

# Standard Unified Modeling, Mapping and Integration Toolkit (SUMMIT)

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SUMMIT PM  
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Science & Technology Directorate  
Infrastructure Protection and Disaster Management Division

Project Background & Capability Gap

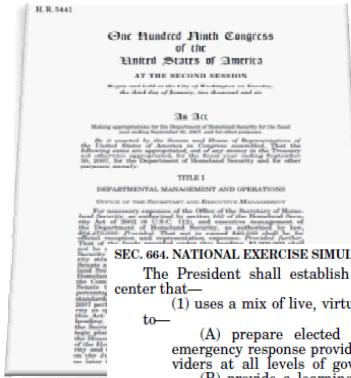
**SUMMIT**

# PROJECT BACKGROUND & CAPABILITY GAP

Guiding Doctrine



FEMA



December 17, 2003 Homeland Security Presidential Directive/Hspd-8

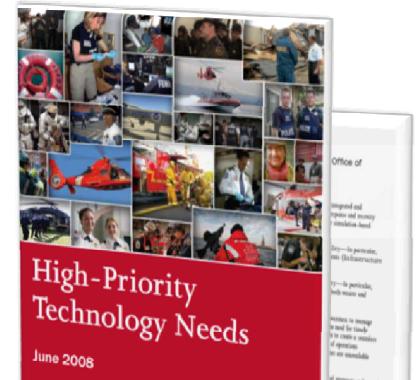
## Subject: National Preparedness

For Immediate Release  
Office of the Press Secretary  
December 17, 2003



# Homeland Security

Science and Technology



## NESC Business Model



## National Exercise Program (NEP) Overview

August 2009



February 18, 2010

## Incident Management

## DHS Leads: Federal Emergency Management Agency and Office of Emergency Communications

## Representative Technology Needs

- Integrated modeling, mapping, and simulation capability—In particular, an integrated and simulation-based incident planning and response capability to analyze all-hazard disaster response and recovery operations, tactics, techniques, plans, and procedures for use in a real-time environment for simulation-based training (Infrastructure & Geophysical Division)

# PROJECT BACKGROUND & CAPABILITY GAP

## Program Inception



## Homeland Security

### Science and Technology

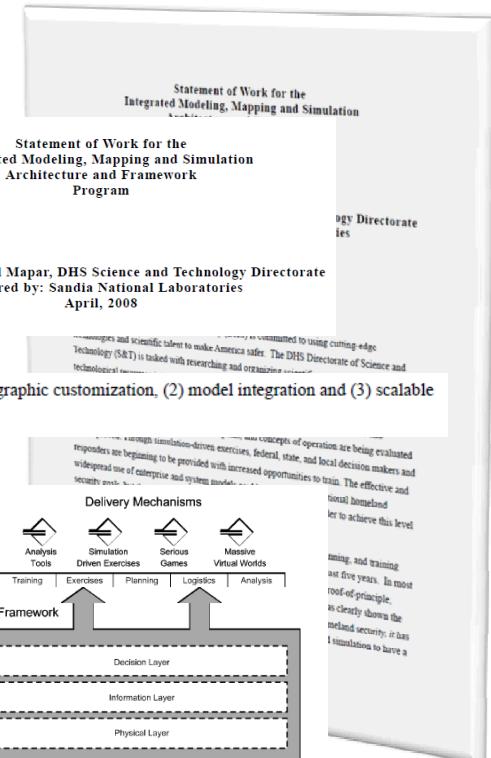
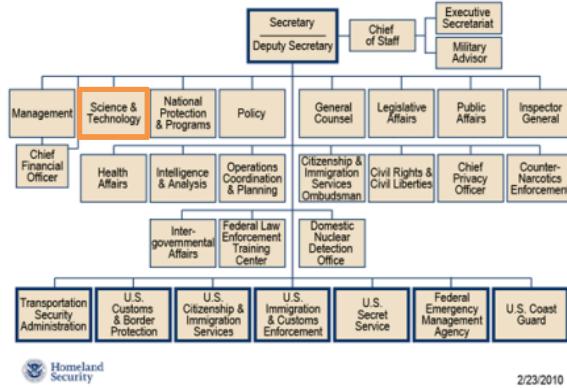
Science and Technology Directorate Infrastructure and Geophysical Division



