

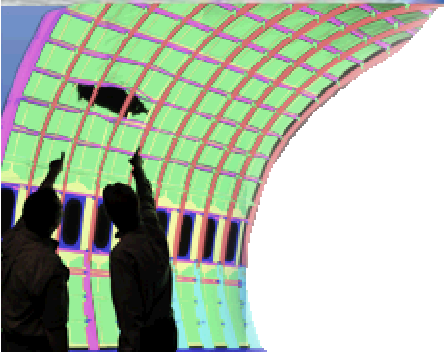


Sandia National Laboratories

1/2012

Standard Unified Modeling, Mapping & Integration Toolkit (SUMMIT)

Katherine Guzman
SUMMIT Team
Sandia National Laboratories



Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.



SUMMIT Background



The White House
President George W. Bush

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

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Office of the Press Secretary
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December 17, 2003 Homeland Security Presidential Directive/Hspd-8

Subject: National Preparedness

emergencies.

(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

SEC. 664. NATIONAL EXERCISE SIMULATION CENTER.

The President shall establish a national exercise simulation center that—

(1) uses a mix of live, virtual, and constructive simulations to—

- (A) prepare elected officials, emergency managers, emergency response providers, and emergency support providers at all levels of government to operate cohesively;
- (B) provide a learning environment for the homeland security personnel of all Federal agencies;
- (C) assist in the development of operational procedures and exercises, particularly those based on catastrophic incidents; and

(D) allow incident commanders to exercise decision-making in a simulated environment; and

(2) uses modeling and simulation for training, exercises, and command and control functions at the operational level.



NESC Business Model

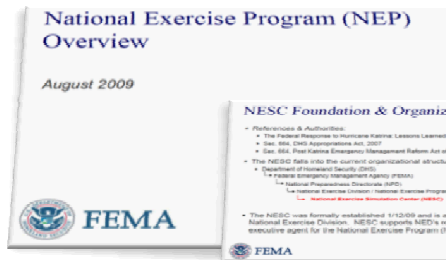


Incident Management

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)

