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SUMMIT: models, maps, data, and iPads in NLE 11

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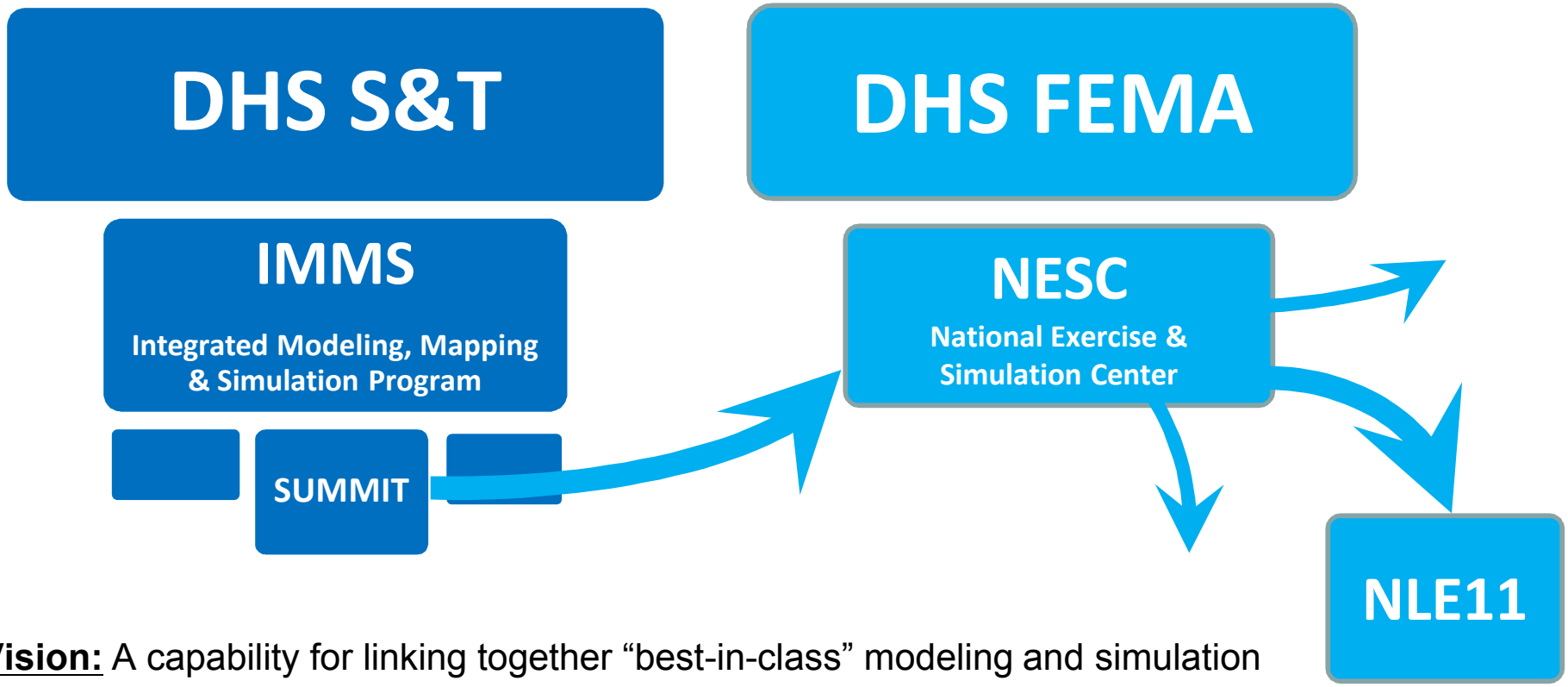
Standard Unified Modeling, Mapping, and Integration Toolkit (SUMMIT)



Vision: A capability for linking together "best-in-class" modeling and simulation tools to enable analysts, emergency planners, and incident managers more effectively, economically, and rapidly prepare, analyze, train, and respond to real or potential incidents.

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SUMMIT support objectives for NLE 11

1. Provide model-based scenario data to exercise planners in scenario development process.

2. Provide a capability to view integrated modeling and simulation results to enhance situational awareness and the common operating picture in the Master Control Cell during exercise conduct.