**Training, Exercise & Lessons Learned (TELL) Project**

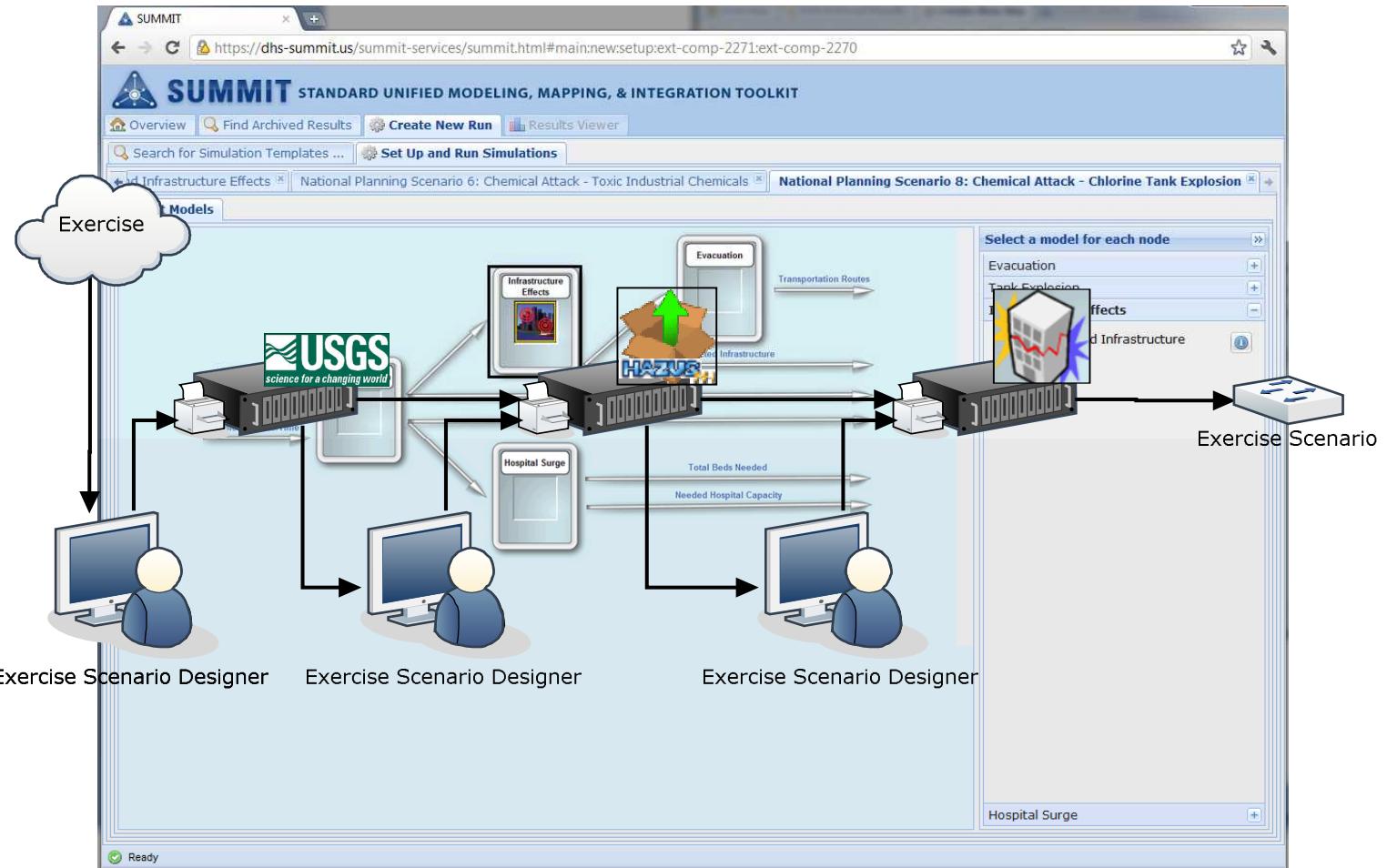
**Project Overview:** This project develops a federated simulation-based training and exercise capability that uses advanced computer models and will allow responders at all levels to affordably train and exercise for large and complex events in a virtual/constructive/live environment. TELL will link multiple agencies, functions, and jurisdictions to improve preparedness and decision-making for emergency responders and managers. TELL incorporates training objectives, scenarios, and metrics defined by other programs, and the capability to capture lessons learned to improve future emergency response capabilities.

