Usage of Military Continuity Management System for Flooding Solution

J. Palecek, R. Hajkova, A. Oulehlova, H. Malachova

Abstract—Increase of emergency incidents and crisis situations requires proactive crisis management of authorities and for its solution. Application Business Continuity Management helps the crisis management authorities to quickly and responsibly respond to threats. It also helps effectively and efficiently planning powers and resources. The main goal of this article is describing Military Continuity Management System (MCMS) based on the principles of Business Continuity Management System (BCMS) for dealing with floods in the territory of the selected municipalities. There are explained steps of loading, running and evaluating activities in the software application MCMS. Software MCMS provides complete control over the tasks, contribute a comprehensive and responsible approach solutions to solution floods in the municipality.

Keyword—Business Continuity Management, Floods Plan, Flood Activity, Level of Flood Activity.

I. INTRODUCTION

CRISIS management is currently a fast growing industry in Czech Republic (CZ), but also in other countries. The basic objective of crisis management is a continuous effort to increase public safety, protection of property and the environment. An important part of crisis management is to prepare for emergencies at the object of European critical infrastructure and the building of critical infrastructure at the state and European Union level so that when had occurred incident was secured their operation.

II. CURRENT SITUATION ANALYSIS

The European Union (EU) in the European region plays a major role in the field of civil protection through the European mechanism in ensuring the crisis response of the European Commission. Important role in the EU occupies center to coordinate response to emergencies to monitor the ensuing crisis, but also the possible situations that may result in a crisis. Center in addition to providing monitoring provides communication among the affected countries with the assistance of experts in the field and intervening states. In 2014 was adopted legislation providing civil protection cooperation in prevention of disasters, assessing risks and

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planning and preparedness with regular training and exercises for European civil protection teams. To the European Mechanism for civil defense covers all EU member states plus Norway, Iceland and Montenegro. In addition to these state there are efforts to restore the membership of Macedonia and preparation of membership for Turkey and Serbia [1].

In Czech Republic during 2000 was adopted legislation aimed at crisis management reflecting requirements of the time. In last 15 years adopted legislation additional amendments, mainly because of changing trends and new requirements for safety level. This trend is assisted by new knowledge in the field of crisis management, experience from incidents and technological progress eliminating the consequences or technologies used for early detection of the possible extraordinary events. New technologies also allow for innovative approaches to solving occurring events.

For crisis management is essential internal division of the Czech Republic to higher self-governing units (regions) and lower self-governing units. Higher government units divide territory into 14 regions responsible for the safety of their residents. The leader is the Regional Commissioner responsible from his position for the readiness of the region's emergency response in collaboration with other regional bodies. He establishes advice body of security and county emergency staff counties. Lower administrative units in the Czech are municipalities that have their own autonomy and are responsible for the security of population in their administrative area. The highest position at municipalities´ holds mayor or deputy mayor(s). The Mayor municipality, defends the interests of municipalities, convene and governing council of municipality and creates special authorities. Mayor is responsible for informing the public about municipality activities provides execution of delegate's power and he is capable to as the Police of the Czech Republic (PCR) on cooperation in ensuring public order etc. [2]-[4].

Important role in crisis management in the CZ plays since year 2000 Integrated Rescue System (IRS), which is regulated by the Act No. 239/2000 Coll., on the Integrated Rescue System [5]. IRS consists of basic and other parts. The incremental bodies of IRS are Fire Brigade Czech Republic, fire protection units dedicated to flat assignment of fire protection units within governing region, medical rescue service, and Police of the Czech Republic. Other IRS bodies are datached forces and means of the Armed Forces, other brigades, public health authorities, emergency, expertise and other services, civil protection, non-profit organizations and civic associations that can be used for rescue and liquidation operations. IRS is used in extraordinary event with the need to

carry out rescue and liquidation work with at least two bodies of the IRS [5].