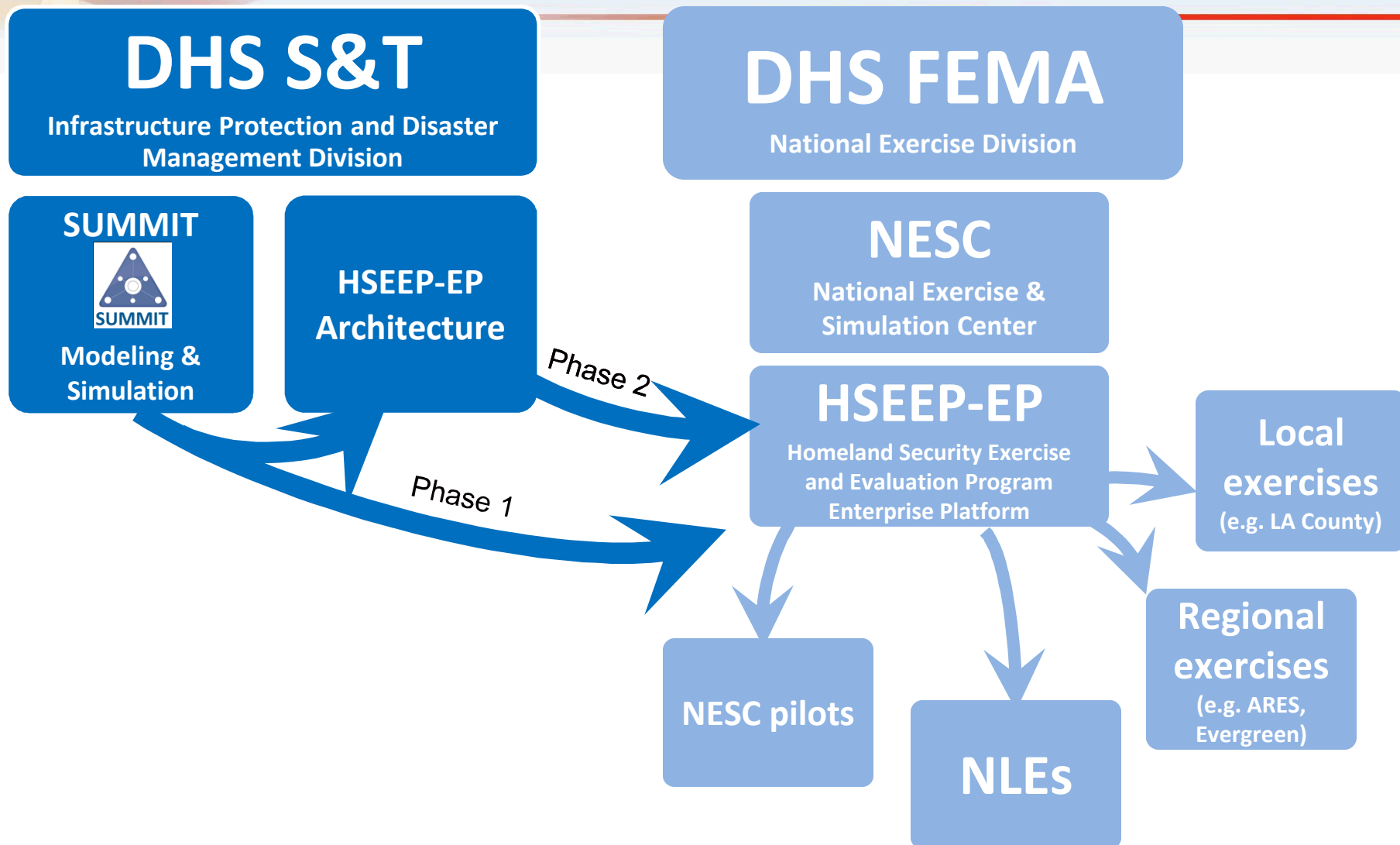


February 18, 2010 8

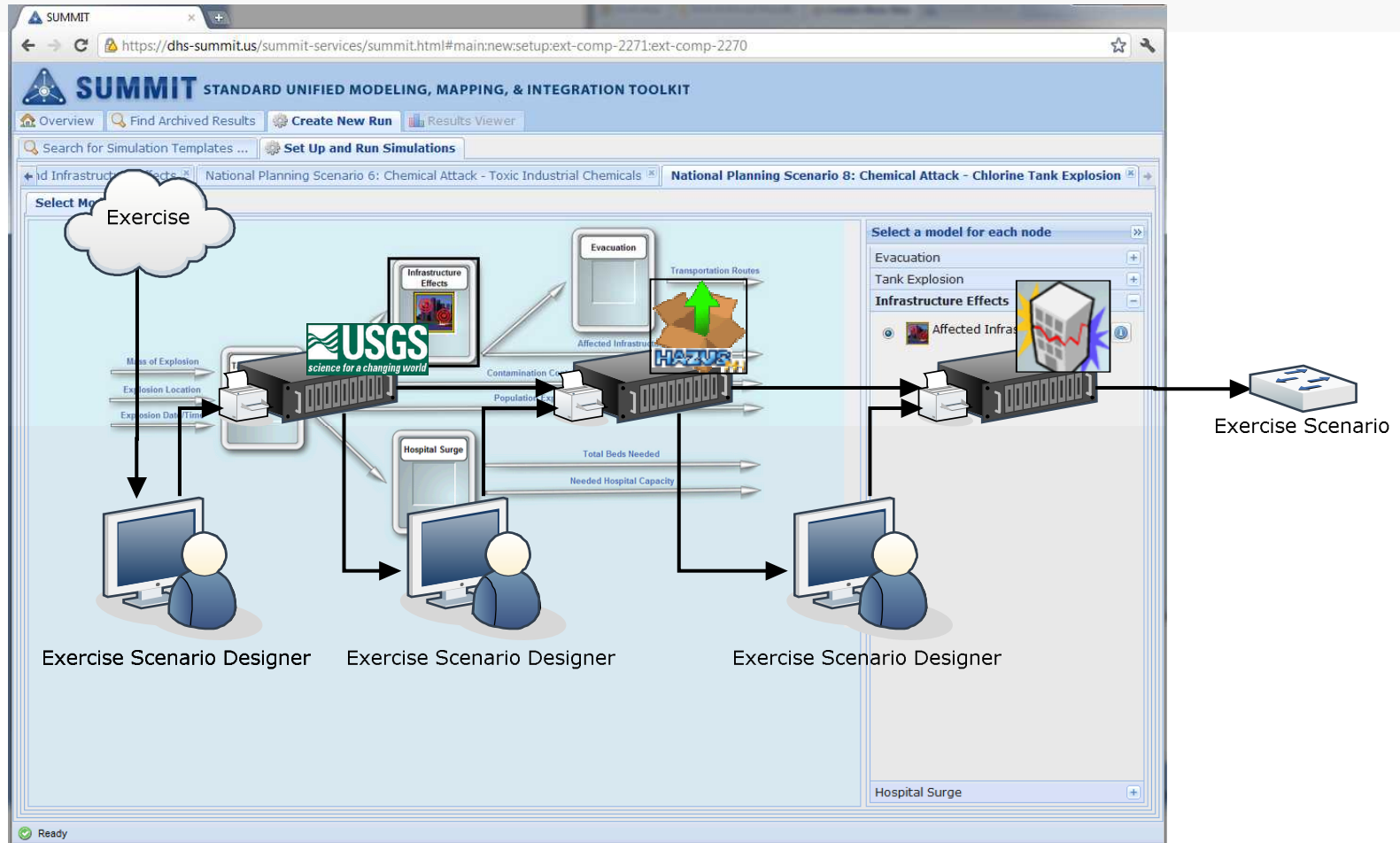


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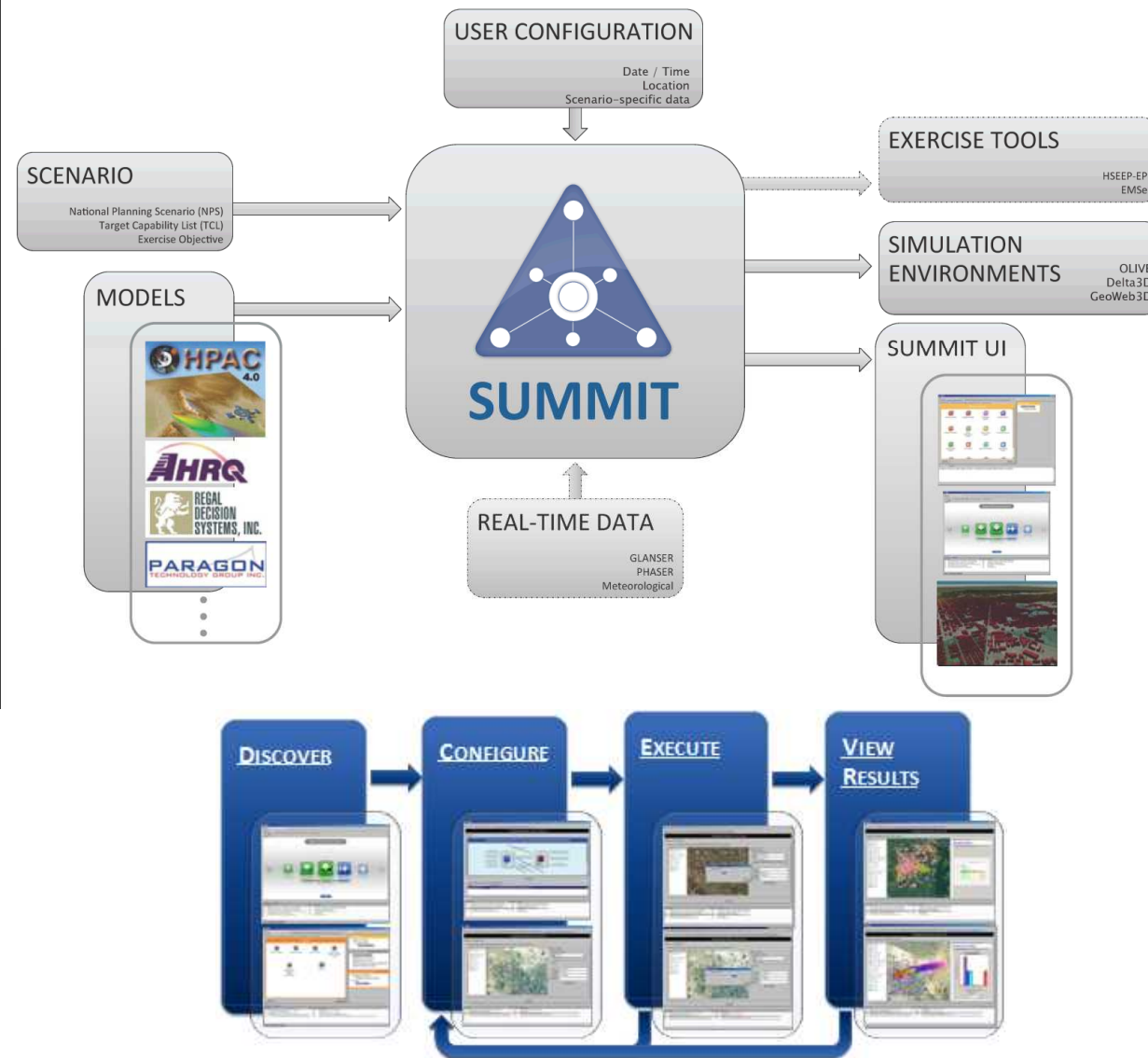
Development and Transition Path for Standard Unified Modeling, Mapping & Integration Toolkit (SUMMIT)