TELL addresses the overarching need of successful implementation of the NIMS and the ability to conduct quick, repeatable, economical, and effective means of training incident commanders so they can be better prepared to handle complex incidents. This project is part of the Preparedness and Response Thrust Area and the Incident Management Enterprise Program of the [Infrastructure and Geophysical Division](#).



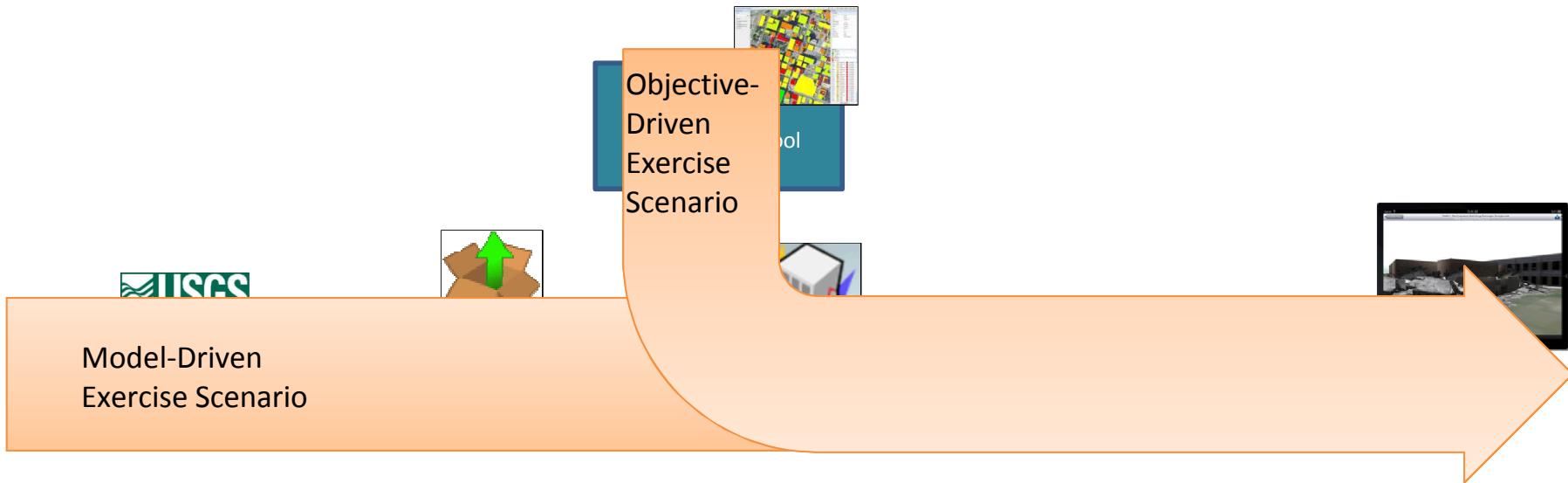