CZ legislation [6]-[9] distinguishes four different types of emergencies, namely: state of danger, State of emergency, threat of the state is declared and state of war. state of danger can be as an urgent measure announced if there are people and their health at risk, as well as property, the environment during natural disasters, industrial and environmental accidents or other dangers that cannot be averted by normal activities of IRS bodies and the intensity of danger does not reach greater extant. State of danger in capital city of Prague can be announced by mayor and in other regions it is announced by Regional Commissioner of the region on the basis of Act No. 240/2000 Coll., on Crisis Management and on amendments of certain acts [6] and shall immediately inform the surrounding region, government and Ministry of Interior. State of danger may be announced to whole or to a part of the region for a maximum period of 30 days. The possibility of extending the deadline above 30 days suggests Regional Commissioner or Mayor and it can be approved by the Czech government. If you cannot avert the threat by state of danger, you can ask the Czech government to announce the State of Emergency. Residents are informed of the publication in the Journal of the laws of the region, on the official board of the regional authority and the municipalities in the territory where the state of danger is announced and means of mass media are used and local information systems. Termination of announced state ends after 30 days form publication if the government or the Regional Commissioner does not decide on early termination prior to this deadline. The government can cancel the announcement of a state of danger, if there are not met conditions for its publication and inform public. It is very important that the state of danger crisis measures and their possible scope [10]. The lowest level of the crisis situation in the CZ was announced in 34 cases. In 28 cases of declared state of danger were the main reason large floods [11].

Incident of second degree of the crisis situation in CZ is a State of Emergency, responsible are Government's authorities. It can also be announced by the Prime minister because of the possible danger of delay in addressing of emergency under condition of approval by the government within 24 hours from the announcement or annulment decision in accordance with the Constitutional Act of Law No. 110/1998 Coll., on Security of the Czech Republic, as amended by No. 300/2000 Coll. [7].

An emergency state can be declared due to natural disasters, industrial or environment accidents, large-scale accidents or other dangers that threaten the internal order and security, people's health, lives and property. It cannot be declared to strike to protect a legitimate economic and social interests and protection if rights.

House of Parliament is immediately informed about the declaration state of emergency and has the power to annul the government's decision. The same as the state of emergency there is 30-day period that can be extended with the agreement House of Parliament and it is valid for part of the territory of the country or its part. Government together with the announcement of the state of emergency by the special law restricts to what extend is the Charter of Fundamental Rights and Freedoms going to be limited and set up the range and scope of the obligations imposed. After 30 days or after the period for which the state declared the crisis situation it is ended or when the House of Parliament can decide to prolong before the 30 day period ends. Czech legislation allows simultaneous announcements of a state of emergency together with the state of danger [7]. An emergency state was until 1st January 2015 in CZ announced five times. Reason for announcement was connected with great floods threatening lives of people [9].

The third critical condition is threat of the state. This condition is promulgated by Czech Parliament by government proposal. This proposal was set in constitutional Act of Law No. 110/1998 Coll., on Security of the Czech Republic, as amended by No. 300/2000 Coll. [7] if the territorial integrity foundation of democracy or state sovereignty is in danger. Threat of the state can be declared only on the entire national territory and for indefinite period. State of war is also the fourth and special crisis situation. It is associated with the outbreak of armed conflict, with attacks against CZ or based on international treaties for collective defense against attack. State of war can be announced in accordance with Article 43 of the Constitution of the Czech Republic [9] by the Parliament of the CZ. The state of war as well as the state menace is always for the whole country and not limited in time [8], [9]. Until today, there has not been declared a state of war or threat of the state in Czech Republic.

An essential part of emergency preparedness is crisis documentation. The basic planning document is an emergency plan comprising a set of measures and procedures to deal with crisis situations and creating conditions to ensure preparedness for crisis situations. Contingency plans are prepared by the Czech ministries and other central administrative authorities (unit plans to process all according to their qualification and contain the recommended procedure handling of the situation), Czech National Bank, regions, municipalities with extended powers and other national authorities to which it imposes a law on crisis management [6]. Plans for the emergency preparedness are prepared by critical infrastructure protections. In addition to emergency plans are developed emergency plans of counties containing possible threats to the region and flood save plans [12].