Capability Gap



SUMMIT Components

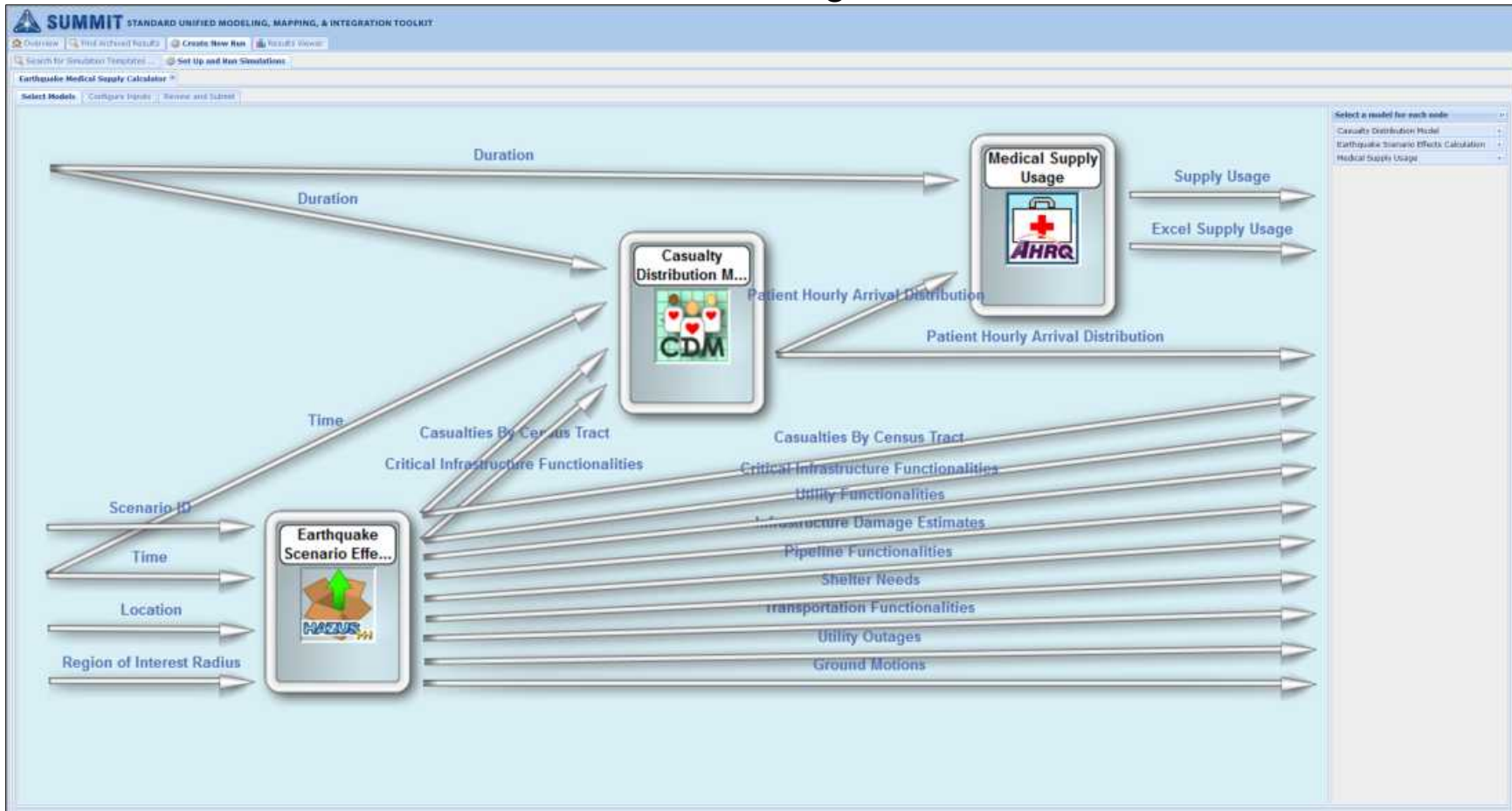


Mission Need:

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.

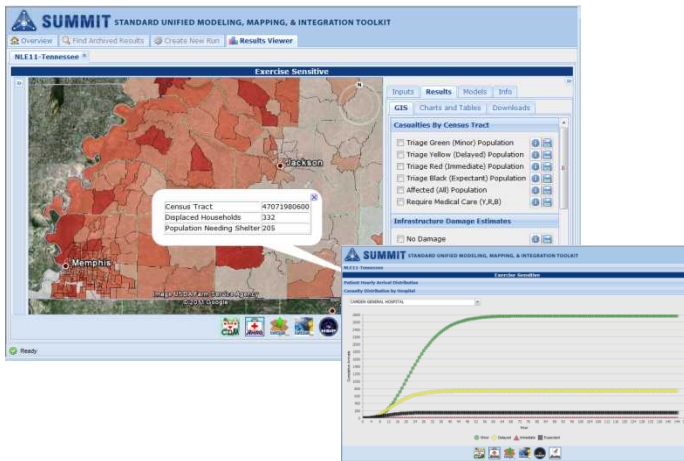
SUMMIT architecture links models in a flexible manner

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

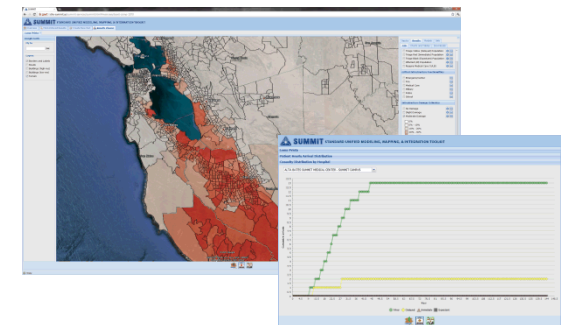


SUMMIT architecture supports geo-agility/scenario re-use

NLE11 Earthquake Scenario



Loma Prieta Scenario



NLE11 Chemical Tanker Scenario



Sweden Chemical Tanker Scenario



SUMMIT is actively supporting end-users in exercises

Seattle, WA July-August 2012
Evergreen Exercise Scenario Support

SUMMIT ground truth data generation and visualization

Salt Lake City, UT April 2012
Utah ShakeOut Exercise Support

SUMMIT ground truth data generation and visualization

Denver, CO November 2012
WARRP Scenario Support

SUMMIT scenario data generation

National Capital Region May 2011

NLE 11 Scenario & Master Control Cell (MCC) Support

SUMMIT ground truth data generation and visualization 3D client- Jonesboro building damage in virtual environment

Jonesboro, AR May 2011

NLE 11 Portable Visualization (iPad) Pilot

iPad - virtual building damage on-scene

Pulaski County (Little Rock), AR; Jonesboro, AR; Shelby County (Memphis) TN, DeSoto County, MS May 2011

