



# Science and Technology

## EMERGENCY PREVENTION & RESPONSE

# HOMELAND EXPLOSIVE CONSEQUENCE AND THREAT TOOL (HEXCAT)

**HEXCAT IS A SCENARIO-BASED PROBABILISTIC HAZARD ASSESSMENT TOOL WITH AN INTEGRATED MEDICAL RESPONSE MODEL USED TO PLAN EMERGENCY RESPONSE PREPAREDNESS AND PROTECT AGAINST EXPLOSIVE ATTACKS**

HEXCAT is an explosive hazard modeling tool that estimates the potential impact and consequences of an explosion, including severity and types of injuries, effectiveness of response, choke points and building damage. The desktop computer tool uses thousands of plausible scenarios to provide holistic hazard assessments of an explosive attack in public spaces. The model guides informed decision-making by allowing users to evaluate various “what-if” scenarios and create multiple protocols to prepare adequate security countermeasures or medical responses based on key characteristics of an explosion.

## KEY BENEFITS

- + Enables proactive measures for addressing threats
- + Identifies bottlenecks preventing effective response
- + Prioritizes counterterrorism and medical response efforts
- + Provides comprehensive data for evaluation of response and mitigation options

## STAGE OF DEVELOPMENT

Prototype

## PARTNERSHIP SOUGHT

License

## INVENTORS

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## DHS COMPONENT

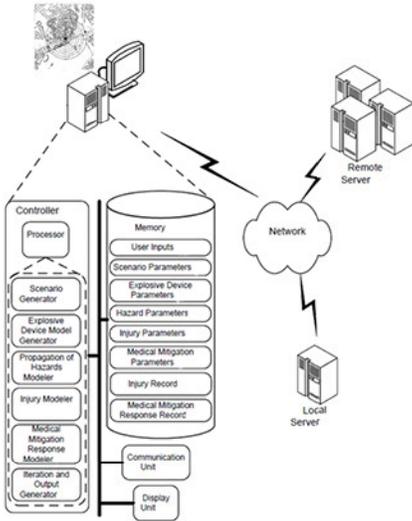
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# THE TECHNOLOGY

HEXCAT is a Monte Carlo simulation tool that models thousands of scenarios based on random sampling of distributions for critical variables, allowing the user to understand the inherent uncertainty in assessing the impact and response options of a potential terrorist attack. The tool also includes an integrated stock-and-flow medical and emergency response model to evaluate on-site care, transportation to hospitals, and in-hospital care, tracking the supplies, medical staff and facilities needed to effectively respond. The innovation evaluates key parameters like target type, location (population density and building types), explosive device characteristics (material, size, thermal or fragmentation enhancements, and location), and on-site and in-hospital medical capabilities and personnel available. Potential consequence outputs from the model can include injury records (type and severity), response ability and resource limitations (resources available, consumed and needed), and potential delays from the time of injury to time of care received.

Minimal user input is needed to develop scenarios and response options because simulations are based on a massive data set. The user can fine tune the scenario characteristics if specific data is available, or run the tool based on default values. The model output can be displayed on a desktop screen or spreadsheet to show the dependence on key variables and anticipated resources needed for response. The tool can also be used to evaluate the impact of competing response or security options to support planners and decision makers.



Overview model of the HEXCAT system, inputs used to produce calculations, and server network structure.

## APPLICATIONS

The technology has several potential end users:

- + Transportation systems and border security
- + Restricted access sites with high volume: government buildings, sports arenas, public facilities, and schools
- + Open spaces such as shopping malls, museums, city centers, and parades
- + Commercial buildings

## PATENT INFORMATION

US Patent numbers 11,766,294



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