

# Simulating emergency management

Applying 3D visual interactive simulation to highway and tunnel emergency training and management is a growing trend in ITS. Although simulation has long been regarded as a valuable tool, the effects of bringing it to life in three dimensions should never be underestimated.

Two companies have recently joined forces to create a special training and management tool that can be put to work across a broad spectrum of ITS tasks. The Japanese 3D visual interactive simulation company, Forum8, and French engineering consultancy, BMIA, have pooled their expertise to produce a new solution to the difficulty of highway and tunnel operator training and management.

One of the many problems with training operators – and indeed managing complex traffic events – is the inability to accurately visualize these events realistically, both in real-time and in the classroom. G'VAL, the new solution from BMIA, solves these problems and delivers huge added value to highway and tunnel operators.

The tool provides real-time 3D visual interactive simulation of traffic for road (G'Road) and tunnel (G'Tun) management – for existing and proposed networks – using Forum8's UC-win/Road. The realistic and accurate visual simulation of the projects produced by G'VAL allows communication both internally – with the team prior to and during the project evolution – and externally, with stakeholders and the media.

## Realistic and real-time

Driven by the SCADA system, G'VAL allows for training in a realistic environment as a result of the use of a real operational human-machine interface. The visual simulation of a wide range of different scenarios provides users with the capability to evaluate and assess

## Need to know?

**Case study of two experts joining forces to devise a tool for training operators in how to manage emergency situations**

- > Partnership between an engineering consultancy and a visualization expert
- > Tackling the inherent problems of training road and tunnel operators how to react in an emergency
- > The key role that visualizing events in real-time can play in training sessions
- > Tool for interactive, 3D visual simulation of a variety of scenarios

the impact of every conceivable potential traffic emergency incident. Simultaneous virtual incidents can be generated, meanwhile, allowing users to study the efficiency of the different ways of resolving complex issues (management of busy traffic, accidents etc).

Customized to accurately reflect each project precisely, G'VAL provides invaluable benefits at every stage of the project, from initial study to final operation. It allows operators to be taught the various operating rules used to manage different scenarios, which encompasses everything from an accident in the tunnel, to lane closures and slow traffic, fire, flooding, congestion and more. As a result of the realistic nature of the 3D simulation, and its inherent interactivity, the trainer can analyze the operator's ability to react to a range of different situations – within the safety of a classroom. At the end of the



(Above) G'VAL combines tunnel management software with realistic simulation for training purposes (Right) 3D visualization of tunnel incidents



training session G'VAL enables the trainer to produce a detailed evaluation report.

G'VAL is composed of three modules – the visual simulator, trainer module, and the SCADA interface. The visual simulator simulates the traffic in a realistic and interactive 3D environment. It generates traffic incidents, simulates the behavior of multiple types of field equipment, modifies their implementation and/or characteristics and can provide images from fixed or mobile cameras into the virtual 3D space. The trainer module permits the user to 'pilot' the simulator in parallel to operating the various tools, and can activate a whole series of scenarios and incidents as well as generate a variety of reports. This module enables the user to control the different parameters of the simulator. The SCADA interface allows the simulator to exchange data with the SCADA database through an OPC

protocol. This data comes from the different sensors simulated within the project (LCS, ADI, door, etc) as well as the control orders from the SCADA or trainer HMI (started accelerator, closed barriers, VMS, etc).

A library of street furniture, vehicles and easily integrated characters in a realistic 3D environment allows the user to produce a visual simulation that delivers images comparable to that of the real cameras from roads or tunnels. Potential simulation scenarios include generation of a slow-moving vehicle, generation of an accident between vehicles, generation of a disabled vehicle, lost-loads on the roadway, and wrong-way driving. ○

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