Case Studies in Fire Safety 4 (2015) 19–27

Contents lists available at ScienceDirect

Case Studies in Fire Safety

journal homepage: www.elsevier.com/locate/csfs

Case study

Geographic information system software application developed by a regional emergency agency

César Martín-Gómez[a], Javier Vergara-Falces[b,*], Asier Elvira-Zalduegui[b]

[a] Building Services and Energy Section, School of Architecture, Universidad de Navarra, Spain
[b] Department of Prevention, Fire Fighting and Rescue of Navarra, Spain

ARTICLE INFO

Article history:
Received 21 May 2015
Received in revised form 29 June 2015
Accepted 29 June 2015
Available online 9 July 2015

Keywords:
GIS
Software
Fire safety
Resilience
Urbanism

ABSTRACT

This paper presents a methodology for risk analysis and assessment to manage territorial data based on Geographical Information Systems from the viewpoints of climatology, geography, disaster science, environmental science, fire safety and urban services. The results in this methodology are intended to support local and provincial government agencies to: make resource allocation decisions; make high-level planning decisions and raise public awareness of disasters risk, its causes, and ways to manage it.

The Autonomous Community of Navarra, as a result of a special administrative status, possesses a number of specific features that have let it build up a high technological development in several fields. The main areas of research are healthcare and renewable energies, but also focused in the implementation of security systems at territorial level. These advances and particularities of the GIS software used by the fire fighters of this community will be the ones shown in this paper, as well as its prospective improvements in the collaboration with the experts responsible for urban planning of a School of Architecture.

1. Introduction

In this explanation, ecological and landscape data are integrated with decision-support techniques in a Geographic Information Systems (GIS) framework [1], which offers a useful communication network that provides a complete picture of what's happening in real time [2,3].

This is a dual system, one online and other offline. The first one opened to different police and emergency services, and the second one for tablet application that the fire fighters officials take with them in their rapid intervention vehicles. A GIS platform has been developed to easily, validly and promptly share and utilize information and tools among firefighting forces, which can locate fire service vehicles, fire fighters operating on georeferenced field and other resources online and in real-time.

This paper will examine how GIS technology is helping the fire service meet the needs of the community more efficiently than before [4].

* Corresponding author.
E-mail addresses: cmargom@unav.es (C. Martín-Gómez), jvergarf@navarra.es (J. Vergara-Falces), aelvira.1@alumni.unav.es (A. Elvira-Zalduegui).

http://dx.doi.org/10.1016/j.csfs.2015.06.002

2. Antecedents

Effective response cannot be continually achieved without adequate planning and preparedness. One of the emerging tools that is helping the fire service optimize its emergency services delivery is geographic information system (GIS) technology [5]. GIS supports planning, preparedness, mitigation, response, and incident management [6]. GIS extends the capability of maps—intelligent, interactive maps with Access to all types of information, analysis, and data. More important, GIS provides the required information when, where, and how it is needed (Fig. 1) [7].

In this sense, building on a data collection system already in place it was possible to minimize the cost and accelerate the training process, and it is possible to find different experiences from the identification of homes that experienced a fire after an alarm was installed and calculated potential lives saved based on program documentation and average housing occupancy, or to measure an organization's fire safety performance [8].

It is also possible to create a final ranking map of the risk of losing resilience, which is very useful in identifying the "risk hotspots" [9], where post-fire management measures should be applied in priority [10].

We know that fire fighters work under extremely stressful conditions where even their own lives and the lives of potential victims can be at stake. It is clear that there is no room for error and that extensive training and previous information are crucial in this regard. In order to save time the entire database works with photographic images of the real places [11].

May include other information of interest such as maps of the floors of the building, plans on building facilities energetic, sectors of fire, means of protection, access and others to help firefighters in their action on fires and other emergencies

3. Online system

This is an online application with 3G technology, which goal is to provide with a geo-satellite positioning system (GIS) the necessary information for the Fire Department, so that there is a chance to have a better control on a forecast basis and an optimal methodology of reaction in both the time invested and the chosen routes when an emergency call is taken.

This application software is developed by a Navarra-based company dedicated to the development of services based on the use of IT for territorial information and that works both for public administrations and private organizations, contributing to innovation and development in this and other computerized platforms of a similar use [12].

There is the possibility of a private sale but for the moment this market area has not been explored considering the ease of working for the public entity.

It is a useful tool created for Windows (not yet as a Macintosh operating system widget), as well as it is available for tablets and smartphones.

When the program is opened can be seen several on-going and updated incidents thanks to the provision of a series of interconnected digital repeaters located throughout various key points of the geography of Navarra. This application links the communication and distributes the relevant information to the different central government divisions: the Police

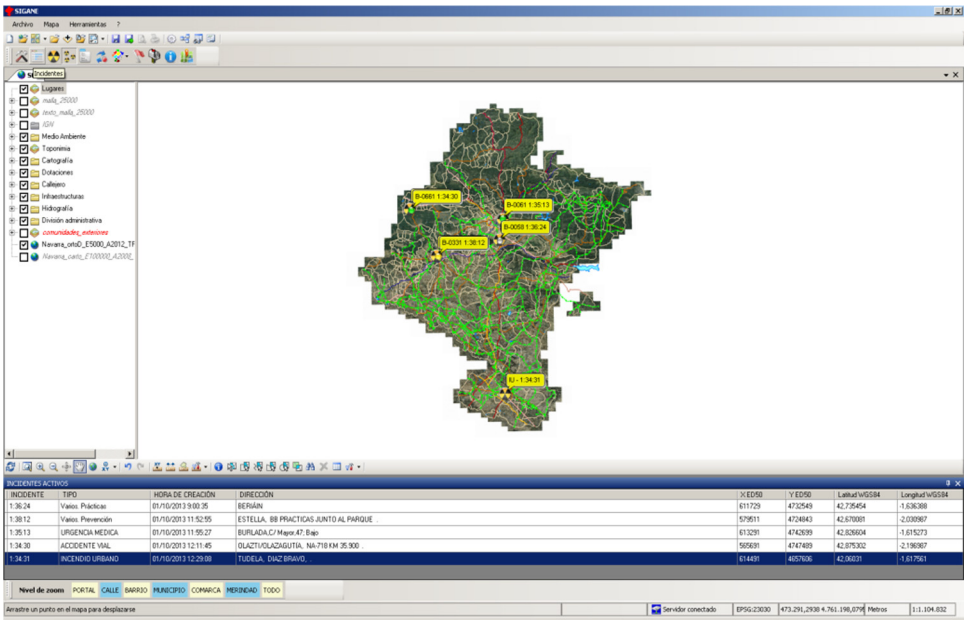

Fig. 1. Navarra territorial map showing incidents that concern the Fire Department.