

TITLE

Historic Centres Protection: Umbria Region Experience in the Montone Drill

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ABSTARCT

The Civil Protection Service of Umbria Region developed an integrated system with GIS ESRI technology, which was used in the emergency drill of Montone (a medieval village in Umbria) inside the SISMA project (System Integrated for Security Management Activities to safeguard and protect historic centres from risks) and CADSES (Central European Adriatic Danubian South eastern European Space). The approach that was adopted is based on a strong cooperation between population and operational structures, in order to reduce significantly any risk in terms of human loss, damage to buildings and to cultural heritage items.

This strategy is completely independent from any public infrastructure and works with mobile system: its architecture is based on a WLAN net with servers and client devices (PC Server, Notebook, Tablet PC and PDA).

INTRODUCTION

The emergency drill of Montone, planned by the Umbria Region Civil Protection Service was conceived inside the SISMA project (System Integrated for Security Management Activities to safeguard and protect historic centres from risks) and CADSES (Central European Adriatic Danubian South eastern European Space).

The project aims to define a new approach of intervention to face the calamitous event, starting from a methodological process of mere damage rehabilitation to an immediate next step, in which prevention becomes the determinant strategy. Prevention usually means a number of actions which allow the correct response of the historic buildings in the event of emergency, but in this case it includes the active involvement of population in the management of it. Information and training activities become fundamental in order to reach this goal. Cooperation becomes both a method and an instrument of action that contributes to a better cohesion and a more intense community solidarity in those places where different approaches on prevention coexist.

SISMA is a European collaboration, born in 2003 in partnership with:

-Italy: Umbria Region (main partner), Emilia Romagna Region, Marches, Abruzzo Region and the National Department of Civil Protection.

-Greece: Athens Prefecture, Peloponnesus Region and Homeropolis district.

-Slovenia: Agency for Environment of the Slovenia Republic

-Slovakia: Slovakia Geological service

The project aims to start up a scientific comparison between different approaches and methods, both developed and on course of development, that contrast and prevent the destructive effect of natural forces. The project combines technical criteria and educational purposes in order to promote and develop coordinated and preventive actions on an international level, and to elaborate the urban and building planning.

The meetings and the emergency drills in the historic centres of Banska Stiavnika in Slovakia, Napflion and Athens in Greece, and Italy (the drills were carried out simultaneously in Forlì, Bagno di Romagna, Santa Sofia and Montone) have turned out into occasions to experiment and exchange opinions. These places have been chosen as sample areas inside the CADSES European area because of their interesting urban structure and their rich architectural and cultural heritage.

THE INVOLVEMENT OF POPULATION IN THE EMERGENCY MANAGEMENT

The wonderful medieval village of Montone has been chosen as a sample among all the historic centres of the area that were studied by Professor Antonio Borri (Perugia University) and Professor Massimo Olivieri ("La Sapienza" University, Rome) for their vulnerability in terms of earthquakes and urban systems, in close collaboration with Regione Umbria.

The emergency drill of Montone, which took place the November, 11, 2006 showed a successful prevention policy, based on population's training. This policy has made the population aware and responsible about the level of vulnerability of the urban system and the possible risks. The training activities that aimed to develop and consolidate the concept of "citizen as first rescuer" were fundamental parts of the drill, in order to raise the safety level for each person and ensure people's active collaboration with the Civil Protection operative structures.

