



**Homeland
Security**

Science and Technology

U.S. Department of Homeland Security



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.

RKB/SAVER Telephone: 877-336-2752

E-mail: saver@dhs.gov

Web site: <https://www.rkb.us/saver>

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TechNote

Individual Skills Training Simulators

Emergency responders use individual training simulators to learn and practice skills for on-the-job preparedness. Individual training simulators provide interactive, audio-visual simulations of various situations using computer-controlled configurations ranging from a video game displayed on a screen to an immersive, three-dimensional (3-D) field of view created with visual display goggles. Simulators can replicate situations that may be too costly or too dangerous to reproduce with live scenarios. Some simulators allow instructors to observe how the user surveys the scene and modify the scenario on the fly to make it more or less challenging.

This TechNote describes individual training simulators used to facilitate skill development needed by emergency responders in the fields of law enforcement, firefighting, hazardous materials (Hazmat) response, and emergency medical services (EMS). Driving simulators are also described because multiple disciplines use them to enhance road skills.

Law Enforcement Simulators

Many law enforcement simulators focus on firearms training and decision-making skills for individuals. The basic elements of these simulators are software that presents various scenarios, a display screen, audio, and a simulated weapon that interacts with the system. Image quality and audio technology vary by simulator. Display screens vary in size, with some encircling users to create fields of view up to 300 degrees.



Law Enforcement Training Simulator

Most firearms and decision-making simulators have numerous training scenarios, including traffic stops or felony warrants, that can be selected and modified by the user. Simulated firing-range lanes or shoot/don't shoot scenarios may be used for marksmanship training to improve response time and accuracy. Judgment scenarios allow users to learn from potentially deadly mistakes, such as indecision or being blindsided. These scenarios are more complex and involve several possible sequences of escalation or de-escalation depending on use-of-force decisions made by the user. Debriefing reports are generated for educational review. Typically, the

number of individual users that a simulator can support simultaneously varies from one to four, with some simulators allowing as many as eight.

The firearms used in these training systems can either be simulated or real firearms with inserts that create laser pulses. Less lethal simulated weapons, such as Tasers, pepper spray, and batons, are also available. Simulated weapons can be tethered to the system or wireless, and the number of weapons per user that may be deployed simultaneously varies. Recoil can be produced with pressurized air in both simulated and real weapons. Some simulators include low-light scenarios, in which users can use simulated or real flashlights to illuminate the scene.

Advanced features include 3-D distance, heart-rate and breathing telemetry, and return-fire simulators, which deliver adjustable electric shocks or fire nylon pellets to represent hostile fire. Simulators which are generally controlled by an instructor, can be mobile, portable, or fixed. Some systems include a laptop computer with preloaded software. With base prices ranging from \$20,000 to \$50,000, law enforcement simulators are often customizable. Prices for simulated weapons, which may not be included in system purchase, range widely from \$50 to \$11,000.

Firefighter Simulators

Individual firefighting simulators primarily focus on improving fire extinguisher techniques and can represent class A, B, or C fires at varying levels of difficulty. These simulators are generally portable and used for firefighting agency training and community education.



Extinguisher Training Simulator

Fire extinguisher training simulators generally include a simulated extinguisher and a display screen. Feedback from sensors located in the screen adjusts the fire size according to the user's technique. Simulated extinguishers have a laser or LED that communicates with the sensors and pressurized air to provide sound. At least one model has a simulated extinguisher filled with compressed air and water that must be used in a wet room or outdoors. Screen size varies, and the field of view can range from flames to a broader depiction of

what is on fire, including a background scene. Prices range from \$3,000 to \$30,000.

Hazmat Simulators

Hazmat simulators use a simulated chemical or radiological hazard that emits a signal that can be picked up by detection instruments. Hazmat simulators are generally portable and some can generate debriefing reports. Systems vary in cost depending on the level and type of training. Prices range from \$4,000 to \$16,000.

EMS Simulators

Paramedics and emergency medical technicians may use patient simulation technologies to practice and teach basic and complex medical skills, such as intubation and insertion of chest tubes. To learn more about these technologies, please see the *SAVER Patient Simulation Technologies TechNote* at

<https://www.rkb.us/SAVER/download.cfm?id=5469>

Driving Simulators

Driving simulators allow individuals to learn and practice driving skills in a virtual reality environment.



Driving Simulator

These systems generally have a mock driving cab with a display screen and speakers to simulate scenarios that may be modified by the user. Most driving simulators are specific to responder fields, such as law enforcement, firefighting, or EMS. Some simulators are able to recreate movement such as seat bounces, vibration, or curb strikes. At least one driving simulator allows the driver to wear visual display goggles while seated in a real, stationary vehicle. Driving simulators can be mobile, portable, or fixed, and can generate debriefing reports. Prices range from \$15,000 to \$75,000.

Additional Information

[Sanjay, J. and C.R. McLean. *Modeling and Simulation for Emergency Response: Workshop Report, Standards and Tools.*](#)

[McGrath, D. and S.P. McGrath. *Simulation and Network-Centric Emergency Response.*](#)