III. METHODOLOGY

In relation to innovative procedures is nowadays being developed an application called Military Continuity Management System (MCMS) that enables creation of business continuity plans. Creation of continuity plans of organization is necessary for dealing with risks without errors. The main importance of continuity plans are based on practical examples and its presented in [13], [14] explained that the level of business continuity in an organization has a direct relation with the resilience level of the organization. They reviewed the concept of resiliency and described that the organizations having implemented business continuity and

disaster recovery plans, are more resilient than other ones [15].

Business continuity management is driven by ISO 22301 Societal Security - Business continuity management system - Requirements [16] and ISO 22313 Societal security – – Terms and definitions [17]. Business continuity life cycle involves six elements including the business continuity program management, embedding competence and awareness in the culture of organization, understanding the organization, selecting business continuity response, and exercising and testing the developer plans [15].

The same steps are used by crisis management, which aims to be ensuring continuity in case of emergencies or crisis situations. Crisis management defines a broad-spectrum of processors of crisis documentation including their roles, tasks, and responsibilities. For this reason, it is very practical to use the principles of business continuity management system for simulation creation and deal with emergencies or crisis situations. Application through primary use for military planning can be also used in the civilian sector.

MCMS is an Internet client-server application. Server performs optimally when using Microsoft Windows Server 2008 and the Microsoft .NET Framework v. 4, the database server is Microsoft SQL Server 2008 and Microsoft IIS 7 with SSL support. Clients can easily connect to applications on the Internet from regular web browsers [18].

IV. PRACTICAL PART

The most frequent reason for declaration of state emergency in CZ are floods that places high demands on its prevention and optimization procedures in the event of its occurrence in order to provide safety of inhabitants, keep property safety and minimize environmental damages. When preparing procedures for dealing with risks, it is important to use the principle of subsidiarity that makes sure that flood plans are created from the lowest administrative units (municipalities) up to the flood control plan of the CZ.

Creating a flood plan must be in accordance by Act No. 254/2001 Coll., on waters [19]. Flood Plan is structured into substantive part, organizational part and graphic part. By using client-server application MCMS can flood plan be elaborated, especially in the organizational part. It provides set of necessary procedures in a predetermined order to ensure correct solution of emerged crisis situation. The necessary information for each flood plan is the level of flood control (a measure of flood risk) linked to standard limits. There are 3 levels of flood activity: 1st level of flood control (vigilance), 2nd level of flood control (readiness), and 3rd level of flood control (emergency) [20].

Vigilance (1. level) requires increased caution near water resources and the warning and patrol services activities. Readiness (2. level) may be announced on the recommendation of the watercourse administrator when the authoritative limit the flow stream is exceeded in checking places. By announcing flood hazard, flood authority body responsible for this situation is activated and important members of flood protection must be contacted. Emergency (3. level) is declared in case of serious security threat or the emergence of large-scale damage, threat to property and lives in flood areas. Ongoing protective work is being provided with the main aim to minimize damage and mitigate the flood according to the flood plan. When its necessary, the rescue and evacuate work must be provided. Emergency is announced the limits are exceeded, on recommendation of watercourse administrator. 3rd level of flood control is announced based on notice of the owner of water work in case of critical values in terms of its safety and emergency measures are initiated. The main authority of the flood is Flood Commission, that announces and recalls on its territory the 2nd and the 3rd level of flood control [19].

V. PATTERN RECOGNITION OF FLOOD PLAN IN MCMS

The basic assumption for processing a flood plan into application MSMC and subsequent use is approved flood plan by local water authority in accordance with the superior plan of flood control.

A. Graphic Part in MCMS

Graphic part of flood plan consists of maps and plans with are drawn flood areas, evacuation routes, aggregation places, flood checking points and informational sites. Application MSMC does not use geographical information system or any custom graphic resources. Instead it uses a graphical representation of the territory using hyperlinks within Google Maps where can be found necessary graphic information about the area. Another part of the graphical interface is codebooks with locations with the name of the site, a brief description, and accurate determination of position.
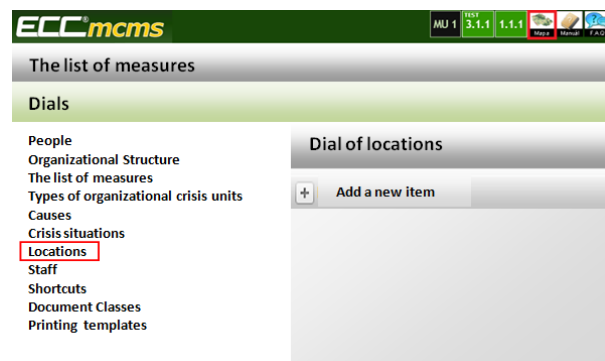