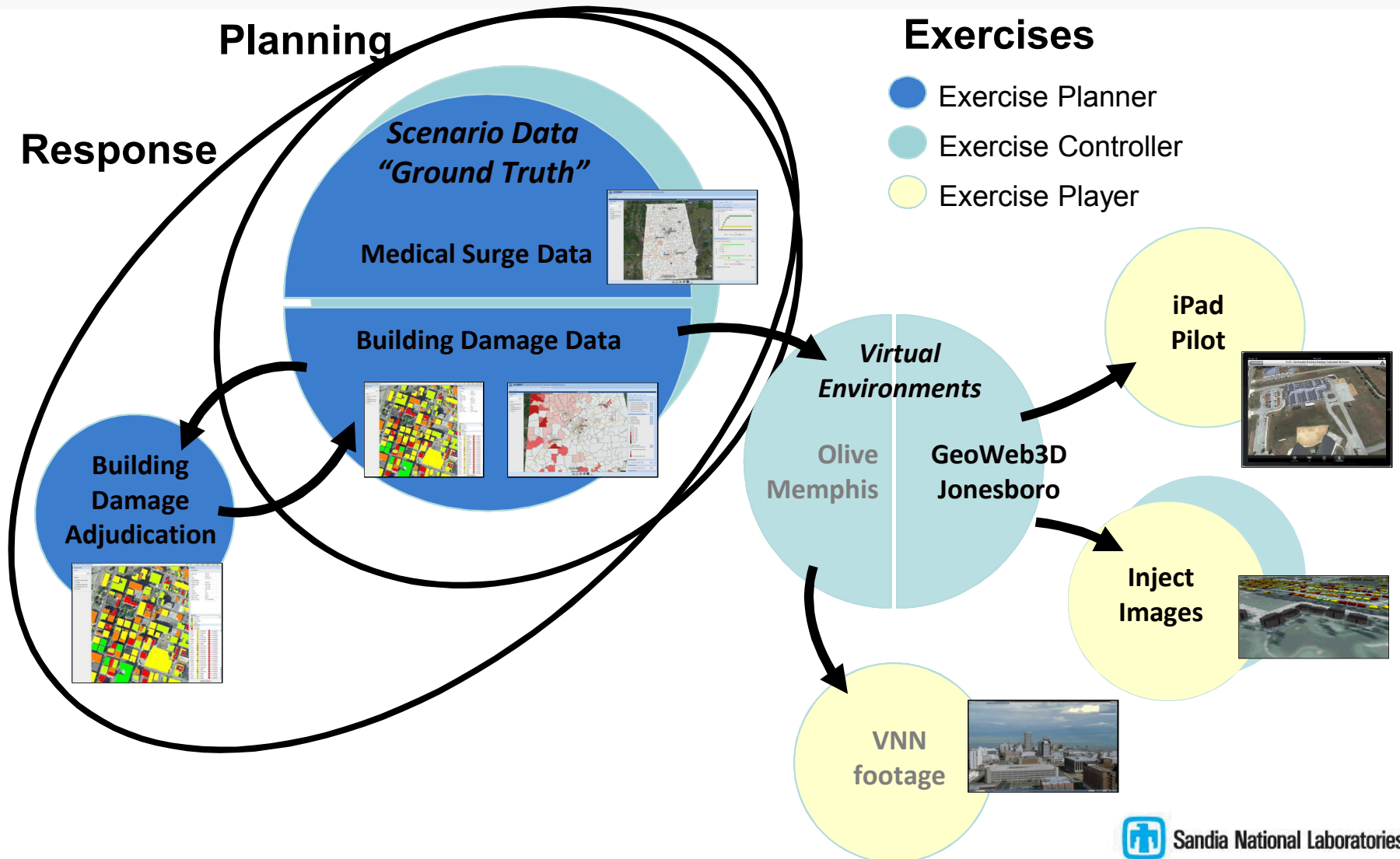
NLE 11 Scenario Adjudication Pilot

Adjudication tool - modification of building damage



SUMMIT provides value across roles and throughout preparedness cycle

Planning → Exercises → Response



SUMMIT Contact Information

SUMMIT Program Manager

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Jalal.Mapar@dhs.gov

DHS Science & Technology

Infrastructure and Disaster Management
Division

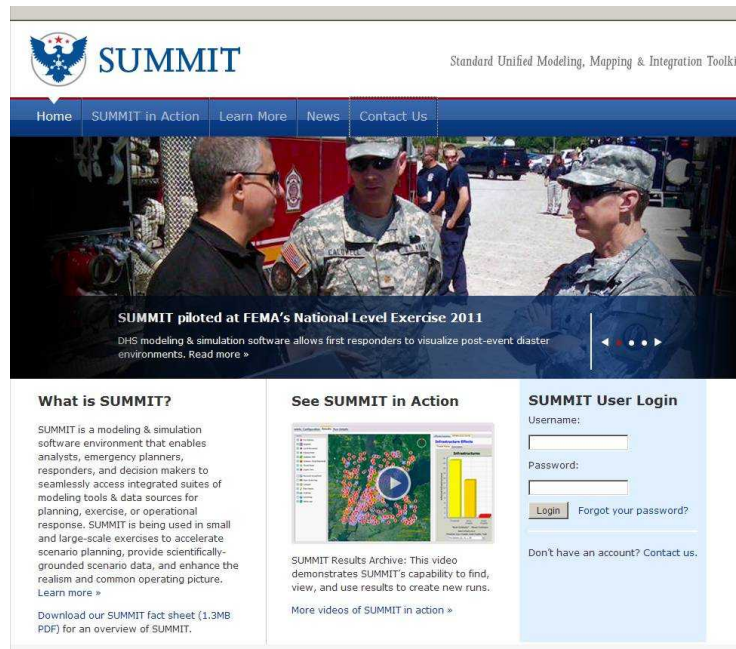
FEMA National Exercise & Simulation Center (NESC)

Justin Legary

Justin.Legary@dhs.gov

DHS FEMA

National Training, Education & Exercise
Division



What is SUMMIT?

SUMMIT is a modeling & simulation software environment that enables analysts, emergency planners, responders, and decision makers to seamlessly access integrated suites of modeling tools & data sources for planning, exercise, or operational response. SUMMIT is being used in small and large-scale exercises to accelerate scenario planning, provide scientifically-grounded scenario data, and enhance the realism and common operating picture. [Learn more »](#)

[Download our SUMMIT fact sheet \(1.3MB PDF\)](#) for an overview of SUMMIT.