# PROJECT BACKGROUND & CAPABILITY GAP

## Capability Gap



# PROJECT BACKGROUND & CAPABILITY GAP

Culture Change



# PROJECT BACKGROUND & CAPABILITY GAP

Mission Need

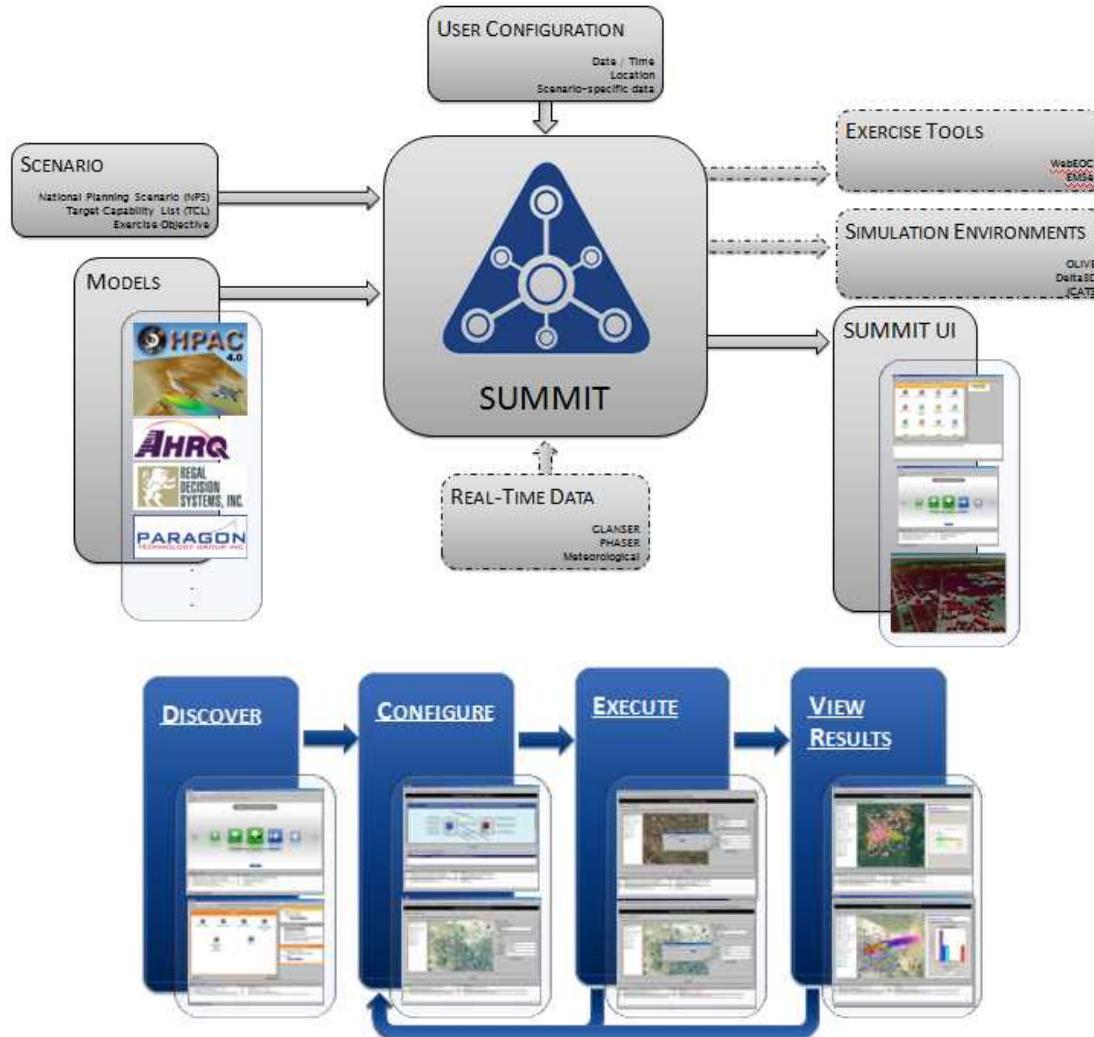
The emergency preparedness community needs reliable access to, and ability to generate science-based information and data that supports evolving emergency planning, exercises and response operations, and that is consistent, readily interpretable, secure, and easy to share.

