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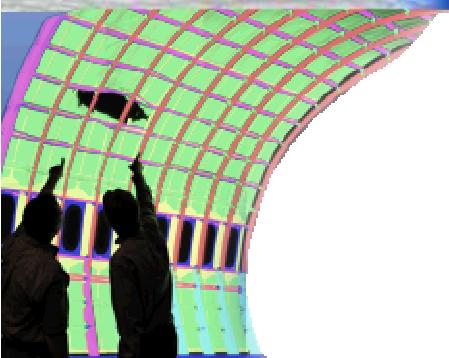
1/2012



Standard Unified Modeling, Mapping & Integration Toolkit (SUMMIT)

Katherine Guzman
SUMMIT Team

Sandia National Laboratories



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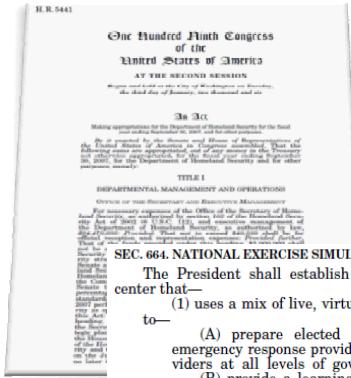




SUMMIT Background

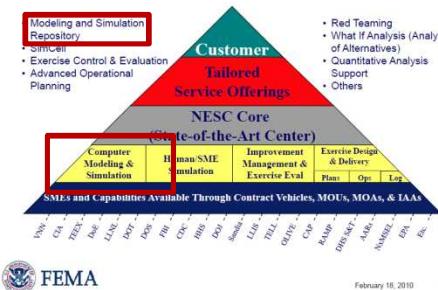
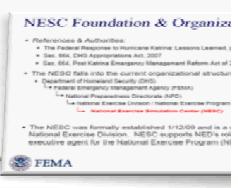


FEMA



National Exercise Program (NEP) Overview

August 2009



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



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

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

Subject: National Preparedness

- (b) The term "Federal departments and agencies" means those executive departments enumerated in 5 U.S.C. 101, and the Department of Homeland Security, independent establishments as defined by 5 U.S.C. 104(1), Government corporations as defined by 5 U.S.C. 103(1), and the United States Postal Service.
- (c) The term "Federal preparedness assistance" means Federal department and agency grants, cooperative agreements, loans, loan guarantees, training, and/or technical assistance provided to State and local governments and the private sector to prevent, prepare for, respond to, and recover from terrorist attacks, major disasters, and other emergencies. Unless noted



Homeland Security

Science and Technology



High-Priority Technology Needs

June 2008

Incident Management

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

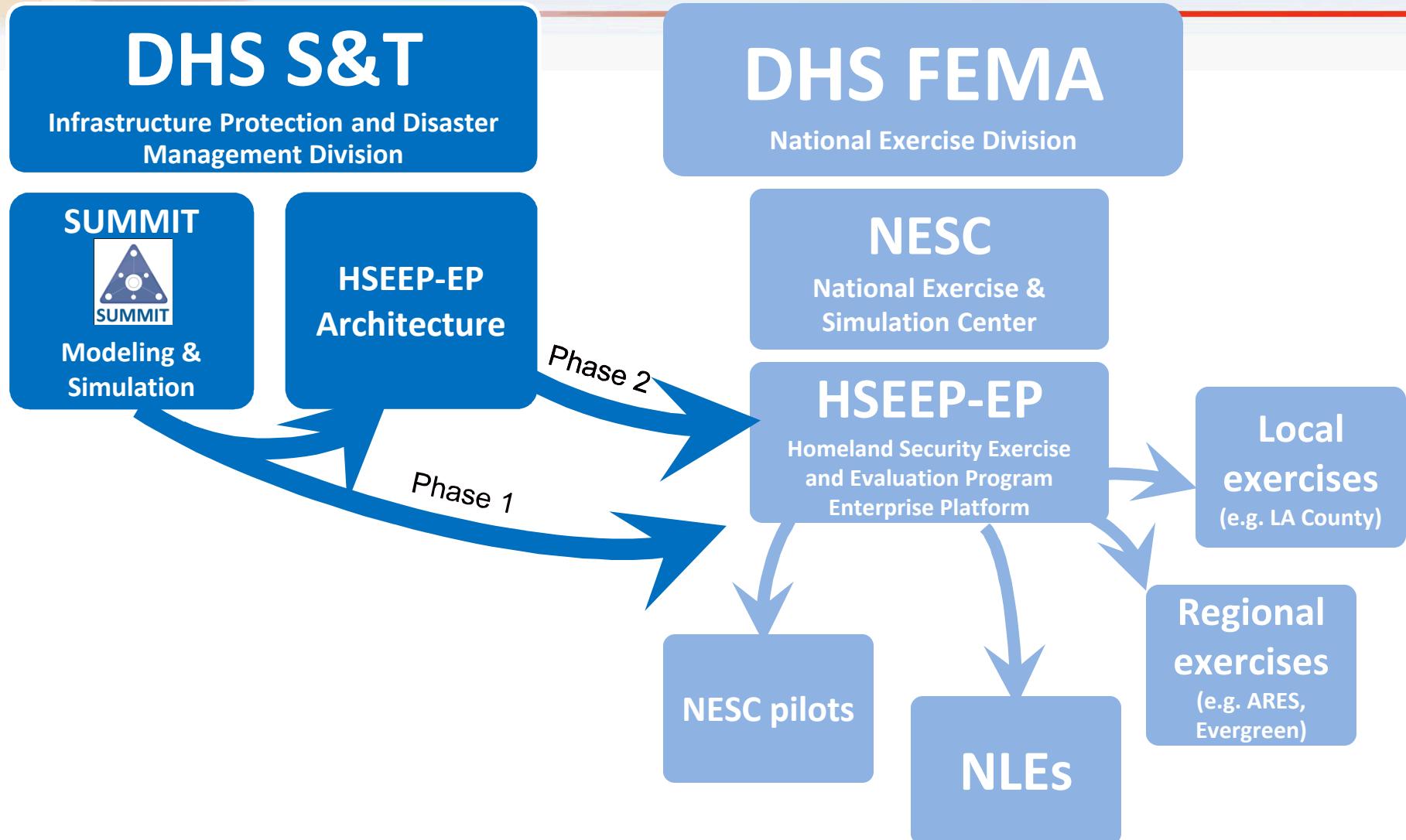
Representative Technology Needs

- **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)



