Info-Firefighter

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Figure 1. The Info-Firefighter

Abstract

A demonstrator has been developed by The Swedish Rescue Services Agency (SRSA) as a prototype for a future command, control and information system for rescue operations. It is being used for the building and running of scenarios together with end users, project members and decision-makers, and to form a platform for real rescue operations in the future.

By building and running scenarios all participating organisations can get an insight into their needs and requirements for all aspects of rescue operations. Rescue Operations in their entirety,

from ideas to real time operations, and from organisation to technology can be tested and analysed. All participating users can easily demonstrate their views.

By running the demonstrator for participating organisations it is possible to get a shared understanding from top level management to end users.

The demonstrator will make it possible for involved organisations such as the rescue services, medical services, police, air and sea rescue, military services and others which could be involved in joint large-scale rescue operations to develop, co-ordinate and increase their effectiveness in different operations.

1. Description of system construction

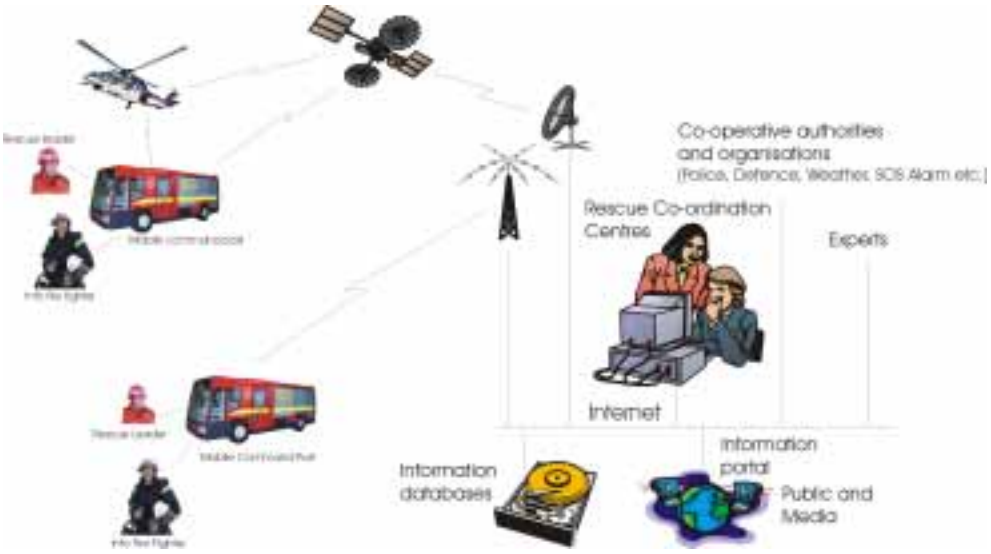

Figure 2. Framework of a system used in the demonstrator

Rescue service work demands information from many different sources, belonging to various organisations and countries.

The facility of being able to connect up to this system in order to obtain information will never be possible due to reasons of incompatibility, secrecy and assessment of information quality.

In the system described all participating users connect up to the Internet. By using the Internet we can then visit participating personnel and experts in order to, in consultation with them, share the information that is available from where the participating personnel are actually working. The information is distributed at the same time that those involved are able to describe, discuss and ask questions about the relevance and quality of the information. Co-operation exists because all those involved are contributing and dealing with the kind of information they are familiar with.

The info-firefighter's equipment is designed to ensure that the firefighter, the rescue commander, the command & control centre, experts and others involved in a rescue operation can work together with voice, pictures, data and virtual reality by using the Internet.

By means of demonstrations and tests with a wearable IT system the whole scope of a future command and control system will be developed. The aim is to show the increased information and knowledge support that will be available for the rescue commander, the rescue personnel and others involved in rescue operations.

2. The rescue command's need for information

As the scope of information becomes even more important for the rescue commander, for example information on hazardous substances, injured people, plans of installations, available personnel etc., the demands on decisions taken on a competent and formal ground increase. Today the rescue commander must rely on the possibility of being able to get various experts to the accident scene. One of the purposes of the demonstrator is to show the option of being able to move experts to the rescue commander in a fast and virtual manner by means of video, data sound sensors and 3-D models of the accident scene.

