ICT-Supported Collaborative Crisis Planning

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Abstract

Crisis planning is an important task of every government. Its main function is to protect human lives, properties and environment. Contemporary information and communication technologies are capable to bring this task to more advanced level, reflecting the new threat situation, including the possible terrorist attacks.

The effective use of IT is capable to support the virtual cooperation of the geographically separated managers, specialists, commanders, resources owners or endangered objects to quickly and properly react to the evolving crisis situation, to build the awareness and manage the active response. There is a possibility to maintain this virtual collaborative network to increase the preparedness – to develop a “live” crisis plan. There has been a successful attempt to establish such an environment based on the information system EMOFF, together with other information systems in the South Moravian territory. The regional government and cities are interconnected and capable to build the crisis plan together, with day-by-day increments and which makes possible to have a common situation picture in case of a crisis situation.

The description of such an approach is explained, together with the additional features and future development possibilities, including the link to the EU IST FP6 project MEDSI (contract IST- 506991).

1. Collaborative crisis planning

There is a basic feature necessary for all living organisms, companies, communities and other organized entities – the immunity system, which allows them to survive. Allows them to react to the changing and often competitive or hostile environment and react adequately to preserve the continuity of their existence. A discipline, which helps to maintain the sustainable development, is so-called “Crisis management”. The definition of such a discipline is very broad and inconsistent among various groups of people, nations etc., but intuitively is understood by most of the people.

The crisis management has become more and more commonly discussed subject in the last years. The reason is mainly in the release of a global war threat and arrival of the “Asymmetric threat” situation, which substantially changes the scope of view on the overall security situation. The signs of it have been visible since the major terrorist attack to the USA in the 2001. Of course - there were also some major natural disasters, which made people to think about the importance of the fact “to be prepared” – Preparedness.

In the past – a major burden of big crises was put to the hands of professionals … to the armies, firemen, rescue workers etc. There was a threat of the war between countries or blocks, citizens were protected by “Civil protection” in order to support own military forces keeping the enemy off their homeland. The “far away” disasters were supported by a very slowly reacting international help.

The current scene looks a bit different. The enemy could be just around the corner in the chemical factory, ready to blast it out, with all chlorine tanks or something even worse. The availability of Weapons of
Mass Destruction has become a sad fact and the possibility of a long-term devastation of large parts of the territory might turn into reality.

Information about any disaster is broadcasted to the whole world in a couple of minutes. The mobility of a rescue and military forces is such great, that it may reach any place on Earth in hours or days, the humanitarian organizations are capable to collect financial and material help and act at the place in the comparable timeframes.

This is really the situation, which requires an intensive collaboration. It has to be admitted, that this collaboration really happens – there is no other way to solve the problems. But we are very often witnesses of misunderstanding, poor communication, lack of interoperability among various actors in the game. This happens in the regional levels (problems in coordination of rescue forces, public administration, humanitarian organizations, …) as well as in the international levels (problems with coordination of military alliance forces and civil organizations, non-synchronized activities of humanitarian organizations etc). The divergent activities lead to the loss of time, material and consequentially to the casualties and devastation of property.

There is one phenomenon, which can facilitate the collaboration – the use of information and communication technologies, supporting the common processes. Right at the beginning it should be stated, that the use of ICT itself is not a universal medicine. This is only a tool that can help, but the main task is modifying the processes and to persuading people, that the collaborative approach to the management of crises is the right way how to proceed in the future.

1.1 Preparedness

The crisis management is very often perceived as the activities of heroes in time of catastrophe. The more proper would be to introduce another heroes – the people who are capable to fight for the budget and spend hours of their own time in “peace time” making ready for potential disaster. Heroes, who are capable to convince politicians and general public to think about risks and to invest time and money to the preparedness. One of the tools used is a crisis plan.

The crisis planning is not an exceptional activity – it should be understood as a standard contemplation of every manager dealing with possible risks in order to enhance the sustainability of the business or organization survival. It does not matter if he works within the private company or in the public administration. Crisis plan is mainly a sort of document regulated by some bylaws with some associated methodology for preparation of it.

Nevertheless, it would be helpful to use a more general view of these documents. They represent a sort of internal memory of the organization. They represent something, which should be to some extent independent on the fact that employees come and leave, have various goals, knowledge and capabilities and have different degree of dedication to fulfil the organisation goals. The Crisis Plan is mainly treated as a document, which needs to be approved and signed, sometimes updated.