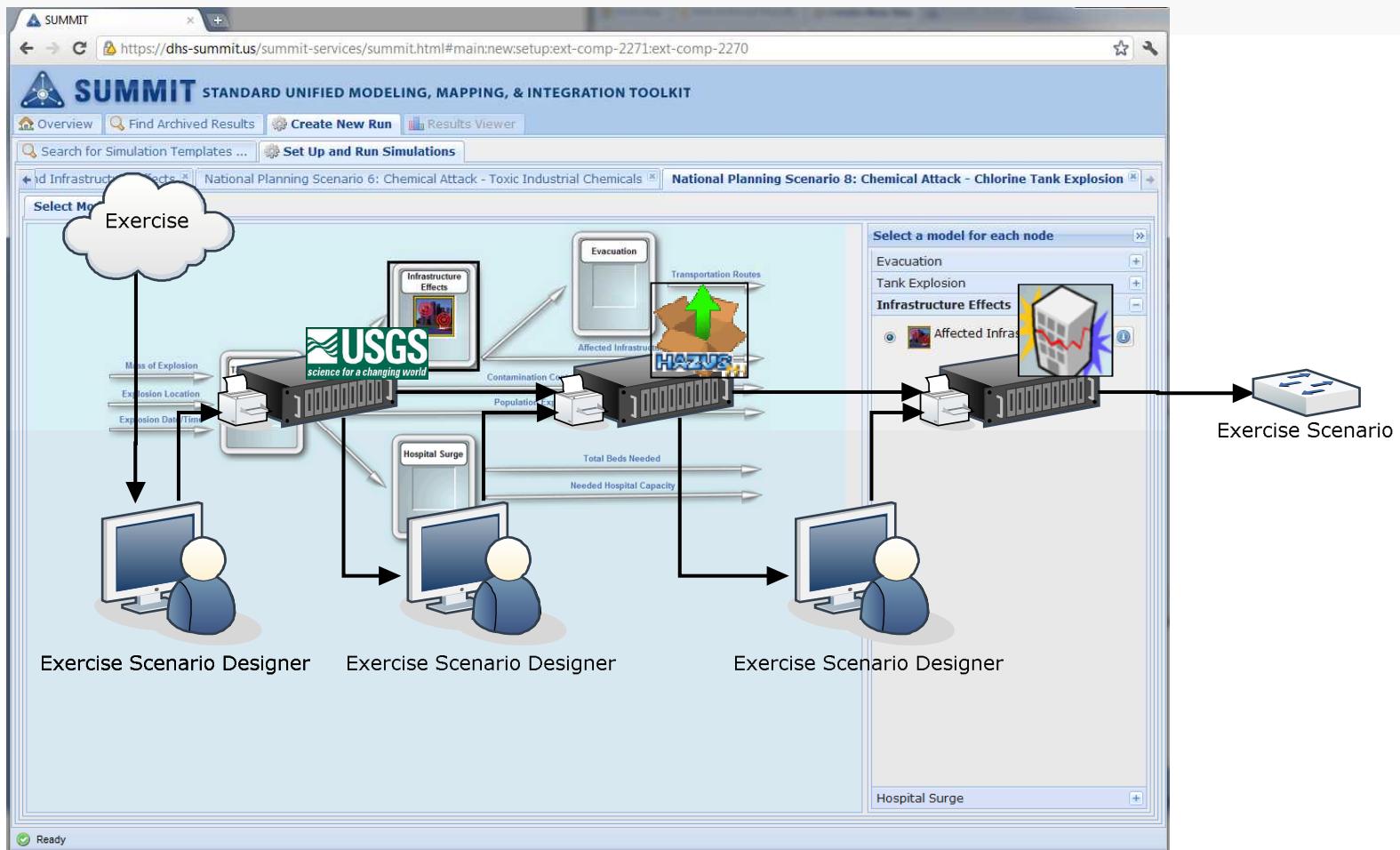
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Development and Transition Path for Standard Unified Modeling, Mapping & Integration Toolkit (SUMMIT)



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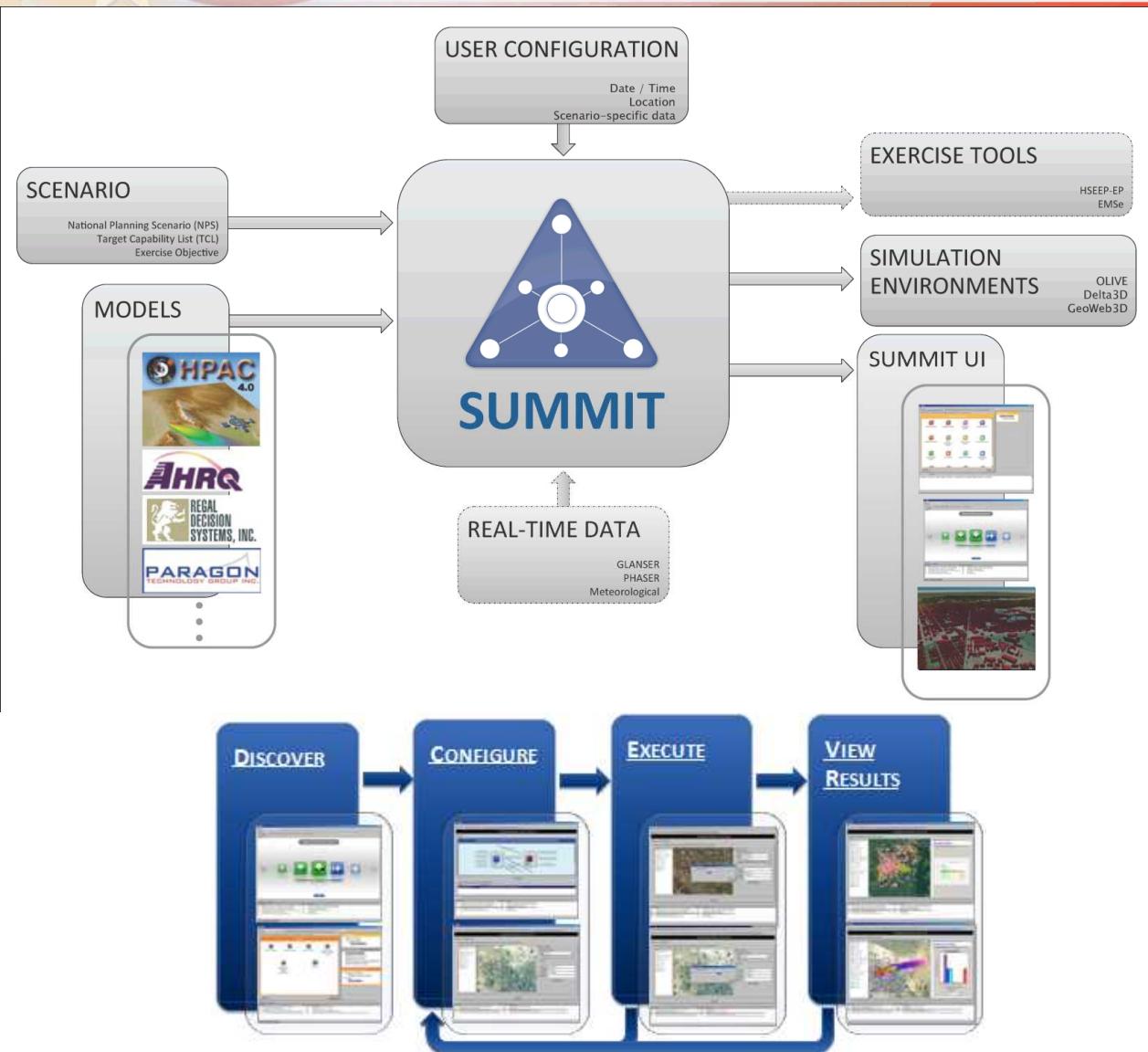
Capability Gap



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SUMMIT Components



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.