See SUMMIT in Action

[SUMMIT Results Archive:](#) This video demonstrates SUMMIT's capability to find, view, and use results to create new runs. [More videos of SUMMIT in action »](#)

SUMMIT User Login

Username:

Password:

[Login](#) [Forgot your password?](#)

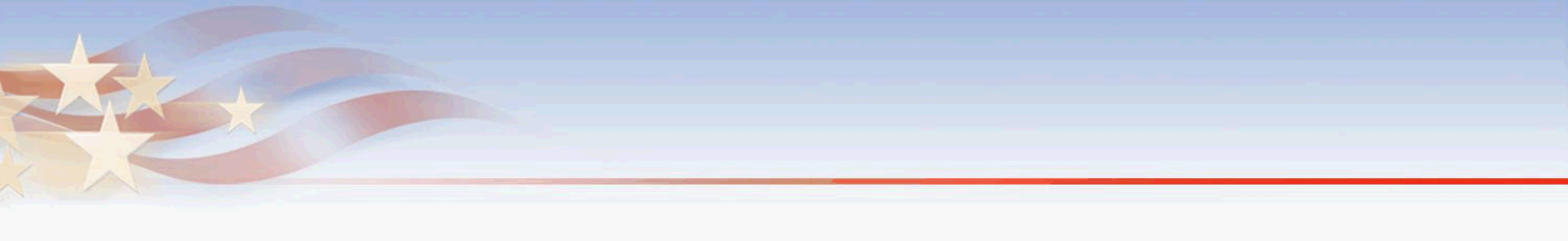
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Sandia SUMMIT Program Manager

Susanna Gordon

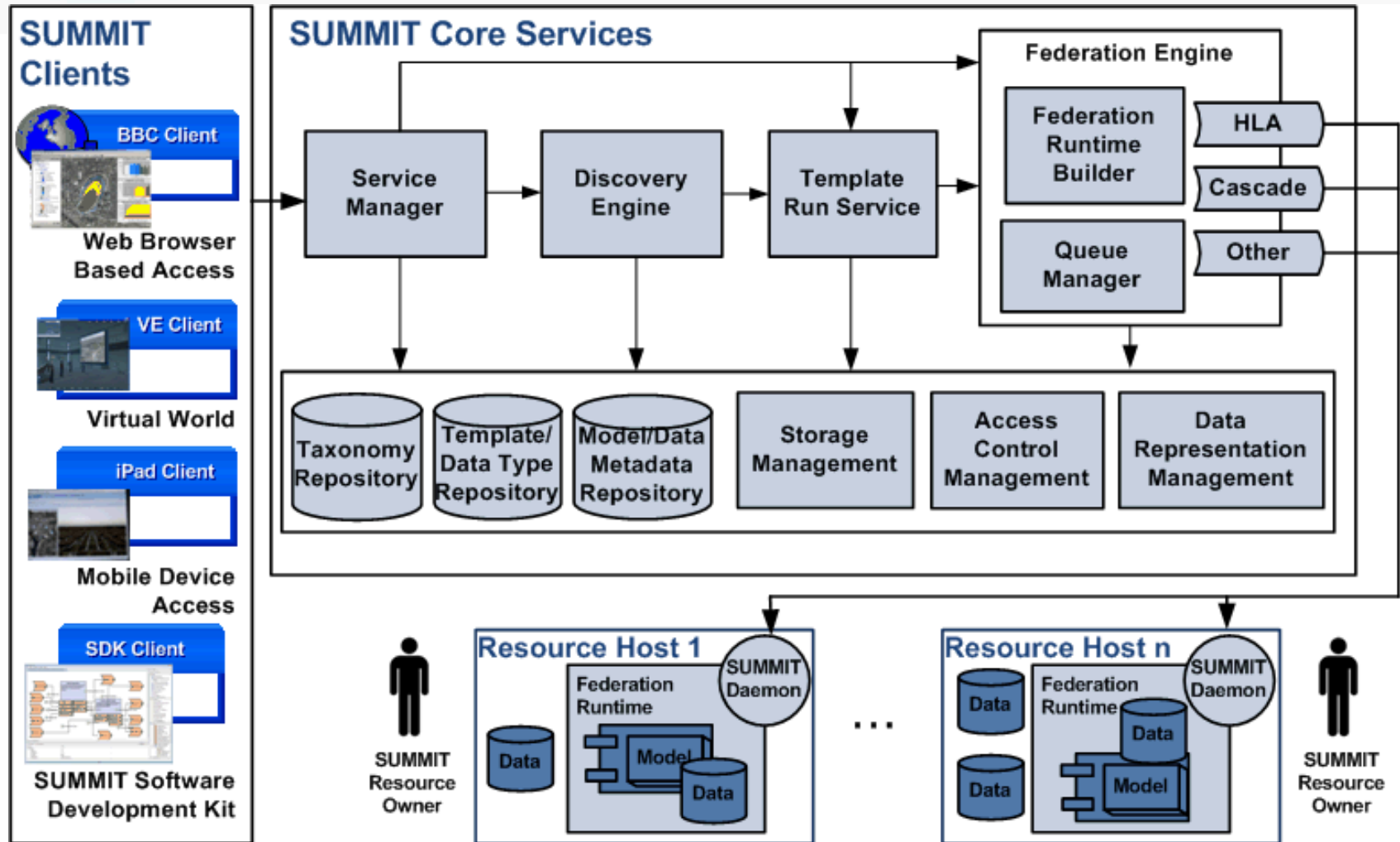
spgordo@sandia.gov

<https://dhs-summit.us>































BACKUP SLIDES

Architecture Overview

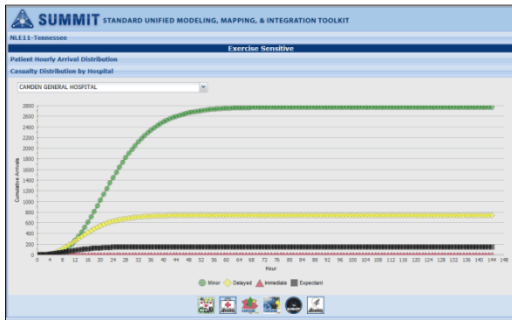




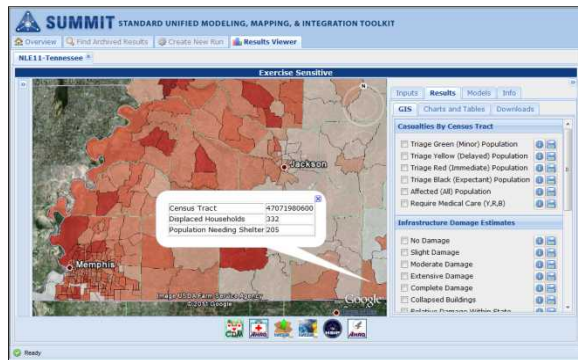
SUMMIT-Supported Exercises

					
		Scenario Support	Data Visualization	Enhanced Realism	Reusability
FEDERAL TIER 1 EXERCISES					
	FEMA National Exercise & Simulation Center (NESC) Pilot				
	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				

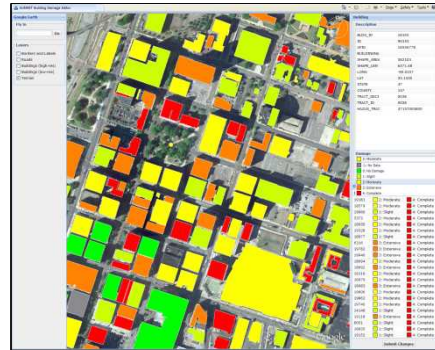
SUMMIT Products Developed for NLE 11



Medical surge needs
(334 hospitals, 8 states)

