



Fast Analysis and Simulation Team

The National Infrastructure Simulation and Analysis Center (NISAC) a program under the Department of Homeland Security's (DHS) Infrastructure Protection/ Risk Management Division (IP/RMD), provides advanced modeling and simulation capabilities for the analysis of critical infrastructures, their interdependencies, vulnerabilities, and complexities. These capabilities help improve the robustness of our nation's critical infrastructures by aiding decision makers in the areas of policy analysis, investment and mitigation planning, education and training, and near real-time assistance to crisis response organizations.

NISAC is a partnership between Sandia National Laboratories (SNL) and Los Alamos National Laboratory (LANL), integrating the two laboratories' expertise in infrastructure disruption/vulnerability modeling and simulation.

Fast Turnaround Concept

In its early months of DHS sponsorship, NISAC was faced with a wide variety of questions that went beyond the boundaries of any one project or expert set. The time requirements involved in these efforts have ranged from 6 hours to 90 days.

The Fast Analysis and Simulation Team (FAST) was formulated to serve as a central resource point for DHS in providing relevant and practical information in response to issues of national importance under limited time constraints.

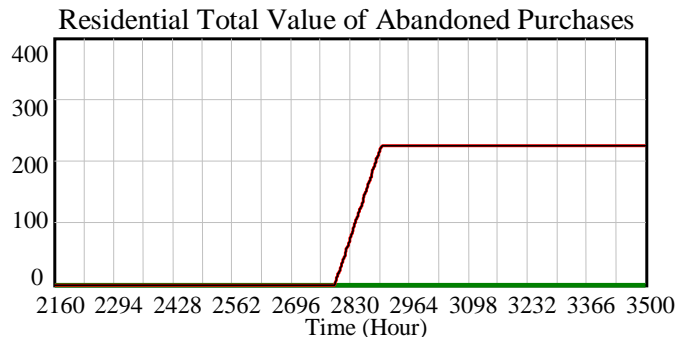
Models and tools developed by NISAC are used as needed within particular fast turnaround efforts to provide insight and analysis pertaining to the questions as posed. FAST also integrates expertise from throughout NISAC, including the core partners, their collaborators and system experts.

Fast Turnaround Team Interactions

Requests for analyses arise primarily within DHS. However, DHS-IP has allowed the capabilities of FAST to be leveraged by the Department of Energy (DOE) Office of Electricity Transmission & Distribution (OETD), both for exercises and real-world events. Exercise collaborators within DOE/OETD's visualization and modeling working group include the Los Alamos, Argonne, and Oak Ridge National Laboratories, and the National Energy Technologies Laboratories. Functioning as a "virtual" national laboratory, participants work together to analyze scenarios in preparation for potential future real events.

Types of Analyses

The information and analyses supplied by the NISAC FTA team provide insights into the interdependency and economic impacts of disruptions to infrastructure elements that might result from an event or set of events, a policy change, or implementation of protective measures. NISAC FAST has also been used to enhance the DHS knowledge base by providing systems analysis and expertise for efforts such as national table-top exercises regarding infrastructure security, through the generation of appropriate and relevant background materials.



Among the important economic measures observed in Fast Analysis and Simulation Team are abandoned purchases, planned purchases that are not made following restoration from a disruption.



Information Needs

The information and analyses supplied by the team cover wide-ranging subjects; however, some common themes include:

- Who will be affected (e.g., population, economic sectors), and how (e.g., duration, scale)?
- Economic impacts
 - By economic or industrial sector
 - By state or region
 - Insured and uninsured
 - Abandoned and deferred purchases
- What are the unexpected consequences, primarily with respect to infrastructure interdependencies?

Simulations

Analyses include simulations of each infrastructure sector as well as infrastructure dependencies and interdependencies. Simulation tools include

- Economic modeling
- Dynamic simulations of infrastructures and their interdependencies.

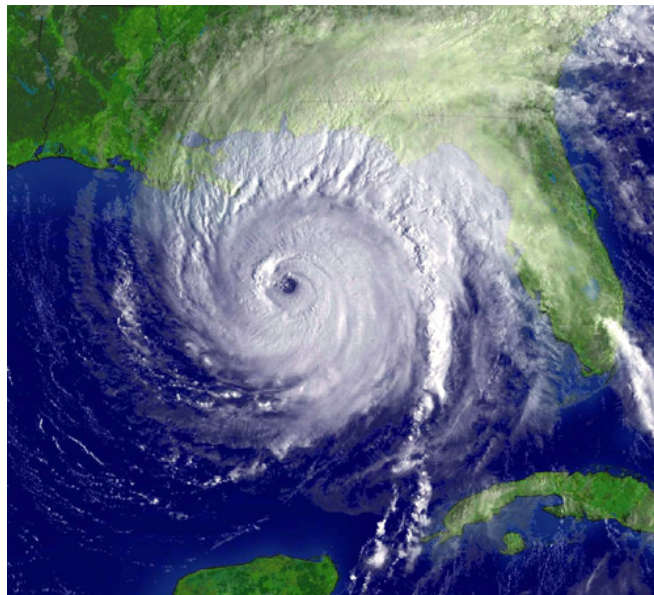
Analyses

Analytic expertise allows us to (in some cases) complete an analysis without running computer-generated simulations. In some cases, data assessment using spatial or other techniques are most appropriate. The breadth and depth of available technical expertise underpin the analyses.

Toolsets have been developed to support the archiving of knowledge, previous analyses, and simulations. Frequently, ‘nuggets of information,’ or interesting and salient facts discerned from data mining, will provide insight into an issue and are as important as the analysis itself.

Selected Examples

- Potential energy emergencies in Florida and California
- Rail Transport Disruption
- Chlorine Transport Disruption
- Electric Substation Disruption Consequences
- Southern CA Wildfire Damage
- Support for Table-Top Exercises
- Hurricanes Isabel, Frances, Ivan, Jeanne
- Asset Location Identification
- Transportation Policy Analysis
- Complexity Work Analysis
- Funding Allocation Analysis



Satellite image of Hurricane Ivan as it Approached the U.S. Gulf Coast (source: NOAA).



Prediction of Economic Damage Contours for Hurricane Ivan.



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