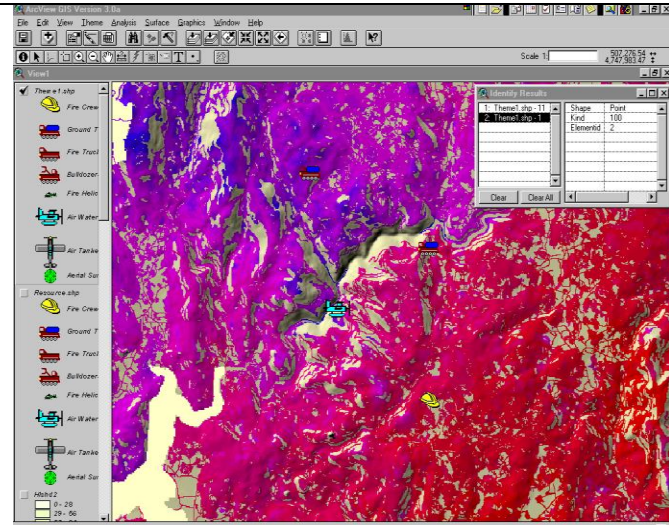
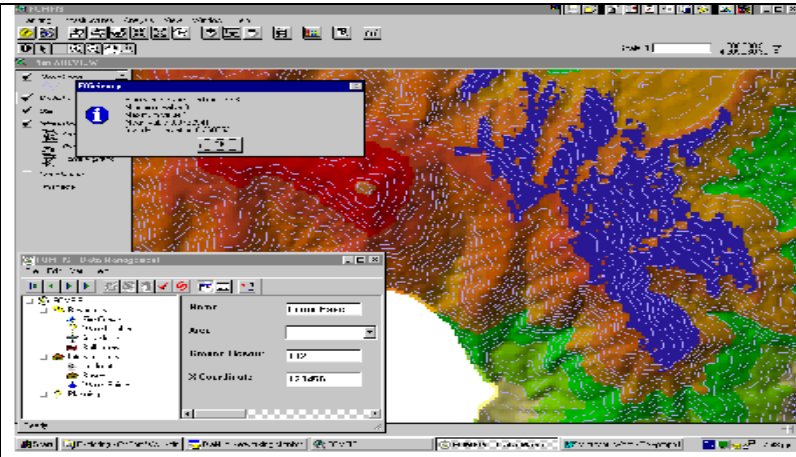


| <b>Acronym:</b> FOMFIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         | <b>Project Title:</b> FOMFIS: Forest Fires Management and Fire Prevention System |                          |                       |                |                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------------------------------------------------------------------|--------------------------|-----------------------|----------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Project No:</b> ENV4-CT96-0335                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |                                                                                  |                          |                       |                |                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |
| Name of legal entity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Country | Project value [Million €]                                                        | % carried out by EPSILON | No. of staff provided | Name of Client | Origin of Funding                                  | Dates [start/end]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Name of partners            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | GREECE  | 1.818.000€                                                                       | 10%<br>181.800€          |                       | EU             | EC-DG XII<br>Fires and Natural Disasters Programme | JAN 1997<br>DEC 1998                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | See foot note <sup>1)</sup> |
| <b>Project Description</b> the Fires and Natural Disasters Programme.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |                                                                                  |                          |                       |                |                                                    | <b>Type of Services Provided [Outlined]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                             |
| <p>FOMFIS is a computerised system based on ESRI GIS technology, aimed to forecasting and managing forest fires. It consists of the modules: fuelling, ignition, risk mapping, fire propagation and behaviour, and resources allocation to tackle fires. It delivers a semi-automatic satellite image processing module, an socio-economic risk module, and a probabilistic module, which serve as a tool to forest fire prevention and management. FOMFIS has been implemented and tested in three representative Mediterranean Regions of Atlantic influence and of typical climate. FOMFIS can accommodate the features:</p> <ul style="list-style-type: none"><li>- Compilation of forest fuel maps based on high-resolution satellite images (Landsat, Spot, Radarsat, Kosmos, other), including the evaluation of the propagation capacity of possible ignition points based-on characterization of the woodlands in terms of fuel properties</li><li>- Production of maps of fire ignition risk, based on an analysis of socioeconomic and climatic data (risk modelling)</li><li>- Allocation of the geographic hot points with a high fire ignition level (statistical and sampled data)</li><li>- Simulation of the fire behaviour and propagation</li><li>- Use of existing GIS technologies for the integration