Fig. 1 Dial locations

B. Constructive Part in MCMS

Another part of the flood plan is the substantive part which contains information necessary to ensure protection against flooding in certain areas, municipalities, watershed, buildings, and territorial units. An important part of the information is authoritative limits for the flood level announcements. A necessary procedure for implementation of the substantive part of the MCMS application is the gradual insertion of documents and subsequent disposal of given flood plan. It is possible to read these documents anytime or edit them. It also automatically saves version history of all documents. There is an option to print a list of stored documents using the preview,

or save documents to the client device enabling standard printing. Documents can be exported as file types * .doc, * .xls and *.csv. Authorized client can remove or change attached documents.
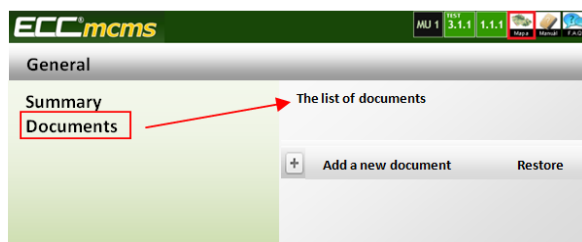

Fig. 2 List of documents

Within the substantive part of the plan it is important to make list of measures which is the most important part of the application. The list of measures allows complex search through all the extensive scales of measures. Measures are targeted against pre-defined event types where after the announcement of the 1st level of flood activity will be implemented different measures than during 2nd level. For easier orientation, it is possible to use filter dividing measures by causes of the incident, emergency organization units or by keywords (full text search). Also new measures can be inserted, but those must be opened in conjunction with cause number and Serial number. Next step is setting up responsible persons, cooperative bodies, and people in charge. Each measure can contain attachment and it allows printing attachment together with measure description. Deleted actions are stored and can be retrieved from the deleted items section by clicking Show deleted items where you can click on Renew item.

C. Organizational Part in MCMS

The third and also the last part of the Flood Plan deals with the organization. In this part there are presented name lists with people who are associated in flood protection and their tasks in such event. There are contacts to those people and their addresses. In MSMC is incorporated detail information about flood commission including composition, duties, and responsibilities of individual members. The application MSMC ties specific individuals to the creation of initial event. Once there is created flood as major incident there are accordingly to the level of flood activity gradually inserted people involved in incident coverage. In order to assign skills and contacts to people, it is necessary to set up specific activities developed in the program to those people first. In case of food plan, the main control element is mayor of the municipality.

Before the allocation of competences, it is necessary to create scenario of activities that will be implemented when plan will be activated. A prerequisite for the accuracy and timeliness of the solution is the addition of all persons involved in them. This function is provided by code list of crisis organizational structure which can be opened under the same name icon. In addition to code lists of activities and their

causes there is also code list with contacts necessary for correct management of crisis with this application. Contacts to important persons can be set by using icon Add new item using predefined form. The contact is then placed on the list and can be assigned to a particular group of people involved in the whole process. In this way, they are inserted into the program, all persons whose activities relate to the organization of emergency operations in the event of a flood. While in MCMS, we distinguish between persons performing managerial and supporting activities.

