FLORINUS
AN EMERGENCY MANAGEMENT, INFORMATION AND COMMUNICATION SYSTEM FOR FIRE BRIGADES, POLICE FORCES AND CIVIL PROTECTION

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ABSTRACT

The PIETZSCH FLORINUS system is based on developments of Control and Information Systems for German task forces, who used similar systems, e.g. during their UN mission in Somalia.

FLORINUS supports the following actions of platoon and group leaders of fire brigades and of civil protection, police and rescue services:

- Determination of own position in the operational area
- Indication of the positions of the other forces in operation
- Working out of operation plans with graphic support and standardised symbols
- Transmission of mission plans and observations
- Indication of weather data, traffic situation etc. through a link to other data bases
- Integration of data of external sensors like wind direction and speed from weather stations, or lines of sight of observation stations for triangulation

FLORINUS is based on standard computer hardware and standard computer operating systems for the stationary office systems and the mobile systems as well. The man-machine interface is based on an electronic map where actions are initiated using function keys or soft keys and the creation of messages is graphically supported and menue driven.

INTRODUCTION

In the case of all disasters which appeared up to now, but also in the case of many damages lying under the threshold of what is defined as „catastrophe", the past

and also the latest disasters have shown that exploration of the actual situation and communication between the various task forces and organisations need to be improved in a large scale in order to mitigate the disaster consequences. This fact will be confirmed by all responsible authorities and organisations.

Especially during the initial phase of a disaster it is very difficult for the responsible persons in every level to obtain an exact image of the actual situation. And therefore it is hardly possible to make the right decisions.

At the moment there are many manufacturers of communication and information systems for stationary headquarters. But for the use in mobile headquarters and at the level of the operational forces the communication and information exchange still is based on verbal messages, transmitted by radios. There is a clear lack of means supporting an advanced information management in this application field.

Due to this fact inaccuracies, misunderstandings and loss of time arise at analysing the situation and for consequence at giving instructions and making decisions. In addition there are the imaginable difficulties in communication with the operation center. May be the communication by radio is disturbed or the communication via a line is interrupted. The more one has to considerate inarticulate spelling and difficulties in wording of some people.

APPLICATION AREAS

The application area of the FLORINUS System is the protection from dangers in the widest sense. These are, above all, disasters, but also events lying under the threshold of what is defined as "catastrophe", especially in the following areas:

- forest fires
- fires in major industrial plants
- accidents arising during transport of dangerous materials and goods
- disasters in residential neighbourhoods (e.g. aircraft crashs or bomb explosion)
- natural catastrophes arising from flood, storms or similar events

FLORINUS can be used in all levels of public authorities who are responsible for protection of affected people and the protection from the respective dangers. These are, above all, the Communities and Districts. But also the Governments of Districts, Ministries of the Federal States and in some cases also the Government of the Federal Republic of Germany do bear responsibility.

The mobile systems can be used by civil protection, emergency services, police, fire brigades and forestry as well.

SYSTEM DESCRIPTION

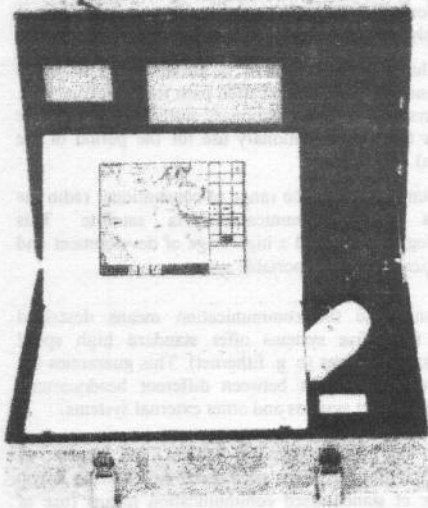There are two different systems which have basically the same functionality.

Fig. 1: Portable System

The portable system for platoon and group leaders is shown in Fig. 1. Central component of the system is a notebook computer as it is available of the shelf, which has been integrated in a shock and water resistant metal case in order to be protected from environmental influences. On the notebook's display a digital map of the mission area is shown. The digital map is based on maps from CD-Roms in standard format from map agencies or on paper maps, which have been scanned into the notebook in various scales. On the map the own position, represented by an icon is shown. The system obtains the necessary information for this purpose from the integrated Global Positioning System (GPS).

The stationary (or office) system (Fig. 2) with a larger high resolution monitor for operation centers and public authorities is based on a workstation. Its primary use on this level is for presentation of information from task forces in operation (observations, messages), for mission planning and for information exchange and communication between authorities. With the higher performance of the workstation big data bases can also be administrated.
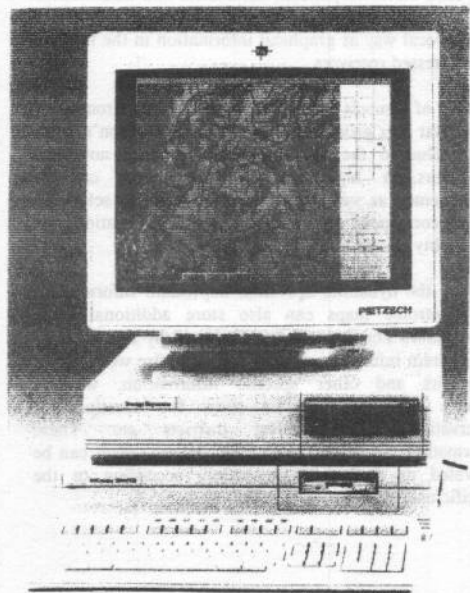

Fig. 2: Office System

Basic Functionality

Most of the features are based on digital electronic maps, which are stored on the mass storage device of each individual system. It is presented to the user by a high resolution colour display. The user can manipulate the presentation of the map in many ways to optimise it for his individual needs. He can vary the scale, he can select and move the section he is interested in and he can choose the degree of information in several levels (see Fig. 3).

