



RESUME OF KEYNOTE SPEECH

Challenges in Designing the Feasible Hardware-Software Solution for Environmental Risks Management with the Emphasis on Economic Impact

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Risk became the main factor in economic and social planning. Modern societies need to re-organize their institutional structures and development trends in order to manage many types of risks like e.g. terrorism, natural or manmade disasters, spread of contagious diseases etc. Although in recent years the disasters have become less life-threatening, they continue to affect all aspects of the economy both in the short and long run context. The disasters cannot be fully prevented, but with appropriate management approach the losses stemming from them can be minimized. It is obvious that high-tech and knowledge-based societies have better chance to manage disaster risks through the implementation of wide range of countermeasures including those made available by the modern technology.

Nowadays, the Information and Communications Technology (ICT) is widely used to minimize the impact of disasters, almost in all phases of the disaster management process: mitigation, preparedness, response and recovery. There are certain types of disasters, like environmental ones, e.g. hurricanes, flooding, earthquakes, explosions, chemical spills, non-controlled emissions of hazardous gases etc., where ICTs play a very important role and have the potential for an unlimited use.

When hazardous gases are released into the atmosphere, whether accidentally or due to a terrorist attack, emergency response authorities require quick and relevant information about the area(s) likely to be affected as well as about anticipated injuries or mortalities. This is time-critical because of the decision-making loop and it is especially important for urban areas, where the population density compounds the potential magnitude of negative consequences and complicates the evacuation of both injured and unaffected population. Hence, there is a pressing need for emergency responders and other civil protection stakeholders to have access to a support system for hazardous gas releases, which is based on the latest information and communication technologies (ICT).



Currently existing hardware-software systems developed for these purposes can provide only a partial solution. They are off-line and predominantly model the pollutant dispersion in 2D or 3D space displaying the concentration profiles (plumes) over digital maps. The plumes are static and do not consider the dynamics of the process, primarily the changes in atmospheric conditions and source of pollution. In addition, they do not support automatic data importing; do not incorporate weather forecasts and, most importantly, the decision-making required for a successful response.

As a minimum a useful system for management and control of accidental/deliberate releases of hazardous gases should at least be real-time with the possibility to integrate several subsystems to enhance the response accuracy; a) Geographical Information System (GIS), b) system for measurement and monitoring of chemical parameters, c) system for hydro meteorological monitoring and forecasts, d) system for modeling gas dispersion, e) local sensor networks, and e) system for planning emergency responses forces .

The GEPSUS (Geographical information processing for Environmental Pollution-related Security within Urban Scale environments) project, which has been funded by the NATO programme Science for Peace, presents one attempt in this direction to provide emergency responders with an integrated system for the control and management of hazardous gases accidents, especially in urban areas(see Fig. 1). The system integrates automatic data importing with GIS-based hazardous gas dispersion, simulation and decision-making and it is very suitable to be used in middle-income level countries, because of relatively low cost.

In this keynote address some experience and lessons learned from this project will be presented as well as the principles of a good and feasible design of emergency response and management hardware-software system for management environmental risks like fires, flooding, earthquakes etc. Some economic impact of using such a system will be pointed to. The discussion and feedback will be initiated.

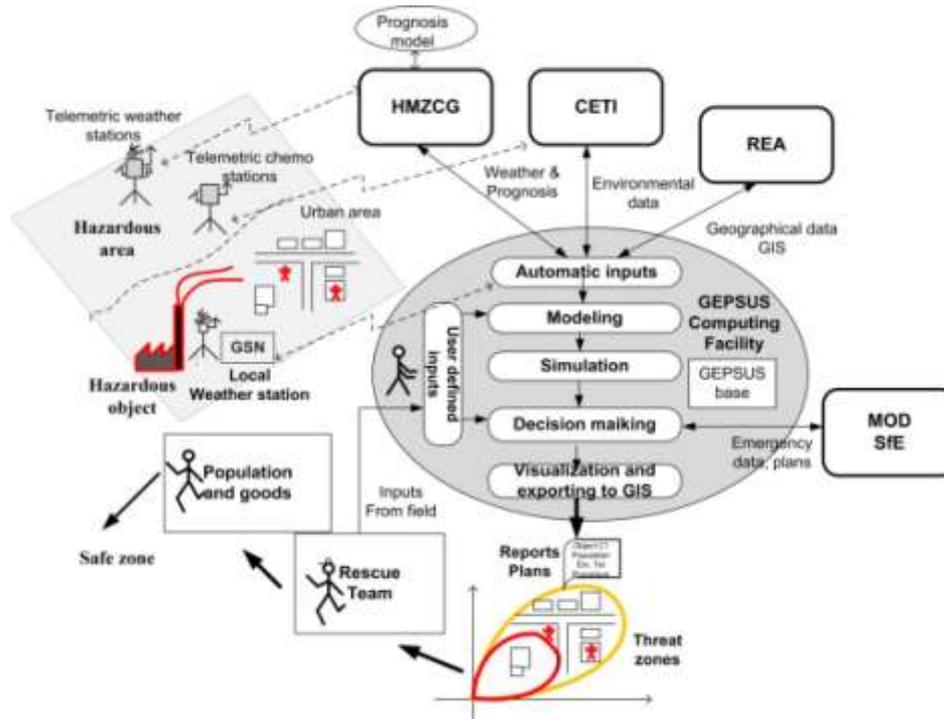


FIGURE1: Architecture of the GEPSUS system

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