In the year 2002, David Alexander defined the so called "Disaster Cycle", a schematic representation of what happens before, during and after a calamity. In this scheme, which is well known throughout the whole Civil Protection, there are four main phases which occur between two calamitous events: Mitigation, Preparedness, Response and Recovery. The Montone drill focused on the second category, by adopting suitable measures to prepare in advance a positive reaction to the disaster impact (ISDR Glossary). This includes, for example, the creation of a system that regulates preliminary alarms, people's evacuation and the immediate displacement of goods far from the area at risk. In this context, people's training and awareness become fundamental and strategic elements, which determine the population's "resilience". Resilience is the "ability of a system, community or society potentially exposed to a hazard, to adapt itself by resisting or modifying itself, in order to obtain and maintain an acceptable level of working" (ISDR Glossary). This resistance to the stress situation is caused mainly by two factors:

- The level of planned preparation previous to the event
- The spontaneous and unpremeditated actions based on the emergency needs

In order to strengthen the ability of society both to learn from past disasters and to set out better ways of protection and risk reduction, several meeting with the citizens of Montone were arranged. Those meetings aimed to increase the level of people's resilience, by explaining them how to act, move and plan when a disaster occurs, describing in detail the predicted scenario.

The village of Montone was divided in four zones: each zone had its own waiting area and safe paths that took to their correspondent gathering area, placed outside the city, in an open and safe space. During the emergency drill the earthquake was simulated, and the inhabitants of the historic centre must leave their homes with their Safety Bag (each person was given one of these Bags, containing the basic survival kit) and reach firstly the waiting area, and then the gathering areas, following the instructions and the evacuation procedures learnt during the preliminary training meetings.

In case of emergency, the Town Emergency Plan usually provides the standard Civil Protection areas (waiting area, reception area and storing area) but for this particular emergency drill, it introduced two new areas, the gathering area and the refuge area. After the disaster the population goes to the gathering areas, where they will be provided with health care assistance and assigned to the reception area. When the aftermath of a disaster requires a long term stay, the refuge area provides the population with suitable structures, until the reconstruction phase ends.

The evacuation is carried out with the collaboration of some reference citizens with a strong sense of responsibility, known as "capozona". They must check out the correct execution of the evacuation and the general state of health of people belonging to their reference zone, and send the collected data to the operative room of C.O.C. (Centro Operativo Comunale, City

Operative Centre) activated by the Mayor, in order to update the disaster scenario. The emergency drill required also the active involvement of local Civil Protection, headed by the Mayor of Montone in collaboration with Regione Umbria technicians and officers that coordinated every activity. The demonstrative rescue activities were carried out by the Body of Firemen, Italian Red Cross and Civil Protection volunteers.

This innovative method of involving the population includes also three advanced elements:

- A GIS tool of analysis, to determine the safest paths to reach the waiting and gathering areas.
- A clear set of icons to reach those areas, both on maps and on the streets
- A GS technology that supports the various “capozona” and the operative room.

GIS AND MOBILE TECHNOLOGY AS A RESILIENCE TOOL

The GIS technology used in the 2006 Montone emergency drill made efficient those efforts of activating and strengthening the system resilience. The drill made possible the use of an integrated system of GIS and mobile technology (Azimut system components) as a support of the methodological approach to the emergency management together with the population.

The system is totally independent from data communication infrastructures (including the web), with an architecture based on a WLAN net with server and client tools (PC Server, Notebook, Tablet PC e PDA), ArcGIS Desktop software, ArcSDE, ArcIMS and mobile applications (as showed in figure 1).