The information exchange with other users takes place on the base of graphical information and symbols, which are entered to the map. These informations can be easily sent to any user via various communication means (see below). The information appears unmistakably on the map of the addressed user or user group at the correct position (world co-ordinates) and with the desired appearance.

By this means police, firemen, foresters or other rescue services can send status reports, observations and requests by using their portable systems. On the other side headquarters can collect the information of all the officers in charge in the field, plan the actions to be taken and send the correspondent commands and informations to the engaged services. These data appear in an unequivocal way as graphical information in the maps of the addressed receivers.

The set of symbols applied by different user groups and by similar user groups in different countries won't be the same. Due to the big storage capacity of nowadays computers, a high amount of symbols can be implemented as subsets, so that the user can select the subset corresponding to his field of application and nationality.

Besides the dynamic, operation dependant informations the electronic maps can also store additional static information. For instance systems used by fire brigades can contain information about hydrants, fire wells, water reservoirs and other specific information, whereas systems used by foresters show the locations of observation towers, forest districts etc. These informations are stored in different layers which can be activated or deactivated separately according to the specific user needs.
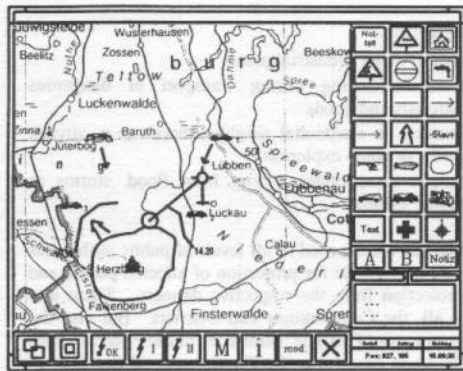

Fig. 3: Electronic map with symbology

Communication Concept

There are various possibilities for the communication between the users. The portable systems contain modems which allow the connection to standard voice radios for information transfer. The existing radios can be used for this purpose without any need to provide additional radios exclusively for the information system. The existing radios can still be used for vocal communication as before, because the data exchange takes place inaudibly in speech pauses.

With the built in modem it is also possible to use a telephone line as communication path for stationary (i. e. office systems) or quasi stationary systems (i. e. portable systems that are in stationary use for the period of the mission).

For distances outside the range of conventional radio the systems offer communication via satellite. This technology has reached a high stage of development and is practicable even for portable systems.

Additionally to the communication means described above, the office systems offer standard high speed network connections (e. g. Ethernet). This guaranties the effective data transfer between different headquarters, decision support systems and other external systems.

During the design of the system the aspect of interoperability has been considered in different ways. The use of standardised communication means (use of voice radio via modem, satellite communication, ethernet) allows an application nearly all over the world.

As the information exchange is based on symbology and therefore mainly language independent, the system can be used cross border. Only very few messages like system status information, help information or some messages appear as text messages. These messages can be presented in English or, if necessary, can be stored in different languages in the computer and the user can select his mother language.

Interfaces

The systems offer different interfaces for internal and external sensors. The portable systems contain a complete satellite based positioning system (GPS, global positioning system) and a built-in electronic compass. So every user knows exactly his own position and heading. These two informations are graphically presented by an icon on the electronic map. They are currently updated and automatically broadcasted. So the other users, especially the headquarters, are always aware of the actual position of all forces in the field.

There can be different external sensors that provide the systems with information. They can be distributed over a larger area and can be connected to the system by one of the above mentioned communication means. For example, universal weather sensors can provide information about temperature, wind direction and strength etc. as input to the office system.

With the network capability of the office system it is possible to interface with other systems, e. g. expert systems, data bases and conventional headquarters systems.

Ergonomic Aspects

A very important aspect for the efficiency and acceptance of the presented system is the implementation of the man machine interface. As most of the users (e. g. foresters, firemen) are not used to work with computers, this interface must be easy to learn and easy to use, it must not frighten even an unpractised user. It has to be optimally adapted to the specific needs of the different user groups.

This requirement is realised by different approaches. First the information representation is performed by graphical means in a way the user is accustomed to. E. g. the electronic map has an appearance very similar to the conventional paper map - but with more functionality - and the symbology used for information presentation is also well known to the user. The second aspect is the handling of user inputs. It is done by pointing to symbols, which represent the desired actions. For office systems the pointing can be performed with a computer mouse,

for portable systems other means such as trackballs and touch screens are more suitable. The last aspect we want to mention is the logical structure of the interface software, which allows the user to perform the desired action with few, transparent steps.

SUMMARY

The systems, especially the hardware, as described above are in use of the German UN task forces and have been used in Somalia.

Currently we are making available this technology for other users and applications under the name FLORINUS and have recently introduced the system to fire brigades, police and public authorities.

The acceptance was so high and the response so good that we started to implement fire brigade and other civil protection services specific symbology and message sets, so that a demonstrator system especially for use by fire brigades is existing.

The FLORINUS system will not replace but add on existing standard emergency control stations. Its emphasis is on the control of mobile forces in major accidents and the actual information of the emergency manager.

As the messages are mainly represented by graphical symbols, no language barrier occurs though that the system can easily be used cross border.

If the European activities to field standard radios will be successful, also the communication via radio will be possible through the European wide user community.