



**Homeland
Security**

Science and Technology

TechNote

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System Assessment and Validation for Emergency Responders

The U.S. Department of Homeland Security (DHS) established the System Assessment and Validation for Emergency Responders (SAVER) Program to assist emergency responders making procurement decisions.

Located within the Science and Technology Directorate (S&T) of DHS, the SAVER Program conducts objective assessments and validations on commercial equipment and systems and provides those results along with other relevant equipment information to the emergency response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in the DHS Authorized Equipment List (AEL).

The SAVER Program is supported by a network of technical agents who perform assessment and validation activities. Further, SAVER focuses primarily on two main questions for the emergency responder community: "What equipment is available?" and "How does it perform?"

For more information on this and other technologies, contact the SAVER Program Support Office.

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Command and Control Training Simulators

Training simulators provide emergency responders with realistic training in a simulated, controlled environment. Emergency responders use simulators to learn, practice, and enhance their skills so they are better able to respond to an actual crisis situation.

Command and control simulators provide interactive, audiovisual simulation of various large-scale operational situations. These simulators can replicate large-scale emergency situations that may be too costly or too dangerous to reproduce with live training. This TechNote focuses on command and control simulator technology designed to train emergency responders on effective incident response in support of the Incident Command System (ICS) model.

Incident Command System Overview

The ICS concept was developed in the early 1970s following a wildfire in California and has since been incorporated into the National Incident Management System (NIMS). ICS represents a standardized, scalable, all-hazards management approach used by the government, private entities, and volunteers to build an organizational structure for managing incidents and responding to large-scale emergencies. There are five primary functional areas that the ICS structure supports: command, operations, planning, logistics, and finance and administration. Command and control training simulators that are compliant with the ICS concept can be an effective training tool to aid organizations in preparing for response to large-scale incidents and emergencies.

Technology Overview

Command and control simulators provide a controlled environment for training emergency responders in leadership roles that involve coordinating personnel and allocating resources during an actual crisis situation. These simulators use scenarios to replicate isolated incidents or large-scale threats requiring an integrated response across multiple agencies and organizational levels. Examples of scenarios include traffic control, hazardous material spills, hostage situations, school shootings, acts of terrorism, and natural disasters. Customized scenarios can also be created for a particular type of incident or to replicate a jurisdiction's physical characteristics, such as streets, buildings, and landmarks.

Many of the command and control simulators on the market today can be classified as desktop or immersive simulation. These systems are distinguished by the variety and complexity of the scenarios they offer as well as the quality of graphics, required hardware, and cost.

Desktop Simulation

Most command and control desktop simulators use computer-generated imagery (CGI) to give training participants the look and feel of an actual event. Depending on the vendor, these products can include three-dimensional (3-D) scenarios, video (e.g., simulated newscasts), and audio (e.g., sound effects) to make the experience as realistic as possible. Participants interact through the use of a keyboard, mouse, or handheld controller.

On some systems, multiple workstations can be connected to support team training. For example, an incident commander at one workstation could order an evacuation onto a roadway that is being closed by a participant at another workstation. To resolve the resulting traffic congestion, the commander could then re-route the evacuation to an alternate roadway.

A variation of command and control desktop simulators train participants to direct personnel and resources while responding to an emergency situation. These systems display simulated two-way radio transmissions as text on a monitor and allow participants to choose a course of action from several possibilities. Once a decision is made, participants must then make follow-on decisions until the scenario is completed.

Immersive Simulation

Immersive simulation supports the interaction of multiple participants responding to multiple, simultaneous incidents. Like desktop simulators, this technology provides high-quality 3-D scenarios, but its high-quality images can be shown on projection screens or in full immersion theaters to create a virtual reality environment. To make the training experience even more realistic, video or still images of a community's roadways and structures can be converted into CGI and incorporated into a scenario. The training facilitator can also introduce a variety of audiovisual elements into the scenario, such as flashing lights, sirens, and simulated gunfire. Figure 1 shows an example of an immersive simulator scenario.



Figure 1. Immersive Simulator Scenario

Once a scenario is initiated, the facilitator has the option to select and modify a course of action based on the participants' responses. For example, in an active shooter scenario, a participant directs emergency responders to one side of a building, and the facilitator responds by placing the shooter at the other side, which creates more casualties and requires the participant to take further action.

Scenario Playback

Both immersive and desktop simulators provide a scenario playback feature, which gives facilitators and participants the ability to review the actions taken during the simulated event. The scenario can then be repeated, or modified and repeated, until participants attain the necessary proficiency.

Cost Considerations

Based on the agency's needs and technology selected, command and control simulators have a wide range of costs, although desktop simulators are generally more affordable. Systems can either be purchased or licensed as part of a web-based subscription. Web-based subscriptions allow agencies to pay for training on an as-needed basis, eliminating the expense of a full system purchase. A variety of training options are available depending on the system selected.

References

Federal Emergency Management Agency, http://www.fema.gov/pdf/emergency/nims/nims_training_program.pdf, accessed October 11, 2012.