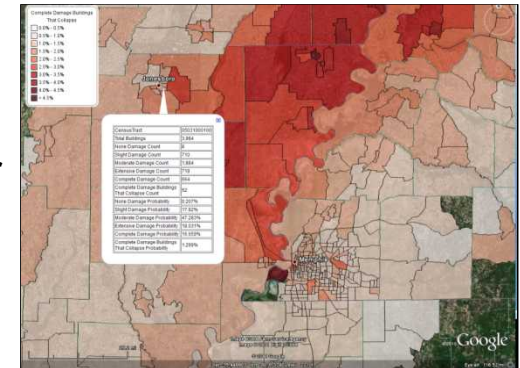


Results Viewer for Trusted Agents
and for Master Control Cell



Building damage
Adjudication Tool for
scenario refinement

Building damage
KML layers for
control,
simulation



Virtual building
damage iPad app



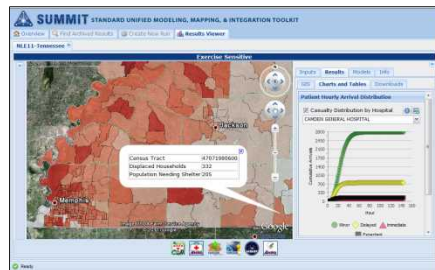
SUMMIT Capabilities Active in NLE11



Planners use SUMMIT to generate and refine scenario data

Linking models to calculate data for scenario

Bridging model-driven scenario with objective-driven scenario



Controllers use SUMMIT to visualize scenario data

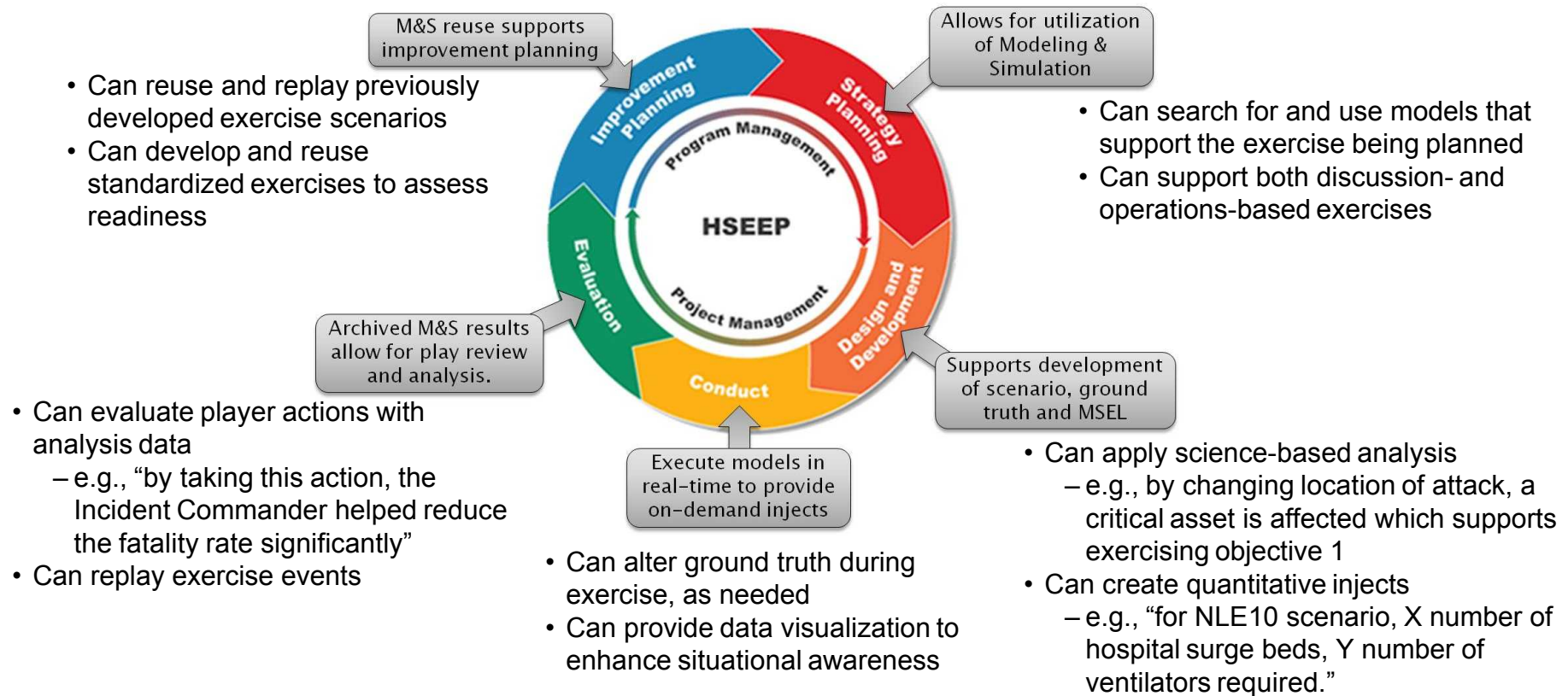
Visualizing model output in 2D (GIS) and with charts/graphs, supporting **common operating picture**



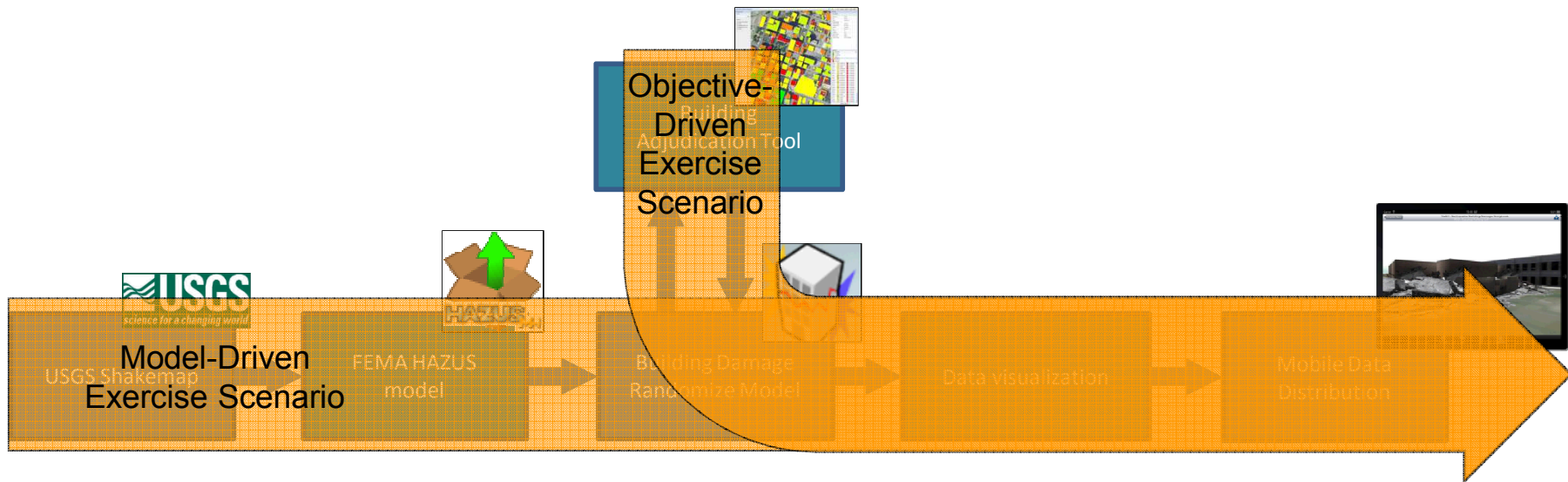
Players use SUMMIT to view scenario data in a virtual world