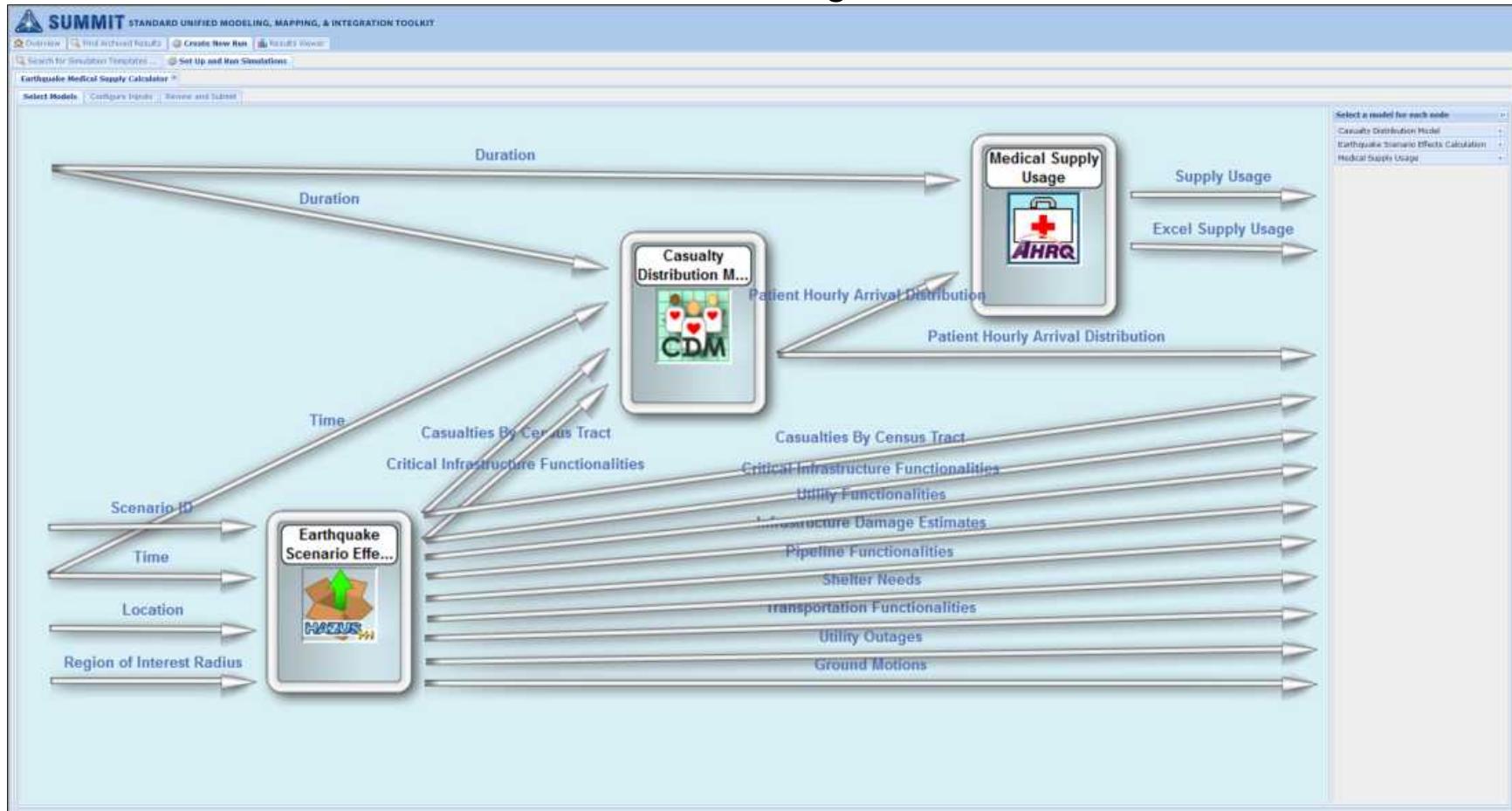


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SUMMIT architecture links models in a flexible manner

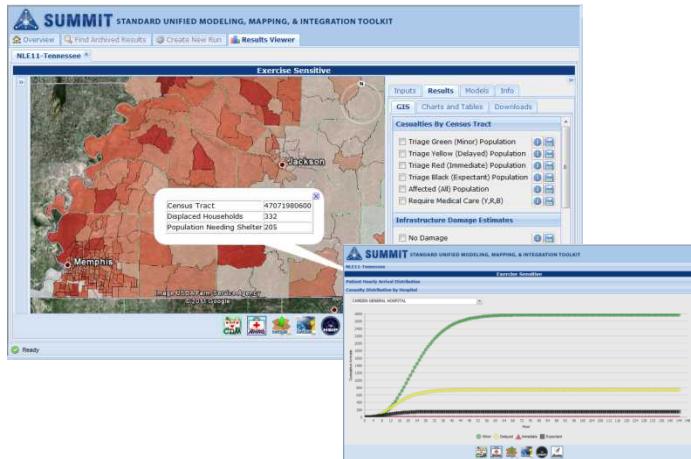
SUMMIT architecture uses templates, model/data slots, data types, and libraries to create a flexible model integration framework



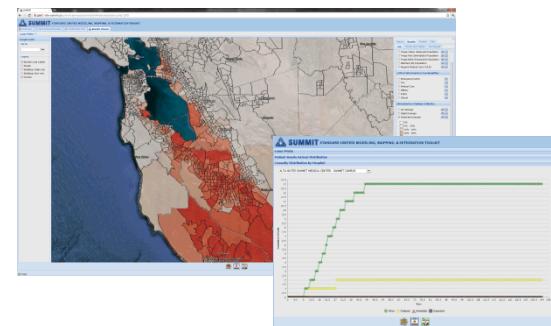
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NLE11 Earthquake Scenario