The rescue commander is the one person who needs vast amounts of real time information. He has to keep an eye on his personnel, on others at the accident scene, on resources, buildings and structures, chemicals and much more and at the same time make operational decisions and weigh up risks. He also has to be able to communicate his understanding of the situation and his General Decisions to those who need that information. At major accidents there is a big risk that the rescue commander can fall prey to information overload, i.e. that he receives more information than he is able to manage, while at the same having many people requiring much more information from him than he is able to disseminate. In those situations the rescue commander needs the assistance of one of his command staff, so that they and not he can be responsible for information.

Personnel and experts at the accident take part in different types of rescue operations (air, sea, land, environment etc.) nationally and internationally where different agencies and nations have different responsibilities. Command, control, and communication systems must be designed to allow personnel at the accident scene, rescue commanders, and experts to use the same equipment and the same systems regardless of which agency or nation is responsible for the operation.

3. Using demonstrators

Demonstrators will allow all involved in rescue operations to obtain information on:

- How rescue operations function currently
- New ideas
- Tests of new ideas
- How to demonstrate new goals for decision makers, project leaders, end users and others
- How to train and instruct personnel in future command and control systems

- Evaluation of products and test solutions for future technical systems

All work will be carried out in order to promote cross organisation and cross border operations by using shared systems, information, standards and methodology in building new command and control centres and rescue systems in Sweden and around the Baltic Sea.

3.1 Example of use at a forest fire

At large forest fires personnel and equipment are spread over a large area.
A situation monitoring & follow up system can automatically give the rescue commander information on their positions.

A prognosis system can calculate times for the movement of resources and reference time points for operations.

Rapid changes in weather and new information can quickly lead to awareness of new risks to personnel, property and the environment.
An aeroplane or helicopter filming the area can contribute with very important information.

The rescue commander, however, doesn't have the time to constantly watch transmitted video footage. The information on fire fronts transmitted from the aircraft must be adapted so that it can supplement the situation map. Such information can later be used to prognosticate fire front movements, taking wind direction, vegetation, elevation, and humidity into consideration. The rescue commander can then choose to watch interesting video footage by clicking on the relevant area of the map, this will give him the latest video footage and indicate when it was taken. The task of collating information on positions, events and prognoses as well as disseminating such information ought to be carried out by the command staff member responsible for information.

3.2 Example of use in a maritime rescue operation

In maritime rescue operations the municipal and national rescue services have little opportunity for effective co-operation other than over the radio.

With the help of Internet based solutions the positions of unit's can be placed on a nautical chart. Then all those who are connected up to the Internet can share this information via the "co-operation function". This connection was tested during a maritime rescue exercise, west of Stockholm in May 2000.

In that exercise a passenger boat and a cargo vessel carrying a dangerous load collided, and a fire broke out. The rescue commander at the Maritime Rescue Co-ordination Centre (MRCC) in Gothenburg alerted Search and Rescue units, the municipal fire & rescue brigade equipped with boats, the police and the coastguard, and directed them to the accident site.

An aeroplane equipped with a simple handheld video camera circled about above the accident site. The video footage was transmitted down to a vessel where the On Scene Co-ordinator was situated. On board this vessel was a staff command room where the video footage could be linked up to other information. Video footage, video stills, nautical charts, maps and much more was continually being put on the Internet during the exercise. It was possible for the units taking part in the exercise and for the command & control centre to share this information. VPN code (Virtual Private Network) was used to protect the information. Certain information was also available to the mass media and the general public.

With the support of this internet based system, co-operation with chemical experts and their systems was possible, which allowed for the rescue units to handle the dangerous substances on board the cargo vessel in the safest possible way.

4. Conclusions and planned work

Completed exercises and demonstrations have shown that information dissemination and common, uniform, situation interpretations are becoming ever more important at major accidents. Expert assistance is being called upon more and more often in relation to, amongst other things, constructions, chemicals and medicine.

Internet based solutions work extremely well across national as well as organisational boundaries. Therefore they ought to be chosen as information carriers in this temporarily established information system.

Commercial solutions are now more than ever following the standards that apply for the storage, distribution and display of information. Consequently video footage, stills, sound, whiteboards, logbooks and much more can be shared on most computers.

During this year the SRSA will continue to work on the Info-firefighter project in order to test new equipment, and to study, among other things, how transmitted information can best be utilised in the various types of command staff work.
The one major problem that the project has encountered is the lack of resources with regards to the administration and management of firewalls, which more and more organisations are installing. Badly administrated IT protection neither allows access to the information that is required nor keeps out competent IT criminals.