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

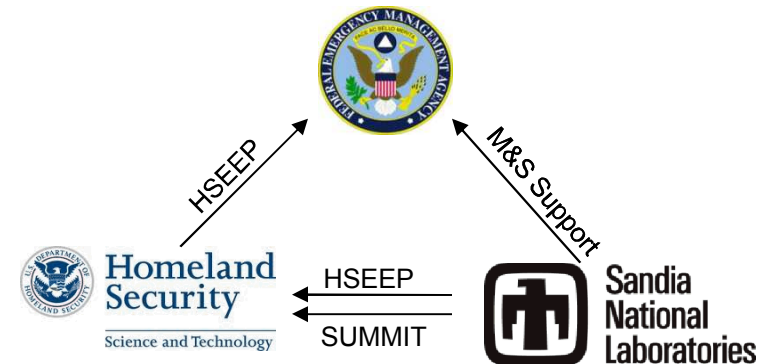
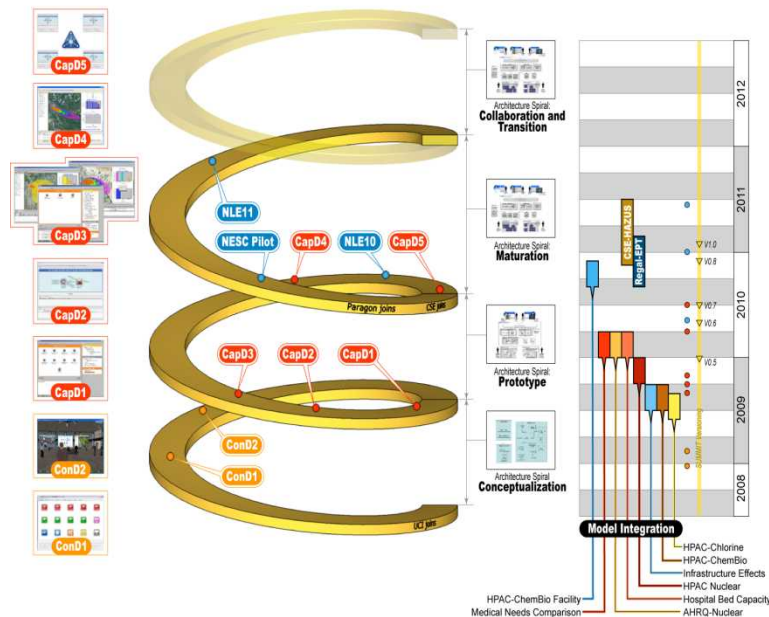
Beyond NLE: M&S in National Exercise Doctrine