3. Inform system requirements of future modeling and simulation capabilities for exercise support.

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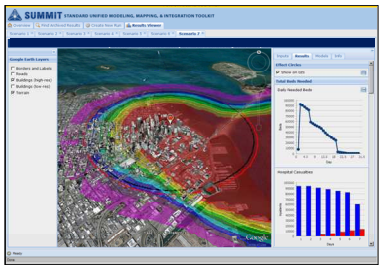
SUMMIT's next-generation exercise capabilities



Planners used SUMMIT to generate and refine scenario data

- Linked models to calculate data for scenario
- Brought model-driven scenario with objective-driven scenario

Controllers used SUMMIT to visualize scenario data

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

Players used SUMMIT to view scenario data in a virtual world

- Introduced next-generation immersive visualization tools for exercises

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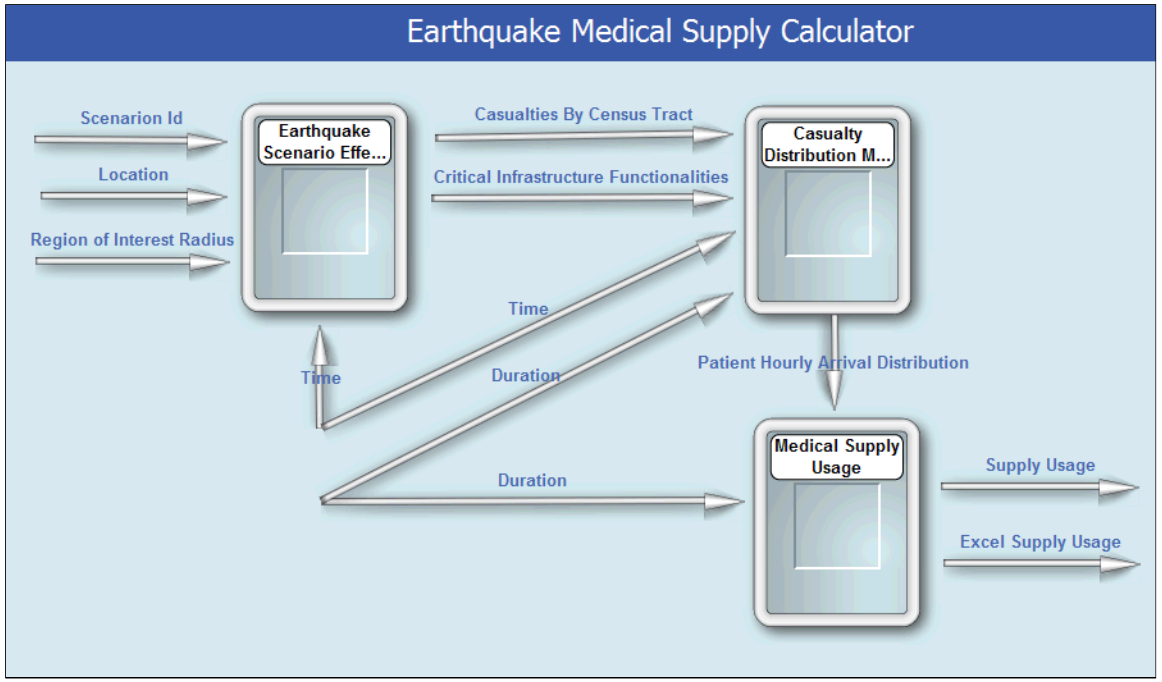
SUMMIT used to generate medical surge data for scenario

- SUMMIT linked HAZUS outputs to a casualty distribution model and AHRQ Hospital Surge Model.
- Casualties from HAZUS were distributed over time to nearest undamaged hospitals. AHRQ Hospital Surge Model calculated medical needs (staffing, supplies, hospital census).



- Medical surge data was part of the scenario and was used by controllers during exercise conduct.
- Medical surge data can be calculated for all hospitals and medical centers receiving casualties.

