub process.

Channel-Based Mass Communication



multiple communication channels might be used. The last activity in this sub process is to conduct the communication which is likely to become a direct or indirect input to the information gathering process. In particular, this will be the case when specific groups are to be addressed.

Exchanges of information on administrative changes affecting crisis communication, experiences from mass crisis communication and different reports of events and studies that have taken place between the MASSCRISCOM partners in Estonia, Sweden and Åland and with experts from primarily Finland, Germany (Hamburg), Iceland, Latvia and Norway. This includes a Qualitative Study from Örebro University to illustrate various categories' attitudes toward a "Crisis Communication Centre" (CCC) as well as how that prospective Centre might relate to the existing 112 Emergency Call Number. It also suggests techniques through which the public may prefer to be approached in case of an emergency or of a situation which requires public warning.



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Experiences of crisis communication in recent years, including organisation aspects

Estonia

In Estonia, the people are considered to be the biggest asset as crisis communicators. The crisis communication network in the regions (government agencies) and on State level (government agencies, ministries) is based on networking and is not a hierarchical setup. The structure is similar to the crisis management system with a crisis communication team on scene and regional level, consisting of local authorities and local offices of government agencies and inspectorates. On national level the team consists of agencies and inspectorates and on central government level of the Ministries. The team is organised for rapid reaction with permanent members from governmental agencies or ministries and there are rules of procedure, a communication plan and defined subordinate bodies.

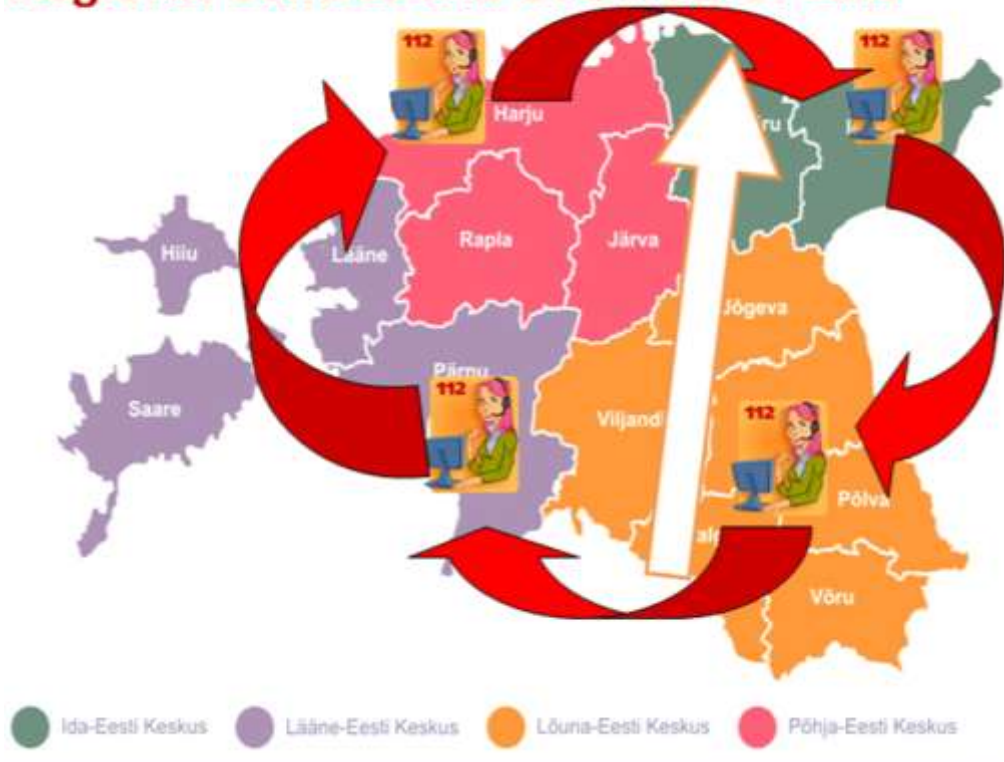
The Estonian Rescue Services, the Border Guard and the Police are organised in four regions under a centralized leadership. There is a standardized and common system with four centres for handling rescue and medical emergency calls and the police calls are under way into this system. There is an overflow system between all four 112 regional centres to ensure that the calls are responded to. All the information received by call-taker from the scene is recorded in a database. The management level follows, supports and intervenes only if necessary.

In Estonia there is a common TETRA radio communication network between 112 and the different collaborating services. Many calls are in the Russian language but there are frequently also calls in English and Finnish. Assistance for disabled people is provided via fax and there are some special forms of communication distributed through the disability organisations. There is a project in process to provide SMS-112 service for disabled people free of charge. The caller location is pull-based but will change when an on-going GIS-112 project is implemented. Caller location service is free for ERC and the costs are born by the mobile operators. There are projects going on regarding SMS service for hearing and speech disabled people, improved handling of rescue cases – development of a rescue index in supplement to the existing medical index for risk evaluation – and integration of the common database and the TETRA radio communication network (status messages, SMSs, alerting, etc.). A challenge is to organise effective two-way communication between the public services and society in crises situations.

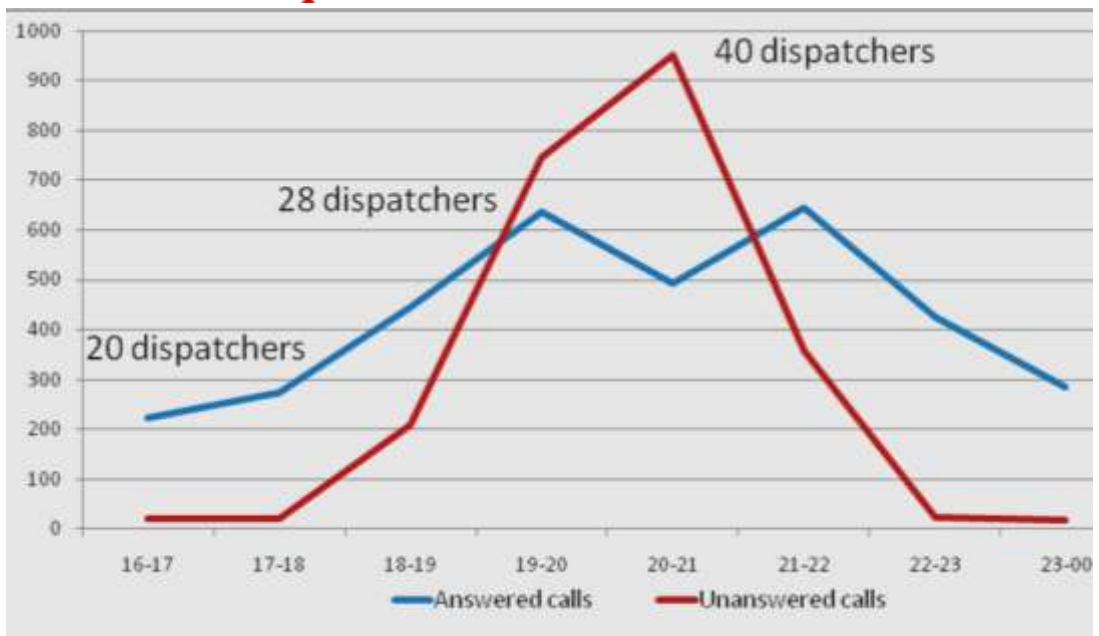
Thunderstorm Derecho in August 2010

In the evening of 8 August 2010, a furious thunderstorm (Derecho) passed over half of Estonia in 3 hours from Latvia to the Finnish Gulf and caused very severe consequences. There was no active pre incident warning message to the public and the only warning message was received through the morning weather forecast, indicating that a storm was coming and wind speed would be 25 m/s.

Regional Centres and overflow of calls



Consequences of the thunderstorm



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The consequences were that 60,000 households were without electricity, the Estonian Energy dispatch centre became overloaded with calls and the public in two eastern regions affected and could not get help or information on how long the power black-out would last. 3000 emergency calls to the 112 system were unanswered from 1800 hrs until midnight, in which period there were 26 fires and 175 ambulance calls.

The lessons learned were that there is a need for an



early warning system to allow the 112 emergency call system to increase its readiness before the incident and not have to take measures to reach a sufficient capacity once it has occurred. Early warning messages must be sent to the public to avoid panic and accidents. The early warning system must provide warnings to all services with information and service numbers, i.e. the Estonian Energy, etc. in order to also increase their readiness to avoid the blocking of the 112 lines which increases the

consequences of the emergencies. Improved co-operation is the key answer to improving the situation. By 2014, the police control centres will be integrated into the ERC centres which is an important change. Thunderstorms and similar emergency situations need more dispatcher capacity which can be achieved through this integration. MASSCRISCOM can play a role in providing solutions on how to avoid an overload of the 112 emergency call system and how to organise two-way communication during emergencies and crisis situations, because lives will depend on this.

An integrated research study was conducted by Tartu University (it is presented more extensively together with the other studies) on the patterns of receiving and processing emergency information – cultural experiences and information searching habits. It was based on a case study with retrospective interviews with people who had actually survived the storm and floods in Pärnu in 2005. This survey focused on the perception of crisis communication information by the citizens, who expe-

rienced real-life crisis events in Estonia. The survey also showed how people reacted to the crisis communication messages and which actions were taken by different social and age groups.

Finland

During the last decade, three large scale reforms have taken place in the emergency services and, since the beginning of 2004, municipalities jointly have to arrange region-wide rescue services in 22 areas. The main purpose was to streamline the organisation by combining administrative functions and to create opportunities for specialization. There are six Regional State Administrative Agencies that started operating on 1 January 2010. The Agencies' tasks consist of those of the former State Provincial Offices, namely occupational health and safety districts, environmental permit agencies and regional environmental centres, and include public safety and a safe and healthy living. The Agencies work in close collaboration with local authorities.

The responsibility of civilian crisis management is shared between the Ministry for Foreign Affairs and the Ministry of the Interior. The Ministry for Foreign Affairs is responsible for the political coordination of civilian crisis management and thus decides which missions Finnish experts may take part in, while the Ministry of the Interior is responsible for issues concerning national capacity building on a strategic level. The Emergency Services College in Kuopio has been given an active role in the training for international rescue and crisis management operations.

The Crises management Centre Finland (CMC Finland), also located in Kuopio, is a governmental institution and a centre of expertise in civilian crisis management. The main tasks of CMC Finland are to train and recruit experts for international civilian crisis management and peace building missions as well as conduct research focusing on civilian crisis management. CMC Finland operates under the Ministry of the Interior and has jointly with the Finnish Defence Forces International Centre (FINCENT) founded the Finnish Centre of Expertise in Comprehensive Crisis Management.

The crisis management and communication changes include procedures and administration, structures on the regional and local level, integration and co-localisation of the services of different actors to improve collaboration, use of modern technology and rationalisation and improved efficiency of the public administration, including involvement of the third sector and outsourcing. Some recent crises related to wild bears appearing in city areas, a waste water accident and shootings of persons lead to the establishment of the web portals Luova (natural accidents) and the Crisis Portal.

The number of emergency response centres will also decrease to seven centres before the end of year 2015 and these will be developed and use a new IT-system to handle all ERC-functions. A new field management system will be provided to all co-operating authorities. The administration of the Emergency Response Centre Authority is located in the Ministry of the Interior, where furthermore the national leading units of the rescue services and police are located; there is also involvement of the Ministry of Social Affairs.

The modern technology to be used consists of Internet, social media, digital TV (cable-TV), Broadband services, radio, GSM, 3G and mobile IT, GPS- and GIS-services and the authority communication systems VIRVE (a TETRA-radio network) and the TETRA Enhanced Data Service (TEDS). In respect to information and training the general principle is that whoever directs activities in a situation is also responsible for informing the public. Information must be provided in advance and preparedness must be built up and practised. Regular emergency exercises are thus required for testing the functioning of the plans and instructions. VIRVE has covered all of Finland since 2002 and is used by various authorities which makes inter-agency communication easy. The main users of in all 31,000 terminals are the rescue services (over 11,000 terminals), the police, the Defence Force, the social and welfare services, the frontier guard and the customs.



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The Åland Home Rule



Åland has a wide autonomy within the State of Finland, which is regulated by the Act on the Autonomy of Åland, in which the division of power between Åland and the rest of Finland is defined. Because of its autonomy, Åland has its own Parliament and Government. The government of Finland is represented in Åland by the Governor of Åland, who is the Director of the State Department of Åland. The Åland Parliament has the right to pass legislation in areas related to its internal affairs and to exercise its own budgetary power.

The most important legislative areas are:

- health and medical care
- policing
- rescue services
- radio and television.

The State of Finland is on the other hand competent within most areas of civil and criminal law, international affairs, customs and taxes, civil protection and state security.

Due to this division of power, crisis communication is a responsibility of both the Government of Åland and the State Department of Åland. The Åland Government is responsible for the rescue services but has a joint responsibility with the Finnish State competent authorities for civil protection,

i.e. the Ministry of the Interior, the National Emergency Supply Agency, the Radiation and Nuclear Safety Authority and the Emergency Services College.

In Åland the rescue services are organized mainly in the same way as in the rest of Finland. There are 16 municipalities in Åland which make agreements with the voluntary fire brigades and are responsible for the civil protection in their areas. In Åland there is one emergency call response centre (ERC) but there are separate centres for the police and the Coast Guard. The police call centre will shortly be integrated into the ERC. The Public Authority Radio Network (VIRVE) is used also in Åland.



The ERC gets information not only from the citizens but also from authorities and companies. Both the ERC and the rescue services can provide the Åland Radio with information in emergency and crisis situations. The Åland Radio has served as the most central and fastest function for giving information to the public, for instance in the event of spreading of dangerous substances, traffic accidents, problems with the water or electricity supply, etc. The radio can also be used in crises for emergency announcements and public notifications or important messages and serve as the command point which was the case in the great snow storm in 1998.

The general warning signal is also in use in Åland for warning people but there is a need to introduce modern technology for this purpose. However, Åland will depend on the warning and communication systems under development and used in the rest of Finland. Collaboration regarding these matters has also been established with authorities in Sweden, in particular the Uppsala County Administrative Board.



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Iceland



The Icelandic 112 Emergency Alert System Rescue Centre works under what is the Skogahlid Concept with the following objectives:

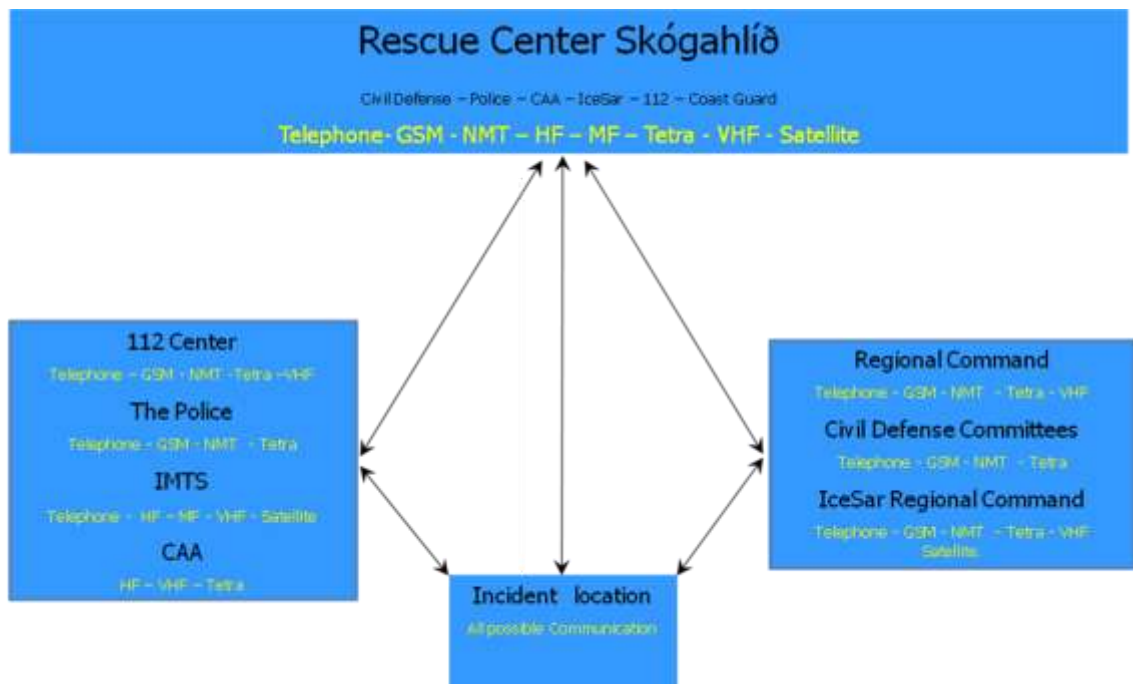
- To have all emergency call taking for the whole Country at the same place
- To be able to operate and control other communications from that same centre
- To have the same people taking care of daily business as well as major emergencies
- To have as many of the first response people as possible working in the Skogahlid building
- To have IT systems and emergency databases centralized
- This will enable response to emergencies everywhere in the Country in a matter of seconds.