of cartographic data, statistical records and sampled data, to effectively assist users</li><li>- Study of fire evolution and fire prevention as a function of undetermined variables in a probabilistic manner</li><li>- Integration of data, optimal resource allocation and management to preventing appearance of fire (firebreaks allocation, new access, roads, distribution of water points, lookouts, etc.) and reduction effects</li></ul> <p>FOMFIS subsystems (models, modules) include:</p> <div><div><p><u>Data Acquisition Subsystem</u></p><ul style="list-style-type: none"><li>- <b>Cartographic Acquisition Subsystem:</b> It handles digital cartographic data in two formats: raster images and vector maps, for any image processing (IP) and geographic information systems (GIS) to be selected for integration</li><li>- <b>Alphanumeric Acquisition Subsystem:</b> It makes possible to import external alphanumeric data and information</li></ul><p><u>Fuel Mapping Subsystem</u></p><ul style="list-style-type: none"><li>- It permits users to take a series of multi-spectral satellite images by following a pre-determined series of image processing steps towards creating reliable fuel maps</li><li>- It utilizes Landsat TM image and a SPOT-Pan image together with elevation information in the form of a raster DTM</li></ul><p><u>Integral Risk Analysis Subsystem</u></p><ul style="list-style-type: none"><li>- <b>Fire Appearance Risk sub-module:</b> It delivers a measure of fire risk appearance in a defined geographic area under given climatic conditions and for a given period</li><li>- <b>Potential Damage Risk sub-module:</b> It indicates the potential damage the presence of fires may produce in a defined geographic area, under given climatic conditions and for a given period</li><li>- <b>Integral Fire Risk sub-module:</b> It indicates the potential damage the presence of fires may produce in a given geographic area, under specific climatic conditions and time</li></ul></div><div></div></div> |         |                                                                                  |                          |                       |                |                                                    | <p><b>Key Words</b><br/>Dispatching, environment, Epsilon, European Commission, fire, FOMFIS, forest, forest fire prevention, fuel mapping, GIS, Greece, Italy, remote sensing, resource allocation, risk, socio-economic risk, Spain.</p> <p><b>For Information</b><br/>EPSILON INTERNATIONAL S.A,<br/>MONEMBASIAS 27, 15225<br/>MAROUSI -GREECE<br/>☎ +30-210-6898622<br/>☎ +30-210-6842420<br/>✉ <a href="mailto:kallidromitou@epsilon.gr">kallidromitou@epsilon.gr</a><br/>⭐ <a href="http://www.epsilon.gr">www.epsilon.gr</a></p> |                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |                                                                                  |                          |                       |                |                                                    | <b>Access times from the operational base</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |

(1) Iberica de Estudios e Ingenieria SA (ES), Software AG Italia Spa (IT), IBERSAT SA (ES), Sema Group sae (ES), Estudios e Iniciativas Forestales S.L. (ES), Conselleria de Agricultura G.yM. (ES), Centre de Productivite et D' action F. (FR), National Agricultural Research Foundation (GR).

