



Western Gulf Coast Analysis

The National Infrastructure Simulation and Analysis Center (NISAC), a program under the Department of Homeland Security's Information Analysis and Infrastructure Protection (IAIP) Directorate, 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 existing expertise in modeling and simulation to address the nation's potential vulnerabilities and the consequence of disruption among our critical infrastructures.

Infrastructure Interdependencies

A focus area for NISAC is the importance of local and regional infrastructures; understanding their interactions and importance to our nation's economic health.

NISAC has developed a *National Petroleum System Simulator* to evaluate the potential short-term effects of disruptions in the western Gulf Coast petroleum infrastructure operations on the rest of the country. The *NISAC Port Operations Simulator* was adapted to the Houston container port to simulate the potential effects of security measures and infrastructure disruptions on container operations.

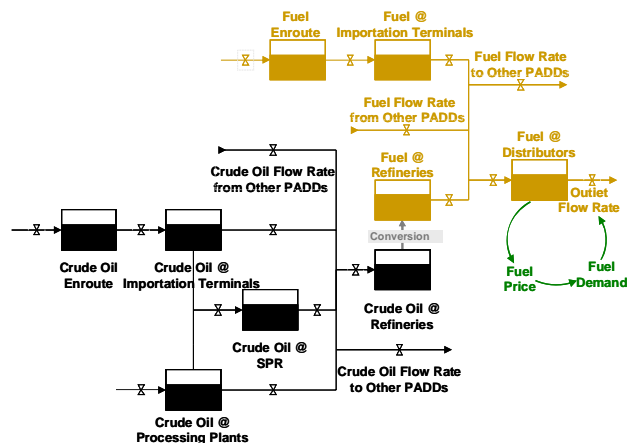
These simulators provide an opportunity to uncover potential problems in water transport-related national security events and policies before they occur or are implemented.



Petroleum imports and refining are concentrated in the Gulf Coast Region and are vital to the regional and national economic health

Regional Collaboration

The NISAC simulation and analysis team worked with U.S. Coast Guard staff, petroleum, water transportation and chemical industry security and operations experts, and regional manufacturing associations throughout the project development, model development and analysis phases. Workshops were held with representatives from each of the collaboration groups to review key regional issues and concerns. Participants also reviewed the simulation and analysis results, and identified areas for further collaboration.

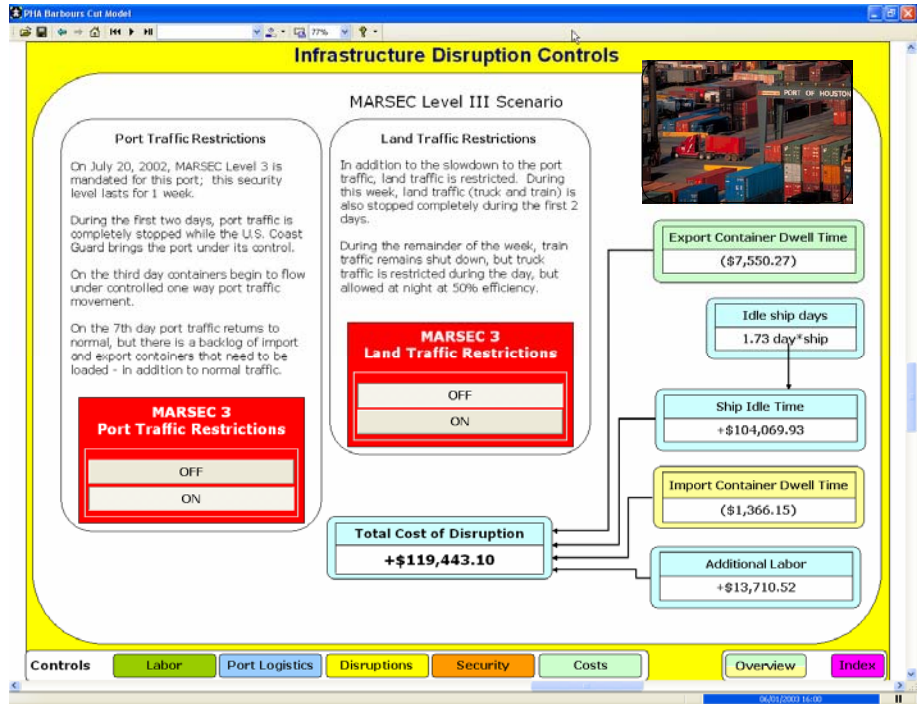


Simplified petroleum system model diagram showing major flows, storage and processes

The *Barbours Cut Port Operations* model provides users with the added ability to run *five pre-defined disruption scenarios* (loss of electric power, breakdown in telecommunications, port security threat/shutdown, labor disruption, and a MARSEC Level III alert) to evaluate port response to the disruption under user selected conditions. As the predefined disruption model runs, users can manipulate various controls to determine how best to respond and recover from the disruption.

The NISAC simulators can be modified to apply to other ports.

NISAC depends heavily on collaboration with infrastructure sector experts at the national, regional, and local levels for data and information about infrastructure processes and operations. This collaboration helps NISAC provide more accurate and complete information to decision makers.



Scenario control panels allow users to set values for the port being modeled, in this case toggling land transport restrictions

Workshops are an important part of the NISAC development and testing process. These workshops demonstrate the capabilities and utility of NISAC's tools and analyses, elicit feedback from participants, and expand NISAC collaborations. These workshops allow participants to gain a systems perspective on how infrastructures and their interdependencies influence the impact of disruptive events and how those impacts may change under different environmental, regulatory and policy conditions. NISAC, in turn, benefits from the knowledge and experience of experts working in maritime-related government and industry. The NISAC models are continually refined based on the results of these workshops.



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