The Rescue Centre thus integrates the 112 Centre, the Police Communications and Command Centre (FMR) and the Icelandic Maritime Traffic Service (IMTS) and involved administrations. The centre in Akureyry can to a certain degree function as a backup for the Skogahlid Centre. The communication system is a public service Tetra communication system which makes it possible to keep low prices for the users, in all 4.700 users. The Tetra system is the core system, used also by the voluntary organizations which are using their own old systems less and less.

The ambulance helicopter uses Tetra for communication with the doctor at the hospital. There are 150 base stations which will increase to 160 also located in the inner parts of Iceland. Fibre optic is as a rule used for connections. There are annually 424,000 group calls, 19,000 telephone calls and 15,000 private calls. The future vision is to also have access to the use, daily and as a reserve in extreme situations, of the base net consisting of a fibre optic cable ring around Iceland, which was formerly developed for military and security purposes.



Skógahlíð, the Concept



Response Units' Communications



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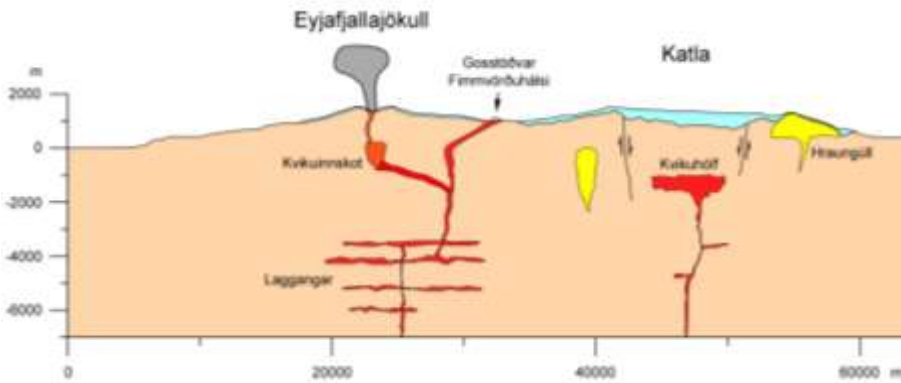
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Earthquake in May 2008

The experiences from the earthquake on 29 May 2008 with a magnitude on the Richter scale of M 6.3, when there were no casualties but about 100 buildings severely damaged, were that the communication needs were considerable. But the Tetra system worked very well, to a great extent with pre planned groups, even though there were 500 calls during the first hour. The mobile telephone net became overburdened. The TETRA communication system withstood the enormous workload during the first hours and made it possible for commanders to have an overview of on-going operations.



Katla and Eyjafjallajökull associated?

Eyjafjallajökull Vulcano Eruption in 2010



Reykjavík downtown – or?



In connection with the 2010 Eyjafjallajökull volcano eruption, Iceland was described as a small nation and large country with many hazards and in fact Iceland has one of the highest frequencies in the world of natural disasters. These include earthquakes due to strong motion of the ground, snow avalanches, glacial outburst floods from sub-glacial volcanic eruptions and meteorological hazards in the form of violent storms, river flooding and coastal flooding. There are also considerable transportation risks in Iceland related to buses, ferries and aircraft.

From 1994 there were some signs of seismological activity in Eyjafjallajökull and 1999 there was more seismological activity. The seismological activity became high in 2009. Early in March 2010 the activity increased and meetings were held with the affected inhabitants. In the evening of 20 March an eruption started at Fimmvörðuháls which lasted until 13 April 2010. The eruption was relatively small but about 700 persons were evacuated from the area in danger due to flooding. Many visitors were in the Fljótshlíð area and some 100,000 "visitors" were on the glacier during the eruption. The main concern for the Civil Protection became (surprisingly) crowd control!

Seismic and volcanic activity stopped on the 13 April 2010 and scientists presumed that this part of the eruption was over, but something was going on west of the eruption site. The eruption started again in the evening of 14 April and early in the night it was decided to activate the evacuation plans fully, i.e. evacuation of both inhabitants and tourist, closure of roads, restriction of flights (10 miles) and activation of the Civil Protection structure of Iceland to its full capacity. There were two floods on 14 and 15 April and the volume of the flowing water was up to 3,000–4,000 m³ per second, the highway no. 1 was breached to save the bridge over the Markarfljót-river (the flood passage) and levees prevented the Markarfljót-river from spreading. The immense ash fall out affected all Europe and damages on agricultural land created difficulties for farmers. Health effects on residents and live-stock are not known. The question now was "is it over", which was uncertain as in 1821–1823 there had been long periods of no activity. As there was still a danger, the emergency phase continued with restricted areas.



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Crisis communication with the public was conducted through phones (voice mail and SMS) and through media, i.e. the national broadcasting service is a part of NCC, the Website www.almannavarnir.is and other national media (press releases via e-mails). The primary communication system for all response units (Police, Ambulance, Fire and the ICE-SAR rescue units) is the TETRA radio communication system. TETRA in Iceland is operated by Neydarlinan 112 (the 112 Emergency Call System). A few weeks before the eruption a new Base Station had been built on the mountain Þórólfsfell, north of the Eyjafjallajökull. During the eruption another Base Station was installed on mount Laufafell. These two as well as other Base Stations around the Glaciers founded the platform for the communications. Another role for these Stations was to serve as a base for measuring equipment used by the scientists and also hosting Web cameras used for observation and world-wide broadcasting.



Strong seismic motions under the summit crater of Eyjafjallajökull (E-15)

The telephone companies installed GSM and 3G services in the 112 stations on these mountains, enhancing the overall communications in their areas. Beside those services, the Automatic Vehicle Location (AVL) system, based on the TETRA system, was also used throughout the operation. AVL was a great help in overall resource management and was used extensively both by the on scene Command Centre and in the National Rescue Coordination Centre in Reykjavik. The TETRA system and its side functions worked perfectly throughout the incident. In the local EOC the chief of police had representatives from all involved organizations and local government. Regular meetings were held with other local and nonlocal authorities, e.g. the Icelandic Food and Veterinary Authority (livestock).

All ministries were involved which leads to a high demand for situation awareness information. Numerous service bodies participating gave vital information but also needed information. Most of them are part of the plan but there are different opinions on their roles and responsibilities. An information team was set up for dealing with the media and government and foreign embassies and providing frequent Situation Reports and elaborating speaking-notes for ministers and Icelandic embassies abroad. Challenges were persons requesting through e-mails information about the situation in Iceland and asking questions, for instance is it ok to travel to Iceland, how are my family members, etc. New challenges, not foreseen in the planning, were the social media, i.e. blog, Twitter and Facebook as well as the spreading of rumours.



Eyjafjallajökull Vulcano Eruption

The lessons learned were that there is an immediate need for a better alarming system in the area to reach unlisted phones, for which purpose there is a lack of sufficient software and equipment, and also for planning for handling international media. Coordination with numerous agencies and ministries needs improvement, partly since these frequently did not have a forward looking planning. The closure of access to dangerous areas must be strictly enforced and monitored, and it is necessary to ensure beforehand that the evacuation plan works and the residents know how to respond or act. The residents must be involved in the planning and preparedness and be kept well informed to enable the system to work. Residents have trust in authorities during and after the eruption which must be maintained.

Sweden

The task of the Swedish Civil Contingencies Agency (MSB) is to enhance and support societal capacities for preparedness for and prevention of emergencies and crises. When one does occur, MSB supports the stakeholders involved by taking the right measures to control the situation. The Swedish structure for civil emergency planning is coordinated by the MSB, which holds the mandate for a holistic and all hazards approach to emergency management. This includes the entire spectrum of



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threats and risks, from everyday accidents up to major disasters. The MSB's mandate is to support the coordination of measures taken by local, regional and national authorities during a serious crisis or disaster. The principle of responsibility is fundamental to Swedish crisis management i.e. an authority responsible for an operation during normal circumstances will also be responsible for that operation during a crisis.

MSB provides methods for crisis communication and the coordination of official information to the public. One important task is to prevent unnecessary duplication and avoid contradictory information. During a crisis or disaster, regular cooperation conferences are held, at which the competent actors maintain action plans and common and up-to-date situational reports of what has happened. This coordinated information is communicated to the public via various channels, including the intergovernmental portal www.krisinformation.se and a communication centre. Press releases are distributed, and intergovernmental press conferences are held.

At the regional level the County Administrative Boards are responsible for the coordination of CEP activities such as exercises, risk and vulnerability analysis. They also act as a clearing house between public and private partners and during a crisis coordinate the measures taken by the relevant actors. The County Administrative Boards also coordinate contact with the mass media during major emergencies, crises, and disasters. The Swedish municipalities have a large degree of autonomy and play an important role in civil emergency planning and preparedness. During a major emergency, the municipal executive board is the highest civilian authority within the municipality and is responsible for all civilian command and crisis management at a local level. In this role municipalities are supported and assisted by the County Administrative Board.

MSB monitors and analyses developments in the media field from a preparedness point of view, in cooperation with media production and distribution companies. The main objective is to ensure the maintenance of the independence of media companies and the best possible work conditions even during extraordinary events. The purpose is to ensure that the public is guaranteed free and independent news coverage and that the media companies are able to produce and distribute warning messages, news and information to the public in the event of emergencies, serious disruptions, extraordinary events and periods of high alert. Media preparedness work is built on cooperation between private and public actors, which requires knowledge, respect and understanding for each other's roles and organizations.

SOS Alarm is by appointment of the Swedish Government responsible for handling 112 emergency calls, and the mission consists in alerting the adequate emergency services and directing the response units to the correct location in the event of fires, traffic accidents, releases of hazardous substances, etc. and large scale emergencies. SOS Alarm has additional contracts with practically all municipalities in Sweden regarding dispatching, etc. The County Councils are in charge of the health and hospital care in Sweden and services regarding setting priorities and dispatching the ambulances are regulated through contracts between SOS Alarm and each County Council. SOS Alarm has successively improved its medical competence and participates in research and development programmes conducted by many County Councils. Presently, an extensive cooperation in the development of new services based on SOS Alarm's new technical platform and the introduction of the Tetra communication system (in Sweden Rakel) is being conducted in collaboration with the emergency services all over Sweden.

SOS Alarm is a public service enterprise and owned by the Swedish Government (50 %) and the Swedish Association of Local Authorities and Regions (50 %). SOS Alarm's 18 regional 112 Emergency Call Centres are operational 24 hours a day, 365 days a year. By calling the single 112 European Emergency Call Number, it is possible to receive help from all or any of the available emer-

gency service, e.g. the ambulance service, the police, the fire and rescue service, the air and sea search and rescue service, the mountain rescue service and a priest on call.

A new strategy, organisational structure and working methodology for SOS Alarm was introduced on 1 October 2010. SOS Alarm is now divided into three production areas, Northern Sweden, Southern Sweden and Central Sweden to facilitate co-ordination on national and local levels. There are four business areas, 112 and crisis management services, paramedics services, rescue services and finally security and stand-by services for calls and social care services. Trends in the further development of the organisation to enable it to adapt itself faster to the customers' needs are:

- Increased specialisation and improved competence within all the business areas
- A focus on close dialogue with clients to meet individual needs within different sectors
- Integration and harmonisation of the 18 SOS centres which together will act as a virtual centre enabling the work load to be transferred between the units
- Increased participation in research and development for instance in pre-hospital care and rescue service, etc. to improve safety and the quality of the service
- Integration of the 112 with the Tetra communication system
- More focus on participation in crisis management in municipalities, regions and nationally.

Storm 4–6 December 1998 leaving 1.5 m deep snow in Gävle, Sweden

A storm came in over the Gävle area Gästrikland from the Bothnia Sea and this led to exceptionally intensive snowing, thunder and with extremely hard Northeastern winds. A considerable amount of energy and moisture had been picked up from the comparably warm and large sea, and when it reached land it turned into snow. The snowstorm lasted for about three days and the snow depth was about 1.5 m.



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This had considerable consequences in different respects. Rail and road communications were more or less completely blocked, including the railway and the main highway between Stockholm and the North of Sweden and all local traffic. People could not reach their homes and many lost their supply of electricity and a general recommendation to people to stay at home was issued. All schools and shops were closed. Elderly needing help and in-

formation were provided with this by using traced vehicles. Operations at the hospital were cancelled but emergency health care was conducted and ambulance transports were carried out with traced vehicles. The rescue service was able to fight a fire using such a vehicle, but a 94 year old man died in the fire. Otherwise there were no accidents. Many people called the 112 emergency call number requesting help with clearing away the snow.



It took about five days for the communication system to start working again and in the first phase only public transport, free of charge, was allowed. In the meantime, military personnel and traced vehicles were used for the transports. Vehicles stuck on the roads were checked and the people stuck in them evacuated. Also volunteers with snow scooters assisted in this task. Many people had to be provided temporary shelter and food. The regular snow ploughs had a difficult task to keep pace with the snow, which was made more difficult due to the strong winds. Some military helicopters assisted also during this period.

Crisis communication was exercised through the local radio and 98 % of the population listened to Swedish Radio Gävleborg Radion Gävleborg. Information on the situation was disseminated continuously and a lot of atten-

tion was devoted to assisting people in need of immediate transport and health care. Radio Gävleborg thus played a vital role in the considerable amount of evacuations and providing information to the public. Everybody was recommended through Radio Gävleborg to stay at home.

Gas accident in Borlänge in April 2000

A goods train with nine liquefied petroleum gas (LPG) tank wagons derailed in April 2000 in Borlänge at the railway station in the center of the town. It was decided to evacuate the area. The social service of the municipality was according to the emergency preparedness plan responsible for necessary evacuation measures. Before the recovery of the railway wagons could start about 630 persons were thus evacuated.



All the people who were to be evacuated received a personal visit by a social secretary. Only about 60 persons needed help from the municipality with accommodation and transport, of these 30 were taken to a health care home. After one week when the response action had been completed, everybody could return to their homes. All crisis management actions were conducted primarily by the rescue services and the social service. A conclusion from the evaluations made after the accident is that what contributed to the municipality being able to manage such a threatening incident so well was that all actions were taken in accordance with the routines in the preparedness plan.

The municipality provided considerable information to the public and to mass media. A lesson learned is that the information spread through the local radio does not reach everybody as the younger generation has other radio habits than elderly people. Another experience of the railway accident in Borlänge is that some hearing-impaired persons were not reached by the information efforts on the radio regarding the necessity for them to evacuate the accident area. Work is going on to improve the different forms of crisis communication with handicaps or hearing impairment, for instance REACH 112 (Responding to all citizens needing help) which is a three-year project partially funded by the European Commission under the ICT PSP CIP programme. It has 22 partners in Europe, including user organisations and major global telecommunications companies.



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REACH 112 has three main goals, namely to:

- increase opportunities for all people to communicate at a distance in video, voice and text
- provide the relay services to allow people who use Total Conversation to reach the population who use voice telephones
- provide direct access to emergency services (999, 112) through Total Conversation The project runs from 2009 until 2012.

Breakdown of telecommunications in Uppland in October 2002

The whole of the Province of Uppland with about 230 000 telephone subscribers suffered on 2 October 2002 during five hours from a breakdown of their telecommunications. No calls were made to the SOS Alarm Emergency Call Centre in Uppsala and the personnel at the Centre understood that all incoming communication had been broken.

One mobile telephone operator, Tele 2, however turned out to be functioning and a Tele 2 subscription was therefore bought at the nearest telecom-shop for the Centre. Emergency calls could then, once information about this had been disseminated through the local radio, be received and communication maintained with the dispatched response units. The local channel of the Swedish Broadcasting Company provided a transmission vehicle outside the Centre which could be used for summoning personnel and dispatching resources.

The vehicle was crewed during the first phase by two SOS operators and the chief of staff of the fire and rescue service. A police patrol was stationed at the Centre and later Radio Uppland and the head surgeon on duty joined. The fire and rescue service, ambulances and police could be dispatched by using the Comviq telephone operator and radio communication. About 450 calls were made to the adjacent Centre in Västerås and 250 of these calls were re-connected to Uppsala. Most of the calls were of information character. No major emergency occurred while the telecommunications were broken down.

The evaluation of the event indicated that there was not sufficient redundancy in the telecom network. Two of the major telecom-operators had co-located technical systems. According to the evaluation report, SOS Alarm has reserve systems to ensure capability of always receiving 112 calls. When the general electricity network is out of order, this will impede the possibilities of fulfilling the tasks. After a very short time, it was all the same possible to establish communications through other channels. This was facilitated by the unique collaboration which has been established between the emergency management organizations through the CeSAM system, involving the ambulance service, the police, SOS Alarm and the fire and rescue service. Important in this context is that SOS Alarm is co-located with the fire and rescue service in Uppsala.

230 000 telephone subscribers became for a period of about five hours completely unable to call the 112 Emergency Call Number. This demonstrates very clearly the vulnerability of modern society. Successively, society is becoming more and more dependent on the technical infrastructure, i.e. electricity, telecommunications and information technology (IT). In this incident a disturbance in the electricity network generated a telecommunication network breakdown which caused the data communication system to stop.