Loma Prieta Scenario



NLE11 Chemical Tanker Scenario



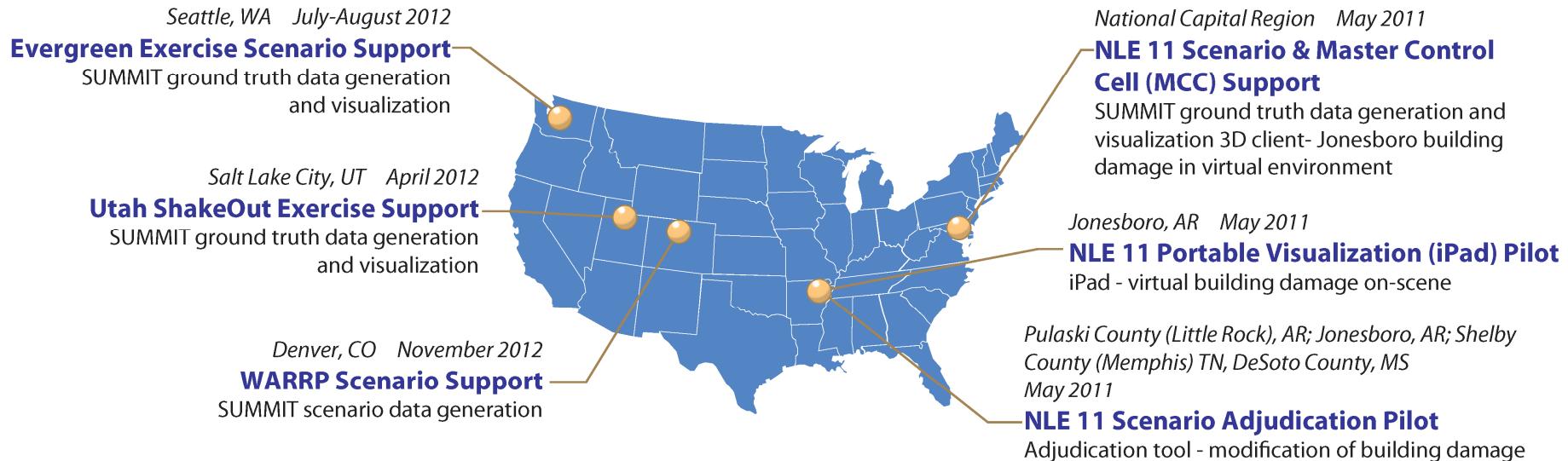
Sweden Chemical Tanker Scenario



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SUMMIT is actively supporting end-users in exercises

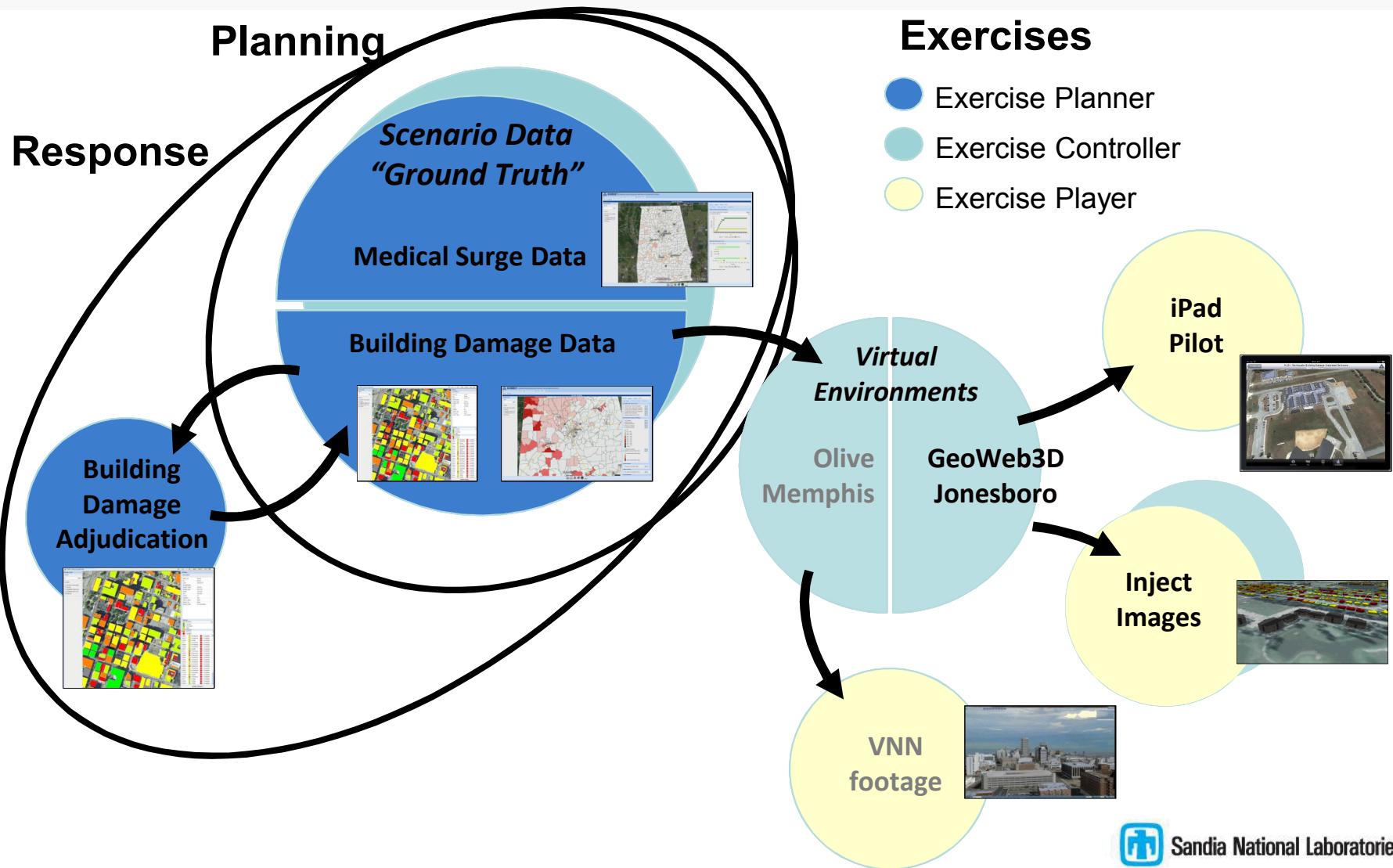


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SUMMIT provides value across roles and throughout preparedness cycle

Planning → Exercises → Response



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SUMMIT Contact Information

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Infrastructure and Disaster Management
Division



The screenshot shows the SUMMIT website homepage. At the top, there is a navigation bar with links for Home, SUMMIT in Action, Learn More, News, and Contact Us. Below the navigation bar is a large banner image showing three individuals in military uniforms standing outdoors near a fire truck. The banner has text overlay: "SUMMIT piloted at FEMA's National Level Exercise 2011" and "DHS modeling & simulation software allows first responders to visualize post-event disaster environments. Read more »". Below the banner are three main content sections: "What is SUMMIT?", "See SUMMIT in Action", and "SUMMIT User Login". The "What is SUMMIT?" section contains a brief description and a link to a fact sheet. The "See SUMMIT in Action" section features a video thumbnail and a link to the results archive. The "SUMMIT User Login" section contains fields for Username and Password, a "Login" button, and links for forgot password and contact us.