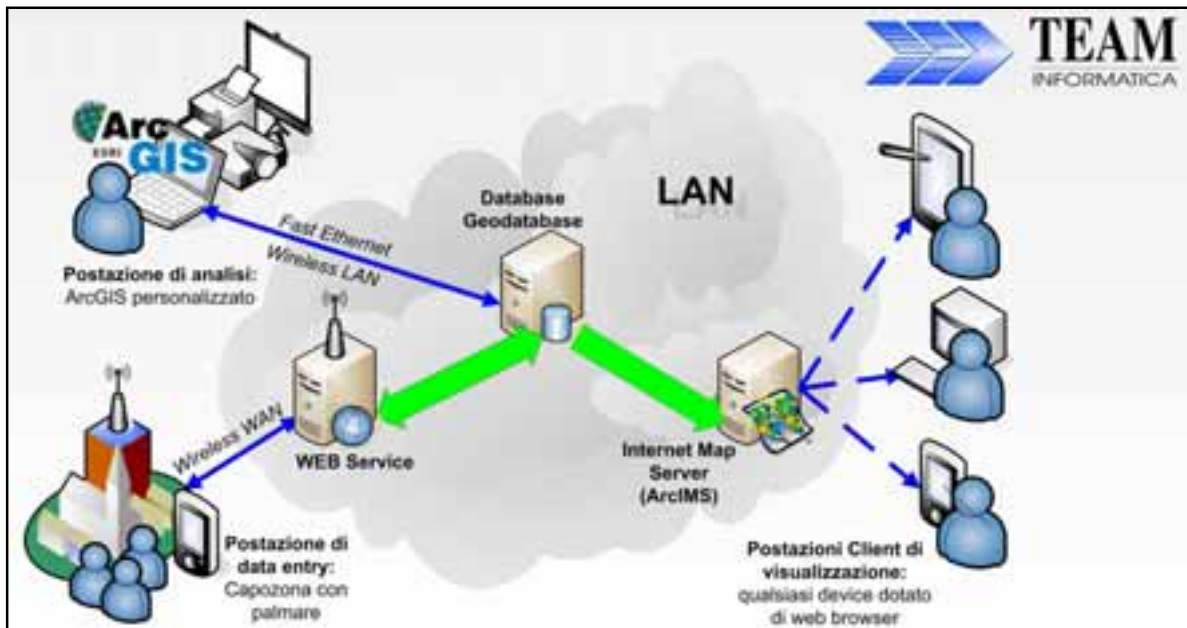


Figure 1

The system nucleus was a simple PC with server functions, placed in the C.O.C. operative room together with a Web Service and a “Geodatabase”, a specific database which is specialised in geographical data with an ArcSDE technology. The Geodatabase memorised all the geometrical and alphanumeric features of the historic centre of Montone (buildings, streets, street numbers, etc...), of the Civil Protection resources (such as waiting, gathering and reception areas) and of the local registry office.

Web Service compared the data collected by the Geodatabase with the mobile client application of the system (as shown in figure 2) installed on wi-fi organizers. This application was conceived according to its strategic and operative function, that is to say its ability of

acquiring those pieces of information that are essential to the operative room, about the condition of buildings and services, population's health and calls to the Body of Firemen and to the Red Cross. The way of communicating those data was not automatically planned: every "capozona" could manage the data autonomously, deciding when and where to synchronise them with the system core.



Figure 2

The communication between the server and the mobile application was guaranteed by a WAN wireless infrastructure, expressly planned for emergency activities, provided by IBAX, which used modem with NAVINI technology. As for the operative room, the Geodatabase data were mapped with a client application, connected to the system core with a WLAN net, and based on a personalised version of ESRI ArcGIS Desktop (as shown in figure 3).



Figure 3

CONCLUSIONS

The experience of Montone 2006 was an interesting example of democratising the local Civil Protection service, in order to increase people's responsibility for their safety, because if the local resources are not efficient, also the rescue operations will not be helpful.

The GIS technology is an essential instrument to improve and make concrete the resilience of a population in the event of a disaster. The present tendency of sharing geographical data with mobile devices led to an increase in the use of GIS technology by a non-expert public.

The Montone drill heightened the awareness of Civil Protection about the importance of GIS and mobile tools in supporting the emergency, prevision and prevention activities.

Now, with the new ESRI technology ArcGis Server 9.2, the experimented system has become even more effective and efficient, and it is being tested as an operative tool and method within the Civil Protection procedures of Regione Umbria.

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BIBLIOGRAPHY

David Alexander, 2002, Principles of Emergency Planning and Management, Terra Publishing

ISDR Glossary on Disaster Risk Reduction UN/ISDR Palais des Nations CH 1211 Geneva 10, Switzerland