

Supporting a Collaborative Environment for National Level Exercise 2011 (NLE11)

The Integrated Modeling, Mapping, and Simulation (IMMS) program is funded by the Infrastructure Protection and Disaster Management Division (IDD) of the Department of Homeland Security (DHS) Science and Technology (S&T) directorate. DHS S&T has partnered with the Federal Emergency Management Agency's National Exercise and Simulation Center (NESC) to pilot the Standard Unified Modeling, Mapping and Integration Toolkit (SUMMIT), the principal component of IMMS. The NESC is a congressionally-mandated exercise and simulation facility within FEMA Headquarters. The NESC's primary objectives include providing state-of-the-art modeling and simulation capabilities to support national, federal, state, local and tribal exercises.

The IMMS program is enhancing the use of science-based tools for the emergency preparedness and management community. By creating an environment that allows linking of "best-in-class" modeling and simulation (M&S) tools and underlying data, IMMS aims to decrease the time and cost needed to train for, analyze, and respond to real or potential incidents—while increasing preparedness effectiveness.

SUMMIT allows emergency preparedness and management personnel to easily and rapidly discover, integrate, configure, execute, and view the results of the nation's modeling and simulation resources and related data. These resources help ensure a scientific grounding for exercises and other emergency preparedness and management activities, while enabling a dynamic view of fast-moving events that allows for analysis of the "what if" trade-offs that are so crucial to effective response during an actual event. Further, SUMMIT offers M&S tool and data providers a standard mechanism for making their resources widely available, providing the nation greater access to a broad range of exercise planning resources.

Sandia National Laboratories is the primary IMMS performer and principal SUMMIT architect.

Scientifically Grounded, Objective-Driven NLE11 Scenario

SUMMIT offers planners, controllers, and players in NLE11 new ways to view data to create scientifically grounded, objective-driven, and dynamic exercises. In turn, feedback from NLE11 will enable further refinement of SUMMIT's capabilities and value.

Scenario Adjudication: Bridging model- and objective-driven scenario planning

The SUMMIT tool adjudication capability allows exercise planners and controllers to tailor model data to exercise objectives. To create baseline data, SUMMIT linked building damage probabilities by census tract generated by FEMA's HAZUS model to a second model that applies this data randomly to generate the damage states of individual buildings. This effort yielded maps with buildings that are color-coded by damage intensity. Using an online scenario adjudication tool, planners can modify individual building damage states to align with exercise objectives, creating scenarios that are both science-based and objective-driven. In addition, controllers will use adjudicated building damage during



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The SUMMIT scenario adjudication tool enables NLE11 planners to view and modify building damage to align with exercise goals.

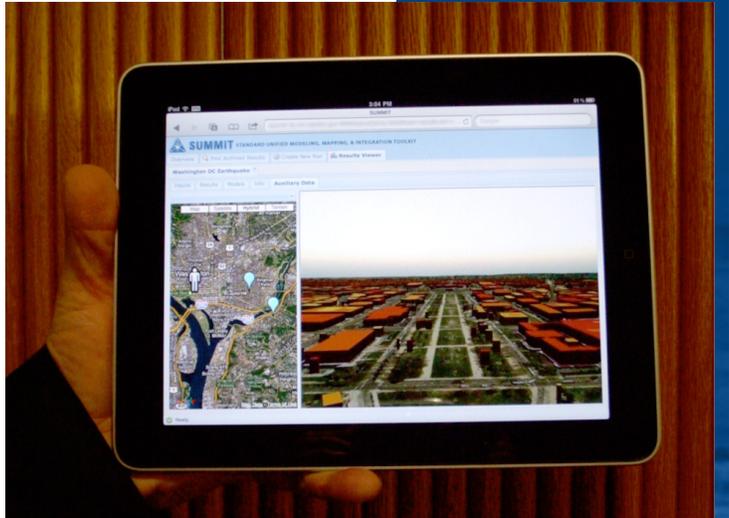
the exercise in the master control cell, to help create a common operating picture. The scenario adjudication tool is being piloted in regions with severe shaking and population greater than 25,000, for which building information was available.

Scenario Data Generation: Linking models to create end-to-end scenarios

For NLE11, SUMMIT will also demonstrate the ability to link models to create comprehensive scenarios. Specifically, it has linked HAZUS casualty outputs to a casualty distribution model and the AHRQ Hospital Surge Model. This linking led to distribution of casualties over time to the nearest undamaged hospitals; calculation of medical staffing and supply needs; and development of the hospital census for all hospitals and medical centers receiving casualties in the eight states participating in NLE11. Medical surge data, a critical portion of the NLE11 end-to-end scenario, will be used by planners before the exercise and controllers in the master control cell during NLE11.

Enhanced Scenario Visualization: Heightened realism for players

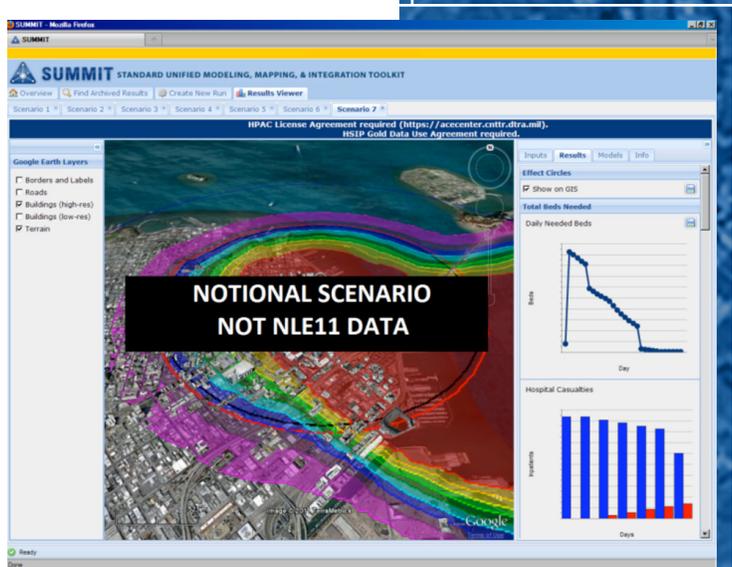
Players—damage assessment teams—will view building damage data (from the adjudicated scenario) in a 3D environment on a portable device (iPad). This enhanced virtual view of damage available to players in the field will explore the potential of next-generation exercise capabilities in creating realism and a common operating picture for players.



SUMMIT links scenario data to a virtual environment, providing enhanced realism to exercise players.

Enhanced Data Visualization: A common operating view for controllers

SUMMIT contains a results viewer that allows exercise controllers to visualize all SUMMIT-linked data, and SUMMIT can output data suitable for other viewers, such as virtual environments. In NLE11, controllers will view HAZUS outputs, medical surge model outputs, and adjudicated building damage in a combination of 2D (GIS), 3D, and charts/graphs. This capability allows all of the controllers to have a common view of the scenario data, facilitating communication and consistency in exercise conduct.



Enhanced data visualization capabilities offer controllers a means to create a common operating view, facilitating communication and consistency during NLE11.

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