

# FireGrid

An Integrated Emergency Response System for the Built Environment

[www.firegrid.org](http://www.firegrid.org)



Retrospective analysis of every fire emergency poses the recurrent question: was the response adequate? Almost invariably the answer is that access to better information would have led to a more effective response. Key sources of such information include:

- Data from sensors (for example, smoke detectors, CCTV, and air conditioning systems) within the building/structure.
- Forecast results from fire models or human behaviour simulations.
- Predicted scenarios from emergency service experts and active response systems.

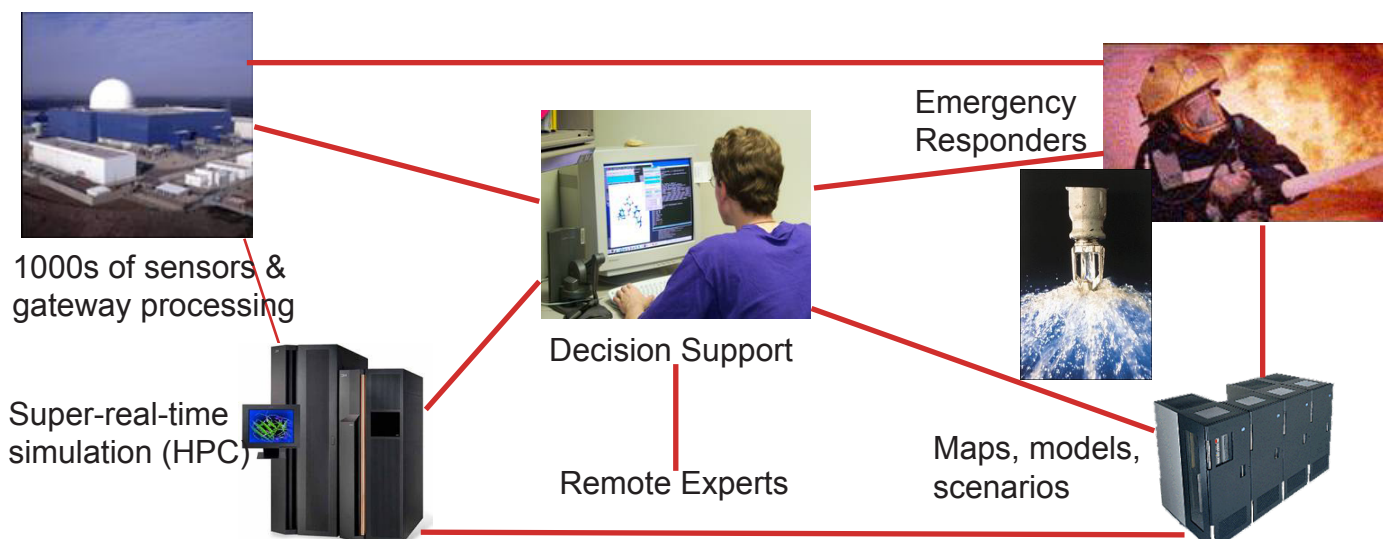
FireGrid aims to integrate these systems to significantly improve building design, fire safety training and emergency response.

At the heart of FireGrid are complex computer models. These simulate the spread of fire in buildings, the effect of fire on those buildings, and the way people behave in emergencies.



FireGrid uses Grid technologies to run coupled and ensemble simulations in parallel. These are guided by input from sensors and linked to a knowledge-based decision support system.

The focus of our initial work has been to demonstrate that input from sensors can be used to trigger simple fire models in real time. The culmination of the project will be a demonstration of the system with live sensor input from an instrumented recreation of a typical domestic fire.



A fully-developed FireGrid would operate in several modes:

*Design mode:* Fire simulations linked to knowledge-based evacuation models will enable the design of safer buildings.

*Training mode:* Fire simulations linked to a knowledge-based decision support system will allow trainees to try different responses

*Support mode:* In the event of a real fire, data from sensors will provide input to a decision support system, including graphical presentations of the state of the fire and analyses from stored scenarios.

*Response mode:* In this enhancement of support mode, super-real-time simulations, guided by sensor-input, will provide further information, including “what-if” scenarios to evaluate response options.



The current FireGrid project is an investigation into the Grid-enabled integration of the component technologies, while identifying the key areas for further research.

The component technologies are:

- The CFD and FE models and simulations of fire
- Resilient sensors and wireless sensor networks for extreme conditions
- Knowledge-based decision support systems
- Knowledge-based evacuation models
- Sensor guided simulation management
- Distributed data management
- Metadata for describing and indexing stored simulations



This project is co-funded by the Technology Strategy Board’s Collaborative Research and Development programme, following an open competition. It is led by BRE. Academic work is undertaken by the University of Edinburgh (School of Engineering and Electronics, NeSC, EPCC and AIAI, School of Informatics). Project management is by Ove Arup & Partners Ltd and other industrial partners include Abaqus, ANSYS UK, Xtralis (Europe) and LFEPA.