In the mobile telephone network, there is a reserve function called "roaming" which means that if the telephone subscriber cannot get contact with his telecom-operator then the mobile telephone will automatically search for another telecom-operator (network) and thereby enabling him to call the 112 number. If this function had worked as anticipated, then all the mobile telephone subscribers would have been able to call 112 over the Comviq mobile network which was accessible.

In the evaluation, it is indicated that "the expectations of the public and the societal rescue organizations that SOS Alarm has the ability to manage also very complex situations are great. Simultaneously, we depend on the network being reliable and the quality of the emergency communication being of high quality. A deeper analysis is therefore necessary as a basis for elaborating proposals on short- and long-term measures."

Some of the experiences of the event are:

- the technical systems of several telecom-operators should not be co-located
- as a preparedness measure, "general" SIM-cards for mobile telephones should be kept in store ready for use
- there is a need to be able to transfer the communications between different SOS Centre, a capability which the new technical platform provides
- the local radio is essential for providing information to the citizens and between different authorities and organizations, in particular when the telecom network has broken down.

A measure taken as a result of this event was that general SIM-cards, which allow for roaming between different telecom networks, were introduced by the Swedish Post and Telecom Agency (PTS) for use in similar situations. Three SOS Centres have the responsibility for distributing these cards to important societal functions through the relevant County Administrative Boards. PTS decides when the crisis roaming cards may be used.

The experiences from the event have in several respects been used for changing routines and enhance the preparedness. The problems related to why the roaming did not transfer the mobile telephone calls to another telecom-operator (network) as was the case in Uppsala have not been resolved. The radio bases indicated that they "were alive" which lead to the roaming not coming into action, even though the emergency calls did not reach the SOS Centre. The reason for this was that the radio bases of the other telecom operators could not be closed. To change this requires that the measures must be taken in a whole region, which the telecom operators find too costly.

The storm Gudrun 8–9 January 2005



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The storm Gudrun is an exceptional event and one of the largest major natural accidents that has occurred in the South of Sweden in recent years. The affected area had the form of a circle with a radius of about 100 km and with Växjö in the centre. The area was mainly covered with woods and forests which in large parts were more or less completely destroyed. The central part of the area suffered from a collapse of the infrastructure.

A large part of the telecom network and the road network was knocked out causing problems in maintaining the communications. Masses of blown down trees blocked the roads and railways. This caused breakdowns of the electricity supply and the telecommunications. It also prevented the filling up with fuel the reserve aggregates of the mobile transmitters. The crisis endured for quite a long time and affected a large area and many people.



During twelve hours, SOS Alarm received 12,000 Emergency Calls which can be characteristic of a mass crisis situation. In addition to these calls, all those calls should be added which resulted in a number unobtainable tone, due to the overload of calls and the telecommunications having been knocked-out. This made it not possible to call in a large part of the area. SOS Alarm was able inter alia to:

- mobilize all available extra personnel to the SOS Centres and triple the amount of persons on duty as a result of having received early weather warnings
- warn and encourage the municipal rescue services at an early stage to man their fire stations in order to make it possible for SOS Alarm to hand over to them all matters related to for instance blown down trees which were blocking the roads
- establish close collaboration with the officers on stand-by in the County Councils regarding the reduced pass ability of ambulance transports, etc.
- create communication networks together with the rescue services for dispatching ambulances
- function as a nave for the flow of information
- serve as a resource for the regional and local crisis groups
- increase its preparedness for possible further problems such as very cold weather conditions and consequences caused by heavy rain.

Many people called the 112 Emergency Call Number only to report personal problems due to the situation and to provide information, which in their view could be useful for others, for instance damage and obstacles affecting the infrastructure. This was not in the least valuable for the planning of acute ambulance and rescue interventions. Many called from all over the country to ensure that their relatives and friends could get in contact with the elderly and health care. There was a risk for emergency ambulance calls being lost among all the calls regarding information.

The experiences were that:

- there is a need for separate channels for receiving information about persons and damage to the infrastructure of non-emergency character
- this need exists at national, regional and local level
- the municipalities need to have access to information to know where there are single persons with particular needs, as personal security alarms etc. do not function if there are no telecommunications available and electricity failures.

Flooding on 5 July 2007 in the Southern Swedish Province of Scania (Skåne)

The South of Sweden suffered on 5 July 2007 from very heavy rain and winds which due to the very fast and unexpected course of events led to a mass call situation for SOS Alarm in Malmö. The weather warning was only on the lowest level (class 1) but the weather took with very short notice another course than the prognosis had forecasted. Many houses in Scania had after a very short while their basements flooded, in many cases with waste water.

Many property owners called 112, primarily to get help from the rescue services. In the course of one hour, SOS Alarm in Malmö received up to about 1.400 calls, compared to a normal rate of about 50 calls. An investigation showed that about 90 % of the calls were only about the flooding. Even if the situation was not life threatening, many felt they were in their right to call as there was no alternative offered. The exceptional burden on 112 made it difficult to separate these cases, related to flooding with lower priority, from the acute emergency calls where life and property were at stake. In some cases, calls for urgent help with an ambulance had difficulties in reaching the SOS Centre in Malmö, due to the system being overloaded.

The new technology platform of SOS Alarm enabled the SOS Centre in Malmö to get help from the other Centres and 10 out of the 18 Centres became involved in responding to the 112 calls in Scania. Only in exceptional cases, the calls could be considered to be such acute emergencies that require the use of the 112 Emergency Call Number.

Interviews with 858 of those who called indicated inter alia that:

- many people called many times, resulting in them being placed last in the queue
- mixing acute emergency calls with calls for information can lead to lower confidence in receiving help in emergency situations
- many people were annoyed because they did not receive help and were not put in the queue for receiving help from the rescue services in emergencies which were considered not to be acute
- the calls that were answered by recommending a call to local numbers received satisfactory answers more quickly

In the summary of the evaluation report of this event, the following measures are re-commended to enhance the preparedness for new mass crisis call situations:



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- increase the conditions for distributing the calls in the country, including the calls for an ambulance
- improve the procedures for referring or transferring calls to the on-call telephone numbers of the rescue services, County Administrative Boards, insurance companies, etc. (Municipalities, County Councils and County Administrative Boards should be obliged to have information about on-call telephone numbers available on a crisis website)
- prepare procedures and messages to the public to be disseminated by the Swedish Radio
- establish a national information number which is permanently available or available in connection with a crisis enlarge the capacity of the SOS Centres to receive information from callers.

The conclusions of the interviews with 858 of those who called conducted by SOS Alarm were that the municipalities must as soon as possible introduce information numbers. These should be available for situations when the public need to be able to get answers to their very relevant questions. When there is a risk for a mass 112 emergency call situation, or if such a situation has already happened, then the public should be informed immediately by radio and TV not to call 112 unnecessarily, in order not to prevent those who really need urgent help from getting it. The public should also quickly be informed about alternative numbers to call for help and advice. In connection with the flooding on 5 July 2007 in the Southern Swedish Province of Scania, it took too long time before the affected municipalities established such alternative numbers to call for help and advice. It is furthermore important that the information to the public is unambiguous.

Bus accident in Dalecarlia (Dalarna) on 3 January 2008

A Russian tourist bus with 60 passengers collided with another bus on a small road near Gagnef in Dalecarlia at 1100 hrs in the morning. The SOS Alarm Centre had an intensive communication in the initial phase with the relevant rescue services, hospitals, municipalities, etc. The Centre could concentrate on the event as all its other tasks could be transferred to other SOS Alarm Centres.

In all, 18 ambulances were dispatched to the site of the accident from Dalecarlia and adjacent counties. Close collaboration between SOS Alarm and different rescue services enabled the involved people to be taken care of quickly. The first care was given at the parish house where a local interpreter was made available. From Mora the local group for psychological and social care (POSOM) was summoned.

The County Council Officer on stand-by could mobilize the health care system. The ambulance services in the region had been cooperating for many years which resulted in the collaboration between four counties working very well.

Experiences from the bus accident demonstrate what challenges a local organisation can face when many people are more or less injured in an accident, there may be language problems and relatives in other countries who need to be informed. The outcome of this event was fortunate as with some exceptions most of the involved had only minor injuries. In more severe accidents, the lack of information about the passengers will be a problem which will have to be addressed. When a large accident occurs the pressure on the local organisation will be a major problem. The SOS Alarm Centre will in its role as a communication centre frequently also become a natural nave in relation to mass-media, the local authorities and involved emergency response organisations.

Flooding of the SOS Alarm Centre in Gothenburg on 2 March 2008

Flooding affected the main fire station and the SOS Alarm Centre in Gothenburg on 2 March 2008. The result was that the garage under the SOS Alarm Centre where the power supply was located was filled with water and this caused a loss of power to the Telia transmission equipment for an hour

which prevented the Centre from receiving emergency calls. The flooding was a result of the water level of the Göta Älv river being 112 cm over normal and at the same time one of the lock gates regulating the level being repaired and thus out of order.

The handling of the tele-communications of the Centre was transferred to a number of the other Alarm Centres. The personnel of the Gothenburg Centre was also temporarily taken to work in the Centre in Halmstad, which is about 100 km from Gothenburg, and a temporary Centre was also established in Gothenburg. The tele-communications of the Centre could thus be handled in a normal manner and there were no indications that the public was affected in any way.



The Gothenburg Alarm Centre had only a few months earlier been connected to the new technical platform which can steer the traffic and allowed these transfers. If this had not been the case, only one Centre serving as a reserve could have been used. The capability for transfer of the handling of the calls is particularly beneficial in a country like Sweden where the climate conditions are very different from the North to the South and the burden on the 112 Centres due to severe weather conditions will thus as a rule not be heavy on all Centres at the same time.

An external unsuspected event of this type will not affect the possibilities of the public to make necessary emergency calls. The tele-communication traffic can be moved smoothly between the different SOS Alarm Centres and the personnel can share the burden. Since the event, the ability to collaborate between the different SOS Centres has been increased further. The operators are not limited to a geographical area as they can log into any of the SOS Alarm Centres. The reliability of the system has been also been improved and all routines are documented and available through the common technological platform. The working methods have furthermore become more harmonized.



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A minor earthquake in Scania (Skåne) on 16 December 2008

Earthquakes are extremely rare in Sweden but one which was stronger than usual with a magnitude of 4.3 on the Richter scale occurred on 16 December 2008 only 33 km east of Malmö in the Southern Swedish Province of Scania. The event, which caused no injuries and very limited damage to property, led to a mass of calls to the SOS Centre in Malmö.

Interviews with 300 of those who called indicated that most of these wished to have information about what had happened and also to inform SOS Alarm that something had occurred, probably an accident at the airport Sturup in their neighbourhood. A summary of the results of the interviews reflects the following:

- one in three felt the shaking and vibrations and one out of four persons described their earthquake experience as fear, panic, worry, etc.
- more or less all of them were inside their house when the earthquake occurred
- for three out of ten one call was enough to get in contact with SOS Alarm, for four out of ten at least three calls were necessary to get contact
- among those who tried to call but did not succeed in getting contact with SOS Alarm, three out of ten called once, more than four out of ten called at least three times without getting a reply
- seven out of ten called 112 to get information about what had happened, one out of eight called to report the incident
- two out of three did not seek for other information before calling 112, one out of nine listened to the local radio
- half of the persons knew what had happened within 15 minutes after the earthquake
- less than three out of ten learned about what had happened from the channel 4 of the local radio, one in eight learned about what had happened through 112

The experiences of this event indicate that there is a need to steer this type of mass calls to a special telephone number. The event is an interesting example as nobody was injured but it all the same had the consequence that many people in the area were worried and called.

Measures necessary to consider are to

- separate requests for and provision of information from the emergency call number and a separated information number
- analyse why many persons primarily called the 112 Emergency Call Number and the radio was not the natural channel of information

Experiences of "The Information Service" in connection with the Bird Flu and the New Influenza (Swine flu) in 2009

Background

When the Bird Flu and the New Influenza (Swine Flu) reached Sweden, the media coverage of these flus increased. Numerous

questions of different types were asked quickly by the general public and many people started calling different authorities to get answers to their questions. MSB (previously SEMA) took on both

occasions the initiative to set up in collaboration with SOS Alarm an Information Service with the two main objectives, namely to:

- answer as many questions from the citizens as possible
- relieve the pressure on the authorities to allow them to work with their problems

In both respects, the outcome of the Information Service was evaluated currently and followed up.



Needs of the General Public

Perhaps the most difficult task for a citizen who had questions about the influenza was to understand which authority is responsible for the issue. Sometimes the questions were of such a nature that collaboration between the competent authorities was essential to make it possible to provide appropriate and good answers to them. There was therefore a great need for a single common information number for the authorities, accessible to everyone regardless of which authority was competent in dealing with the issue. In addition, the requirement was that the information number was accessible and the expectation that answers were provided to the questions.

The Authorities' Needs

To avoid overburdening each single authority with too many direct calls, the need for lessening the burden was a great. At the same time, the risk was significant that each authority was not quite sure which authority had the responsibility for answering a specific question. Furthermore, there was an important need for knowing what issues other authorities responded to and what answers they gave, as many issues could be relevant for more than one authority.

This meant that the authorities generally had needs for both lessening of the pressure on them and coordination and collaboration. The ambition was therefore to establish a common, coordinated and



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efficient approach in their relations with the citizens and to allow the authorities to use their resources wisely as well as ensure a high quality of the Information Service.

YouCall – call centre activities

YouCall is a subsidiary of SOS Alarm with 70 % ownership of SOS Alarm and 30 % the municipality of Piteå. The company, which is located in Piteå, runs call center activities which consist in brief of YouCall being able to manage a telephone exchange and/or customer service at a distance. There are therefore considerable potentials for integration between the YouCall's system and that of the customer. At the same time, there are opportunities for YouCall to remotely operate directly in customers' own systems, which YouCall regularly does for a number of its customers for instance SOS Alarm. A high security level of the outer shell protection and well established routines for access combined with a reserve supply of power and Service Level Agreements (SLA) covering all important parts of the business guarantee a good and adequate security.

Collaboration Methods

To create a common information service for the authorities requires well established procedures and routines for some of the important forms of collaboration which MSB has elaborated. To begin with, the actors are needed to cover the issues that will or may arise must be identified. These actors may vary over time but those who were the most active during the two influenzas were MSB, the Swedish Institute for Infectious Diseases Control, the National Board of Health and Welfare, the Medical Products Agency, the Swedish Work Environment Authority, the County Administrative Boards and the Swedish Association of Local Authorities and Regions (SKL).

There is a need for a procedure for preparation of the issues by the relevant competent authority and these are dealt with by the whole collaboration group. It is necessary to consider in the group whether an issue is adequate and the answer complete or contradictory from another authority's perspective. In addition, new issues that are raised the whole time in the contact with citizens have to be dealt with and, finally, a routine is needed for removing the old issues that no longer are relevant. Collaboration in this way requires continuity and available expertise in each authority and the Call Centre, which is not simple, one of the difficulties has been to maintain continuity, for instance during the holiday seasons. Mail addresses to the involved units instead of personal email addresses are also important to enable the collaboration group to function over time.

Another important area for collaboration is to continually monitor what questions and to what extent these questions are asked and how the flu is expected to evolve. This collaboration serves two purposes, primarily to see if the authorities need to improve their proactive dissemination of information in a certain area. The other purpose is to try to predict the work load on the communication centre in future periods which is a difficult but necessary. As the work load depends largely on the media's attention and reporting, it will vary considerably even under short periods. Fluctuations of 500 % in the same week are not uncommon and activities must be planned accordingly.

Construction of the Frequently Asked Question(s) (FAQ) Database

The Frequently Asked Question(s) (FAQ) database is built in two steps, the first step being taken before the service starts, when the authorities' collaboration group together tries to identify as many potential issues as possible that the public might raise. Answers to questions are elaborated in such a way that the answer can be read in dialogue with the caller, without being understood by the caller as being read aloud by the operator. This is very important as the call centre strictly follows the information contained in the FAQ, and operators never make their own interpretations/translations of

what the authorities have prepared. It is important that callers are experiencing a high quality of the dialogue and providing this becomes part of the specific skills that operators must have.

The second part of the building of the database starts when the service is provided and the public begins to ask questions. Then all the questions that no one could predict in advance will be asked. Often, the questions are relevant and now the database will be developed dynamically with questions and answers throughout the course of the influenza. The database contains the question, the prepared answer, information on which authority is responsible, how many times the question has been asked, at what times the question was asked and when the question was asked most recently.

YouCall provides a flexible and secure quality system based on both the FAQ and case management, in which great importance has been attached to the traceability and documentation of each individual case from the status of "received" to informed citizen.

Flow description of the answering process

When somebody calls the information service, the caller is firstly notified that he or she has come to the Information Service for the influenza and can choose to receive information in English. If YouCall does not reply immediately, then the caller receives information about his or her place in the queue, and an option to either remain in the queue or wait for a call. When YouCall takes the call then the questions are answered, in so far as the appropriate answers are available in the database. If a person asks a question that is not in the database, the reply is that the question will be transferred to the relevant competent authority and that the caller will hear from YouCall again when the answer is available. This will take a maximum of 48 hours. The caller will be asked to specify whether he or she wants to be called or contacted by e-mail when the answer to the question is available.