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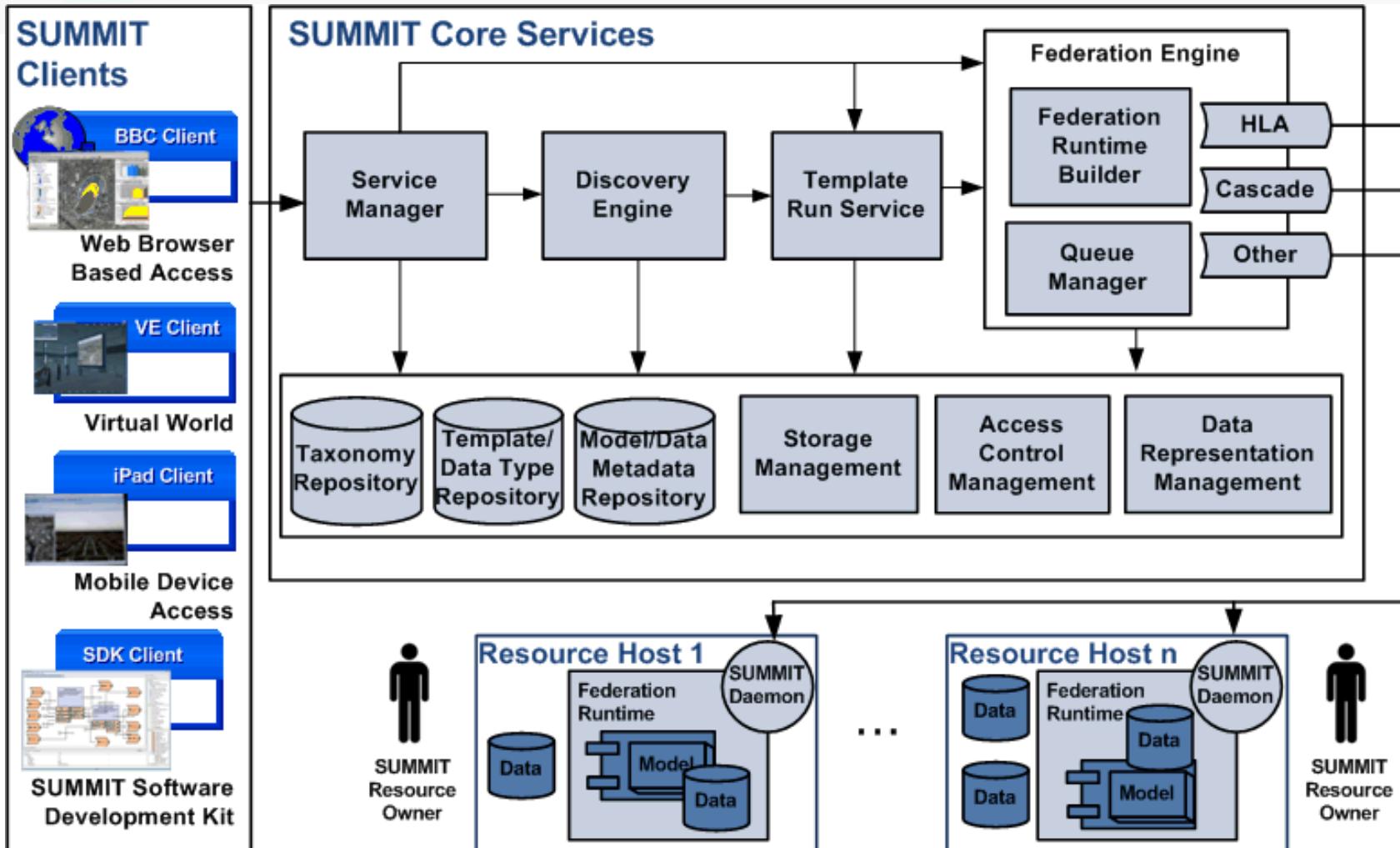


BACKUP SLIDES



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Architecture Overview

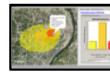




SUMMIT-Supported Exercises



Scenario Support



Data Visualization



Enhanced Realism



Reusability

FEMA National Exercise & Simulation Center (NES) Pilot



FEDERAL TIER 1 EXERCISES

National Level Exercise 2010 (NLE 10) – IND



National Level Exercise 2011 (NLE 11) - Earthquake



National Level Exercise 2012 (NLE 12) – Cyber



ADDITIONAL EXERCISES

ARES – Anthrax



WARRP – Anthrax, Mustard, RDD



Utah ShakeOut – Earthquake



US-Sweden – Chemical Release



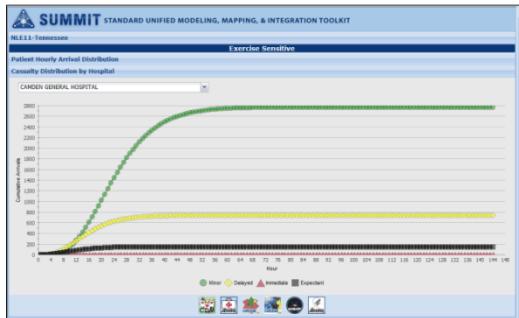
Long Beach – RDD



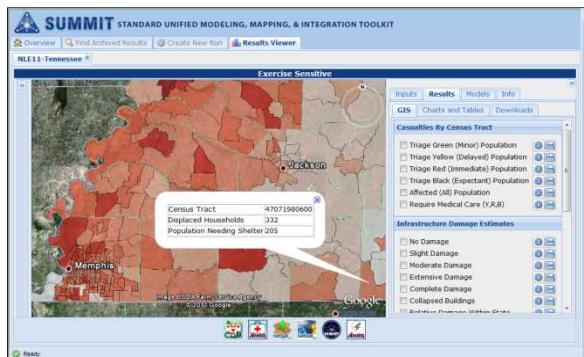
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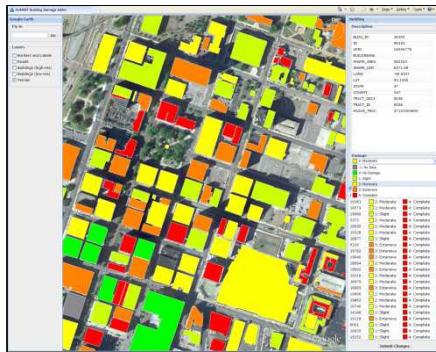
SUMMIT Products Developed for NLE 11



Medical surge needs
(334 hospitals, 8 states)



Results Viewer for Trusted Agents
and for Master Control Cell

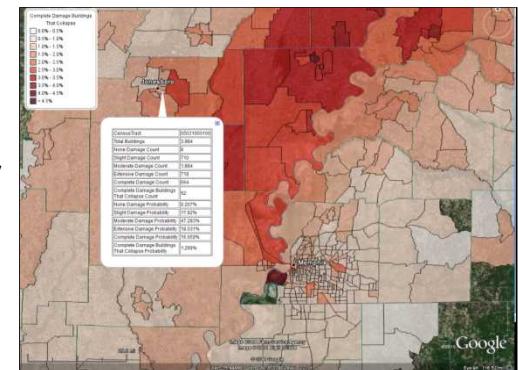


Building damage
Adjudication Tool for
scenario refinement

Building damage
KML layers for
control,
simulation



Virtual building
damage iPad app



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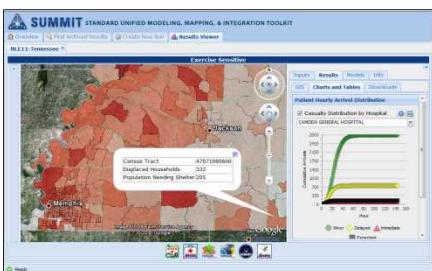
SUMMIT Capabilities Active in NLE11



Planners use SUMMIT to generate and refine scenario data

Linking models to calculate data for scenario

Bridging model-driven scenario with objective-driven scenario



The interface shows a map of a geographic area with colored regions and a legend. A callout box highlights a specific census tract with the ID 47071900000, showing a population of 2000 and a population needing shelter of 200. To the right, a line graph titled "Casualty Data Arrived by Hospital Capacity (Hourly)" shows the number of casualties arriving over time, with markers for "Inter", "Delayed", and "Immediate" arrivals.