Operational Component Culture Change

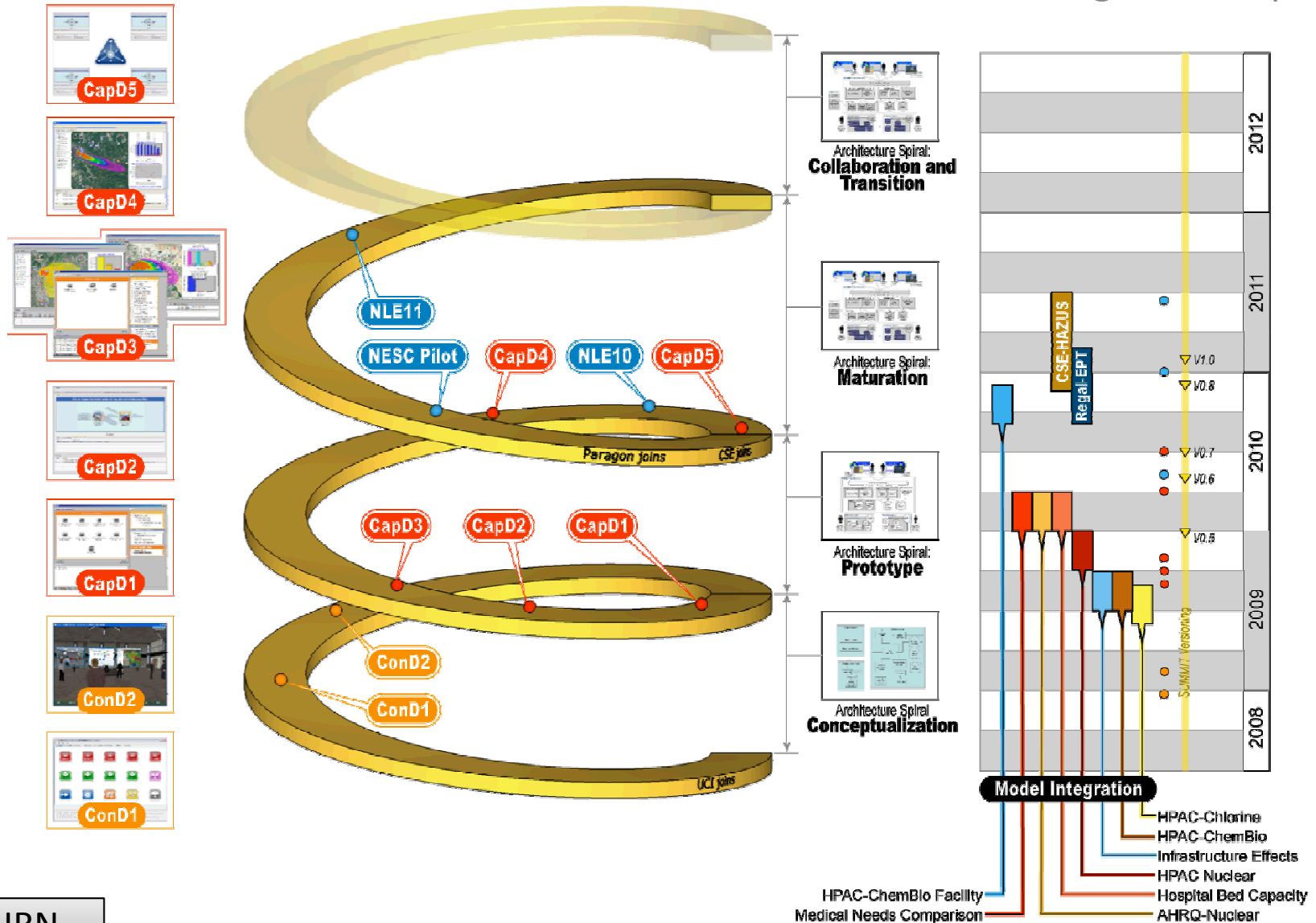


Transition Path



IMMS CURRENT EXECUTION

Program Components



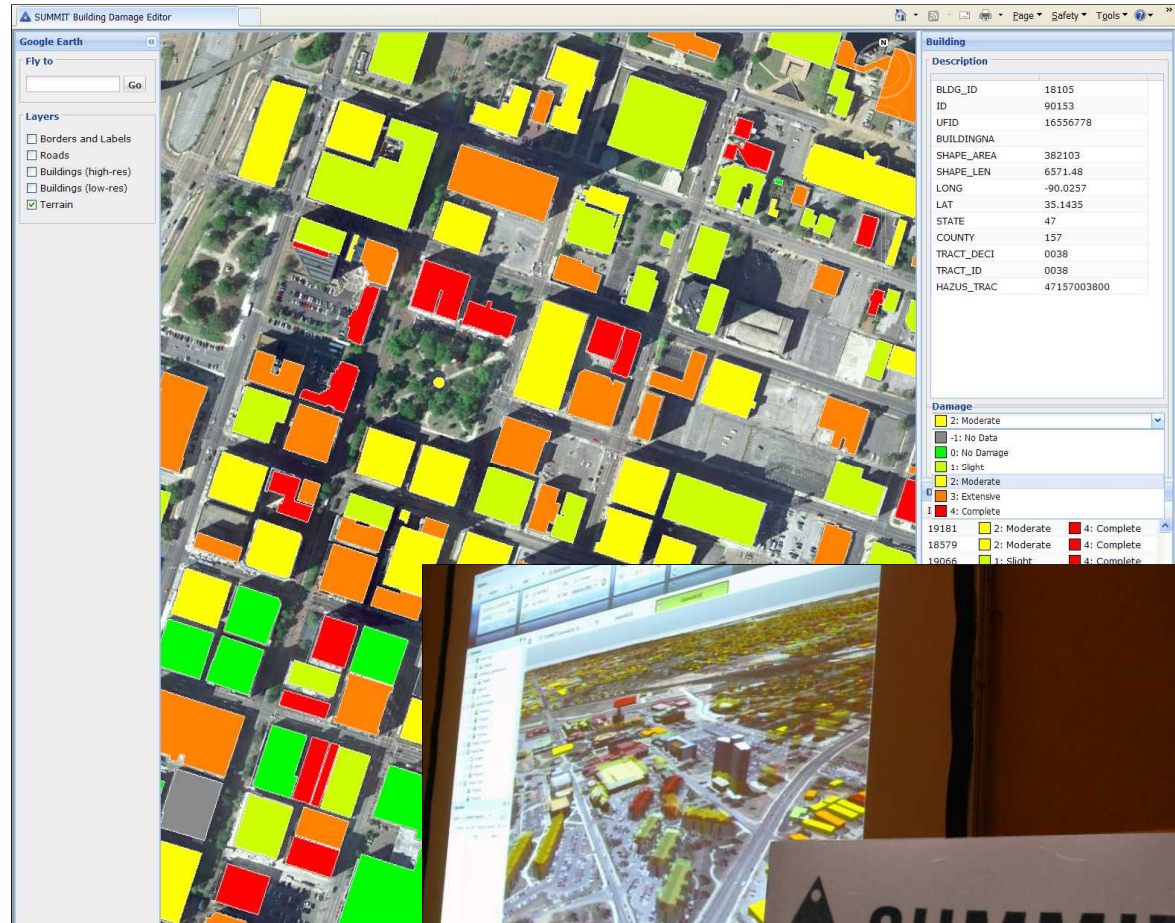
SUMMIT's Scenario Adjudication Tool allowed state and local planners to refine scenario

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)



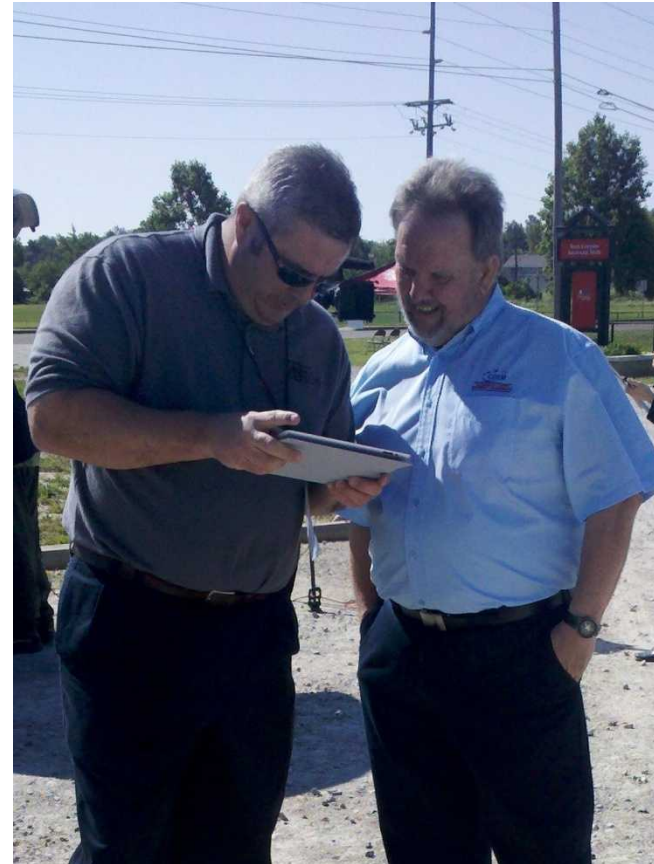
Jonesboro, Arkansas



Discussing the iPad capability with National Guard members



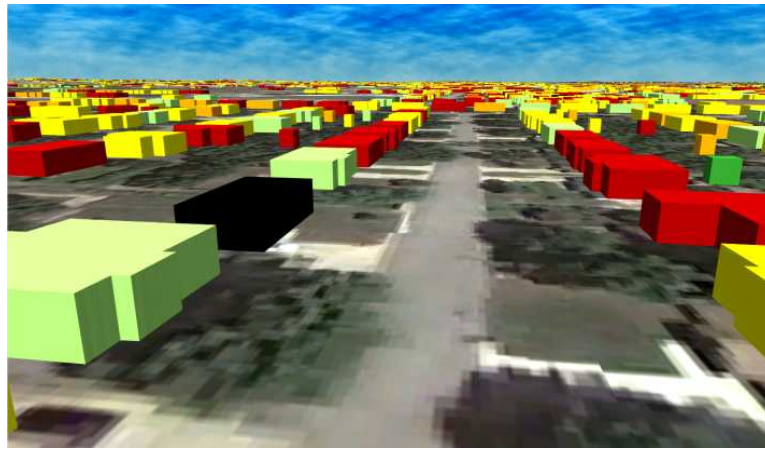
David Moore (Craighead County emergency management director)
using iPad visualization capability



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

