



Screening and Evacuation Tools Help Protect Stadium Fans from Terrorist & Natural Threats

Stadiums from almost every professional sports league are using patron screening and evacuation simulation tools developed by the Department of Homeland Security (DHS) Science & Technology (S&T) Center of Excellence for Visualization and Data Analytics (CVADA) at Rutgers in partnership with Regal Decision Systems Inc. The tools enable public safety and emergency managers to select the screening and evacuation methods likely to work best at a particular venue.

For their simulations, CVADA researchers collect field data on entrances, exits, obstacles, crowd movements, queuing, inspection times, and related information. They translate this information into mathematical models and use statistical and machine learning tools to analyze the data. They then feed the data into computer programs designed to simulate various inspection and evacuation scenarios.

Patron Evacuation Simulation Tool

- Identifies best routes and processes to evacuate fans quickly and safely during events.
- Six National Football League (NFL) teams have used the tool to develop evacuation plans: the Eagles, Jets, Giants, Cowboys, Ravens, and Redskins.

Patron Screening Tool

- Enables stadium operators to determine which types of inspection will work best in their particular environments to maximize security and minimize inconveniences.
- Options include metal-detection wands, bag checks, pat-downs, and walk-through metal detectors.
- Computer simulations show different sizes of waiting crowds, the length of entry lines before and up to game time, and how long it would take to clear patrons under different scenarios.

Guide to Best Practices in Anti-Terrorism

The DHS S&T Office of SAFETY Act Implementation (OSAI) worked with CVADA-Rutgers to use outcomes of this research to develop a Best Practices in Anti-Terrorism Resource Guide:

www.safetyact.gov/externalRes/refdoc/CCICADA%20BPATS.pdf

The guide helps stadium owners and operators develop and strengthen the anti-terrorism readiness of their large venues in order to submit an application for security-insurance coverage under the federal SAFETY Act. Five stadiums have achieved SAFETY Act certification since publication of the guide.



Early in its development, the patron-evacuation tool was used during this October 11, 2010 lightning storm to safely evacuate fans from MetLife Stadium.

Next Steps

CVADA-Rutgers continues to enhance the stadium queuing simulator tool, incorporating feedback from Major League Baseball (MLB) and NFL users, and it is exploring the licensig of the tool to a company already positioned in the sports venue space. CVADA-Rutgers is also working with its stadium partners in reviewing configuration options for the placement, appropriate number, and staffing of walk-through metal detectors.

"In the work that CCICADA did with MetLife Stadium, studying how security practices interact with the patrons, we were all impressed at how [they] could take the raw information about ticket scans, and develop a complete simulation of how the guests were queued up and waiting at football games. Those simulations were very helpful in finding our optimal policy for patron screening."

- Danny DeLorenzi
Director of Security & Safety Services
MetLife Stadium