When there is no answer to a question in the database is received, the question is sent to the relevant authority and a copy to the MSB. A response to the question is prepared and returned to YouCall which contacts the caller. The authority collaboration group simultaneously makes an assessment of the issue to determine if it is so relevant that it must be quality assured and added to the database. Quality assurance means that the issue is also linguistically processed so that both the question and response can be used broadly. All questions that are answered are not saved in the database which is the case if for instance it can be considered very unlikely that the question will be asked again.

Quality Requirements and Monitoring

Availability is the primary quality requirement. At least 80 % of the received calls must be answered within 30 seconds. The flow of calls, time for answering calls, lost calls and the length of calls are monitored continuously. The number of lost calls is extremely low.

The next quality requirement is to measure how many callers get answers to their question directly during the call to YouCall. Some specific requirements are not stipulated but the measurements that are made continuously indicate that 96–98 % of the questions are answered directly. This result is a very good and due to the service that YouCall provides and the attention given by the authorities to providing good answers to the callers.

The third quality requirement is that the caller gets an answer from the relevant competent authority within 48 hours to the questions that cannot be answered directly. On some occasions this ambition has not been sufficiently reached. Some differences have been found related to the capacities of the involved authorities can be found and this has made it difficult for them to always live up to the commitment to respond within 48 hours to new questions.



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Outreach activities and more examples

At the outbreak of the Bluetongue infection in the autumn of 2008, YouCall was used also for outreach activities by the authorities. The Swedish Board of Agriculture needed on this occasion a rapid identification of the livestock in a very large number of farms. The aim was to establish efficient logistics for the vaccination campaign to be carried out by the county veterinarians to limit the spreading of the infection. YouCall contacted some 6.500 farms in order to update the information on what types and numbers of animals there were, how to contact the farm, etc. 19,000 calls were needed in the course of a few weeks to update the data from these 6.500 farms. YouCall registered the new data directly for the Swedish Board of Agriculture which then did not have to contact any farms themselves.

Another example occurred in November 2006 when an unknown radioactive substance was discovered on two British Airways passenger planes which inter alia had had Stockholm Arlanda as a destination. On the initiative of YouCall and SEMA, the Swedish Radiation Safety Authority (previously SSI) decided to immediately establish an information service to manage the information needs of passengers, relatives and health care centres. These centres wanted to know how to respond to passengers who had flown on these planes and now got in contact with the health centres. The National Board of Health and Welfare became involved as many questions quickly arose, for example pregnant women wondered if there was a danger to their foetuses. Relatives and passengers from the planes wondered, besides their own risk, if they could affect their families by carrying nuclear radiation, etc. During this incident the information service was operational for four hours after the request from SSI.

Economy

The costs for operating a common information service encompasses the expenses for each involved authority for the working time spent and the costs of the communication centre. Staffing levels will vary dynamically up or down each month as the needs change. An estimation can be made of the costs for a team of approximately 22 communication centre operators, who are scheduled to work in shifts, and the associated work management and administration. This will amount to about 1.1 million SEK per month based on past experiences. Such a team will be able to run a communication centre with up to 1.500 calls per 24 hours and maintaining expected service levels (80 % responses to calls within 30 seconds), provided that calls have a maximum length of three minutes on average. In practice, this means that call volumes should be between 500 and 1.500 calls per day to allow for the service standards to be maintained.

At the start-up of the information service, there will be additional costs for the set of technology, telephony, database and recruitment. These costs are one-offs and the price will depend on the scale. Spare standby time during days that are not congested will be used for education and training purposes.

Conclusion

Experiences indicate that a common information service for the authorities can be managed with high quality in their service to the general public. There are many benefits to be gained with such a service in the form of coordinated messages, good use of resources and high efficiency. The mission entails many complex processes and therefore involves problems in establishing the service as well as the need for making successive organizational adaption to cope with continuous long-term work. Most probably, both work procedures and the quality and economic performance will be improved further with more regular use of the service, when the volume of work is larger and in connection with longer missions including more stakeholders. The same technical infrastructure can then be

used again and the time for operational preparedness can be reduced. In summary, the common information service provides:

- a coherent common site for crisis information, the public receives the same answer/information to important questions and global issues
- a high level of availability enabling the public to get information around the clock and every and any day all the year
- an overview of the information needs of the general public as well as continuous feedback to/from the concerned competent authority
- traceability and documentation of each individual case
- opportunities for also conducting rapid outreach missions

The use of Social Media during the New Influenza (Swine Flu)

In April 2009, there were still not many Swedish authorities that had started using the social media, only the Board of Agriculture, the Swedish National Heritage Board, one single rescue service and some municipalities and universities. Krisinformation.se started to put its news on Twitter on the 24 April 2009 in order to disseminate the crisis information from Swedish authorities quicker and to more readers.

Three days later, the first news about the New Influenza (Swine Flu) reached the media, both the traditional and the social media. Most Swedish people got then (as they still do) their information mainly from the TV, radio and newspapers, but the new media still played a major role for many people. Social media have two advantages compared to the traditional media, namely that they are fast – one does not any more have to wait for the evening news or tomorrow’s daily paper to find out something – and above all they are social. There are quite simply other people to speak to, others to listen to before making one’s decisions. It did not take many days before Twitter, Facebook, fora and blogs were flooded with questions and speculations concerning this illness and the vaccine.

During the first months, the questions remained unanswered by the authorities, with the exception of the links to FAQs and similar sources which Krisinformation.se put on its Twitter channel. Many authorities (for example the Swedish Institute for Communicable Disease Control (SMI), the Medical Products Agency (MPA) and the National Board of Health and Welfare (SOS)) certainly used continuously their own websites for information, but most users of Internet never came as far as to look there and were probably not aware that the answers of the experts could be found there. Instead, they discussed with each other above all in the field for comments on the webpage of the evening paper Aftonbladet (aftonbladet.se), at large fora such as familjeliv.se (family life), in Facebook groups, on Twitter and in different blogs. The discussions were very lively and particular blogs and fora were created for debates concerning the illness and the vaccine. The types of discussions varied immensely, ranging from discussion about serious health issues, public economy and lifestyles to theories about conspiracies and horrifying pictures of the pandemic disease or the vaccine, or both, which could exterminate the population. Many people were worried that the vaccine was not sufficiently tested or contained dangerous substances.

It would have been very valuable if the relevant authorities had taken their responsibility and responded quickly with a focus on dialogue. If the public had been provided with the opportunity of asking questions to a credible and sensitive source at an early stage and received answers with nuances then much worry could most probably have been avoided. When the time came for getting vaccinated, it was discovered that many people were unwilling to take the injections, in particular young people. The National Board of Health and Welfare therefore decided to conduct a campaign



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on Facebook and the visitors were encouraged in order to convince the doubtful to put a particular YES button on their own profile site to indicate that they were positive to being vaccinated.

On the whole, many authorities started to wake up out of their sleep to a new media environment, a new platform for communication with the public. MSB's Head of Communication concluded that "the major challenge for the future, according to the strategic experts of the authorities, was the question of how to handle the social media, which had a significant importance already during the Swine Flu influenza, had great importance for the gathering of information by young people.

The authorities realized suddenly that they needed to supplement their normal channels with presence in the large social media and on the micro blogs. In no other place, the information is spread so quickly both the information which the authorities wish to convey and the information which is perhaps completely wrong.

But in general, action was taken at too late a stage in respect to the Swine Flu influenza and the efforts that were made were not always well thought out or without support having gathered for them due to the hurry. The Facebook campaign of the Swedish Health and Welfare Board was therefore a failure, even if this campaign was given enormous attention in both traditional and new media. There were only 22 000 visitors and only 2 200 persons chose to show the YES button on their own profile site. The bad result may be due to a lack of knowledge of how social media work. The site did not have a personal character, did not allow any inter-activity, did not permit any others to give their opinion and were not founded on the interests of the users and their involvement.

In a study from 2010, (Communication with very bad chances for success – a study of the authorities' crisis communication efforts during the Swine Flu influenza on the Webb by Karolina Israelsson & Madelene Häggroth, the Mid Sweden University, Sundsvall 8 January 2010) the authors write that "organizations that create particular websites in crisis situations increase the possibility for achieving two way communication and interaction in their crisis communication. By using a website the organizations can themselves exercise influence on their crisis communication and, at the same time, they get the opportunity to invite the public and have a dialogue with them. By creating possibilities for a dialogue, the organisation gets the opportunity to listen to what happens in its surroundings and will in this way be able to meet the questions which appear in a crisis. Social media provide, just as the organization's own website does, opportunities for direct contact with the receivers and improve the conditions for two way communication. The organizations can communicate with the public in a more efficient way and this gives an opportunity to reach a wider target group. By being present in the social media, the organisation can participate in the discussion and answer questions to prevent misunderstandings."

The study continues: "A problem which has been given attention is that the Swedish authorities nowadays know about and use social media, but many of them lack a deeper knowledge about the subject. This was the result of an inquiry made by the Swedish Public Employment Service concerning authorities and their awareness of social media which was conducted in the summer of 2009. Even if many are more aware of the benefits of using social media in crisis communication, not all will know how to do so. The authorities responsible for the communication regarding the Swine Flu influenza have the task of informing Sweden about the crisis. The authorities must make use of appropriate channels and be accessible in places where the public is seeking information and in this way be able to create an open dialogue. It is a duty for the authorities to meet the public in a crisis and try to mitigate the crisis but for this there must be resources available, time and involvement.

Experiences and introduction of an information number(s)

Estonia

Since a few years, there are practical experiences in Estonia of handling information numbers in a separate service, co-located with the 112 Emergency Call service or Emergency Response Centre (ERC). The service group numbers are thus managed by ERC and can be divided into the Emergency calls on 112, the fire and rescue services information and crisis communication information number 1524, the environment inspection number 1313 and the non emergency call number 1345 connected to the local government services. The supportive assistance numbers allow better management of non-operational calls and thus ease considerably the workload of 112. The current model for the issuing public warnings is for instance that the rescue officer in the lead on site calls ERC on number 1524 and is connected on 1524 to the Estonian National Broadcasting to inform citizens.

The 1345 dispatcher service helps to solve problems involving municipal engineering issues such as electricity, water and sewage, heating systems, maintenance of streets and roads, etc. in the city of Tallinn and surrounding municipalities with in all about 500 000 inhabitants. Citizens may also report any information about urgent matters or situations which need immediate intervention in public places. The problem is forwarded to the appropriate institution/company or alternatively the caller is connected with the necessary institution/company. Practical and integrated co-operation is established between the State, local government, citizens and companies to solve and prevent both critical and non-critical accidents and problems.

The 1313 environment information number is available for matters related to injured or dead animals, environment pollution, environment regulation violations and fish quota information. The 1524 fire services information number's main functions are related to automated fire alarm systems, fire safety regulation info (how, when and where to make a fire), fireplaces, chimneys and heating systems safety and fire control and serving as an info channel between authorities and the public in the event of large emergencies. The 1345 number served as the main contact point in connection with a plane crash on the Ülemiste lake on 18 February 2010 and a bomb explosion in an apartment building in Tallinn on the 28 March 2010. The further development of the information and service numbers is under consideration. (This Estonian service is expected to be developed further and perhaps even merge into a single information number. Also in other countries the introduction of a information number(s) to improve the 112 and crisis communication capacity can be expected or has already been initiated.)

Sweden

SOS Alarm proposed on 12 October 2009 to the Swedish Government that SOS Alarm in collaboration with the Swedish Civil Contingencies Agency (MSB) should be given the task to investigate the feasibility of introducing an information number in support of crisis communication. In the view of SOS Alarm, such an initiative is partly about creating a way to strengthen crisis communication in society generally but also to lessen the burden on the emergency call number 112, on occasions when many people would otherwise use the emergency call number for seeking or providing information of non-emergency nature. The issue is, among other things, mentioned in paragraph 3.18 of the new Emergency Call Service Agreement between the Swedish Government and SOS Alarm. One can distinguish two main types of events that require special handling, i.e. a slow course of



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events where there is time to organize crisis communications and on the other hand events with a short duration and quick turn of events. The question of a special information number has been previously raised by SOS Alarm based on the latter type of events. Events of similar nature have occurred since then.

In connection with a storm and very heavy rain in Southern Sweden in July 2007, there was a serious mass-call situation. About 1.200 calls were made on the emergency call number 112 in the course of one hour in the evening of 5 July to the SOS Alarm Centre in Malmö. When the about 800 recorded calls had been listened to, the evaluation showed that 90 % of the calls were about flooding problems only. Many of the callers were aware of the fact that 112 should not have been called but explained that they had no alternative. It is not possible to determine exactly how many callers only needed information.

A minor earthquake that occurred in December 2008 also in Southern Sweden led to another mass-call situation. According to an evaluation conducted in cooperation with Synovate, seven out of ten persons called 112 to get information on what had happened (earthquakes are extremely infrequent in Sweden) while one call in eighth was to report the incident or alarm the emergency services. The influenza epidemics in recent years provide concrete experiences of communicating with a large number of individuals in the course of events with a more lengthy duration.

In the view of SOS Alarm, a joint number for the involved authorities can provide:

- a single site for obtaining information, the public will receive the same answer/the same information on important and common issues for the involved authorities
- a high level of availability – the public can get information around the clock all days of the year
- an overall picture of the public information needs with continuous feedback to the concerned authority
- traceability and documentation of each case
- opportunities to also undertake rapid outreach mission

SOS Alarm is working in close cooperation with MSB on the basis of their different roles in the preparedness of society to manage emergencies and crises. Further benefits can beyond any doubt be achieved through an increased coordination. A particular aspect is how society's communication needs in connection with crises can be met while at the same time the effective functioning of the emergency call number is ensured. On the basis of the SOS Alarm commitment in the Emergency Call Service Agreement and the recently gained experiences of crisis communication, SOS Alarm considers that it is of great value to proceed to investigate the feasibility of introducing an information number in support of society's crisis communication which at the same time can lessen the burden on the emergency call number 112 in situations with extreme pressures such as major incidents and infrastructure disruptions.

The Swedish Government decided on 14 April 2010 to commission MSB, on the basis of the proposal for how an alternative information number can be introduced which SOS Alarm presented on 15 October 2009, to elaborate and present, in collaboration with SOS Alarm Sverige AB (SOS Alarm), the National Police Board and other stakeholders, a plan for how the introduction of a special information number can be established. The plan was to define the content of the service, how the service supplements the contact number 11414 of the police and how it can be introduced. In the plan an appropriate division of responsibility for the development and management of the service should be described and motivated. The estimated costs for the introduction of the information number and its management and a proposal for how the service is to be financed should be presented. The proposal was presented, as was required by the Government, on the 1 October 2010.

MSB thus submitted the plan for how the introduction of a special information number can be established to the Government. MSB recalled in the proposal its coordinating role of supporting other public authorities to enable coordinated decision-making and dissemination of information – cross-sectoral consequence analysis and efficient use of public assets. MSB also assists the Government Offices with updated situation reports. The coordinating role is based on the principle of responsibility which means that each competent authority maintains its responsibilities. The experiences from previous crises for instance the avian flu, the Eyjafjallajökull eruption and the influenza A(H1N1) were that peoples’ needs for information were comprehensive, there were reasons for trying to influence behavior and to reduce anxiety and different authorities were responsible for providing information but the information messages needed to be coordinated. An information service for coordinated information to the public was therefore established. MSB gave support to responsible authorities to create coordinated FAQ:s and other information to the public. The information service to the public was organized by MSB in collaboration with SOS Alarm and this service answered thousands of questions from the public and thereby lessened the burden on the competent authorities.

The conclusions in the plan for how the introduction of a special information number can be established, which MSB was commissioned by the Swedish Government to present, concludes that there is a need for a special information service for major events and crises and there are benefits for society to have an information number in combination with other communication channels. This improves communication between agencies and the public but the work on information issues should be built on collaboration between authorities. The development within the information area is rapid and the communication behaviour changes constantly.

MSB found that it is therefore important that the information number is seen as a part of an overall solution for the whole chain of communication in a serious incident, furthermore taking into account that people will also use their own channels of communication. The basic requirements are that the separate information number is permanent, will lessen the burden on 112 and be well known by the public. It should be able to provide current, confirmed and coordinated information, receive and compile information and transfer this to the responsible authorities and also pass on calls to other actors, when needed. The proposal from MSB is to continue the planning and preparation of the introduction in two steps which are to be finalized in the autumn 2012.



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Crisis Communication Studies

Estonian State Officials' perceptions on crisis communication co-ordination

The Estonian results regarding the Estonian State Officials' perceptions on crisis communication co-ordination of the MASSCRISCOM survey have been presented by an Advisor in the Government Communications Unit of the Estonian State Chancellery. It was underlined that the public's perception of the situation is the reality. Important for Estonia is to have fresh ideas on informing the public in emergency situations, reflect on the gaps in crisis communication from a crisis management point of view and compare MASSCRISCOM results with different surveys previously carried out in Estonia (on risk communication; emergency calls; the public's risk behavior, etc.)

