

# Analysis of Classical and "Unconventional" Data Using for Quality Improvement of Handling Extraordinary Events in Czech Republic and/or Abroad

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## 1 Introduction

Emergencies, which influences humankind, take place on the earth surface. They are influenced by it and also influence it. Owing to this fact, earth sciences can provide valuable information for the management of emergencies, during all its phases (preparation, response, recovery, and mitigation). This also implies, that almost every data used for its management can be equipped with meaningful spatial reference.

The geographical information systems usually serve as a means for transfer of the earth sciences findings to the daily praxis of emergency management. They provide us the means and tools for storing and processing the spatial data, in order to provide qualified informational support to all peoples involved in the management of emergencies.

## 2 Classical and "Unconventional" Data

The data used in the management of emergencies can be split into two basic categories. The classical data, which occurs routinely in the emergency management process, and the other "unconventional" data, which must be collected and processed according to the new (suddenly) occurring needs.

In the category of classical data falls the reference data stored in the data warehouses. They are regularly updated and serves as a base for map projects used on operational centers of Integrated Rescue Systems basic parts. They can also be used for support of the collection and processing of the other data. In this category can be also included a data describing the emergency, such as the data concerning to the 112 calls and response to the emergency.

On the other hand, the need for collection and processing of the other data is caused by the newly occurring reality. It can be a new kind of emergency, like rapid outbreak of zoonosis African swine fever virus or foot and mouth disease or a sudden explosion of the ammunition storehouse. Or it can be a substantial increase in the processed data volume, the occurrence of the Big Data, which demands new approaches for its storage, handling, and processing.

## 3 The usage of the data

The geographical information systems are information systems, so the usual rules for its development must be followed. The various particularities, caused by the spatial nature of the data, must be also respected during such process.

Geographical information systems, in praxis, usually implies storage of the large and voluminous data in various (relational) database management systems, wherein its tables stores both spatial and non-spatial attributes. If we follow the modern three-tier architecture, the data are accessed through the application servers by the various heavy or lightweight clients.

We can have large important data stored in databases, but without the data accessible at the right moment at the right places to the right people, such data are completely useless. We can also pay attention to the high-speed search mechanisms in order to make selected data available during a short period of time to the users.

The REST architecture, using HTTP(S) protocol, provide us the very interesting possibility, to access, through the same mechanisms, both the data and procedures for its processing. This leads to the creation

of easily manageable, and testable information system which can substantially improve the cost-benefit ratio of such systems.

## 4 The main aim of the work

The main aim of this work is to improve quality of the public service, protection of the lives and health of inhabitants, environment, and property against fires and other emergencies and crisis situations, by a means of the spatial data usage improvement.

The work will try to establish new methodologies and guidelines for usage of the spatial data for emergency management. It will also test the suitability of the existing approaches and its combinations for such purposes. The new ways for the usage of existing data will be also considered.

The focus will be given on the usage of the data, describing the emergencies, for support of the strategic decision of the Fire and Rescue Service of the Czech Republic. This can encompass the evaluation of forest fires data for planning of aerial extinguishing of the largest forest and field fires. Work will deal also with an improvement of the generation various statistical outputs for highest levels of commands and also for the common public like Statistical yearbook.

The improvement of data accessibility to the users, for example, publication of the data both professional and voluntary fire station through web services will be also discussed. The creation of the program for complex preparation of the spatial data for full-text search will be considered.

The other data will be included in this work according to the daily praxis needs.