Fig. 3 Dial of crisis organizational structure

Flood forecasting service providing information about flood for stakeholders including citizens is implemented as code list under section contacts. Security warning service is a prerequisite for timely evacuation and using program makes it possible to monitor whether this activity was carried out by competent person at the right time. There are followed also other supporting activities, such as the declaration of flood activity by sirens, local radio or through the mass media. Contacts to companies providing local television and radio must be listed in Contacts, specifically in the section of local teams, service providers. This section also covers a list of carriers that provide alternative transport during floods.
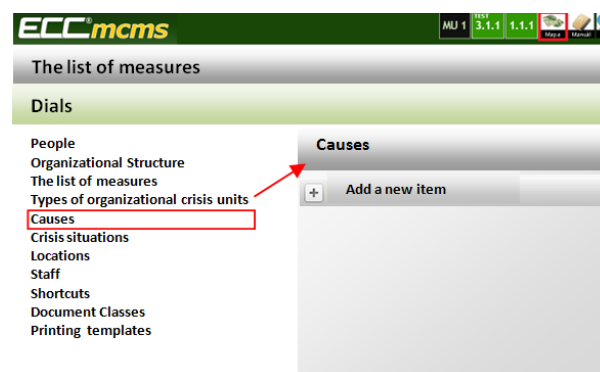

Fig. 4 Dial of causes

D. Linking All the Functionalities in MCMS

Reprocessing of constructive, substantive, and organizational part of a flood plan to MCMS application allows creation of a comprehensive approach joining all the

people, departments, and facilities to address the emergency by following the set consecutive activities. By starting the event program displays in the Report tab a list of Crisis management activated events, activated plans, and activities that are necessary for successful fulfillment of plans. In the list of activated events can be used filter according to the type of cause of the event, start time, and end time according to event status (Everything, Proclaimed, Ended).

All parameters of the filter can be combined allowing faster searching and orientation. Double click on selected activated event displays the detail of the plans and displays all activities related to the plan, colored fields indicate the level of the operation in question. Gray colored field indicate activities that have not been activated. Yellow colored fields indicate activities that are not resolved yet, but aren't delayed against the scheduled time for the solution of the activity. Green colored field stand for fixed operations and red colored fields indicate delays in the activities carried out.

There are predetermined responsible people to each activity solution who have assigned powers within the application mark of operation to be settled within framework of activity detail by clicking Resolve operation. In case of absence of information relating to responsible the performer, operation of the application does not allow the plan to be activated. Termination events can be done directly from the detail of the event, where is the field condition with possibility of termination. After saving changes to the event those will no longer be displayed in the upper right corner (activated by events and triggered states of emergency), and it will be completed with the date and exact time of the event. An important condition for completion of the event is to resolve all plans and activities connected with the event.
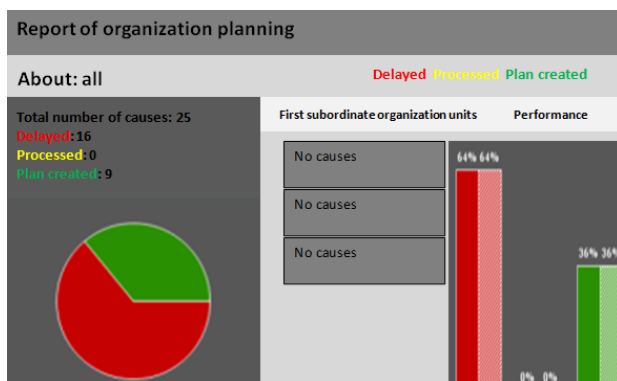

Fig. 5 Organizational planning report

Activation of the emergency state is done by selecting the section for activating states of emergency that appear above the list, which holds appropriate condition to activation and by pressing Activate the status is activated. The course of solving activities and plans obey the same principles as solving other events. After completion of all pre-defined plans and activities, the state of emergency can be deactivated using icon Deactivate. Automatic prompted window will appear asking whether you really want to end the state of emergency and

after confirmation will be made, deactivation of the state of crisis will be finished.

VI. CONCLUSION

Within the text were discussed possibilities of using client-server applications in crisis situations where the general procedure was shown at solving crisis situations associated with floods. The aim was to highlight the all-round possibility of using MCMS application in planning and crisis situations and other events with business continuity management. It is also important to highlight the possibility of using applications both within the public sector to deal with emergency and crisis situations, and also in the private sector to deal with emergencies in enterprises. Simple handling also allows the use of this application for people with elementary knowledge of work with information technologies.

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