There were 47 respondents in Estonia to the Web-based questionnaire. The respondents were civil servants related to crisis management and/or communication and the results of the survey provided an impulse for new ideas and directions in crisis communication. There were a number of conclusions connected to the great expectations on the 112, quick weather forecasts for timely crisis communication, information from the public and dissemination of information to the public, cooperation with the social workers and the need for training.

The 112 system is regarded as a two way information channel for providing help in difficult situations, not only providing the rescue and first aid response. The future options could be for 112 to concentrate on the first aid and rescue response and establish an additional communication centre for non-critical calls (a similar phone number could be introduced in Europe). There is a need for quick weather warnings and formulation of these so that they make sense for the general public, i.e. clear-cut explanations of numbers in m/s and the warnings, including the impact on individuals and a certain region.

Receiving information from the public is crucial for creating the context of the situation and a situation awareness. The options for the future could be the introduction of new channels or technical platforms for gathering information from the public and these could possibly be adapted to the social networks. The information will have to be adapted to different target groups (strategic and operational levels).

A majority of the respondents (73 %) are more or less satisfied with channels used for disseminating information to the public (media, Web and sirens). Media and phone lines are vital information channels for the Estonian public during emergencies but Web sites are not especially used in urgent situations. Future options could be the use and combination of different channels and message formats in urgent situations (SMS/cell broadcast, voice messages, face-to-face informing, phone lines, social networks, etc.). Awareness on how to reach and inform the disabled people – channels, messages and formats – should as a future option be improved by initiating cooperation with social workers and assistants to the disabled people.

Continuous training is needed for raising awareness among the governmental agencies and enterprises responsible for informing the public to achieve impact and possibilities of exercising crisis communication, including as a future option-training in crisis communication – Web 2.0, mobile communication-based solutions, etc.

Summary of the perceptions on crisis communication of representatives of emergency and crisis management actors in Åland

The important and pragmatic role that the Åland's Radio and TV plays, in particular how the local radio is used for emergency communication and providing information to the public, was clarified at a MASSCRISCOM seminar held in Mariehamn. It was furthermore underlined, in the discussion of the different possible solutions for providing information and warning the public, that it is necessary to have a holistic system in which the different elements and capabilities supplement each other. The solutions have to be adapted to the different needs in each situation that is faced and account must also be taken to the ability of the public to understand the content of the messages to be communicated.

A Web Inquiry was conducted by MASSCRISCOM in Åland on emergency and crisis communication experiences, and this summary reflects the main result based on information provided by 19 representatives of different actors including authorities, the Red Cross and the Åland Radio and Television.

There is a clear understanding among the public in Åland that it is legitimate to call the 112 Emergency Call Number primarily only in the event of an acute need for help from the public response units such as the ambulance and fire and rescue services and the police, but it is also accepted by many that this is also allowed when someone is in a difficult situation and does not know exactly what help is needed. An explanation for this is that it is necessary to take into account how small Åland is and that it is reasonable to have a somewhat wider scope for legitimate contacts than normal, including the need for seeking urgent advice, even though an emergency response is not required. The expectations of the public on the 112 Emergency Call Number are on a very high level but to maintain this the 112 operators need to be well trained to also handle appropriately calls which seem to be of the character mischief or lack of knowledge.

On some occasions with extreme weather or natural disasters, the 112 Emergency Call Number has become overburdened and all persons requiring help have not been able to reach a 112 operator within the prescribed time limit. When there is no other channel provided for receiving the calls and the amount of people really needing help increases significantly, there is a need for at least having a sufficient capacity to be able to prioritize emergency calls. Most people will accept and realize that it is unavoidable that the service level sinks in extreme situations. Some do however not accept this and claim that maintaining the high level is necessary to ensure the credibility of the Emergency Call Number.

The inquiry reflects the view that good routines must be in place to shorten the reaction time and provide the necessary capacity to be able to quickly start conducting mass crisis information. The level of service should be high, but it is at the same time recognized in the answers that it can take a little time to mobilize more personnel when something extreme occurs. It is felt necessary to be realistic and accept that it is not possible to have a level of personnel that guarantees service under all conditions and adapted to directly handle the extreme burden on occasions which cannot be predicted.

The chosen alternative must however according to views expressed require that extra resources can be called in immediately to avoid panic among the public. All calls for help should be received in order to prioritize those needing immediate help, and others should be contacted once sufficient resources have been mobilized. In disasters with a large amount of people needing help at the same time, the calls should be handled in accordance with a disaster plan through alternative channels and



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information provided through radio, Internet, etc. to the public. An extra leadership group should be established to assist the call takers and also serve as a coordinator in such situations.

A very clear majority finds it better to handle non-emergency calls through a separate national information number whereas some prefer to maintain 112 as the only number and instead increase its capacity. Many are in favour of having the responsibility for responding to these less urgent calls on regional level i.e. Åland. The best solution is considered to be a common national information number being handled in the same way as 112, i.e. on the regional level, with delegation to the local level combined with a certain obligation to report back.

Different existing channels can cover the need for providing warnings and urgent information in Åland to the public in the event of a severe incident. The use of radio, TV, tyfons (sirens for outdoor warning) and Website is more or less sufficient but there have been some technical and linguistic problems related to dissemination by radio. Test broadcasting has not worked or the information has to a certain degree only been disseminated in Finnish. The service provided by the local radio and television can be developed even further. In the countryside municipalities, the sirens are not sufficient or are not always possible to hear depending on their location and do not reach persons with impaired hearing. Cars that drive around with loud speakers on top and spread information are normally only used in cities.

It is necessary to ensure that the adapted means for crisis communication function in practice. Dissemination of less urgent information to the public in a not so serious event can also be made through the existing channels and through local papers and the local radio in close collaboration. Reporting is made at an early stage on events that occur, and the local papers and the local radio contact the incident commander more or less immediately. All authorities could provide emergency information on the website of the alarm centre as well.

Warnings to the public often generate a need for more information and the results of the questionnaire indicate that this need should be accommodated through supplementary information available at an indicated website address and an information number which can be called by the public. Such information should furthermore be disseminated through radio and television and provided by local actors in connection with the warning.

The Red Cross in Finland can mobilize quickly an information number which is manned by volunteers trained for the task. This proved to be a valuable service in connection with the shootings in a school at Kauhajoki and the shopping centre at Sello/Esbo. The Red Cross can also provide information in person by knocking doors, etc. but the problem is that there is no organized public information number. More than 10,000 people are estimated to be reached in Åland. The Red Cross provides general information on crisis communication in its courses on first help and so do the rescue services on different occasions such as the 112 day. Information concerning healthcare and its organisation and priorities for dealing with immediate needs for care in a disaster should reach the whole population.

Weather warnings come into practical use both privately and for work and they can provide a good awareness and basis for action, should this be needed. A problem is that they are not issued in Åland by the Finnish weather forecast service in the Swedish language, but on the other hand the Swedish SMHI reports for the Northern Baltic Sea and the Archipelago Sea are used instead. Besides Swedish there is a certain need to be able to communicate with the public in particular in Finnish and English. Other language groups are increasing in numbers. Access to interpreters would be valuable.

The need for being able to have particular specific weather warnings is considered to be large by a majority of responders. Under Åland conditions, it is at present felt to be not possible to rely on the authorities and institutions which are responsible for the providing weather forecasts and issuing

warnings for different weather conditions. Most people responding to the questionnaire are of the opinion that it would be valuable to be able to have weather warnings related to exceptionally high sea water levels, storms, etc. defined for a certain geographical area, for instance a municipality or a specific water course or area.

Communication from the public related to disturbances in the public infrastructure, including electricity supply, fixed telecommunications, mobile telecommunications, the Internet, provision of drinking water and roads, and flooding, effects of storms, risks for infection, forest fires and needs for search and rescue at sea can be valuable for authorities to receive. Such communications do not have to go through 112. The public can also assist in assessing the damage, identifying the need for help and providing information about on-going response actions.

The received and compiled information from the public will assist the authorities in creating a situation awareness and be made use of by the incident commander. When the information has been checked and confirmed, the information can be of help in identifying questions and preparing responses to be given by personnel in a communication centre to the public. A national information number, SMS/MMS, facsimile, e-mail and also websites, blogs and web formats should be available for reporting information about an event, but it is also important for the public to be able talk with a person who can ask or reply to follow-up questions.

There is no specific experience at present in Åland besides that from the local media and the rescue services on how a large area can be reached within a reasonable time. Some situations with extreme weather conditions, wind, rain and snow, will cause problems. The specific professional groups for instance intervention commanders are reached quite well, and the means for achieving this are the Tetra communication system Virve, which has been in practical use for a number of years, as well as good local knowledge with regular collaboration in prevention work and planning. This also creates favourable conditions for reaching groups with particular needs (seeing impairment, handicapped, etc.).

The public serves as an emergency channel and in some situations the public will call before the rescue commanders and police are informed. Massmedia are sometimes contacted first when unexpected events occur and the police and rescue services will then get the information from the Åland Radio and TV.

Finally, it is suggested in some responses to the questionnaire that the authorities could improve their cooperation in mass crisis communication with voluntary organisations or the third sector. This could be achieved by conducting the planning for such situations in collaboration. Sometimes the feeling can be among the organisations that the authorities do not know that they can get help from organized and trained volunteers. It is also suggested that it would be valuable if even more cross border collaboration than at present is established as Åland is located "in-between". Both Finnish and Swedish authorities should not forget Åland and that more use can be made of the local experiences. One problem is that information coming from Finland is often in Finnish. More training and regular exercises are deemed necessary.

An integrated research study on The patterns of receiving and processing emergency information – cultural experiences and information searching habits

An integrated research study on the patterns of receiving and processing emergency information – cultural experiences and information searching habits was conducted by the Tartu University, Institute of journalism and communication. It was based on a case study with three focus groups and



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retrospective interviews with people who had actually survived the storm and floods in Pärnu in 2005, a "laboratory" research of reactions of seven focus groups to simulated warnings of different types of threat (storm, chemical pollution, radiation) and a survey with standardised answers to the questions about possible behaviour strategies and preferred information sources in the times of crisis (radiation). Some patterns came out as a result of the factor analysis.

The survey thus focused on the perception of crisis communication information by the citizens, who experienced real-life crisis events in Estonia. The survey also showed how people reacted to the crisis communication messages and which actions were taken by different social and age groups. The main results of the analysis of peoples' information seeking habits, reaction to the warning messages and behaviour (real and intended) in the crisis – a summary of these results are presented as an ANNEX – were based on the questions:

- What warning message response strategies are utilized among the lay public?
- Which factors support the response efficacy of the warning?
- What are the barriers hindering the response efficacy of warning, especially the instructing information?

Another outcome was a discussion of the possibilities of strategic planning of pre-crisis communication. The first part of the discussion addressed the following:

- Cognitive coping is used to make sense of the crisis situation and prepare for taking actions (Jin et al 2007, 2008).
- Emotional coping with the crisis helps to overcome the fear, based on low certainty (Baker and Berenbaum 2007)
- Crisis message should contain instructing information and (psychologically) adjusting information (Struges 2004)
- Networking can be undertaken for looking for additional emotional support. Calling to acquaintances helps to adapt emotionally but during the process of networking the coping with the crisis is likely to transform to cognitive coping.
- The process of obtaining information is itself important to prepare for cognitive and conative coping (taking actions).

and led to the following suggestions:

- Network communication should rather be encouraged by the communicating institutions, not prohibited.
- All workers in an organization, not just official spokespersons, should be trained for communication in crisis situations
- People should be encouraged to talk with persons who do not follow the mass media regularly (grandparents, neighbours, etc.)

The second part of the discussion addressed the following elements:

- Conative strategy (Jin 2010) might be utilized when one can be expected to follow the instructing information given by institutions but also when one will rely on the first impulses for what action to take
- Ignorance of the further information provided and institutional instructions given is likely to occur when a person feels high uncertainty about the threat and its low controllability by the institutions.

and led to the following suggestions:

- Risk and pre-crisis communication can help people to evaluate a situation more adequately
- Education on risks should be considered for a secondary network of experts – teachers, nurses, various volunteers, etc. – to whom the public may turn to collect additional information about threats (two-step- flow of communication). These experts can serve as opinion leaders in the two-step communication model (Katz & Lazarsfeld).

The question of a new paradigm in crisis communication would result in calls for decentralised crisis communication strategies (Falkheimer and Heide, 2010; Gilpin and Murphy, 2006; Tyler, 2005) i.e.:

- a shift from technical action plans to the creation of pre-crisis strategic frameworks
- a shift from the sender and central spokespersons to the public and networks of communicators using, in addition to the mass media, minority media and micro media and interpersonal meetings
- not informing recipients but achieving that the public understands and can act on their own accord
- new methods for preparing the crisis teams to act in the situation of indispensable ambiguity and uncertainty of the crisis situation and for encouraging managers to think differently

When, how and why we are calling SOS? – A citizen's perspective on the alarm feature 112 of the mobile communications landscape

The study on When, how and why we are calling SOS?—A citizen's perspective on the alarm feature 112 of the mobile communications landscape was part of the research project Crisis Communication in a Digital Age at the Örebro University.

Background to the study

The number of calls made to 112 has increased in recent years and about one half of all emergency calls come from mobile phones. Many people call "just" to find out and get information about an event. This is an international phenomenon. Explanations of the increase are the evolvement of mobile telephony, a considerable faith in the alarm function and a lack of alternative phone numbers for getting information.

According to SOS Alarm, the mobile calls to 112 are about half of all emergency calls that reach SOS Alarm. The amount and nature of calls received during the recent storms and rain storms in Sweden raised the issue of introducing a special information number for the public alongside the emergency number 112. In the earthquake in December 2008 in Southern Sweden (4.7 on the Richter scale), SOS Alarm received two thousand calls to 112 in one hour, whereof very few callers were in need of emergency aid, but only wanted to know what had happened. Up to 90 % of calls to the 112 related to the storms were considered to be non-urgent matters.

Historically, calls to the emergency numbers 90 000 (until 1 July 1996) and thereafter to the common EU emergency number 112 had been related to very urgent emergency situations, as reinforced by regular public information campaigns aimed at members of society. But why have we nowadays become more inclined to contact 112 earlier, and what are the explanations for this behaviour? Are the answers to be found in the development of mobile telephony and the subsequent new patterns of communication – or are there other alternative and parallel explanatory factors?

The increase of calls to the emergency numbers is not just a Swedish phenomenon. In recent years, the so-called non-urgent emergency calls in Britain to summon an ambulance escalated in a proble-



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matic way (Widiatmoko et al 2008). Already in the 1980s and 1990s, the load increased very quickly on the North American emergency number for police, 911. At the 911 Centre in California, the number of calls from mobile phones for example increased from about 13,000 in the year 1985 to about 516,000 in the year 1995. At the end of the 1990s, the North American call centres received in all 270,000 calls each day, of which about 80 % were considered to be of non-emergency nature. The explanations of the National Emergency Number Association (NENA) in North America to the increased number of U.S. calls at the end of the 1990s are:

1. increased opportunities offered by mobile telephony to gather information and report incidents
2. irresponsible actions by other public bodies, in parallel with increased confidence and trust in the police force
3. lack of alternative phone numbers to contact the police with calls that do not have an emergency nature (National Institute of Justice 2005)

Much research has been conducted about the organisation of the alarm function and its technical communication systems as well as the linguistic interaction and understanding between caller and SOS operator. There is less research about the individual citizen's view of emergency calls. Historically, the focus in research into crisis communication has rarely been on "the citizen", "the individual" and/or "the public", etc.

In Sweden, the knowledge is not particularly great about how the new wireless communication facilities may have changed the citizen's expectations for community services in risk, crisis and disaster situations of emergency nature. The research on Swedish conditions for emergency calls to 112 have so far mainly dealt with other important aspects of linguistic interaction and understanding between callers and emergency call operators (see for example Cromdal et al 2008, Persson-Thunqvist et al 2008) and work conducted by SOS Alarm in large great social crises and disasters such as the Estonia disaster (see e.g. Larsson & Nohrstedt 1996).

This study therefore instead explores more deeply citizens possibly changing perceptions and expectations of society's alarm functions in the light of the increasingly more mobile media landscape, rather than the linguistic work in the handling of emergency calls or the organisation of SOS Alarm. It is hoped that in this way to find possible explanations for the increased call load at the Public Safety Answering Points (PSAPs).

The communications technology development proceeds and the resulting parallel social, cultural and organizational change and new opportunities for emergency and crisis communications. One effect is the emergence of new opportunities for contact patterns between helping authorities/institutions and individual citizens in distress and emergency situations such as SMS, MMS and micro-blog functionality is useful in emergency communications (see eg Jaeger et al 2007; Laituri & Kodrich 2008; Samarajiva 2005, Sutton 2008). Communication technologies are obvious, but in an emergency, however, communication always proceeds from the individual citizen's needs and desires, rather than on technology to streamline the potential, if communication is to persuade to become social betterment.

The study focuses on the citizen's beliefs and expectations surrounding community alarm functions. The study examines how citizens perceive and experience the alarm function, that is, when, how and why we call 112. In practice, for example, about how and in what situations the citizen believes and perceives them to be able to contact 112 and to be reached, for example, by different types of societal warning messages.