The idea of Crisis Plan is to describe the content and structure of activities and information linked to the risk management, presentation form of it and description of procedures associated to the sustainability. There might be a large variation in content, form and size of crisis plans at various levels. Whatever the crisis plan is, the most important thing is, that somebody makes some efforts before the crisis happened to think and talk about risks and probably design some ways out of potential troubles.
1.2 Organizational memory

There is a common notion of differentiation of organizations by the aspect; how much their operation depends on the specific individuals. What makes the difference, is the organizational memory and its quality.

This memory is not for free – it costs at least some time and effort to be created. It is apparent that the proper function of power distribution, hospital or bank cannot depend on the current configuration of staff. The organizational memory, written to the processes description, directives, meetings, trainings etc. enables the organization to perform independently on the employee’s fluctuation and what more – if well managed – it increases the performance and quality of organization by every new incomer. This applies not only for companies, but also for governments and international bodies.

The organizational memory is an excellent area for the Information and Communication Technologies support. The complexity and volume could not be handled without it.

Fig. 1: Crisis management in the process environment © T-SOFT

The organizational memory and its support are necessary not only for the standard processes, but also for the emergency and alternate ones, which take place during critical states. The crisis management is just an integral part of a standard management (see Fig. 1).

The documentation describing both the standard and exceptional behaviour is usually spread over many places, under the responsibility of various persons and probably organizations. It is obviously very hard to find the proper information – especially in the critical time and people then prefer the ad-hoc decisioning and usage of primitive tools, but with actual information.

But there is a possibility to work it out with a help of ICT.
The current or emerging technologies are enabling us to share and exchange the information easily:
- Internet and interlinked websites
- Common databases
- Geographical information systems (GIS)
- Hosted applications, available worldwide
- Mobile phones (including the satellite ones) with SMS notification and data transfer
- e-mail
- Audio or video-conferencing systems

Such environment enables any user to access and store information from any place.

On the other hand there are also some issues that cause the decrease of exaggerated optimism:
- Vulnerability of ICT infrastructure
- Lack of procedural interoperability
- Sensitivity of some information and necessity to protect it
- Differences in legislations
- Language diversity
- Differences in procedures

1.3 Collaborative crisis management

The collaboration in the real situation requires several basic things:
- Common understanding of the goal
- Political/legal condition to enable the collaboration
- Common information ground, including the standardized dictionaries and indexes of common information items.
- Common operation picture
- Non-ambiguous information exchange

In many cases most of these things are missing and the crisis treatment starts with ad-hoc building of the common picture and procedures right on the place and with the simplest communication tools and IT support (radio, phone, faxes, e-mail, word processors and spreadsheets, multimedia downloads…).

The step towards the collaborative crisis management might be the utilization of common ICT tools, that allows the users from various organizations, regions, industry sectors, government etc. to share the basic information, to build the common understanding and to exercise time-by-time the level of preparedness.

We would like to show some examples and tools, working currently in the Czech Republic, that supports the collaborative crisis management. The further extension of this principle might be seen in the MEDSI system, which is being developed under the EU IST Frame programme 6.

1.4 Collaborative management of resources

There is a resources planning system in the Czech Republic, where the government maps all the resources available at the territory (decreasing thus the need for the government-owned resources, which would be very costly and ineffective). The record in the system also has a positive effect for the company involved as it has a higher chance to maintain the continuity in the crisis situations via the government support.

The resources planning system ARGIS collects information about the various resources in the country-wide scale, having thousands of users in the public and private organizations and gives the planners and crisis managers tools to fulfil their responsibilities. The main goal of this system is to simplify as much as possible the user access to information, minimize the operation costs and open it for integration with other
systems - local, regional and international. As some of the system features (especially the data gathering) are opened to the public, both information security and interoperability have been treated as important factors.

In the specific crisis situation, the information stored in ARGIS serves as a first point for the resources lookup, getting fast response for the crisis management teams at various levels of country management.

The basic purpose of the system is a permanent collection and maintenance of the resources information, with all associated information. Individual users at the companies and various organizations of the public administration are doing the data input and maintenance collaboratively. Regional authorities are able to see both their own resources and the resources available in the neighbouring regions.

