INFORMATION SYSTEM FOR DISASTER RELIEF OPERATIONS

Karin Mertens
Royal Military Academy
Dept CISS - INFO
Av. de la Renaissance,30
1000, Brussels, Belgium

Wim Mees
Royal Military Academy
Dept CISS - INFO
Av. de la Renaissance,30
1000, Brussels, Belgium

ABSTRACT

Disaster relief operations are very different from the traditional war operations. In disaster relief operations everything has to go very fast, the relief workers have to leave on very short notice and cooperation with other organizations is needed in order to save as many human lives as possible. The information system of those operations has to be small, flexible, rapidly deployable and mobile. Above that, it has to ensure the information exchange between the coordination center in the home nation and the relief workers in the field. In this document the structure and the use of a GIS in such an information system are described.

KEYWORDS

Geographical information system, disaster relief operations

1. INTRODUCTION

The number of disaster relief operations is growing and conventional command and control systems are not suited for those operations. They are too heavy, too complex and take too long to deploy. An information system that is usable for disaster relief operations has to be flexible, rapidly deployable and user friendly.

This paper examines the information system that is being developed within the framework of an ongoing research project to support the Belgian First Aid and Support Team (B-Fast). B-Fast is a group of military people, fire fighters, civil protection units and others that perform international relief work. Each time there is an international demand for aid because of a major crisis event, the Belgian government can decide to send this team of relief workers.

The information system will support the data exchange between the relief workers in the disaster area coordination center (DACC) and the decision makers in the national coordination center (NCC) during relief operations. Both teams will be connected using a wide area network (WAN), see figure 1.

Figure 1. The National Coordination Center (NCC) will be connected to the Disaster Area Coordination Center (DACC) using a Wide Area Network (WAN)

In this document, the structure of the system at the NCC will be discussed, followed by an overview of the situation at the DACC and finally a brief discussion is given of the information exchange between the two coordination centers.

2. NATIONAL COORDINATION CENTER (NCC)

The National Coordination Center, presented in figure 2, is situated in the home nation. It will be equipped with a link to existing human and material resources information systems of organizations from which personnel or material participates in crisis response operations, like ministry of defense, civil protection, fire departments, etc. In this way, the management of a lot of information can be outsourced to other organizations.
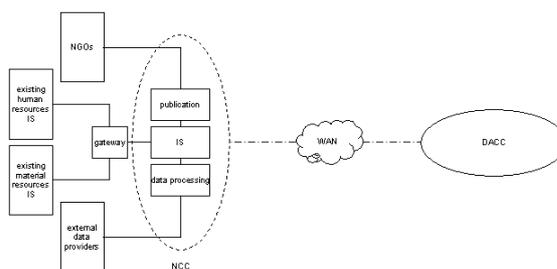

Figure 2. The structure of the National Coordination Center

Through a publication gateway, certain parts of the information contained in the information system will be accessible to third parties such as Non-Governmental Organizations (NGOs), the press and the general public. Because of this, NGOs and the public stay informed of the ongoing operation.

Finally, the NCC will have the possibility to import data coming from a number of external data providers. Any kind of topological or cartographic information can be integrated, spread and displayed by the information system.

3. DISASTER AREA COORDINATION CENTER (DACC)

The Disaster Area Coordination Center, shown in figure 3, will contain a server that replicates information with the NCC. The information can come from the DACC itself, but most often it will be entered and retrieved from mobile terminals, carried by the relief workers in the field.
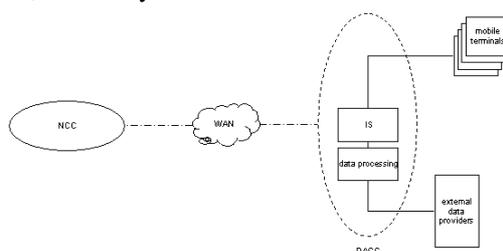

Figure 3. The structure of the Disaster Area Coordination Center

These mobile terminals can vary from Personal Digital Assistants (PDAs) to laptops. They can be equipped with different types of data acquisition devices, such as Global Positioning System (GPS) receivers or digital camera's.

Sometimes there are some external data providers available at the DACC, like for instance an existing local measurement infrastructure for measuring chemical agents in the air or measuring rainfall. When the measurement infrastructure (partially) survived the disaster and the measurement variables are relevant for

the disaster relief operation, an effort will be performed to link the measurement infrastructure to the information system.

4. INFORMATION MANAGEMENT

The information that has to be managed in the system is very divers and is inserted in various parts of the system. To handle the information flow the system is based on a commercial of the shelf geographical information system (GIS) software. The use of a GIS allows to present topographic information (maps, digital terrain models, satellite and aerial images) from the disaster area and to visualize objects, such as personnel, material, buildings, roads, etc., based on theirs coordinates.

The system uses ArcInfo, ArcSDE and ArcIMS software to handle the information at the NCC and to present data to NGO's and the press. At the DACC an ArcEditor license is available and ArcPad or ArcView can be used on the mobile terminals. Figure 4 gives an overview of the different software products that are available in the information system.
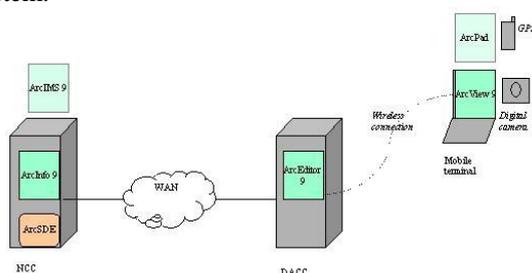

Figure 4. The information system is based on GIS software products from ESRI

5. CONCLUSION

Because of the possibility to exchange data, the information system will enhance situation awareness at both the NCC and the DACC. The NCC will be able to send background information like topographic maps, satellite images, etc to the relief workers in the field, who in turn can reply with a detailed overview of the situation on the field.

At the NCC, there will be the possibility to outsource a part of the information to existing human or material resources information systems and to publish specific information to third parties. At the DACC, the external data providers and the mobile terminals will insert a lot of information concerning the situation on the field.

Thanks to the underlying geographical information system the inserted information can be properly managed and presented in a synoptic manner.