Controllers use SUMMIT to visualize scenario data

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



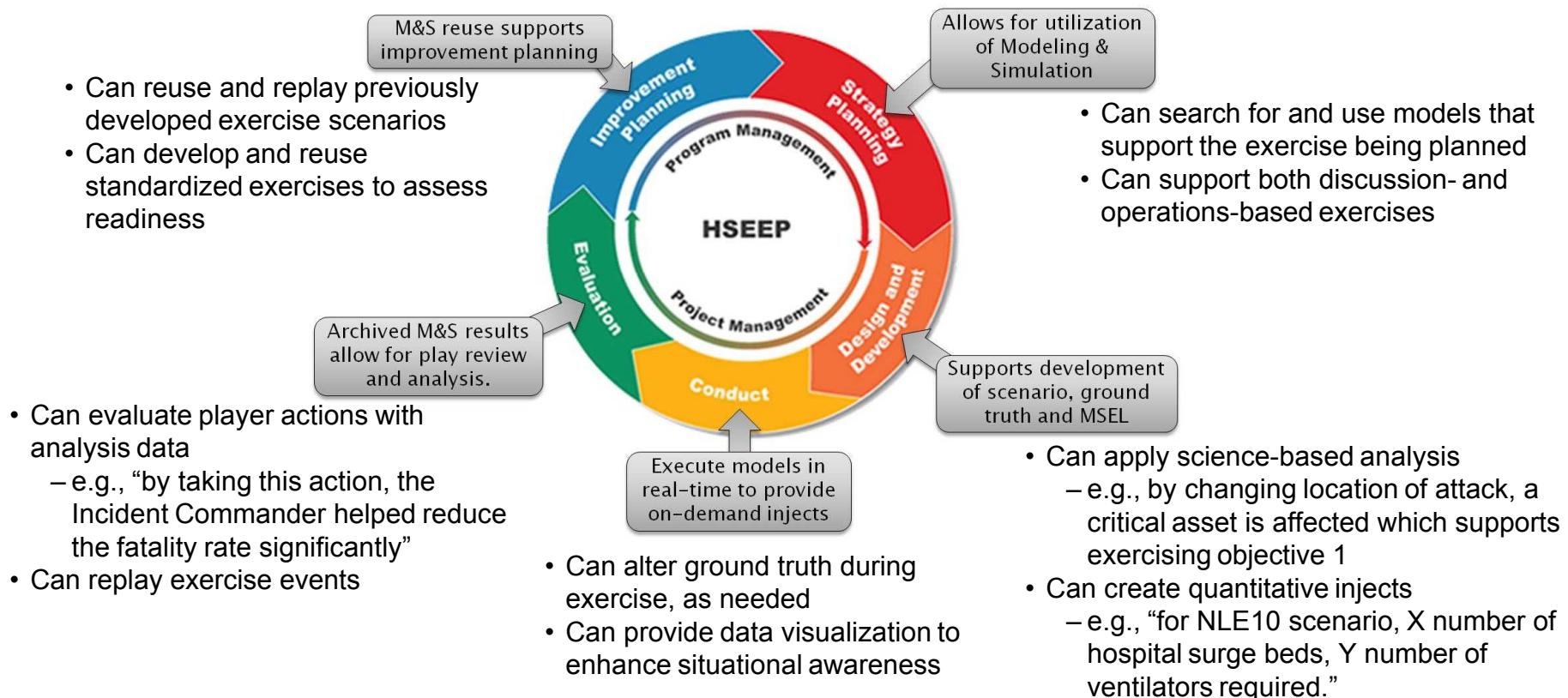
Players use SUMMIT to view scenario data in a virtual world

Introducing **next-generation immersive visualization tools** for exercises



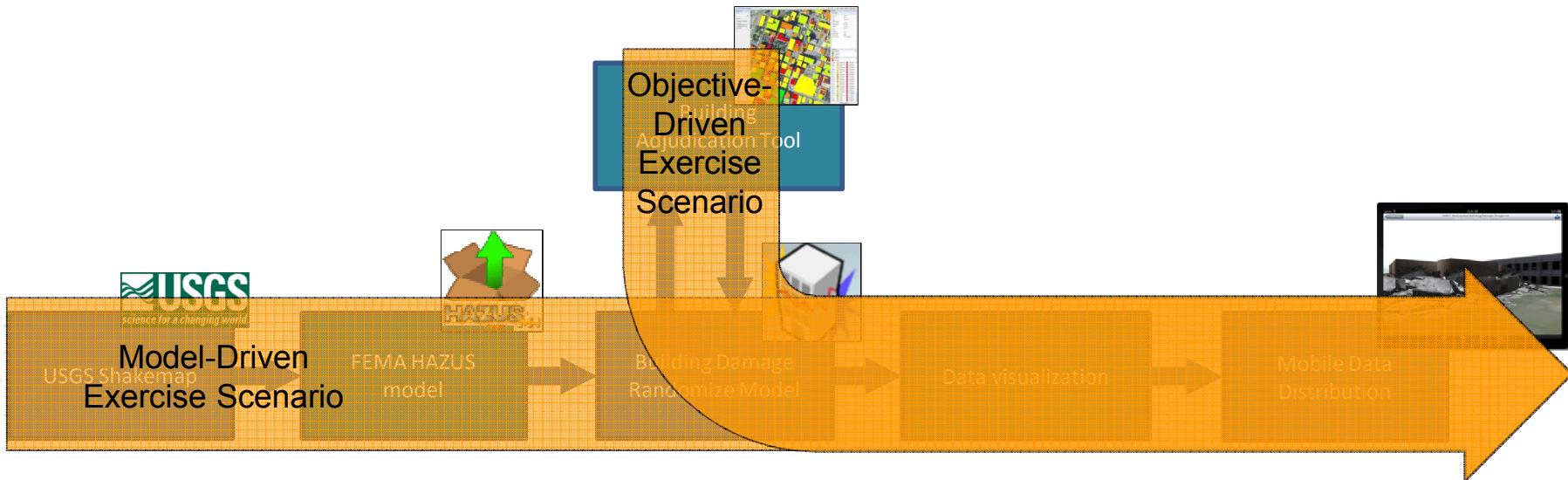
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Beyond NLE: M&S in National Exercise Doctrine