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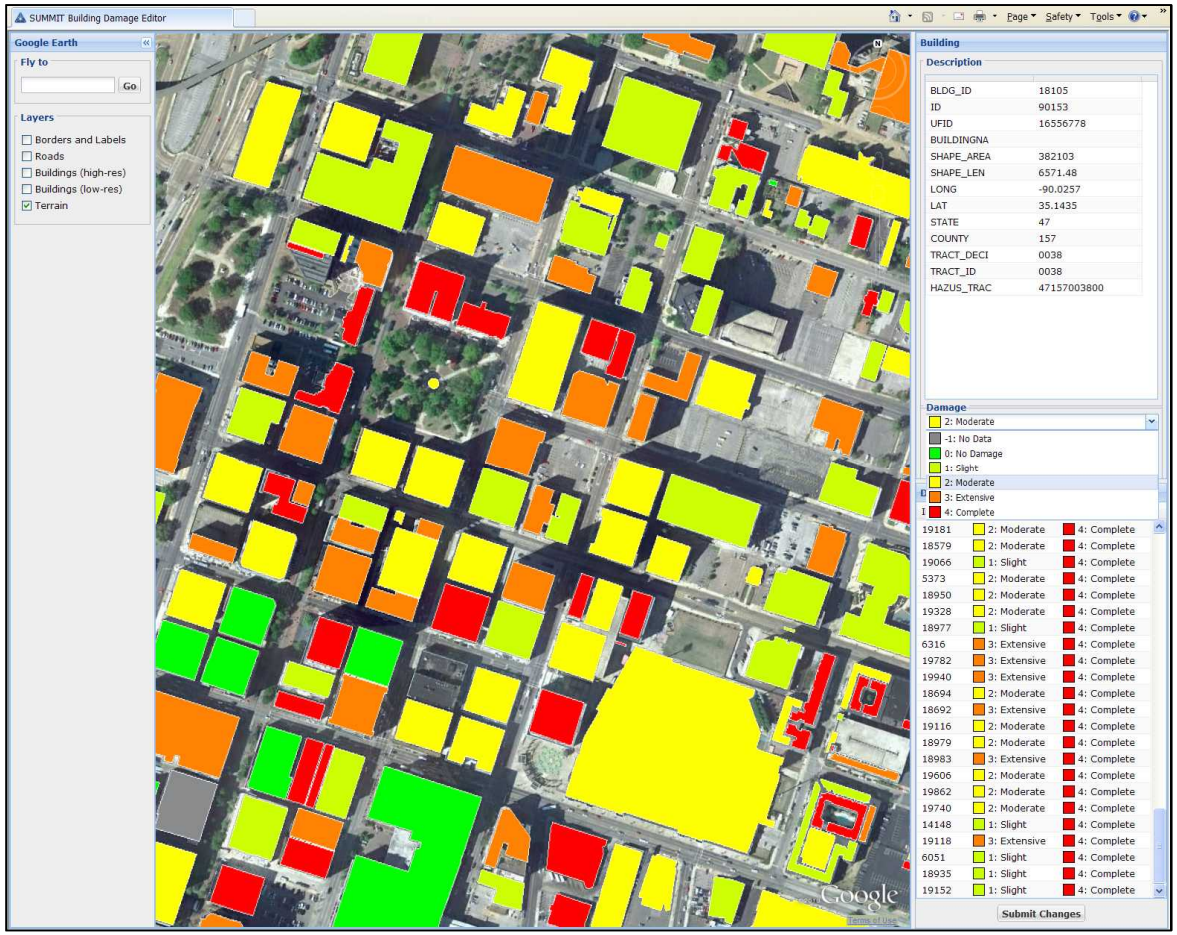
SUMMIT's building damage adjudication tool used to refine NLE 11 scenario

- SUMMIT generated individual building damage states, based on HAZUS results.
- Individual building damage states were modified by planners to support exercise objectives.
- Adjudicated building damage was used in MCC during exercise conduct.
- Tool was piloted in locations with shaking severity (MMI) > VI and populations > 25,000.



