Meleager - Executive summary

The project aims to use the knowledge and the results of a multiannual research activity of the leading members of the project's development team for the implementation and provision of a comprehensive fire protection system for the effective protection of the environment and human life and property from fires.

The deliverable system, named after the mythical hero Meleager, will incorporate a unique combination of innovative techniques, and information and communication technologies to implement a competitive product at international level, which aspires to become a market leader for both the public and the private sector.

The idea of the project comes from the research activity of the Mobics researchers- partners on the project SCIER (Sensor and Computing Infrastructure for Environmental Risks, which was funded under the 6thFramework Program of the European Union (EC RTD Contract IST-5-035164, 2006-2009). The knowledge and experience gained by the Mobics researchers - partners through their participating in the University of Athens research team, which had the overall technical management of SCIER, guarantee the technical feasibility and maturity of the proposed business plan.

The Meleager system aims to offer one of the most advanced and integrated technology solutions for fire protection worldwide by integrating the following important innovative features:

1. The system incorporates the unique worldwide visual fire detection subsystem, which consists of a high resolution camera and an embedded digital signal processing and machine vision system. This subsystem is a Greek response to imported high-tech solutions that have been occasionally adopted in parts of the country at very high acquisition/deployment cost and too high, which do not offer automatic event detection-tracking capability. These solutions often require the transmission of video to control stations, which increases the networking and operating costs. The Mobics solution is an important development for the international standards since it manages to overcome the above technical-technological barriers by providing a flexible and cost-effective environmental protection system. The solution exploits commercially the university research on machine vision, and presents excellent prospects for a wide range of applications (e.g., intelligent transportation, security).

2. The simulation subsystem has the unique feature of the "parallel" execution of multiple simulations for different scenarios of environmental parameters. The fire simulator handles the high variability of forest fires, by examining a set of environmental parameters (e.g., wind direction and speed) and creating dynamic hazard maps for the ongoing crisis. The fire simulator uses an innovative design that allows it to perform multiple snapshots of the perturbations from the average recorded values of environmental parameters.

3. The data fusion subsystem incorporates a unique two-tier data fusion scheme for better assessment of the field observations, and for developing safer conclusions about the crisis

and risk. Existing forest fire detection systems do not implement an established form of data fusion and therefore they (a) do not provide mechanisms for automatic detection of events or (b) formulate conclusions of limited confidence and low operational impact. The Mobics solution incorporates many years of research experience in information fusion of different, heterogeneous sources to accurately identify the incident at hand (model). The system uses approximate reasoning (Dempster-Shafer, mathematical theory of evidence). The innovation offered by this approach is evident from the impact of the relevant publications of the researchers involved in the project team (see below). The two-tier organization of the fusion scheme allows the scaling of the mechanism and the effective implementation of various versions of the Meleager system (large scale / prefectures, local authorities, private installations).

4. Open protocols and interfaces: Meleager will be based entirely on open standards for information exchange to ensure interoperability with existing systems, e.g., crisis management systems, GIS data, cartographic systems and systems for registration of land use.

5. Crisis management with advanced algorithms - the part of crisis management incorporates applications based on spatial data (e.g., firefighting resource management). The dynamic positioning of various resources allows more efficient treatment of environmental risk and minimizes the impact on the lives and property of citizens and firefighting forces. This subsystem can optimize the firefighting equipment deployment and the citizen evacuation process of the affected region.

6. Open GIS and interfaces. An innovative feature is the ability to record real-time information on the fire evolution, and reproduce at a later time and time scales selected by the system user (e.g., real-time reproduction, fast, slow, transition to a specific point in time).

7. Implementation of personalized alerts / alarms and automatic activation of fire protection/sprinkler systems.

The implementation of advanced technology and the major innovations incorporated in the proposed system meet requirements that other systems fail to meet, enhance the system functionality, usability, efficiency and interoperability while at the same time they can reduce costs.