To access the citizens' deeper emotions, reasoning and reactions related to society's alarm functions are used, a qualitative research method, in the form of group interviews, is used in the study. Issues relating to citizen's views on society's alarm functions, questions about how the citizens want to be contacted and responded to and possibilities for the citizen be able to communicate with authorities and other relevant services in crisis and/or an emergency, may seem simple and obvious, but are in fact quite complex. The qualitative interview method chosen should give the study results depth rather being generalized. The group interview form provided an opportunity for the interviewees to help each other to remember events, illustrate, explain and develop reasoning.

The aims of the study

The overarching aim of the study was to investigate and find out why the citizens have become more inclined than before to contact the emergency number 112, and the underlying aim was to present proposals for important reflections for those with responsibility for developing the ability of society to manage a crisis in general, as well as emergency communication in particular. To understand the citizens, it is necessary to understand the present society. Communication patterns and reasons to use mobiles have changed. The study focused on these research questions:

4. In which situations do citizens today feel that it is legitimate to contact society's alarm functions?
5. What expectations do citizens today have of society's alarm functions?
6. What are the expectations of citizens today of the opportunities to make contact and communicate with society's alarm functions in the future?

The outcome of the study

The attitude to the mobile phone as a lifeline was among young people that younger people have their mobile phone always with them and a situation-based organisation of life and that the mobile phone therefore provides a form of security for them. Among older people the attitude was that they prefer to avoid being constantly contactable, only take the mobile phone along when the security aspect is tangible and are conscious to the use of mobile phone for security.

There is a relatively consistent (theoretical) view of the legitimate contact situation and in practice a broad interpretative horizon for what is considered in reality to be an urgent alarm status of the right scale, for example, can you call to raise an alarm preventively? A major, serious event is required to entitle a caller to phone 112 but there is a strong faith in the ability of the institution to provide help and advice when you yourself find it difficult to determine the level of seriousness. A phone call reduces the personal dilemma in the decision-making process! Access to mobile technology combined with greater concern, individualism, etc. presumably leads to a greater number of calls – without the individual's view of what legitimizes a call having been changed.

There are very high expectations of the emergency number 112 related primarily to the personal, calming and guiding encounter with the SOS operator. There is a high degree of faith that the operator will be able to determine the need for help and provide emotional support and awareness that the capacity at 112 is not always sufficient. However, there are doubts for the future about Information Communication Technology (ICT) in urgent emergency communication.



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Some reflections are made in the study on the preparedness for alarm and emergency communication:

- The reason for the calls can be found in broader changes in society, such as an increasingly mobile communication society, a higher perception of threat and risk and many other changed social features.
- There are several positive benefits of an alternative emergency number reducing the load on 112 but also potential negative effects, such as, citizens already find it difficult to keep track of the range of different service numbers, ambivalence about which number to choose will increase and greater demands may be made on SOS operators.
- What happens, when Information Communication Technology's (ICT) ability comes up against the physical conditions facing for example the emergency measures initiated by SOS Alarm, to the good faith that has been built up in the activities of SOS Alarm?
- The effect might be divided into two, either we (1) live in a society that is better equipped to help citizens or we (2) live in a society that is becoming more dangerous and unsettled, and where we are in greater need of emergency assistance.
- Despite the development of potentially more efficient communication technology systems for crisis communication, the core of emergency communication remains in the language and the dialog between the caller and the SOS operator.
- Is it perhaps those with little faith in society and their fellow citizens who are making the non-emergency calls?

Afterword

The mobile technology is due to its nature assumed to steer society towards a safer, more efficient and faster emergency communication. Lessons from the Tsunami, Hurricane Katrina and many other incidents also show how the emergency response has improved, thanks to the affected people having access to mobile telephony. Obviously, despite the improved choices offered by mobile communication technology in this context, the personal conversation between the citizen and the SOS operator will remain the core of the acute emergency communication.

The mobile communication technology development does not seem to diminish the role of the personal call, but rather reinforce its central role. It is probably not the level of communication technology development for emergency communication that will in the future limit the ability of society in the area. Rather, crucial will be the skill of the SOS operators who will be responsible for the important human performance of the system and meet the increasing volume of incoming phone calls with the expected advice, assessments and dispatching the appropriate response action. The SOS operator must now deal with and have an understanding of the system's solutions and their increased amount of choices offered (both for themselves as for the individual citizen). The operator's ability to interact linguistically with the caller however remains or even becomes more important than previously.

Studies of literature and research reports within the field of the project's scope in collaboration with Jonas Landgren, Ph. D. specialized in Public Safety at the Victoria Institute in Gothenburg

Emergency Alerts and Warnings to mobile phones

Since the mid twentieth century, governments have used a range of technologies such as sirens, radio, and television to deliver warnings to citizens. Over the past few years, the adoption rate of mobile phone use has resulted in new possibilities for messaging systems as a complement to existing emergency notification systems. The focus on mobile phone oriented systems is an effect of the new possibilities to use the location of the users (Adoulat et al, 2007). According to an overview, listed below, by Adoulat et al (2007) there are two primary global mechanisms that can be used to provide location based services for emergency notification to citizens, namely SMS and Cell Broadcast-ing.

SMS

SMS offers virtual guarantee for message delivery to its destination (European Tele-communications Standards Institute, 2006). In case of an unavailable network coverage or temporary failure, the message is stored in the Short Message Service Centre (SMSC) network component and delivered when the destination becomes available. The message will also be delivered if the mobile handset is engaged with a voice and/or data activity. SMS messages do not consume much bandwidth although the network might become overloaded if an immense number of SMS messages and/or phone calls have been initiated simultaneously. Delays can occur and may result in delivery failure, especially during emergencies and disasters time. SMS does not provide any geo-specific location information by itself. Such information like cell ID must be obtained from other resources by mobile service provider. However, SMS does have the potential to be used in location-based emergency services. Mass SMS messages can be directed to specific mobile numbers when they have been identified to exist in designated areas.

CELL Broadcasting

Cell broadcasting technology is a service delivered by mobile providers where uniform text messages are broadcast indiscriminately to all mobile handsets in a specific geographic area. The messages could be broadcast to all towers in a carrier network covering a whole country or to a specific cell covered by a single tower. Cell broadcast service (CBS) has not been widely adopted in commercial applications. Unlike SMS, the nature of CBS does not allow for two-way interactive communication.

CBS is conveyed on dedicated channels by using a fraction of the bandwidth that is normally used for mobile phone calls and SMS text messages. Therefore, it will not place additional demand on carrier resources or suffer any degradation when network becomes highly congested during emergency incidents or calamity events (CellCast Communications, 2006). CBS can broadcast Multi-language on multiple channels simultaneously. Because it is a broadcasting service, there is no way to know the number of people who will receive it.

Security and Privacy Concerns: There are no guarantees that spammers would not be able to control the broadcast. Concerns from legal liability in case of hoaxes and false alarms arise as well. Therefore, in The Netherlands and South Korea the cell broadcasting is restricted by law to government agencies and only authorities can send warning messages (O'Brien, 2006).



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Findings from global studies of location based services (Adoulat et al, 2007)

The case excerpts below are from a study by Adoulat et al (2007) and based on the result of their survey of news and media resources about broadcasting services for location-based services for emergency response.

Relief fears after a massive power failure in Italy: *On 28 September 2003, a massive blackout hit Italy, leaving nearly 57 million people in the dark. Around 17 percent of Italy's electricity is imported from its neighbors. The failure began in Switzerland and involved France, Austria, then Italy. Rail and air traffic faced interruptions with most of the emergency phone lines jammed. Three people were killed as a direct result of the power failure. The failure coincided with a cultural festival in the capital Rome with more than a million people located out of doors that night. During the blackout, people were forced to leave shopping centers and stores for security reasons. Many people found themselves in the streets with rain starting to fall. About 12,000 people took refuge in Rome's subway stations and 30,000 others were stranded on 110 trains. People started to panic as many of them did not have any kind of information about the incident. With no electricity, conventional notification channels were useless. Therefore, the Civil Protection Agency (CPA) with the cooperation of mobile carriers targeted every mobile handset in metropolitan Rome and successfully sent SMS messages to all mobile phones in Rome informing people (Povoledo, 2003).*

Lightning risk alert system in Singapore: *Starting in 2007, Singapore deployed an early warning system as a part of the "lightning risk alert system". Singapore as a country has one of the highest rates of lightning activities in the world with an average of 166 days of thunderstorms and almost 187 days of lightning a year. The system basically tracks and monitors 400 predefined geographical locations. If there is high possibility for lightning activity in a specific location it will initiate warning messages to schools in the targeted areas. A school principal will receive the SMS message that includes information such as the beginning and duration of high lightning risk situations. Messages are also sent if the warning is cancelled. Chemical companies that have subscribed to the service also get the same message content. The initiative is controlled by National Environment Agency and the Ministry of Education (Mulchand, 2007).*

Warning system for impending disasters in New Zealand: *In 2007, New Zealand started a new warning system providing mobile phone users in perilous areas with free live text updates about pending emergencies. The system sends alert messages in emergencies that include lahars, major flooding, Tsunami, or other natural or man-made disasters. The system explicitly requires the registration of any citizen who wants to use it. Registration can be done by texting the word OPTNNCD to a specific number. Citizens can also register by completing a permission form available from the regional councils' websites. Only users who have already subscribed and happen to coincide in danger areas would receive warning messages. A user can unsubscribe anytime. The service is free and the regions' Civil Defence Emergency Management Group (CDEM) which has the authority over the project will bear the cost of each SMS that will be delivered by OPTN Ltd mobile network provider (New Zealand Press Association, 2007).*

Tsunami Disaster in Sri Lanka: *When the Tsunami disaster hit Asia on December 26, 2004, Dialog GSM, a mobile service provider, used location-based cell broadcasting*

technology to provide ongoing updates and emergency information to its subscribers along the coasts of Sri Lanka. The information included coming waves, brief news reports, hospital help lines and supply distribution centres. The company has been using mobile cell broadcasting for advertising and commercial purposes. The solution is based on Celltick Proprietary LiveScreen technology. During and after the events that followed the cataclysm, the system has been used to disseminate CBS emergency alerts messages to relevant areas under the provision of the Ministry of Disaster Management and Human Rights. While other communication systems like voice calls and SMS collapsed, CBS has proven to be a great success in delivering ongoing emergency alerts. The network as a whole suffered extreme traffic overload because millions of people tried to call or send SMS messages. Contrary to phone calls and short message service, CBS does not virtually consume any bandwidth (Writer, 2005).

Early Warning Location-Based Alert System in Australia: Australia has recently started to test its national mobile alert system. Tests have been done in Western Australia and Victoria to warn people about bushfires. The Victorian state government accompanied with Telstra partnership and with the cooperation of Emergency Management Australia (EMA) has successfully tested a trial emergency alert system that simultaneously telephoned every landline in a specific area. Victoria State will initiate a mobile emergency alerting system that will be able to send SMS alert messages and emails to people in specific areas in case of natural disasters or emergencies (Dunn and Collier, 2007). Another similar system will be introduced in New South Wales (NSW). The system sends SMS warnings and emergency information in the case of terrorist acts or natural disasters to all mobile users in suspected or endangered area. The information will include details like evacuation procedures, advices in case of bushfires, alternative routes, etc. The system is expected to operate with all mobile service providers. (The Australian, 2007). Both systems in NSW and VIC are supposed to function in 2007.

Implications:

Avoid services that require sign-up

There are significant negative aspects of requiring sign-up for being able to receive an emergency notification. Such solutions do not get the required adoption scale in order to provide complete population coverage.

SMS is suitable if we find a way to obtain cell-id's.

SMS is the most generic solution that also allows for two-way communication capabilities, e.g. send and then receive a response. However, SMS does not include any location specific capabilities. Information about which mobile phone that is located in a specific area must be provided by the mobile service providers. The delivery of an SMS could be affected by network overload and therefore be delayed for a shorter or longer period of time.

CBS is good if the need of reply via the same message is of less importance

Cell Broadcast Services (CBS) provides multi-language support but lacks features to verify the amount of messages received. However, there are no two-way communication capabilities in CBS. Operators must agree to use the CBS functionality of their network-infrastructure.



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Robustness of the distribution channel

According to the findings from the tsunami case, CBS is a more robust distribution channel compared to the traditional SMS-service. In cases where the mobile network will be overloaded, CBS-distributed alerts will only consume a very limited bandwidth.

Successful use of sending alerts to specific areas

As shown in the New Zealand case and Australian case, there are already solutions in use where alerts are sent to specific geographical areas. These studies show that geographically specific alerts are feasible.

General privacy concerns might decrease the acceptance

For all Location Based Services, there are privacy concerns that should not be underestimated. According to Morris (2002), many users are worried to reveal mobile location information.

Multiple Channel and Social Media Crisis Communication by Anna Toss, Development Expert, Swedish Civil Contingencies Agency (MSB), and Jonas Landgren, Ph. D. specialized in Public Safety at the Victoria Institute in Gothenburg

Crisis management has the aim of mitigating and minimizing the consequences of crises and disruptions of society. Efficient communication is a condition for the execution of professional crisis management. This communication is important for both authorities and the general public as well as in the dialogue between authorities and the public. The rapid development in recent years of communication through Internet services has led to the establishment of social media as a separate and vital form of communication which has pr

“Social media are media for social interaction, using highly accessible and scalable communication techniques. Social media is the use of web-based and mobile technologies to turn communication into interactive dialogue.” – wikipedia.org

The competent authorities, that are expected to have a capacity for exercising a crisis management leadership, should elaborate strategies for making use of social media in events with multiple damage and mass crisis communication situations. These strategies should include specific activities to make use of the opportunities that social media have in respect to the ability of authorities to

- disseminate information and influence the course of events
- gather information and provide the basis for a social media based situation awareness
- intensify the processes for dialogue with the public or specific groups with the aim of minimizing uncertainties and reducing the risk for misunderstanding

People have from time immemorial had a need for information but also for discussing the information and becoming involved. Social media have replaced market-place meetings. By using Internet and mobile telephones, all people can make their voices heard and contribute to societal processes and resolving problems.

When authorities are entering the "online society", the traditional way of providing information from the authorities to the public must be supplemented with a channel from the public to the authority and perhaps also methods for listening to the communication between members of the public.

Social media are not an additional website or only another channel for disseminating information. What is essential for the transmitter or authority is to create sustainable relations, to be interesting and to be interested in getting information and to permit dialogue. An attitude which promotes transparency, discussion and interaction is furthermore needed. Social media must always emanate from the grass root level perspective and anyone wishing to inform must have a personal message and take into account what is of interest for the public.

Social media lead to a need for many authorities to radically reconsider their attitude to the public as receiver of their information and the public as having to be informed. In social media, the hierarchic structures are less evident and all participants in the communication are on the same level, with the same rights and opportunity of taking responsibility.

Crowd sourcing – when many people take responsibility for resolving problems

Internet in general but social media in particular permit the public to be creative and take responsibility on its own. This is particularly clear when social media are used for crisis information.

A good example of this is the English programmer *Ben Marsh*: When there was an exceptional amount of snow in England in December 2009, the whole country was paralyzed. Marsh programmed a map which indicated the amount of snow in different places and which was created on the basis of contributions of observations from the public. People everywhere in England provided information using their computers or mobile telephones and twittered their postal code and how much snow that had fallen in their surroundings, using a scale of 0–10. These data were transferred to a Google map of England, which in this way became a real time crisis snow map.

The Marsh example and the crisis snow map that was created indicate how information and functionality can be combined in new ways to create specific applications. To use and compile information and functionality from several different independent sources, programmes, etc. in this way is called to make a *mash up*. The example of the snow maps demonstrates another important aspect in relation to social media which is the opportunity provided for a large number of individuals, without any expressed coordination, to establish together a considerable capacity for reporting specific information. When many people contribute to resolving a problem or compiling facts is called crowd sourcing.

The Swedish Meteorological and Hydrological Institute (SMHI) has also taken advantage of the public in the weather reporting and introduced in June 2010 the website *Folkets Väder* temperature to the thickness of the ice and algae bloom and also send pictures and have a discussion with other people interested in the weather.

Another well-known example of efficient crowd sourcing is *Ushahidi*. The elections in 2007 in Kenya were violent and bloody and there was electoral rigging. Four Kenyans invented a way for people to report cheating and violence by sending text and photos with the mobile phone to a website and built the website on a mash up of SMS, MMS and Google maps. Both the website and the software were developed in three days and were given the name *ushahidi*, which is Swahili for testimony. In many countries where people do not have computers and Internet in their homes, the mobile phone has instead partly replaced the need for connection to Internet with the computer.

Ushahidi has been used in numerous other similar situations after the elections in Kenya, for example to monitor the elections in Mexico and India, to gather reports from eye witnesses in Gaza and to localize where help was needed best after the earthquakes in Haiti and Chile as well as to report on blocked roads in the snow and winter storms in Washington DC. The latest service is *Huduma*,



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which permits people in Kenya to report to the authorities when the public services do not function, for example bad or non-existing health care, closed schools, civil servants who are not accessible, etc.

