Center for Transportation Analysis

RailReady:

A Visualization-Based Decision Support Tool for Emergency Management

What is *RailReady*?

RailReady is a data-driven, visualization-based decision support tool that allows elected officials, emergency managers, security and emergency personnel, and other stakeholders to make informed decisions through collaborative planning and comprehensive vulnerability assessments. Equally important, it provides a common operational picture to optimize integrated and coordinated action among all involved during response and recovery.
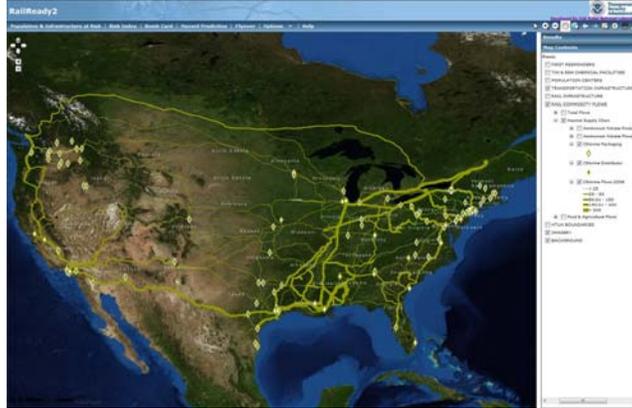

Chlorine supply chain and volume shipped by rail.

How does *RailReady* work?

The backbone of *RailReady* is an integrated set of diverse and critical data layers, and a set of analytical capabilities driven by the data.

RailReady includes data layers on physical assets (e.g., ports, rail tracks) and also on operational characteristics (e.g., traffic volume on a specific highway segment and volume of certain hazardous material moved) and on population attributes (e.g., special evacuation needs populations). Data integration is enabled through Geographic Information System applications.
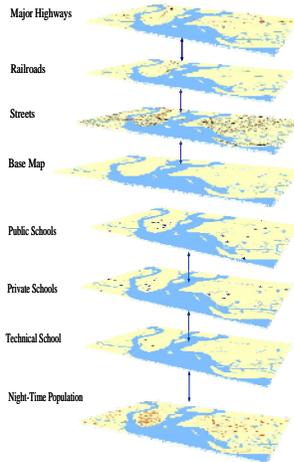

Based on the integrated data, algorithms were developed to compute various consequence indices on-the-fly for any user-specified areas.

What does *RailReady* do?

Geographic boundaries and critical sectors that may be impacted by any planned or unplanned events can be visualized and the impacts quantified.

First, *RailReady* allows a user to specify the radius of a circle, or draw a boundary of any geographic area. Then, for any user-specified areas, *RailReady* can:

(1) Provide domain awareness with satellite images and detailed information (e.g., jurisdiction, ownership, location, emergency contact) of surrounding critical infrastructures, population centers, national icons, hazardous material facilities, and incident recovery units.
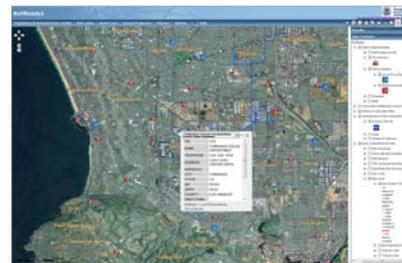
An example of pinpointing location attributes and contact information for a police station in Los Angeles, CA.

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(2) Compute the consequence index based on risk exposure, critical infrastructure, and national symbols and population at risk within the user-specified area.
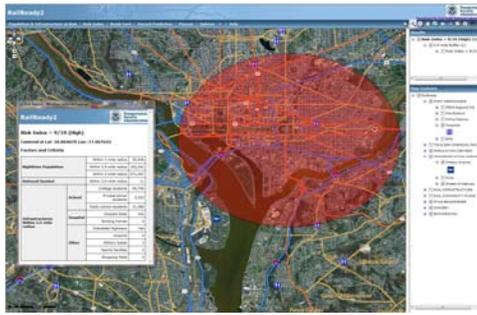
Consequence Index for a 2.5-mile radius.

(3) Estimate and summarize hazard-specific impacts such as:
- the extent of impacted critical infrastructure sectors (e.g., miles of highway, pipelines, and power lines; number of cell towers and bridges); and
- the size of population at-risk (e.g., day-time and night-time population, and the vulnerable populations such as the elderly without vehicles).
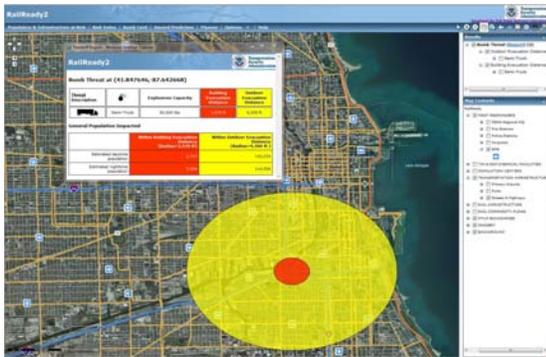

Estimated impact of 60,000 lbs TNT equivalent.

(4) Develop Google Earth tours that enable the user to virtually fly to and over any destinations.

All of the surrounding critical infrastructures, population centers, national icons, hazardous material facilities, and incident recovery units can be visualized and relevant information queried. Furthermore, the composite consequence indices are displayed at every one mile interval.
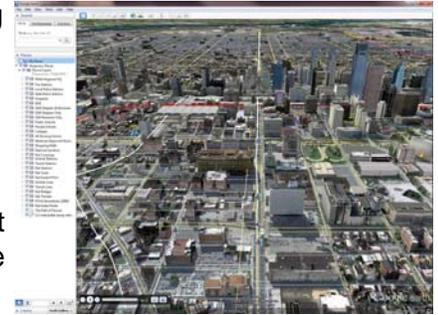
An example of a user-specified Google Earth Tour over downtown Philadelphia, PA.

RailReady focuses not only on rail infrastructure, assets, and critical commodity movements but also on the interdependence between rail and other critical infrastructures. Specific detail is provided for high-threat urban areas.
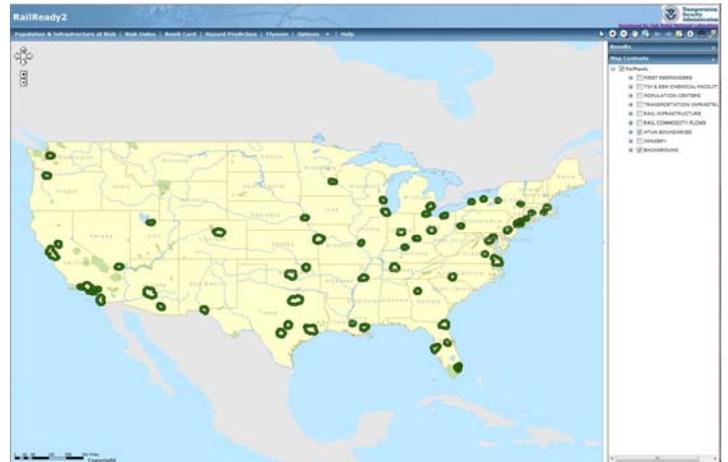
U.S. map showing the FY 2008 46 high-threat urban areas as defined by the Freight Rail Security Division of the Transportation Security Administration.