The permanently updated database is able to query during preparation of plans (risk analysis, resource planning, …). Resources can be searched by various criteria (types, properties, ownership, justification of use, geographic location, ...) and used both for planning and optimization and for the real support of rescue operations.

![Fig. 2: Argis – collaborative resources planning](image)

The system has been built-up on the following criteria:

- Availability of the relevant information in the understandable and usable form.
- Efficient system of information collecting and updating
• Standardization - use of standard indexes and formats as for example
  - Index of economic subjects
  - Standard Products Classification
  - Territorial ID Index
  - Countrywide index of streets and public places
  - Military and civil maps background
  - Etc.

• Information Security

Fig 3: ARGIS in the process of crisis planning

ARGIS architecture is based on several premises

• Powerful, centralized web-based countrywide system with distributed backups for sustainability of its operation.

• Automated collection system for easy gathering of information from the subjects, with the minimization of occurrence of errors.

• User interface based on maps with a simple geographical identification of resources, with the possibility of geographical analysis and internet-like user interface

• System interface, enabling working with multiple heterogeneous information resources (various maps, databases, sketches, tables, etc.), enabling also the automatic upgrading and maintenance of software.

The basic ARGIS position in the crisis-management planning environment is on the Fig. 3:

Any type of information including multimedia can be attached to the objects on the map. Thus the picture of a building, plans, video sequences, specific charts, spreadsheets, text files and so on may be used.

ARGIS is built to use as much as possible of COTS products and technologies.

Information is assigned at various layers. These layers are able to switch on and off separately. To the standard set of layers describing for example roads, rivers, forests, factories, etc. are associated special ARGIS layers describing the economy, based on the standard indexes. The system utilizes mapping web-services provided by the National Mapping Centre.
ARGIS represents a suitable tool for the collaborative preparation of the information base for planning and utilizing the resources for crisis situations.

1.5 EMOFF for the collaborative planning support

The next example is the Emergency Office (EMOFF) system, which has been in the air for several years for the crisis management support. EMOFF allows the collaborative preparation of crisis documentation within hierarchically structured and complex organizations as for example regions, government, large companies and utilities etc. and the coordination of decision support in critical situations.

The EMOFF database schema holds practically all the information needed for the preparation of crisis documentation at various levels by various users.

![Fig 4: – Emergency Office EMOFF – Entry screen](image)

Some characteristics of the collaborative preparation of crisis plan at the regional level with the EMOFF support:

- Central institution (or top management) defines the structure and content of the crisis plan both for the subsequent organizations and for itself. This brings the expertise from the specialists to the centre to the local environment, where obviously there are not enough resources for these activities.

- The structure is described as a template in the EMOFF system, together with all inherited documents, styles, graphics and parts, which are generated from the system database.
Individual cities work on their respective data areas, input the information about their infrastructure, resources, procedures, etc. Each individual information provided by the user, receives his original tag together with date and time of update.

Each user can decide about visibility and accessibility of the information deposited (it might be private or released to use to other specific users).

It is possible to upload any kind of document to the EMOFF database and benefit from sharing and protection features.

There are common indexes maintained to enable the integration of information areas and maintenance of data integrity.

The function „Generate the crisis plan“, based on the template, generates the text file (currently in MS-Word format), which consists of the „static“ part of the template, associated documents and all the actual data queried from the database.

The content of the resulting document depends on the actual database content and on the user context. This means that the user from the city X will get the plan for city X, with the relevant data concerning city X and possibly other appropriate information released by other users of the system. The regional user will receive the regional plan, based on the regional template, with all the information needed from the region.

2. Conclusion

In this paper some aspects of a collaborative crisis management were discussed. The collaborative information processing is based on the need of building an organizational memory the way the organization needs for the continuity of its operation. The organizational memory brings to the organization the independence on specific individual knowledge, skills and capabilities. This leads not only to the improvement of standard processes, but also to the better treatment of extreme cases leading to emergencies and crises.

The ICT support of the collaborative processing was demonstrated on the features of systems ARGIS and EMOFF, which work at various levels of crisis management in the Czech Republic. Further extension of the collaborative crisis management is developed under the international EU FP6 program as a system MEDSI.

More details can be found on www.tsoft.cz.

Bibliography

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