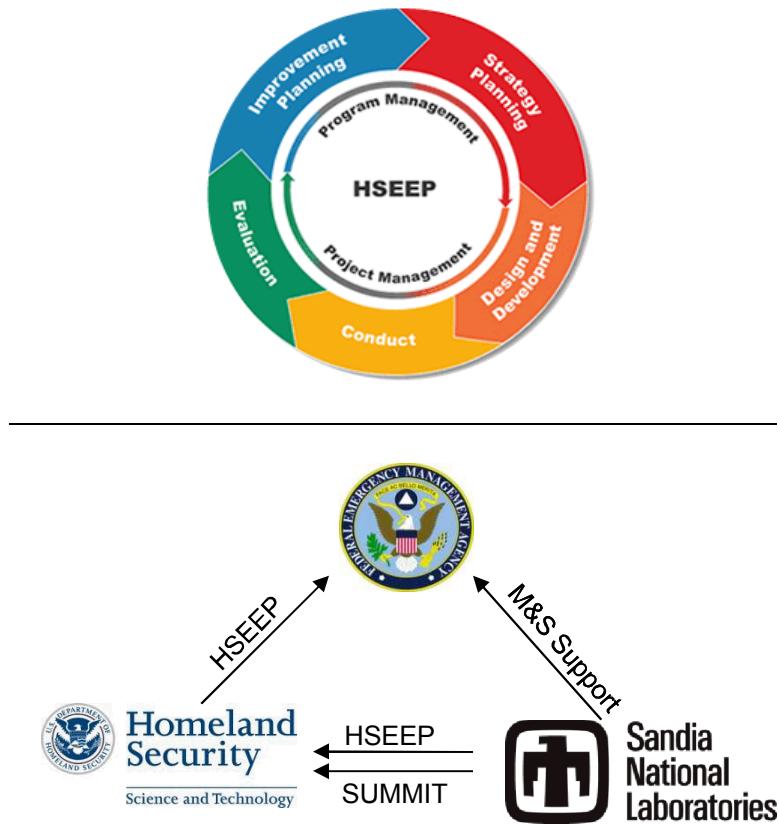
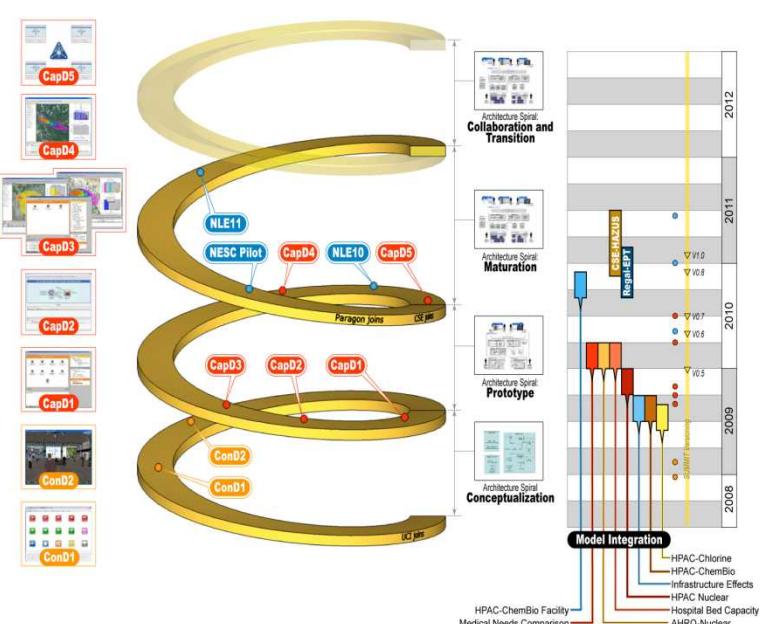


Operational Component Culture Change



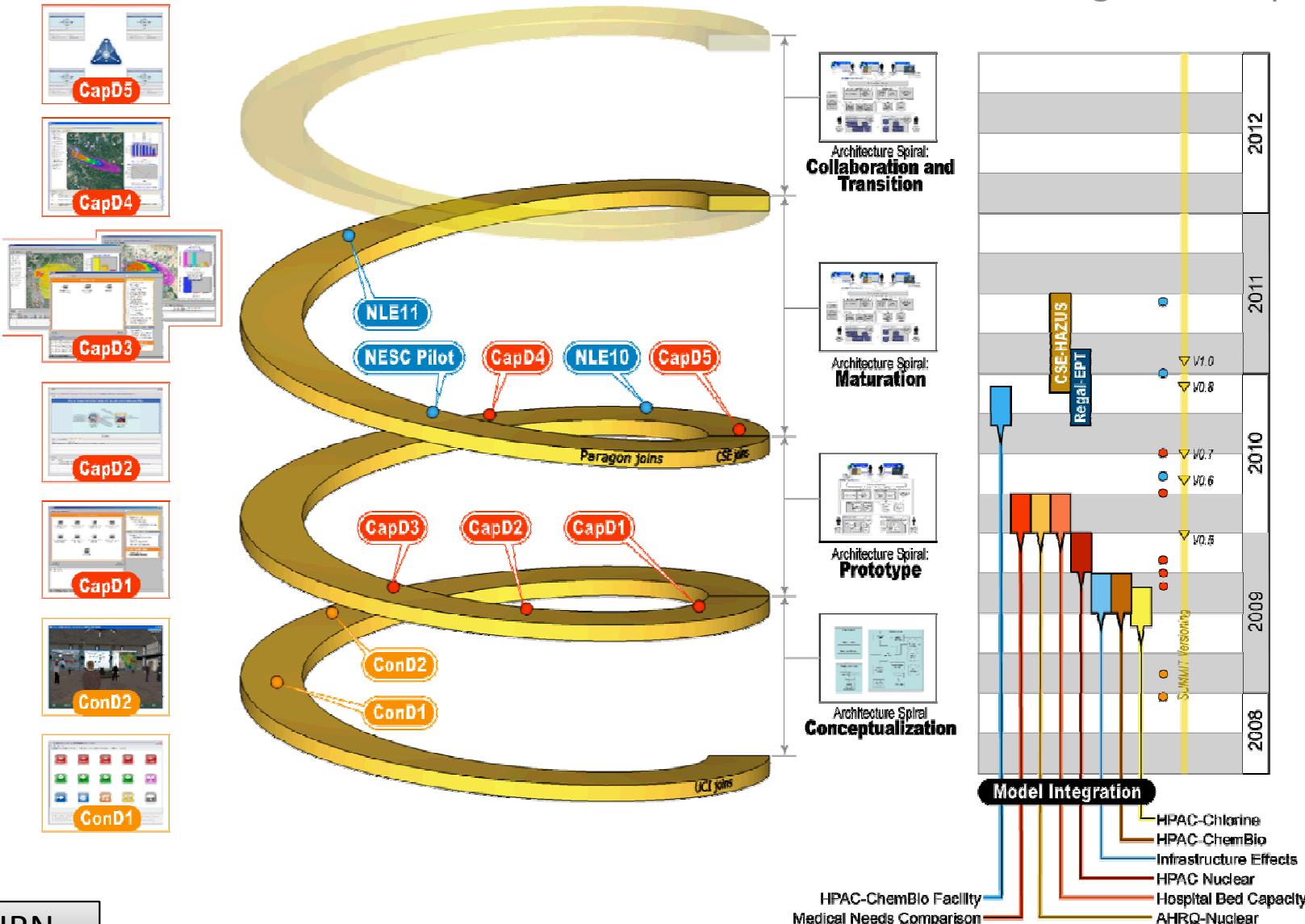
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Transition Path



