

FOMFIS: A Computer-Based Tool for the Preventive Planning of Forest Fire Defence Resources

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The FOMFIS project (Forest fire Management and Fire prevention System) is a computer-based application which purpose is to give support in the forest fire defence-planning processes. This goal is achieved through the consideration of the following objectives:

- Classify the vegetation patches into forest fuel maps using remotely sensed data.
- Characterisation of the socio-economic and natural risks.
- Calculation of the forest fire defence efficiency.
- Simulation of the proposed resource planning versus the forest fire scenarios.
- Analysis of the results in terms of balancing the costs and losses.

The FOMFIS system is comprising several State of the Art technological solutions that have been widely used in the forest fire defence planning and management, such as geographical information systems, remote sensing, spatial analysis, statistical methods, probabilistic generation, knowledge based systems and fire behaviour simulation models.

An international Consortium embracing four European countries has developed the program. The project has been partially financed by the European Commission DG XII under the fourth Framework program of R+TD. Three test areas have been selected in Spain, France and Greece, embracing most of the fire hazard situations in the Mediterranean countries.

The computer application has been implemented as a extension module of the ArcView GIS platform and comprises five modes of operation:

Administration, dealing with the updating and maintenance of the required data as well as the management of user access and permissions.

Scenarios, where users configure the different fire situations and their evolution over time, including the weather, wind, fire appearance and terrain characteristics.

Planning, in charge to give users support on the distribution of fire fighting resources according their efficacy and associated budget. Most of the functionalities are strongly based on the existing spatial analysis tools, whereas others have been specifically developed. It embraces the study of the bases, water points and lookouts distribution, road and access coverage, airborne resources coverage, performance, work shifts distribution and associated costs. Besides a simulation tool analyses the forest fire defence operation together with the weather, wind and fires evolution over time. Finally, a set of reports gives all the information regarding the results of the simulation.

Forest fuels, that allows users to classify the vegetation patches identified from remotely sensed data and assign fuel loads to every used fuel model.

Risks, comprising a set of tools allowing users to characterise socio-economic risk analysis and hazards due to natural factors, such as terrain roughness, weather and wind. The socio-economic risk model performs predictions of the number of fires according the values and distribution of significative variables. Users adapt the number and type of variables depending on the studied area. Statistical analyses of historical databases give the distribution over time of the fire outbreaks.

The main utility of FOMFIS system is its ability to simulate the effects of what-if scenarios comprising either, the fire theatre and the proposed planning schemes. In this way, it is a valuable tool for the characterisation of the effects of pressure of human activities, mostly in the nearby of large urban areas and surrounding the highways, railroads and other infrastructures connecting cities together.