GeoCTA:

Geospatial Transportation Analysis Tool

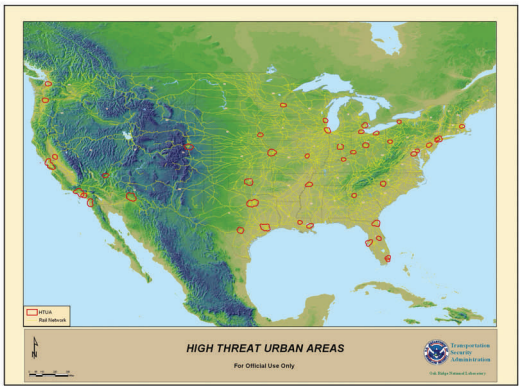
Center for Transportation Analysis (CTA) Research Areas

Aviation Safety
Air Traffic Management Analysis
Data, Statistical Analysis
Geo-Spatial Information Tools
Defense Transportation
Energy Policy Analysis
Environmental Policy Analysis
Highway Safety
Intelligent Transportation Systems
Logistics Management
Supply Chain Management
Modeling and Simulation
Transportation Operations
Planning and Systems Analysis
Transportation Security

Patricia S. Hu, Director
Center for Transportation Analysis
Oak Ridge National Laboratory
2360 Cherahala Boulevard
Knoxville, TN 37932
865.946.1349
(Fax) 865.946.1314

Website: cta.ornl.gov

GeoCTA is a geospatial information-based risk analysis tool that allows security managers and first responders to assess risk and prepare for emergency responses for natural disasters or acts of terrorism. It can also be used by first responders to assess the initial impacts of a transportation security incident. *GeoCTA* focuses on transportation and other critical infrastructure systems within high-threat urban areas.

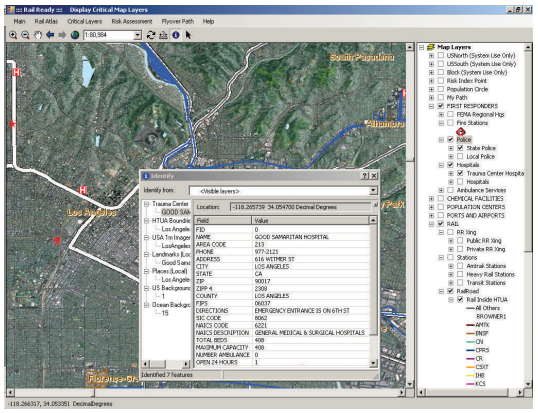


U.S. map showing the FY 2006 46 high-threat urban areas as defined by the U.S. Department of Homeland Security's Urban Areas Security Initiative (UASI) Program.

Functionality

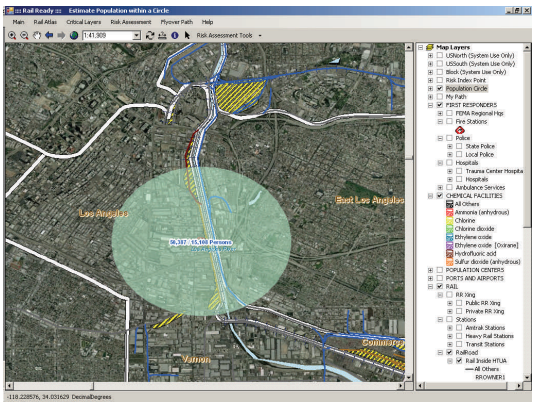
For each of the high-threat urban areas, *GeoCTA* provides four unique capabilities:

1. provides domain awareness with up-to-date digital maps of each area–equipped with more than twenty geo-spatial data;
2. pinpoints location, attributes and emergency contact information for selected critical infrastructure, population center, national icon, hazardous material facility, or incident recovery unit;



An example of pinpointing location attributes and contact information for the Good Samaritan Hospital in Los Angeles, CA.

3. calculates the population at risk (both day-time and night-time) and a consequence index for the area within a one- (or two and one-half) mile radius of <u>any</u> location within the United States; and



An example of a population at risk for the area within a user-specified one-mile radius of the Alameda Corridor located in Los Angeles, CA.

Oak Ridge National Laboratory is managed by UT-Battelle, LLC, for the U.S. Department of Energy under Contract number DE-AC05-00OR22725

UT-BATTELLE

4. views user-specified Google Earth tours with any combination of geo-spatial data layers displayed in 3-D.

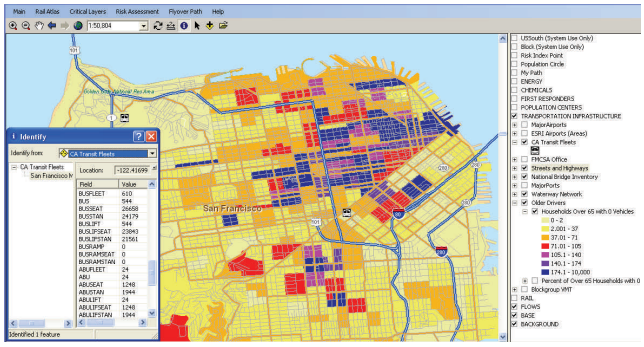
A screen capture from viewing a user-specified Google Earth tour along the Alameda Corridor in Los Angeles, CA.

Geospatial Data Layers

1. Transportation Infrastructure
   - A. Rail (freight & passenger)
     - Railroad network (with a 1:100,000 geo-spatial representation) within a 1-mile corridor on either side of the track)
     - Owner/operator of the line and the railroad name designation
     - Industrial spurs and railroad crossings
     - Yards and stations
     - Bridges and tunnels
   - B. Highway network
   - C. Highway bridges and tunnels
   - D. Major ports and airports
   - E. Waterways and lakes
   - F. Locks and dams
2. Energy Infrastructure
3. Defense Significance
   - A. Military installations
3. Population Centers
   - A. Schools
   - B. Major league stadiums
   - C. Shopping malls
   - D. Hospitals and nursing homes
4. Major incident recovery units
   - A. Police and fire departments
   - B. FEMA Regional headquarters
5. National icons and monuments
6. Hazardous material facilities
7. Traffic flow and commodity movement

Other Applications

1. The GeoCTA tool can evaluate the spatial accessibility of transit vehicles to evacuate special-needs populations.

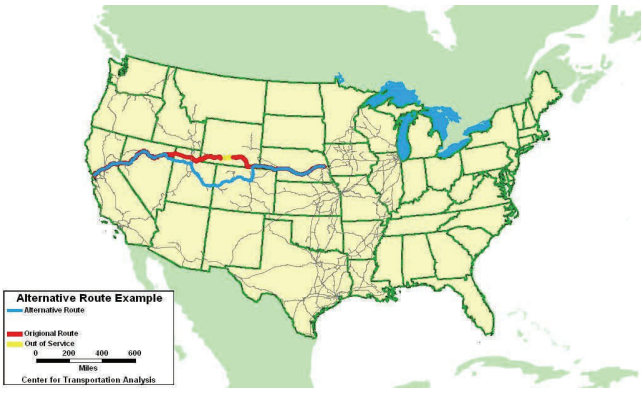


Special evacuation needs populations — concentration of elderly households without vehicles.

2. This tool can help in preparing and responding to hazardous material spills.

Chlorine supply chain and volume shipped by rail.

3. GeoCTA can help in identifying alternative routes.



Alternative route identification.

For more information regarding this research contact Pat Hu, Center for Transportation Analysis, Oak Ridge National Laboratory, phone (865) 946-1349 or email hups@ornl.gov.