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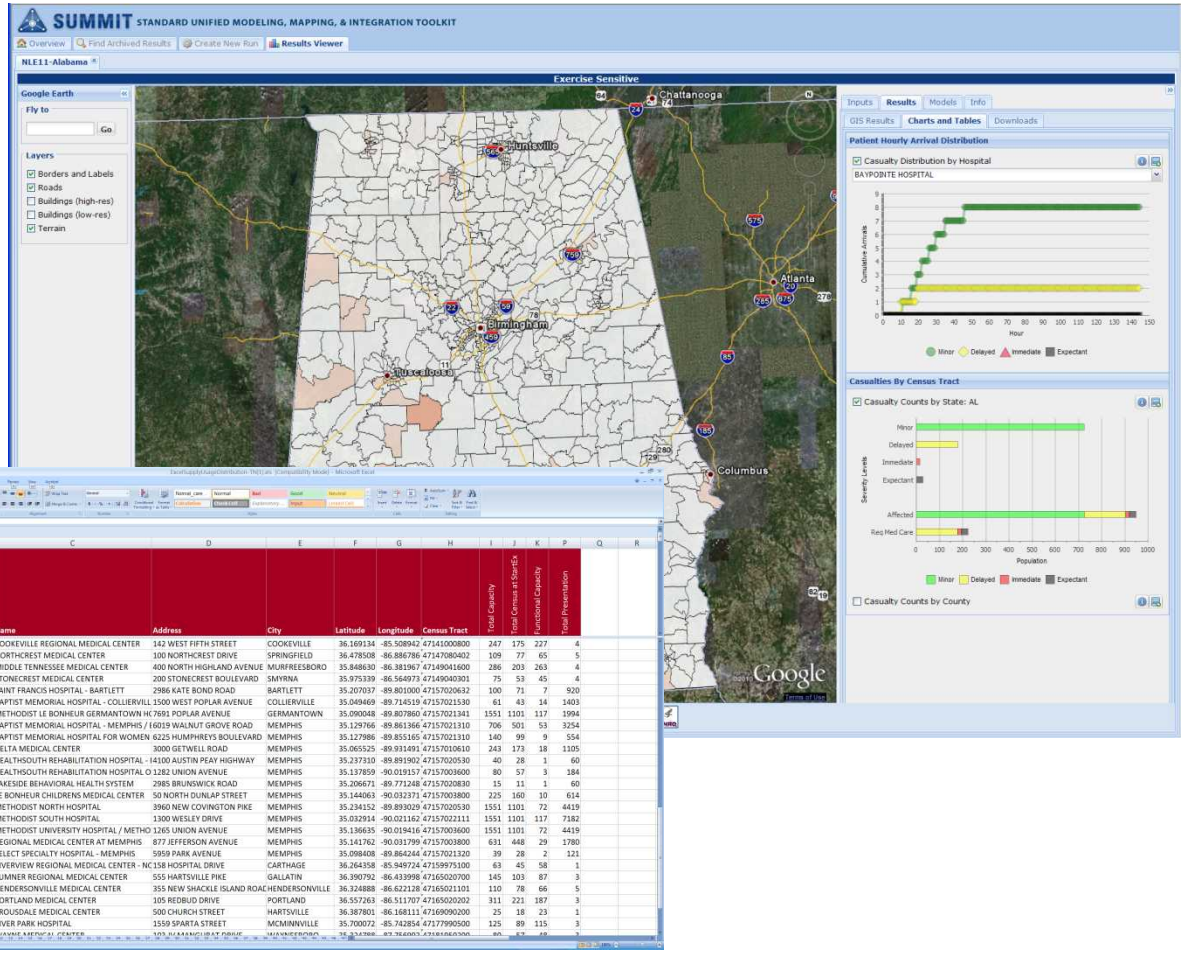
SUMMIT was used to visualize damage and medical surge data

- The SUMMIT results viewer displayed model output in 2D (GIS) and as charts and graphs.
- HAZUS and medical surge data was viewed in SUMMIT for all participating states in the MCC during exercise, which enhanced the common operating picture.



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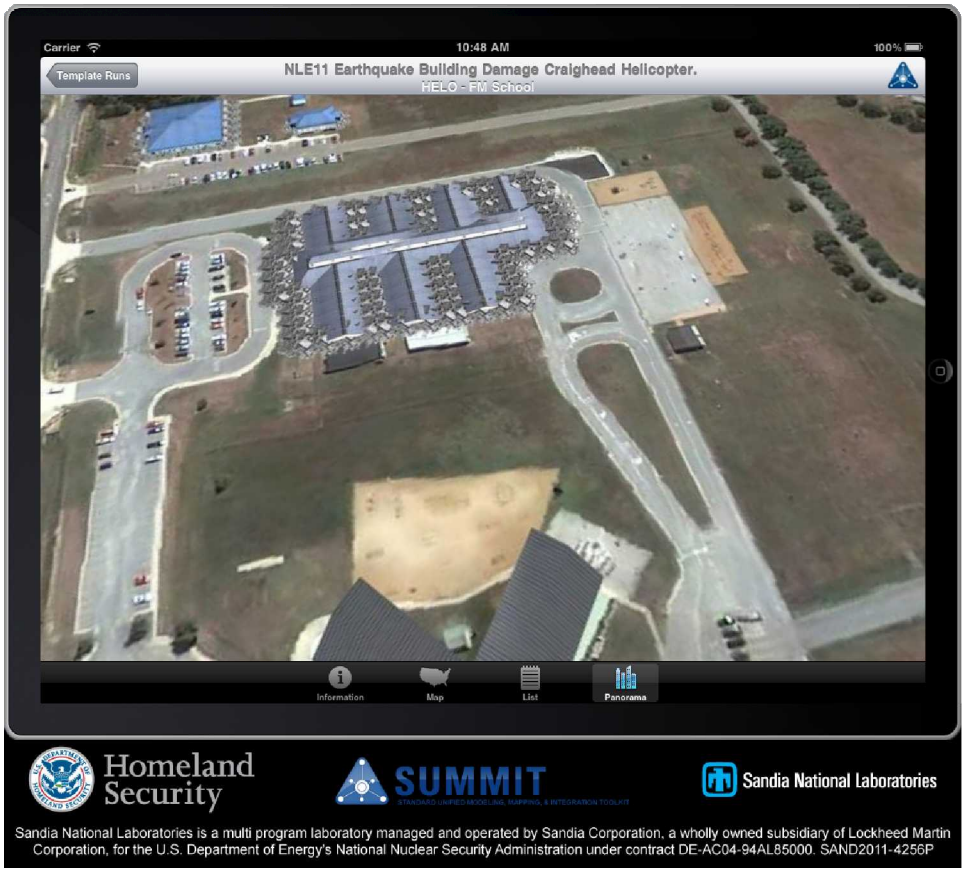
Damage assessment teams used SUMMIT to view virtual building damage in the field