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Acronym:</b> FOMFIS<br><b>Project No:</b> ENV4-CT96-0335                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Project Title:</b> FOMFIS: Forest Fires Management and Fire Prevention System                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Project Description</b> the Fires and Natural Disasters Programme.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Type of Services Provided [Outlined]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p><u>Probabilistic Planning Subsystem</u></p> <ul style="list-style-type: none"> <li>- <b>Efficiency Driven Planning sub-module:</b> It covers three functionalities: (a) it allows user to define locations and characteristics of resources, infrastructure and forest fuel control, (b) it evaluates their corresponding efficiency following criteria based on actual forest service operations, and (c) it computes associated cost per use.</li> <li>- <b>Planning Analysis Engine sub-module:</b> It constitutes the core of the system analysis, where fire spreading is simulated via the Fire Behaviour Module (FBM). It characterizes and classifies forest fires according to their importance. It determines the number and type of resources required for each fire. It assigns resources by minimizing total accessing times. It computes the associated cost and losses of fire fighting operations. It computes the total number of fires and the total burnt surface.</li> </ul> <p><u>Valuation Subsystem</u></p> <ul style="list-style-type: none"> <li>- The Valuation Module (VAL) is composed of two main sub-modules: (a) a functional computation taking into account three elements: economic, environmental and social; (b) a report generation presenting the results of the former analysis in a structured form and forest fire service templates</li> <li>- This report contains the simulation parameters, the infrastructure and resources used. The outcome of the simulation is total cost, loss, number of fires, burnt surface and associated surfaces.</li> </ul> <p><u>Socioeconomic Risk Characterization Subsystem</u></p> <ul style="list-style-type: none"> <li>- The <b>Socioeconomic Factors (SEF)</b> define a structural risk, that presents a relatively stability, according to the characteristic of the geographic area. The specific impact of the different SEF can be observed through a comparative analysis of different areas (Departments or Municipalities)</li> <li>- The utility of this analysis is mainly oriented to <i>prevention, planning and evaluation</i>. The SER factors allow establishment of a system intervention in the forest fire fighting design and particularly important to establish the cost-benefit priorities in fire resources according to social preferences.</li> </ul> <p><u>Scenarios Generation Subsystem</u></p> <p>The <b>Scenarios Generation</b> module produces the scenario data structure feeding the system given a situation to be analyzed. The definition of a scenario is performed in two ways: from probabilistic analysis of historic databases (fires, meteorological) and deterministic user-driven parameter definitions. Scenarios are stored in the <i>Scenarios database</i>, and will be an input to the <i>Probabilistic Planning Module</i>.</p> | <p><u>Services-Deliverables</u></p> <p><u>Key Words</u><br/>         Dispatching, environment, Epsilon, European Commission, fire, FOMFIS, forest, forest fire prevention, fuel mapping, GIS, Greece, Italy, remote sensing, resource allocation, risk, socio-economic risk, Spain.</p> <p><u>For Information</u><br/>         EPSILON INTERNATIONAL S.A,<br/>         MONEMBASIAS 27, 15225<br/>         MAROUSI -GREECE<br/>         ☎ +30-210-6898622<br/>         ☎ +30-210-6842420<br/>         ✉ <a href="mailto:kallidromitou@epsilon.gr">kallidromitou@epsilon.gr</a><br/>         ☆ <a href="http://www.epsilon.gr">www.epsilon.gr</a></p> <p>The FOMFIS platform is based on: -<br/>         Intel Pentium PC (&gt;233 MHz)<br/>         - Windows NT 4.0 Workstation<br/>         - MS-SQL Server<br/>         - Arc/Info, ArcView, ARC Spatial Analyst, ARC Avenue, and Visual C++ development.</p> |
| <p><u>Fire Behaviour Subsystem</u></p> <ul style="list-style-type: none"> <li>- The <b>Fire Behaviour Model (FBM)</b> covers user needs on forest fire simulation characterization relative to FOMFIS system requirements, and constitutes a valuable tool for the <i>what-if</i> operational analysis</li> <li>- Several described modules within FOMFIS base their operation in spread simulation applications, hence, are in close relationship with probabilistic planning and management and integral risk characterization</li> </ul> <p>The FOMFIS platform is based on:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Intel Pentium PC (&gt;233 MHz)</li> <li><input type="checkbox"/> Windows NT 4.0 Workstation</li> <li><input type="checkbox"/> MS-SQL Server</li> <li><input type="checkbox"/> Arc/Info, ArcView, ARC Spatial Analyst, ARC Avenue, and Visual C++ development.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  <p>Visibility Analysis</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |