

A Research Based Approach to Predictive Simulation in Disaster Management

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Abstract

The presentation will describe an innovative collaborative research effort between a university, industry and government agency to research and develop a series of simulation based decision aids. This simulation decision aid, tool, known as SimSeries is designed to be a reliable and research based tool to support decision making and risk mitigation for multiple types of natural and man-made disasters. The first phase of the project objective focus on three areas: (1) Establishment of a theoretically sound framework for a modeling data sources and constructing a series of simulation systems using a hierarchical approach (2) Using this theoretical basis to develop a suite of robust, dynamic simulation tools to support mitigation, training, preparation, and response, and (3) Convert the system into exportable programs that have the ability to interface with existing exercise simulation products. A strong theoretical foundation is critical in the development of SimSeries as this will impact the confidence, accuracy, repeatability and scientific merit associated with the system as well as future models that are constructed using the principles outlined in the methodology.

SimSeries will be used to support states, municipalities, private companies, and federal agencies in disaster mitigation and training. The second phase of our project will focus on ensuring that

the simulations provide the needed information to support preparedness and mitigation strategies. Agent based simulation approach will be used to do optimization for evacuation routes, first aid, agency network coordination, distribution of lifeline utilities and shelters. Creating an environment to simulate near-real time disaster events will be the third phase of our project. The discrete event simulation, predictive models, agent-based modeling, mitigation plans and GIS will be integrated to form the final platform. The presentation provides an overview of the initial phases of the research. The preliminary platforms that have been developed offer a user friendly system that is robust, flexible and provides valuable information to support decision making.

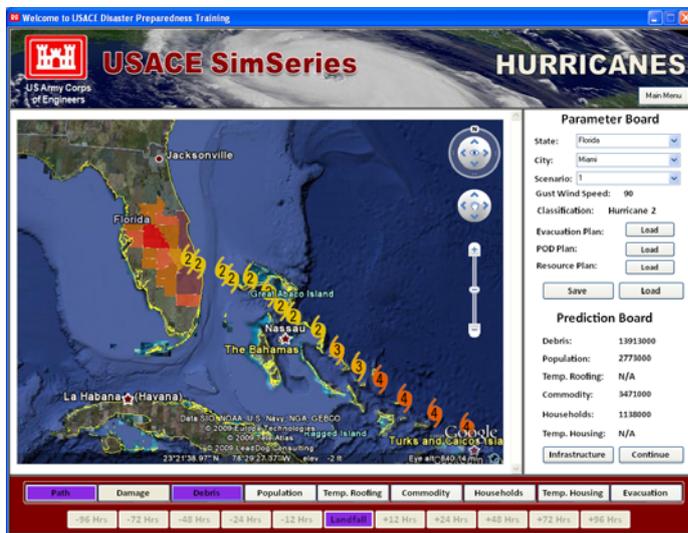


Figure 1. SimSeries Hurricane Impact Prediction

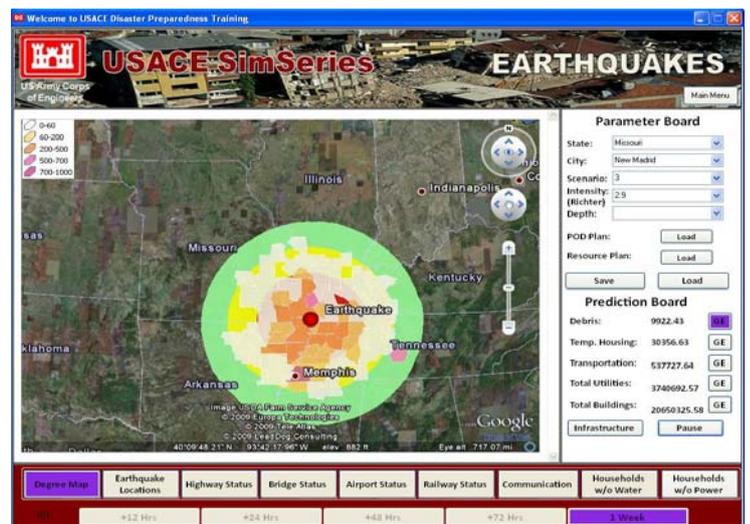


Figure 2. SimSeries Earthquake Impact Prediction