- SUMMIT generated individual building damage states, based on HAZUS results. Building damage was adjudicated with exercise planners.
- Damage data was visualized in a 3D environment and viewed on a portable device (iPad).
- Images of scenario building damage were used by 'boots on the ground' players to inform damage assessments. This virtual view of damage in the field provided enhanced realism to the exercise scenario.



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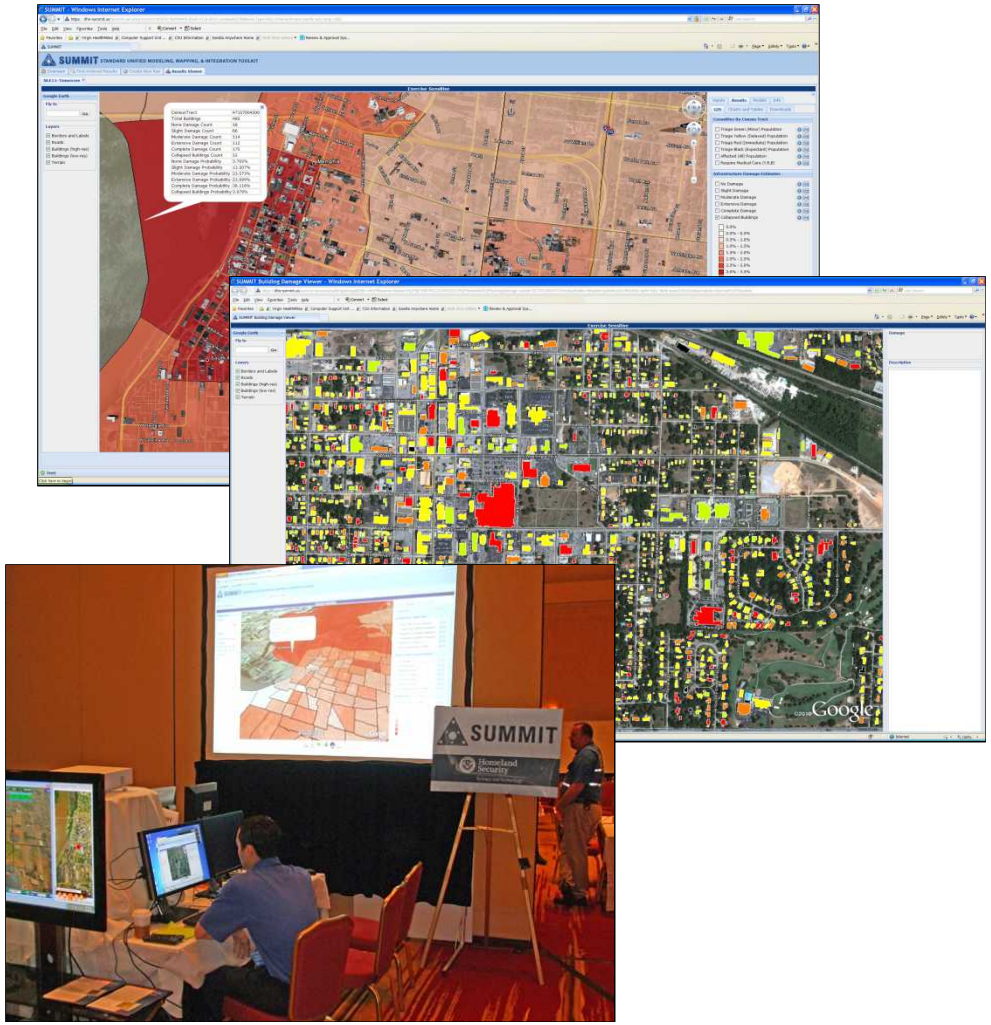
Major strengths: SUMMIT in NLE11

