



Transforming the Resilience of Critical Infrastructure Systems and Communities

Resilience Week Objective: A Symposium dedicated to advancing the interdisciplinary dialog on policy and technologies that accelerate critical infrastructure and community resilience to unexpected and malicious threats.

Session 01: Using Detailed Simulation Tools to Support Scenario-Based Analysis

Session Chair

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Session Abstract

Operational resilience, such as in communities and organizations, depend heavily upon interactions between different human, technology, and information domains. Past analytical efforts have exposed dependencies, for example among infrastructure sectors or organizational roles, in turn informing definition of “critical” conditions or functions. However, accurately predicting interactive behaviors among complex systems with different underlying principles (e.g., Multi-physics) requires synchronized “co-simulation,” and there is not yet a suitable substitute for “human-in-the-loop” exercises to expose emergent phenomena and creative responses. Virtual models can lend realism to role-playing exercises, and human interactions provide important feedback in return. Interactive real-time numerical simulations, such as flight simulators and virtual reality games provide realistic experiences for individual role-players, but they typically are limited in context and require significant investment. Military simulation capabilities provide cross-domain and collective interaction, but few communities or organizations could justify the resources needed for such capabilities. Communities and organizations need more accessible approaches to capture diverse, dynamic interactions between changing environmental conditions, engineered systems, and people, in order to broaden capacities to anticipate, respond, recover, learn and adapt.

The proposed panel will explore examples, insights, and emergent techniques for relating computer-based modeling and simulation to scenario-based analyses, especially involving diverse role-players. The anticipated outcome is to strengthen collective understanding and collaborative measures which promote resilience.

Topics

- Existing tools that support operational training and/or exercises with detailed system simulation;
- Experiences involving use of system M&S to support operational analysis;
- Assessment of requirements and key challenges in relating engineering models to collective scenario-based analysis;
- Proposed techniques to create efficient interaction between system models and human-centric exercises.