Examples of collaboration between authorities and the public regarding information exchange:

Co-fast Lower Severn Community Flood Education Network started as a research project in which the inhabitants of Lower Severn in the United Kingdom were asked to share pictures and films from present and earlier days of watercourse in their area. These pictures were gathered using the Web 2.0 technologies like in the video network *Vimeo* and the photo network *Flickr* and a blog to encourage communities to add their own resources to the archive whether stories or photos with the aim of providing a basis for measurements of the water-level and how this had an influence on the inhabitants of Lower Severn. There is also the opportunity to comment on the resources already posted. The project is at present being developed into an early warning system through which the local inhabitants can with reference to the old pictures assess if the water-levels are rising or sinking significantly <http://insight.glos.ac.uk/TLI/ACTIVITIES/CO-AST/SEVERNFLOODS/Pages/default.aspx>.

The *Red Cross* (The International Red Cross and Red Crescent Movement) has a twitter channel called *Safe and well* and in the event of a disaster survivors can twitter a message that they are safe through this channel. The Red Cross forwards the message to the organisation's website to facilitate for relatives to find the information (<http://twitter.com/#!/safeandwell>).

Firemash is a collaboration regarding firefighting between the NSW Rural Fire Service and the inhabitants in New South Wales in Australia. Both parties report on where fires have been observed and where there is firefighting going on (<http://www.firemash.com>).

Community Rivers is an Australian joint voluntary and public project with the objective of protecting floods, rivers, streams, swamps, etc. Volunteers send observations of the watercourses' conditions to a database which can localize the origin of the information (<http://www.communityrivers.org.au/siteresultsb.php?state=QLD>).

HealthMap is an information system for early detection of disease and global out-brakes of infectious illnesses or disease. Facts about HealthMap are available at the World Health Organisation (WHO) or other health authorities, but also at Google Zeitgeist (<http://www.healthmap.org/en/>).

SMSlivräddare (SMSlifesaver) is a research project with the aim of increasing survival from cardiac insufficiency in Stockholm, conducted by Södersjukhuset (Stockholm South General Hospital) and Karolinska Institutet – a medical university. Mobile positioning technology (geographic positioning of mobile telephones) is used to identify and quickly dispatch life savers outside the hospital with knowledge in the field of heart and lung lifesaving. When there is a call to the 112 emergency call number service, the geographic position of the caller is defined. If there is suspicion of cardiac insufficiency, the operator activates a positioning system which positions the mobile telephone users involved in the service SMSlifesaver and if such a user is close to the site of the cardiac insufficiency then this lifesaver is dispatched through his mobile telephone. An ambulance and the rescue services are dispatched simultaneously. The plans are to extend the geographical area of the project (<http://www.smslivraddare.se/>).

Person Finder is a database for missing persons, searching a relative or reporting information about a person (that you are alive). This database was created by voluntary Google programmers in connection with the earthquake 2010 in Haiti and has also been used in the earthquakes in Chile and Yushu and the floodings in Pakistan, the earthquake in New Zealand and the recent earthquake outside the East Coast of Japan (<http://person-finder.appspot.com>).

Dialogue creates credibility

In the event of a crisis, it is of utmost importance that as many people as possible are provided with the best available information as quickly as possible. In this context social media play a certain role nowadays, even if traditional media such as TV, radio and the press, in particular with its new home on Internet, still have a much greater impact.

But the spreading of information through social media is very fast. The websites, newsletters and information numbers of the authorities are, in comparison with social media, nowhere near their possibilities of disseminating crisis information speedily and efficiently. The public discussion in social media does not only fill the role of a "grass fire". Twitter, Facebook, CrowdVoice and other similar services can definitely contribute to reaching people who otherwise would not receive the information equally fast, but their most important role is rather to provide opportunities for a dialogue. This implies that the individual can himself make his voice heard and get possibilities to listen to the opinions of others, enabling him to make his own decisions himself which will be felt to be more satisfactory.

The Swedish Defence Research Agency (FOI) decided last year to start a Facebook group but this function for dialogue was closed as FOI was afraid of getting many "not wanted comments". The FOI website became mute and really just another notice-board. Nine months later a successor has been introduced but very few are aware of FOI being on Facebook. The FOI investment in Facebook is furthermore extremely unclear and to a great extent a failure as FOI has no understanding of how social media work and can be used to create contacts and establish relations.

The Swedish Armed Forces (FM) started at more or less the same time as FOI their Facebook group which allows comments to be made. It now has more than 7700 participants and page after page with questions and answers. The position of FM is that critical comments are welcome on Facebook as this provides an opportunity for answering the questions and perhaps clearing up misunderstandings. A typical dialogue can look like this:

Samir I would very much like to do military service but was not accepted due to a knee injury, I was not even offered an examination of my health. I have now exercised my knee quite a lot and wish to apply for entry into the service. Where can I do this?

FM Hello Samir, even if you have not been accepted on an earlier occasion to the military service training, you can apply for entry in the normal way. In connection with the tests for entry a new medical examination will be made.

Frequently, there are other persons who answer the questions, which will make it unnecessary for FM to provide further responses.

Transparency is more important than which tools are used for communication

Many more authorities should follow the example of FM, the Swedish Meteorological and Hydrological Institute (SMHI) and many municipalities and become active participants in the social media. This provides a unique opportunity for letting people have insight and take responsibility and for receiving information and opinions and creating credibility. When a relationship has been established, the opportunities will increase for having a far greater impact from important messages in a crisis. A society, in which many people have a personal relationship with the authorities, have a greater credibility for these, are able to put reasonable requirements and understand their own responsibility, is a society with a greater power of resilience and ability to recover.



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It is not important which tools are used – Facebook, YouTube, Twitter or other programmes – and the pages which are popular to-day may have disappeared in half a year. Neither are the formal rules important – for example how often the employees of an authority are allowed to Twitter or to what extent they are obliged to register their Tweets. Most important is to have the courage to take the first step towards communicating with the public and be attentive, interested and open.

Besides the challenge in being open for dialogue, there are two other problems, seemingly difficult to handle, which often collide with the wish of authorities for starting or increasing their use of social media. The primary problem is that social media are not understood by many decision makers to be reliable and that it becomes strange if an authority participates in social media, in which also many every-day and trivial issues are discussed.

The belief that for instance Facebook and Twitter are social media with a less reliable image will in the long run be eliminated completely as more and more protest movements around the world (most recently North Africa and the Middle East) demonstrate continuously that communication media can play a role of life or death. The closing of the access to social media, which some regimes have done with the aim of limiting information and communication in connection with protest actions, indicates with all desirable clarity the force which the media allows makes possible to exercise.

Old problems, new solutions

The other major problem is how to handle undesired comments, obvious errors, deliberate disinformation, attacks or threats. None of these are however new for the authorities or other actors. What is new is that the problems can occur in a very much larger scale and be more wide spread and visible for everybody. Previously, unwished for comments, obvious mistakes or errors, deliberate disinformation, attacks or threats could be ignored. Attacks and threats could be handled through being reported to the police. In social media these matters are handled differently.

Undesired comments and obvious errors can be answered and met with dialogue and by making available information which shows another side of the matter. Most probably also others than the authorities themselves, will help with correcting the errors. Attacks and threats need to be handled in the same way in social media as when they occur in other different situations. Attacks should therefore be pronounced as not welcome and threats should normally be reported to the police, even if no person can be identified directly as responsible.

The authorities can create an increased credibility for their work and can furthermore get a large group of individuals who can serve as a resource for the authority in its work by conducting an increased dialogue with the public in social media. They can get a better understanding of specific questions by being able to study them also from the perspective of the public. Within the framework of the dialogue in social media, there is also room for the public to keep the authority and others updated about specific events that have happened or the development of an event or crisis.

Krisinformation.se, which is a web-based portal for information to the public from the competent authorities, is a good example of how the Swedish Civil Contingencies Agency (MSB) uses social media to reach out with its information. By making the flow of news on *Krisinformation.se* available on inter alia Twitter, anybody can forward the information to others, comment on its contents and publish the information again within his own networks. This naturally also means that the information can become corrupt, but as the link to the original text on *Krisinformation.se* is included then the receiver of forwarded information can have access to the original text.

In a similar manner, *Krisinformation.se* could be used when the authorities have a need for gathering large amounts of information, for instance when a disease has broken out locally. By publicizing a

link to an infection information template, the people who are following the flow of Twitter from the authority can forward the link to specific groups which can contribute with information. In different events, authorities can propose different key words, so called hash tags (for example #forestfire, #sthlnsbomb, #toxicfumes, #gothenburg, etc.) which people can use to relate their messages on Twitter to, update the status on Facebook, etc. to the situation at hand. Authorities on different levels (local, regional and national levels) can then seek and follow what individual persons write about in relation to these events.

There are different strategies, which can be used for gathering information about infections from people and in which a link to the different sources of information on infections (smittinfo) are publicized differently by relevant competent authorities. As many different authorities collaborate with other national, regional and local authorities regarding the publishing of important information, a considerable range of the communication can be achieved. A link to a template can in an event for example be published by the competent authority (The Swedish Institute for Communicable Disease Control) or a municipality (Östersund), as was the case in recent case when drinking water was infected in Östersund, Sweden. It is also possible for the competent authorities to follow what is written on blogs and different fora which will facilitate for them to provide the information that the public needs, accommodate the need for dialogue and gain credibility.

In this way, social media can facilitate reaching large groups of people and channelizing the gathering of information to a common place in line with the principles implemented for national telephone and SMS information numbers.

Three steps on the road to changing the approach to social media

The competent authorities which in on or other way are responsible for safety in society and security will in the long run be forced to address matters related to social media as not being present or lacking a strategy in this field will be considered to indicate that the authorities do not take their professional responsibility. When an authority starts a process with the aim of increasing its presence and participation in social media, then this will lead to an undertaking or process of continuous long term change.

A first step can be to conduct in specific events a certain monitoring of the world around with the help of social media and in this way benefit from what people and the public in general produce. Social media can thus function as an informal channel, a so called Back-channel (Back-channels on the front lines: Emerging use of social media in the 2007 Southern California Wildfires, Sutton, J., Palen, L., & Shklovski, I. (2008), Conference on Information Systems for Crisis Response and Management) for the authority to get a feeling of the opinion and increase the knowledge about how the situation in the event is perceived.

A second step can imply that the authority elaborates parts of its information strategy somewhat more social in the meaning that information is made available also in social media.

A third step could consist of trying in specific events to reach out to specified groups, establishing dialogue processes and accelerating the gathering of information in order to better understand the possible areas of maneuver for the authority and role in a certain situation.

These three steps are examples on how authorities can approach social media and responsibility must in the long run be taken for being able to provide good service of high quality to the public. Such service should be provided on those locations and in those connections which from the perspective of the public are most appropriate.



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In the longer term, it is also reasonable to expect that central public authorities establish technical platforms which will facilitate linking together the individual and particular systems of the authorities to the social media with the aim of efficiently reaching out to large groups of people, being able to gather information efficiently and establish interaction and dialogue which are valuable for the crisis management which future events will require.

Conclusions on needs to be addressed in MASSCRISCOM1

General

This Requirement Specification solely contains such media that to any extent can be utilized for two-way communication. The Qualitative Study from Örebro University illustrates various attitudes to a "Crisis Communication Centre" (CCC) or Service Centre for the Public as well as how that prospective Centre might relate to the existing 112 Emergency Call Number. It also suggests techniques through which the public may prefer to be approached in case of an emergency or of a situation which requires public warning. The technical solutions to be used are not in the form of technical specifications, the requested functionality is merely expressed.

Speed

Many situations require that an early warning or a warning and emergency information reaches as many affected people as possible and as quickly as possible. In for instance the scenario when a flammable or toxic gas cloud threatens to spread to a populated area, speed is more important than precision. The studies indicate that a significant share of the recipients or affected people, typically more than 10,000 and as much as over 100,000 persons, need to be reached. The demands on the mass communication process are therefore significant. New methods to warn the public are furthermore needed.

Geographic precision

In certain cases, the need to address only the people presently in a distinct geographic area is important for instance to avoid unwanted movement of people that may block escape routes or cause unnecessary panic. In these situations, exactly those people that really need be alerted or warned and provided with emergency information should be addressed and the geographic precision is more important than speed. The studies undertaken have also indicated that the need for geographic precision is considered to be great or very great.

Numeric precision

Also in an event with slow development but possible serious consequences which may be hard to observe, it is necessary to ensure that each individual person within a defined area has received and understood a warning message. An example is that, in a scenario with uncontrolled but comparatively slow spreading of radiation in a certain direction, all individuals in the area must be informed. The need for numeric precision is thus also great or very great.

Precision as regards ability to reach individuals with particular needs

In respect to people with hearing and speech impairments or persons who have cognitive disabilities and persons who do not fluently understand the national language(s), particular measures need to be taken to reach these people with particular needs. The same applies to persons that are unable to move without assistance or other impairments for which it is also necessary to have specially designed processes for contact as well as for carrying out the needed actions resulting from the early



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warning or warning and emergency information. These measures require precision to be undertaken and are important even if the persons can be expected to be limited in number.

Security as regards delivery

The channel(s) to be chosen for the early warning or warning and emergency information must be very accurate and secure to ensure the delivery of the message.

Security as regards authentication

The important need for authentication must be ensured, as far as possible, and any possibility to falsify, corrupt or irregularly forward any message containing an authorized early warning or warning and emergency information must be prevented. This also applies to spamming. As the outcome of the studies undertaken strongly emphasizes, the trust issue is basic and any genuine early warning or warning and emergency information must be easily distinguishable from fake messages or SPAM. It is therefore of utmost importance that an early warning or warning and emergency information message can be trusted and actually originates from an authorized source.

Robustness as regards electricity supply

The channels to be used for dissemination of early warnings or warnings and emergency information must be robust as regards electricity supply. The functionality of each channel must be guaranteed through appropriate measures to prevent any disruption of the public electricity supply for an extended period of time.

Robustness as regards other disturbances

The channels to be used for dissemination of early warnings or warnings and emergency information must also be robust as regards other threats or risks, than possible disruption of electricity supply. Plans and measures must therefore be considered and undertaken to protect the channels from the consequences of inter alia:

- Electromagnetic Pulse (EMP) effects
- Extreme weather conditions
- Sabotage (terror attack or other)

Ability to conduct two-way communication and monitor and manage the communication

Most of the present systems and methods for early warning and providing warning and emergency information serve the purpose of one-way communication for dissemination of messages. They do not have the capability to register which the receivers of the message are and how the message has been received by these. Answers to a number of questions would be important to have answers to, for instance:

- has the meaning of the message be fully understood?
- are further details needed concerning the crisis or risk at hand?
- is it clear what response is to be taken by the receiver of the message?
- has the information about immediate action to take been understood?

Crises can cause worry and an urgent need for the public to receive information and advice to know more and have instructions on how to act. But there may also be a strong wish to supply information to the authorities on what is going on. When building the new-generation system for crisis communication such a system should include various two-way communication options and also be able to monitor the communication and manage the measures to deal with the requests of the public, which the present technology allows for. The following demands should therefore be put:

- Traceability to ensure whether a message has reached each recipient or not
- Monitoring to control whether the message has been understood
- Management of responses to the public regarding for instance needs for evacuation
- Provision of further information and explanations and assistance for instance through a web portal or telephone conversation

The studies undertaken have indicated that:

- the enhanced means of communication in today's media oriented society lead to an increased request for information – the more we communicate the more the needs and expectations for information increase
- the core of crisis communication will, in spite of any newly developed technique for communication, still remain in the spoken conversation between two human beings – ‘the need to actually talk to someone’
- any event that occurs has often an impact on others than those situated near the site of occurrence – as people are nowadays more independent of time and space than before

The crisis management actors want and need to know what the needs are that the public has. The benefits of receiving information on observations of the public from the site of an incident will be considerable for their organizations on occasions like infrastructural disturbances, floods, forest fires or storms. It is also beneficial to receive information from the public concerning on-going rescue activities. The expected benefit from two-way communication with the citizens is high according to the studies.

Two-way communication between authorities and the public

Accidents and crises occur suddenly and unexpectedly. The need to warn and to provide the public with crisis information is a major challenge and the responsibility for this lies normally on the local rescue service but can be different in a crisis situation when many actors at different levels become part of the crisis communication. The expectation of the public as regards prompt information has increased, as the media landscape has changed. Peoples' increased mobility as well as their access to new means of communication raises new demands on the authorities in charge. Experiences from major incidents and exercises indicate that the offered information is often deemed to be unsatisfactory, as is the coordination between the acting authorities.

Experience also shows that the 112 Emergency Call Number often becomes overloaded on such occasions. The public does not know where the information they seek can be found or does not receive answers to their questions promptly enough. 112 is then considered to be the only remaining option for those seeking information, even though the public is aware of the fact that this number is only to be used in an acute emergency.



