

**Weapons of Mass Destruction-Decision
Analysis Center (WMD-DAC)**

Simulation Capabilities

Sandia National Laboratories is using its expertise in advanced computer simulation and visualization to develop an interactive tool that addresses the threat of an urban terrorist attack. This capability – embodied in the Weapons of Mass Destruction-Decision Analysis Center (WMD-DAC) – is designed to help integrate national and regional WMD defense.

The WMD-DAC simulation architecture builds on Sandia's counterterrorism studies related to various use scenarios for chemical, biological and nuclear materials. The architecture brings together weapons knowledge, decision analysis tools, and advanced simulation and visualization. Knowledge about weapons of mass destruction is drawn from services and agencies responsible for addressing terrorist attacks and is integrated into state-of-the-art computer software.

The simulation architecture is founded on the Institute of Electrical and Electronics Engineers (IEEE)-standard High Level Architecture (HLA) protocols. Developed by the Department of Defense, the protocols support large, distributed simulations in which multiple organizations pool independently developed models to study complex operational scenarios in a rich synthetic environment. By using this standard, participating external organizations can easily customize and enrich the simulation by adding HLA-compliant models to the WMD-DAC library.



The simulation environment provides a framework to study such complex issues as defining priorities for attack preparedness; detecting early indicators; and assessing response and mitigation options. To achieve these goals, system elements are modeled with high fidelity, the simulation scenario is accurately visualized, and straightforward user interfaces promote active participation.

Simulation User Facility

Sandia makes the defense simulation capability accessible in the WMD-DAC user facility in Livermore, California. Policymakers, tactical personnel, and first responders can use this facility for education and training exercises where they explore the complexity of terrorist WMD defense via interactive, real time, "what if" computerized war-gaming.

Participants in a WMD-DAC exercise practice decision-making while immersed in realistic scenarios. The simulation provides clear



feedback on the impact of their decisions over time.

Multi-resolution simulations conducted at WMD-DAC will permit:

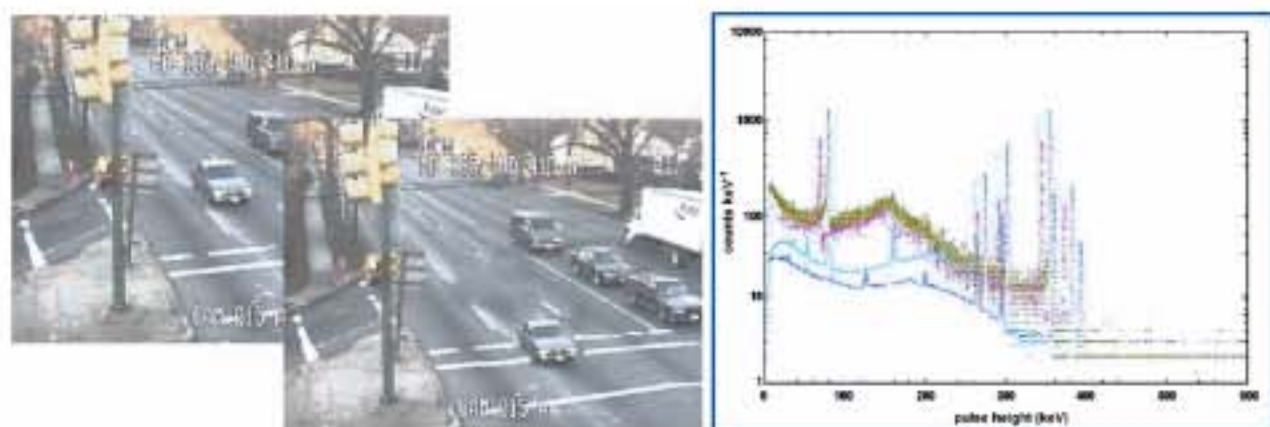
- * analyses of the performance of new technologies in a system context,
- * execution of user-defined, realistic high-level exercises and training, and
- * communication of contextual insights to first responders.

Prototype Applications

The WMD-DAC simulation architecture is being used to design system architectures for both wide-area nuclear threat detection and bio attack detection/mitigation. The architecture can be rapidly reconfigured to accommodate new applications. Confidence in the results is gained from extrapolating actual data obtained during limited deployments of prototype detection systems.

Applications of the simulation tool include optimizing system architectures for specific locales within a city and/or for a city as a whole, and for a range of threat scenarios and combinations of threats and scenarios.

Since the simulation can make use of real detectors and sensors, it can be integrated into



Outputs from Video System and Radiation Detector

testbed exercises to aid system design, analyze detector results in a detection network and evaluate expected detector and sensor performance.

Continuing Development

In addition to developing the WMD-DAC simulation architecture and user facility to address issues and scenarios described above, Sandia seeks to expand these capabilities to analyze a larger set of homeland security issues such as border protection and improved customs procedures for commercial shipping.



Facility Protection



Nuclear Smuggling Defense

For more information contact :
Sandia National Laboratories
Carolyn Pura at (925) 294-2811
cpura@sandia.gov
Howard Hirano at (925) 294-2053
hhhiran@sandia.gov