

Innovation results

AN R&D CASE STUDY

#023

Saving lives and property

FireGrid is being developed to give the emergency services vital advanced knowledge about the fire they are attending, how it will progress and where victims may be trapped.

The need

Hindsight would be very useful to avert tragedy in major incidents. Rescue services would make enlightened decisions if they knew how to tackle particular emergencies from the outset. This has been tragically illustrated on numerous occasions including; the Mont Blanc Tunnel fire in 1999 and on 9:11 when emergency crews continued operations oblivious to the impending collapse of the south tower of the World Trade Center.

As well as the obvious human cost of fires, according to the Association of British Insurers there was a 16% increase in the insured cost of fires in 2008. The total insured cost of fires in the UK in 2008 was £1.3bn with commercial fire damage costing £865m, and fire damage to homes costing £408m.

The results

FireGrid will save lives and property by providing emergency responders with predictions of the likely sequence of events following the outbreak of fire in a building. For example, how the fire will spread, the probable locations of people trapped by the fire and if and when a structural collapse or a 'flashover' (a rapid escalation in the intensity of a fire) may occur.

An experimental FireGrid system has been successfully demonstrated.

In the demonstration a fire started in a large-scale, multi-room structure equipped with a variety of sensors was modelled and its behaviour predicted by the FireGrid system.

The demonstration showcased results of the three year project including:

- a system for the collection, communication and utilisation of data from a wide range of sensor technologies

- the application and coupling of established fire, egress and structural response computer modelling packages modified for use with high performance computers
- on-demand call-up of remote high performance computer resources performing faster-than-real-time computer modelling and generating predictions of fire and structure behaviour
- the use of real-time sensor data to update computer modelling and improve the accuracy of predictions
- an easy to understand building command and control interface for incident commanders that facilitates rapid assessment of the incident

The project also investigated the behaviour of wireless communication systems in fire situations.

Over 35 publications were generated throughout the project and FireGrid was featured in the BBC Horizon documentary 'Skyscraper Fire Fighters'.

Next steps

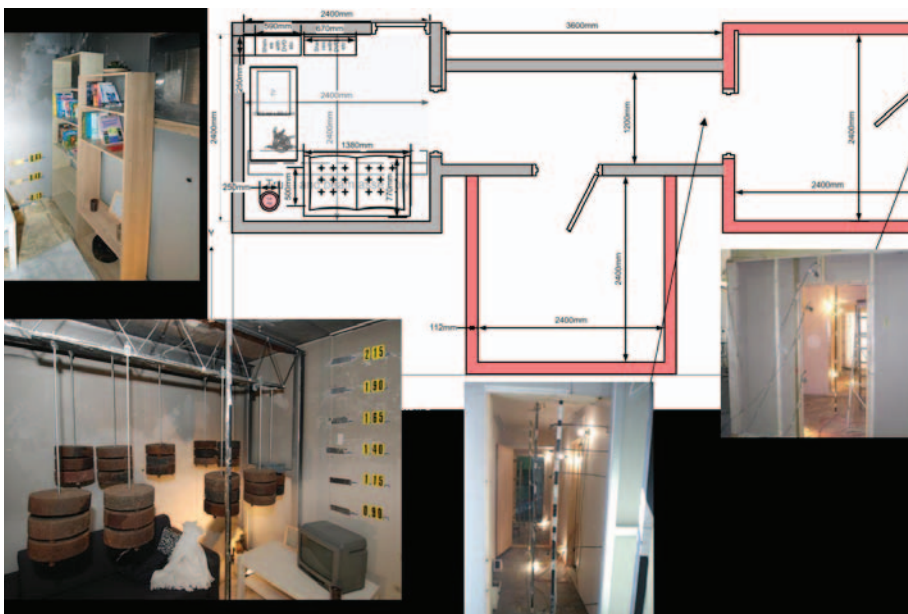
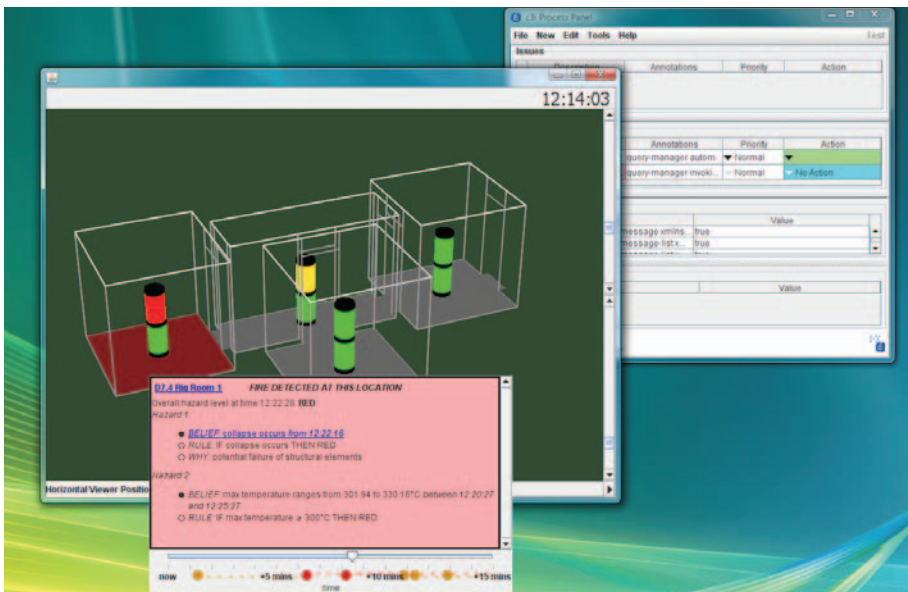
Now that each of the components of the FireGrid system has been demonstrated under 'laboratory conditions', the next steps will include applying FireGrid in a real building-based scenario. This will enable the project team to establish the number and types of actual building sensors required, as well as the necessary data and infrastructure for the successful commercial implementation of FireGrid.

An easy to understand command-and-control interface was developed to display FireGrid predictions. In this case (pictured below) a structural collapse is predicted in about eight minutes.



'The knowledge generated by FireGrid may now be used to develop a tool that can save lives and property.'

JOHN HOLDEN, BRE GLOBAL



Technology Strategy Board

Driving Innovation

Collaborative research and development projects are one of the tools that the Technology Strategy Board uses to drive innovation in the UK. The Technology Strategy Board is a business-led executive non-departmental public

body, established by the Government. Its role is to promote and support research into, and development and exploitation of, technology and innovation for the benefit of UK business, in order to increase economic growth and improve the quality of life. It is sponsored by the Department for Business, Innovation and Skills (BIS).

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Project no.

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Project partners

BRE Global Ltd (project leader)
The University of Edinburgh
Arup Fire
Xtralis Limited
Simulia Limited
ANSYS UK Limited
London Fire and Emergency Planning Authority
Institute of High Performance Computing, A*STAR (Singapore)

Project Duration

April 2006 – April 2009

Technology Strategy Board investment

£1m

Total project investment

£2.2m

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