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MASSCRISCOM suggest as a solution to the overload problem the establishment of a:

- "Crisis Communication Centre" (CCC) (including a Public Information Number and a web portal)
- linkage between the CCC and the systems for early warning and dissemination of warning and emergency information tested within the project

The general idea is that the CCC will serve as a multi-channel portal for the public to contact in any situation when accidents and crises occur suddenly. The CCC is expected to supply through the available channels initial information, guidance or advice in supplement to the early warning and disseminated warning and emergency information. An information number should be integrated with the organisation that issues the early warning and disseminates the warning and emergency information. This will enable the validation of the message and direct callers to the correct source of information or the competent authorities. Even in other situations when there is a need for quick answers, the CCC will function on a similar way.

The systems will thus be developed and used to:

- enable the supply of information, after an early warning has been issued and warning and emergency information has been disseminated in the event of an incident, to calm, inform and advise on how to respond and what action to take in order to handle the situation in the best possible way
- provide more information and guidance to the callers on who to contact (for instance the municipality, the local medical care centre, the local rescue service, etc.)
- receive information from the public, e.g. their observations or knowledge of the incident and its consequences

Communication with persons or groups with particular needs

The channels for early warning and dissemination of warnings and emergency information and other information must be chosen so that they enable communication with groups of people with particular needs. This may require multiple channels to be used and in the studies there were strongly supported suggestions to use a web site for information in other languages but also blogs and social fora. Similar views were expressed in the studies in respect to communicating with hearing impaired, i.e. blogs and social fora, but SMS was also suggested to be utilized to reach the hearing impaired. Groups with particular needs should thus be given the possibility to leave and receive information using the same tools that they use in their daily communication with others, social as well as official contacts.

The "Crisis Communication Centre" (CCC) must provide information that is comprehensible, as regards factual contents as well as due to how the information is packaged, transmitted and received. The Centre will have the ability to give information – spoken or written – in languages other than the country's official language(s). The choice of languages will not be made in the Requirement Specification.

Support for receiving and supplying information

The methodology to handle any incoming call to the "Crisis Communication Centre" (CCC) should be based on experiences from existing organizations for handling the 112 Emergency Call Number as well as those handling information to the public.

The following components of the methodology should be considered:

- computer aided interview support (indexes)
- automatic or semi-automatic positioning of a caller and incident
- a case handling system for registering all cases – compatible with the methods and techniques for case handling in all the competent authorities that may be feeding or be fed by the Centre
- a Frequently Asked Questions (FAQ) database to secure that only approved information is given

The findings from the studies are that the public deem the spoken communication to be the fundament for both leaving and receiving information, particularly in the event of a crisis and that the confidence is on a high level for the present handling of the 112 Emergency Call Number. An information service by telephone that the public can call is considered to be the best channel to leave and receive information. The possibility for the public to speak to an ‘actual’ person is emphasized. Processed information from the public presented in written reports or summaries about an on-going event received through a national information number would be useful or very useful. When a warning is issued additional information should be included about the website address and/or information number that the public can call for further information.

Information exchange between the 112, the Centre and national web channels/portals

In the creation of a ”Crisis Communication Centre” (CCC), the coordination and information exchange between:

- the 112 Emergency Call Number
- the ”Crisis Communication Centre” (CCC)
- the national web channels/portals

should be considered. All design will have to have as a basis a perspective of the public and its view of the needs which will mean that all information, irrespective of which channel is used, should aim at being consistent. As control of all the channels to achieve this goal cannot be executed fully, the project should, as far as possible, identify obstacles and suggest solutions for exercising coordination. The technical integration and methods to enable coordination and knowledge transfer between the actors will thus be addressed, more specifically in the following respects:

- databases for common FAQ, contact information concerning actors in charge and other relevant information
- methods for achieving a continuous information exchange process and descriptions of these
- a system for automatic information transfer and sharing of information
- a methodology for compiling, assessment and use of the information received from the public

Horizontal, inter-organizational information exchange between and across heterogeneous organizational structures is complex and difficult to realize fully in practice, which is not due to a lack of technical means to serve this purpose but rather lack of agreements and understanding between the involved parties. The need for establishing agreement on and implementing standards for a common information infrastructure and coordination should be considered. Such an infrastructure would exploit the technical base to be used, be flexible to accommodate for future changes as well as include networks for the coordination and information exchange between the actors. The implementation of such a standardized and common information infrastructure and its management in order to promote participation and balance the need of flexibility and improvisation should be considered. This could



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also include studying the existing standards in the relevant area, such as Tactical Data Objects, Geographic Really Simple Syndication (GeorSS) or any other appropriate Global or European standard.

Ability for communication after an early warning

The "Crisis Communication Centre" (CCC) should have prompt access to any available information regarding an issued early warning to enable the immediate handling around the clock of any questions from the public concerning the event and speed is essential, since the public can be expected to respond immediately to any uncertainty related to the message. This need for quick action but also for having information support available and integrated is based on experiences from different crises and in the studies of existing literature.

In the events after the destruction of the World Trade Center in New York in September 2001, new innovative ways of using geographical information systems emerged (Harrison et al, 2006). According to a study of Harrison et al (2006), new ways of keeping the public aware about public emergency alerts was developed based on the New York City Map System (NYCMAP-system), compiled from more than 7.500 aerial photographs. The underlying NYCMAP-system was used by a range of government organizations for city development purposes. The new system was called Emergency Management Online Locator System (EMOLS) was used by emergency managers to make visible on-going emergencies and hazardous situations in the aftermath of the collapse of the WTC-towers.

This information was dynamic and changed many times a day, making the communication process to the general public difficult. A decision was made to make the data in the system (EMOLS) available for the public. A web application was developed that functioned as a gateway to the underlying data. The web application proved to be a good solution in order to allow the public keep updated via this self-service solution, based on the approach to allow the public to pull information from underlying governmental systems.

From a MASSCRISCOM perspective, a viable and feasible solution could be to allow the public to have rich media access to the crisis and emergency information that is stored and maintained by the competent authorities. The public could for example have some form of access to a subset of information stored in systems such as WIS, Samverkanswebben or the SOS Alarm dispatching system. Such functionality would require an overarching security and data access model in order to minimize leakages of data inappropriately, for instance privacy information or other sensitive data.

Weather warnings

Weather warnings are general or customized, as wanted. To get a higher value in the weather warning service, it should be possible for a user to subscribe on warnings valid for its own region and with its own warning criteria. Weather warnings as such are not included in this study.

Many persons are affected by the weather in their profession in matters which depend on the weather situation and use the weather warnings. In general, the existing system of weather warnings in Sweden meets according to the studies most of the needs of society, but many users could benefit from a more individualized warning service. The findings are thus that it would be of great value, for instance for a municipality, to be able to define its own geographical region for weather warning. The general conclusion is that the present system for alerts and warning in Sweden meets a number of needs, but further precision in the targeting of warnings is deemed valuable. This is partly a matter of being able to specify the prerequisites for a warning to be issued. It is also a matter of limiting the geographical area for which information is requested and is deemed particularly beneficial.

In the studies conducted there are also indications that there is an uncertainty about the difference between weather forecasts and warnings and it is important that this observation is taken into consideration for the communication of weather warnings.

Annexes to the Crisis Communication Studies

A summary of some results of an integrated research study on The patterns of receiving and processing emergency information – cultural experiences and information searching habits presented by Triin Vihalemm, Tartu University, Institute of journalism and communication

The integrated research was based on a case study with three focus groups conducted with retrospective interviews with people who had actually survived the storm and floods in Pärnu in 2005, a "laboratory" research of reactions of seven focus groups to the simulated warnings of different types of threat (storm, chemical pollution, radiation) and a survey with standardised answers to the questions about possible behaviour strategies and preferred information sources in the times of crisis (radiation). Some patterns came out as a result of the factor analysis.

The survey thus focused on the perception of crisis communication information by the citizens, who experienced real-life crisis events in Estonia. The survey also showed how people reacted to the crisis communication messages and which actions were taken by different social and age groups. The main results of the analysis of peoples' information seeking habits, reaction to the warning messages and behaviour (real and intended) in the crisis were based on the questions:

- What warning message response strategies are utilized among the lay public?
- Which factors support the response efficacy of the warning?
- What are the barriers hindering the response efficacy of warning, especially the instructing information?

Another outcome was a discussion of the possibilities of strategic planning of pre-crisis communication.

The strategy of following and trusting the mass media

- Traditional and new mass media is preferred information source in times of crisis and following it is considered appropriate in the situation of serious threat (like radiation)
- The pattern connects with active and varied media usage and high trust towards institutions
- characteristic to (ethnic) majority, people with higher education, people in their thirties-forties

During the night of the flooding in Pärnu ...

...some respondents made an extra effort in order to stay in the infosphere. It gave them some (psychological) feeling of security:

– *When the water covered the stadium near our house electricity was cut off. **Then I took the batteries out of a torch and put them in the radio.** The radio was on all night...information was delivered all the time by the state radio station (public broadcasting) and we followed it*

Repeating of information, certain trusted channels generate trust and raise response efficacy

– *At six o'clock in the evening the Estonian Television (public broadcasting) started to warn that the storm was coming and that there would be a rise in the water level.*



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*I didn't believe it at first because I wasn't in Pärnu in 1967 (the previous flood T.V.) ... But at 9 o'clock, when Aktuaalne Kaamera (the main evening news broadcast) T.V. **very seriously** talked about it **I went and put my car** on a little hill in my garden //What do you mean by "very seriously"? //It was **the third time** it was announced and from **such a serious channel** as Estonian Television ...I don't take the commercial television channels that seriously.*

Reactions to the simulated warnings

- Trusting the instructive information, i.e. when hearing the warning about radiation:
 - My **first thought** listening the message was that I should leave the town immediately...but **then it was said** that it is no need no reason to leave the area, just stay indoors.....**so I would do so**
- The information presented in the official message is sufficient:
 - They (Estonian Television) are connected with the crisis centres and there is no sense in people trying to contact these centres directly... the lines would be busy anyway
- An informal warning (friend calls and inform that dangerous chemical substances may be emitted to the atmosphere and to the lake of Ülemiste as a result of accident in a plant near Tallinn) is not trusted unless confirmed by the mass media:
 - It could be just rumours: 'an old lady said' ... Why should you trust every rumour? I would listen to the national radio and watch TV. I'm sure that they would inform us if something like this (chemical pollution T.V.) happened!

Pattern of networking

- In some cases people may not feel satisfied with the information given by the mass media but actively seek additional information from personal communication networks: family members, friends and acquaintances, who are considered to be experts in the area, and obtain additional information directly from institutions – for example by calling 112
- The critical reflection over the information provided but the wish to put together ones' "own" picture from various fragments of information is characteristic for this response pattern
 - characteristic to (ethnic) minorities, people with higher education, younger people

During the night of the flooding in Pärnu...

- ...some people paid attention to the warnings in the mass media after they got the same information from their acquaintances:
 - I have a trustworthy information source in Stockholm, an Estonian lady who always calls me when a storm is on its way to Estonia. She follows the (Swedish) weather forecasts and a cyclone always moves in a certain way, so I begin shivering when she calls. She also called that day (before the floods T.V.)

During the night of the flooding in Pärnu...

- ... the first warning by the mass media was combined with information obtained from specialized information channels in order to get a picture of the local situation:
 - We got the **first warning** from the Estonian Television, but **after that we started** to call the Pärnu Harbour. They have an automatic weather forecast station. So we got **a pretty good picture of how fast wind and water were moving...** We took potatoes out of the cellar. Afterwards, when the water

level was at its maximum, there was **no connection** any more but then it **didn't matter anyway**...when you have water in your house...

Reactions to the simulated warnings

Calls to friends-acquaintances and institutions after having heard the warning. Various reasons for utilizing this strategy. People may...

1. ... feel that they can better control an unstable situation this way:

– *I would follow the official information and probably **call the relevant official services**, but I would **also ask my friends**. Many of them are specialists in **different areas** – **what they think about all this?** And then **I would draw conclusions myself** on the basis of all this information*

When hearing (simulated) warnings people make calls because they...

2. ... want to get some sensitive information which could be obtained mainly from acquaintances who were working in the relevant institutions:

– *I know people who work in a relevant sector or may **be more informed** than the radio. If you talk to others you get reasonable information – there is **no bluffing***

3. ... not to trust communicator:

– *Various facts are used by different political groups in their own interests in the media...in order to lift somebody up or to humiliate somebody. I suppose that people who are responsible for this situation **will try to cover up this information in order to avoid responsibility**. I am not saying that this is definitely true, **but I do not exclude it, as people in high positions usually take care of themselves first**; they want to protect themselves*

Sceptical attitude towards instructing information

People consider that institutional warning may not contain all information needed to take relevant action to protect themselves, because...

- ... government may want to avoid panic and traffic jams and thereby suggest not leaving the area;
- ... government has no special shelters and thereby suggests staying indoors as a sufficient measure to avoid radiation

– *This is doubtful! It really depends. Not all walls can protect you from radiation; it's obviously said in order to avoid panic*

When the warning message forbids personal calls in order to keep the telephone lines open for distributing official information it comes into serious conflict with the peoples' life-world:

– *I would definitely call my family, even if the authorities advised against doing so – they are my family after all*

- Prohibiting the telephone calls is likely to increase psychological insecurity
- This may also prevent the information reaching those segments of population who do not follow official information channels (like grandmother in the countryside, Russian-speaking neighbour who do not follow local media)

The strategy of (non-)action without checking information



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There can be situations where some people, having heard about a possible threat, do not consider seeking additional information from outside sources. They "leave the space" where the information circulates and may just act (e.g. escape) or ignore a warning (e.g. go out to look at the storm), relying on their own experience.

Shock at the time of flooding in Pärnu

– *It (the storm) was totally unexpected ... we were at a party in the evening and didn't notice anything when we came home. We went to sleep and I was awakened by our neighbours at 05.19. I looked at my watch. The neighbours told me to move quickly because the water was coming. I didn't know where to go and the neighbours invited me to their place...they do have a second floor. ...I started to wake up my kids...I actually forgot that I had a son ... I woke up my little daughter ... and then I sat somewhere in the dark ... somewhere on the second floor... I didn't know anything ... even that it was my neighbours' bedroom ...*

Storm – ignoring the warning

- A victim of the storm in Pärnu told that he was woken up by the flashlights of cameras – people had come to see the flooding.
- People living close to the shore also complained that they could not move their cars to a safer place because the cars of those who had come to watch the storm blocked the streets.
- Responding to the simulated warning about coming storm a young man explains:
– *I believe that I have seen enough and I know Estonian weather – fortunately it does not change very quickly – and I am able to say whether trees would be falling over and things would be flying or whether it is just a strong wind that is manageable. I try to assess the situation adequately.*

Reactions to the simulated warning message about radiation

- The instructive information contained in the warning message was responded but in the oppositional way:
– *How much time is there until it (the radioactive cloud) reaches Estonia? Several hours... I would still check if there were tickets on some flights and would try to leave if there were places available... It doesn't matter where, just to stay away for some days*
– *I would still leave the area with my family There is no way I would stay and wait for it to reach Tartu, not indoors nor with iodine pills*

Factors that facilitate this pattern

- The belief that public authorities would diminish the threat intentionally (to avoid panic) or unintentionally (because of the lack of expertise).
- Socially stigmatised threat (disaster in Chernobyl)
- Not trusted communicating institution and big perceived risk increase the probability of employing the oppositional action strategy without seeking information.
- It is a hard task to communicate about danger and give instructions to the audience utilizing this response pattern.
- The response strategies were utilized for processing the warnings given in different formats
- Our study informed that a person may internalize different response patterns in different situations of threat. The usage of the response patterns seems to depend much on the specific situation

Acknowledgements

- 16 focus groups and 4 in-depth interviews carried out in Estonia from 2008 to 2009 funded by the European Community's Framework Seven Programme (FP7/2007-2013) under grant agreement nr. 217889.
- National representative survey (N=1500) of the Estonian population financed by The Estonian Ministry of Education and Science 0180017s07

The instructive information contained in the warning message:

*An announcement from the Radiation Control Centre and the Ministry of Internal Affairs: There was an accident at XX nuclear power station resulting in an emission of radioactive substances in the environment. The leak started at 7.45 this morning. A cloud of radioactive particles is moving towards Estonia and will reach the east of Estonia at 13:00 the earliest. Until that time the level of radioactivity will be normal in Estonia. The inhabitants of the **County A, B, C are asked to stay tuned for more information.** In the next message delivered at 10:30 at the latest the rural municipalities will be listed where people should seek shelter indoors. The necessity to stay indoors will start in the east of Estonia at 13:00 the earliest. **Please keep iodine pills close at hand but do not take them before it is officially recommended.** Precise instructions on taking shelter and taking iodine pills will be forwarded on the radio and on TV. **There is no reason to leave the area.** The radioactive cloud will persist for about two days and people should stay indoors also for about two days. Radioactivity will not rise to the level that would threaten health. However, people should protect themselves from radioactivity in order to minimise exposure. It is sufficient to stay indoors during the time the cloud moves across Estonia. Farm animals and pets, their feed and drinking water should also be protected. **Please refrain from using the phone in order to keep communication lines open.** This will ensure that important official communication is maintained. Further information about the situation is provided on the radio and on TV.*



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BBC SCOTLAND INVESTIGATE, INTERVIEW WITH
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