IMMS CURRENT EXECUTION

Program Components



RETURN

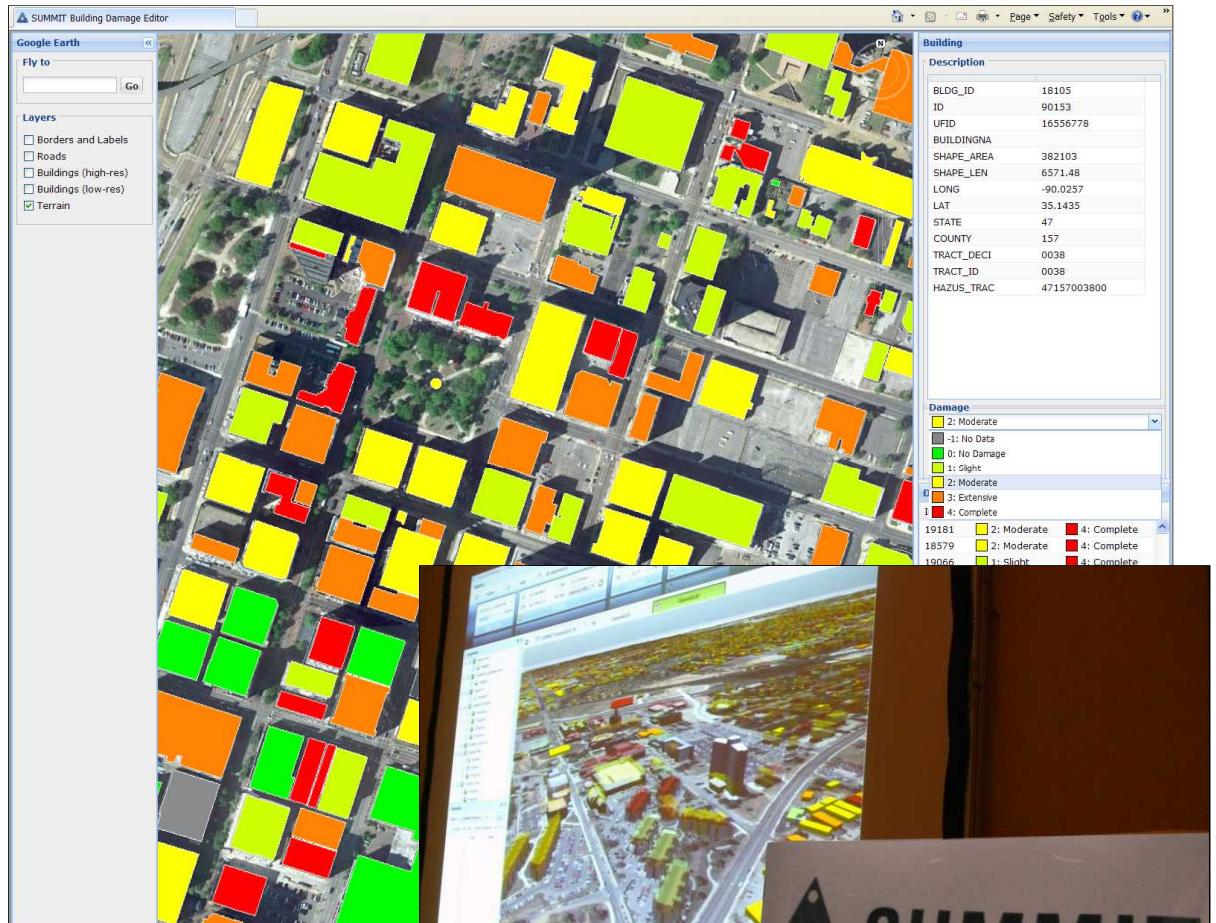
SUMMIT's Scenario Adjudication Tool allowed state and local planners to refine scenario

SUMMIT generated individual building damage states, based on HAZUS results.

Individual building damage states were modified by planners to support exercise objectives.

Tool was piloted in locations with shaking severity (MMI) > VI and populations > 25,000.

Pilot is complete. Adjudicated data became part of ground truth (used in Master Control Cell), and tool became a building damage viewer.



Master Control Cell



SUMMIT Team showing building collapse data to ESF 9 (Urban Search & Rescue)



Jalal Mapar (DHS S&T) and Keith Holtermann (FEMA NED Director)
discussing SUMMIT with Richard Serino (FEMA Deputy Administrator)

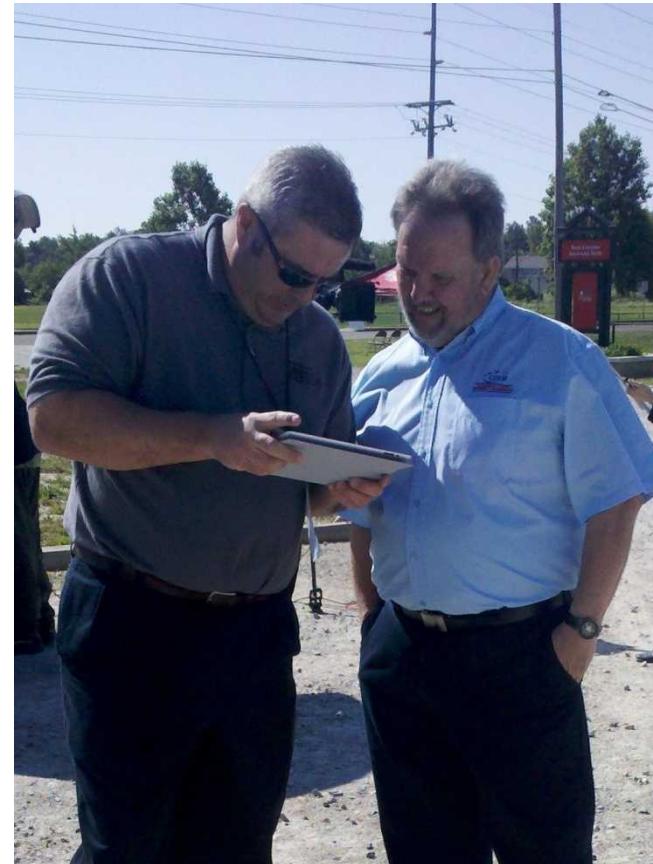
Jonesboro, Arkansas



Discussing the iPad capability with National Guard members



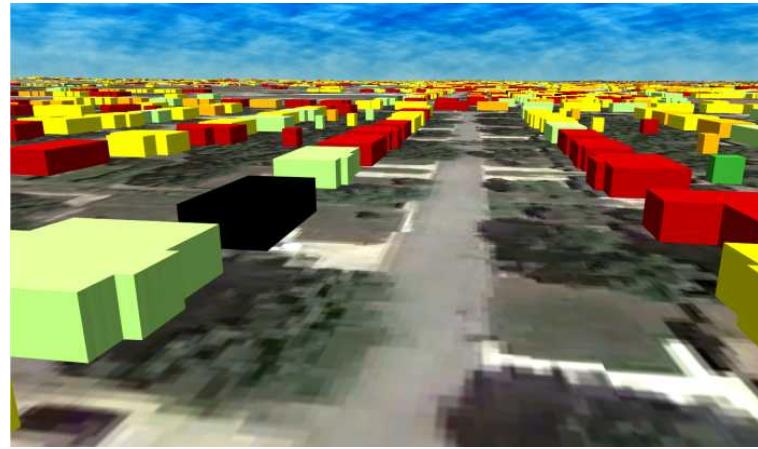
David Moore (Craighead County emergency management director) using iPad visualization capability



Demonstrating iPad capability with David Moore (Craighead County emergency management director)

Building damage in SUMMIT virtual environment

Polygon view



Realistic view



Analytical view



SUMMIT Building Damage Visualization

Undamaged



Damaged



SUMMIT Building Damage Visualization

Undamaged



Damaged