Project Description & Current State

# **SUMMIT**

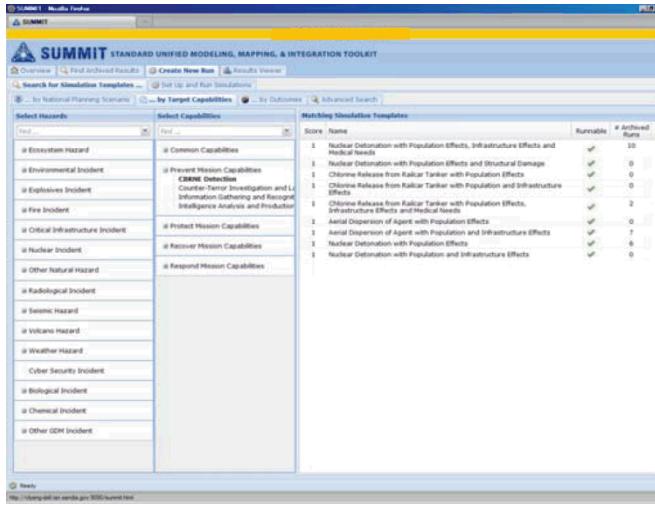
# PROJECT DESCRIPTION & CURRENT STATE

## Project Description

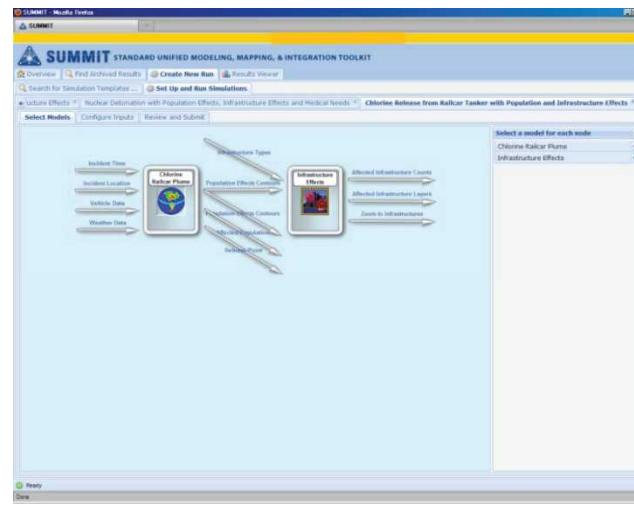


# PROJECT DESCRIPTION & CURRENT STATE

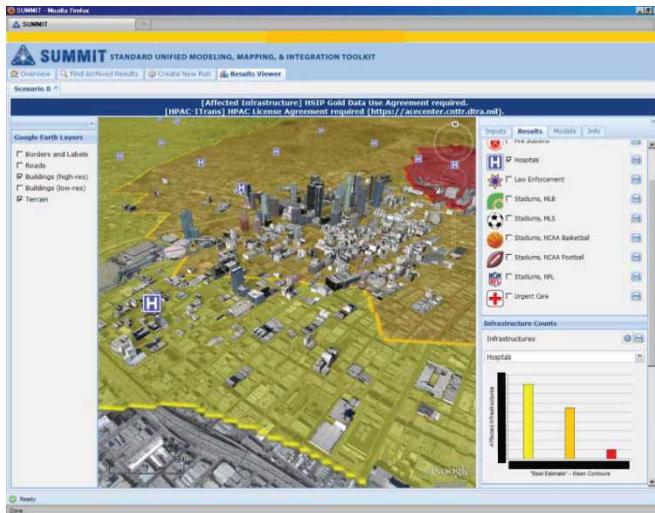
SUMMIT Screenshots



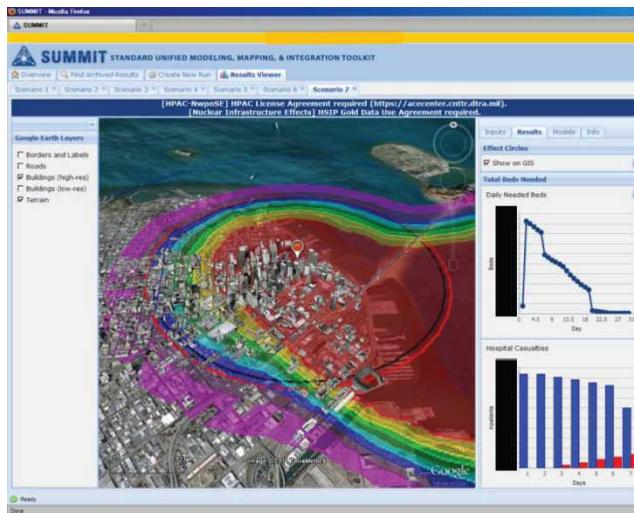
The screenshot shows the 'Matching Simulation Templates' interface. On the left, a tree view lists 'Select Hazards' and 'Select Capabilities'. The 'Select Capabilities' tree includes 'Common Capabilities', 'Counter-Terror Investigation and Response', and 'Intelligence Analysis and Production'. The 'Matching Simulation Templates' table lists 10 templates, each with a 'Score', 'Name', 'Runnable', and '# Archived Runs' column. The first template is 'Nuclear Detonation with Population Effects, Infrastructure Effects and Medical Needs'.