- *New integrated modeling capabilities streamlined scenario data creation for the large number of states and counties participating.*

- *Building adjudication tool effectively bridged the gap between a model-driven scenario and an objective-driven scenario, allowing for model-based scenario data that was adjudicated by exercise planners to meet exercise objectives.*

- *Integrated view of scenario data in the SUMMIT results viewer greatly enhanced the common operating picture for the Master Control Cell.*



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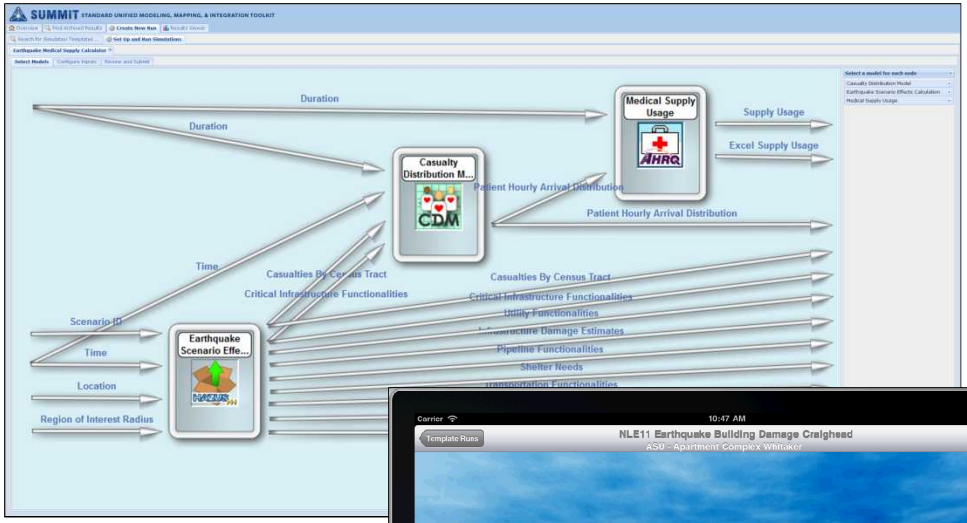
Major strengths: SUMMIT in NLE11

- *NLE 11 earthquake scenario template can be readily re-used building the capability base offered by the NESC.*

- *SUMMIT successfully demonstrated the ability to export model-generated data to external clients, such as virtual environments that visualized the building damage data.*



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SUMMIT lessons learned

***OBJECTIVE 1:* Provide model-based scenario data to exercise planners in scenario development process.**

Lesson Learned	Corrective Action	Timeline
For successful integration of modeling and simulation into an exercise, involvement must occur during initial exercise planning (i.e. C&O, IPC).	• Collaborate with FEMA exercise planners early to identify applications for mod/sim.	3 months Status: FEMA Region 8 using SUMMIT in Utah ShakeOut 2012
Data acquisition, storage, and accessibility is necessary for mod/sim	• Partner with FEMA NESC to develop a mod/sim data strategy.	18-24 months Status: FEMA NESC has initiated strategy development

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SUMMIT lessons learned

***OBJECTIVE 2:* Provide a capability to view integrated modeling and simulation results to enhance situational awareness and the common operating picture in the Master Control Cell during exercise conduct.**

Lesson Learned	Corrective Action	Timeline
To enable full integration in exercise control and evaluation, there is a need to model/ingest player actions and decisions.	• Augment SUMMIT architecture to support interactive modeling that incorporates player actions as well as model interactions.	18 months Status: In development

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SUMMIT lessons learned

***OBJECTIVE 3:* Inform system requirements of future modeling and simulation capabilities for exercise support.**

Lesson Learned	Corrective Action	Timeline
Human in the loop models are needed for conduct.	• Identify human in the loop models that support NLE 12 exercise conduct and/or exercise evaluation.	6 months Status: FEMA NED/NESC will survey NLE 12 stakeholders on mod/sim resources

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Sandia National Laboratories is the principal SUMMIT architect.

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