The screenshot shows the 'Model Toolkit' interface. It features a central 'Infrastructure Effects' model node connected to 'Affected Infrastructure Counts', 'Affected Infrastructure Levels', and 'Zones in Infrastructure'. To the left, there are input sections for 'Incident Time', 'Incident Location', 'Vehicle Data', and 'Weather Data'. To the right, there are output sections for 'Affected Infrastructure Counts', 'Affected Infrastructure Levels', and 'Zones in Infrastructure'.



The screenshot shows the 'Results Viewer' interface for Scenario B. It displays a 3D map of a city with various infrastructure layers. A legend on the left shows 'Google Earth Layers' including 'Borders and Labels', 'Roads', 'Buildings (high-res)', 'Buildings (low-res)', and 'Terrain'. A legend on the right shows 'Infrastructure Counts' for 'Hospital', 'Law Enforcement', 'Stadiums: NFL', 'Stadiums: MLS', 'Stadiums: NCAA Basketball', 'Stadiums: NCAA Football', 'Stadiums: NHL', and 'Urgent Care'. A bar chart at the bottom shows 'Affected Infrastructure' counts for 'Hospital' (blue), 'Law Enforcement' (orange), and 'Urgent Care' (red).



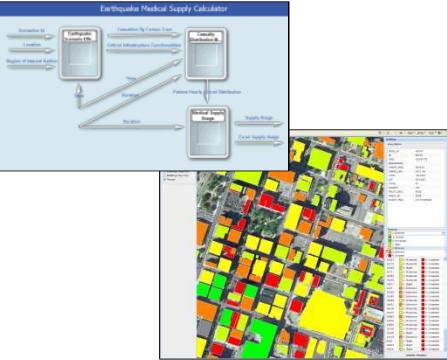
The screenshot shows the 'Results Viewer' interface for Scenario 2. It displays a 3D map of a coastal city with a large red 'Affected Circles' overlay. A legend on the left shows 'Google Earth Layers' including 'Borders and Labels', 'Roads', 'Buildings (high-res)', 'Buildings (low-res)', and 'Terrain'. A legend on the right shows 'Affected Circles' for 'Share on GIS'. A line graph on the right shows 'Total Beds Needed' over 'Day' (0 to 33.3). A bar chart at the bottom shows 'Hospital Casualties' over 'Days' (1 to 7).

FEMA Support

**SUMMIT**

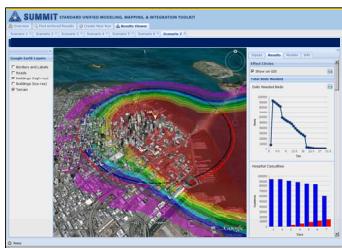
# FEMA SUPPORT

NLE11 Efforts



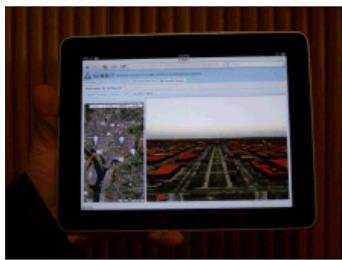
## Planners use SUMMIT to generate and refine scenario data

- Linking models to calculate data for scenario
- Bridging model-driven scenario with objective-driven scenario



## Controllers use SUMMIT to visualize scenario data

Visualizing model output in 2D (GIS) and with charts/graphs, supporting common operating picture



## Players use SUMMIT to view scenario data in a virtual world

Introducing next-generation immersive visualization tools for exercises

# FEMA SUPPORT

FEMA Pilot Efforts

## National Exercise & Simulation Center (NESC) Pilot



Scenario  
Support



Data  
Visualization



Enhanced  
Realism



Reusability

## Federal Tier 1 Exercises

### National Level Exercise 2010 (NLE10) - IND



Scenario  
Support



Scenario  
Support



Data  
Visualization



Enhanced  
Realism

## Regional Exercises (planned)

### ARES - Anthrax WARRP- Anthrax, Mustard, RDD Cincinnati - TBD



Scenario  
Support



Data  
Visualization



Enhanced  
Realism

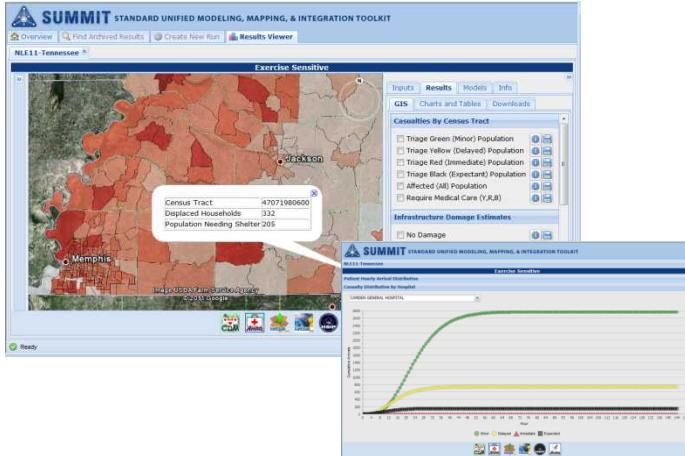


Reusability

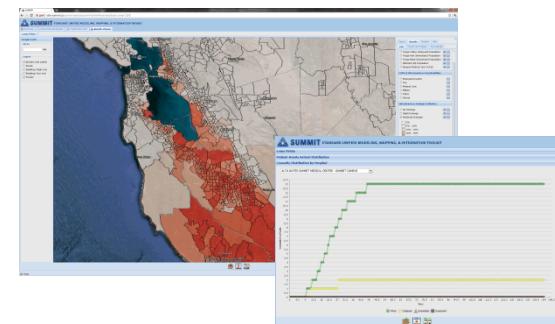
# FEMA SUPPORT

FEMA SUMMIT Use

## NLE11 Earthquake Scenario



## Loma Prieta Scenario



## NLE11 Chemical Tanker Scenario



## Sweden Chemical Tanker Scenario

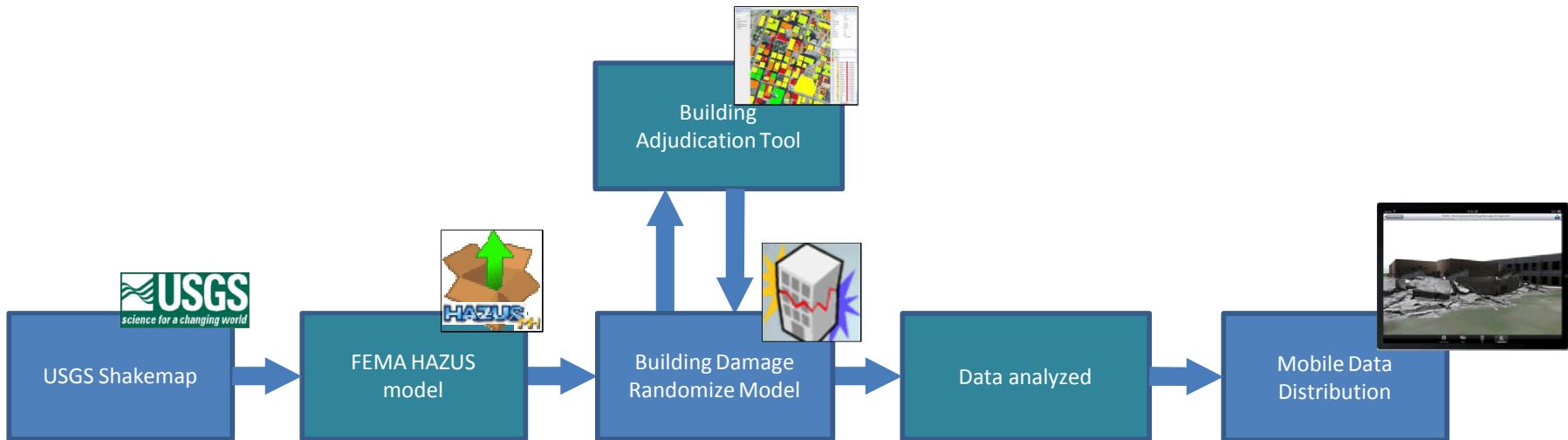


Future Plans: Response

**SUMMIT**

# FUTURE PLANS: RESPONSE

Mobile Client



- Pre-populated with pre-run model data
- Adjudication moves from the desk to the field
- Second-order model-driven results driven by adjudicated data