Brief TRAGIS Background

• TRAGIS is a standard routing GIS application, its population data capability has made it a useful application for the analysis of routes for the shipment of hazardous materials including nuclear material and spent nuclear fuel (SNF). As a result, TRAGIS has been used for:
  – Environmenta Impact Statements (EIS) for shipping SNF from each nuclear power plant in the U.S.
  – RADTRAN inputs
    – Population densities
    – Route characteristics
  – Shipment of nuclear materials between DOE facilities
  – DOD shipments

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TRAGIS History

- Predecessor models developed in the late 1970’s
  - HIGHWAY
  - INTERLINE

- TRAGIS developed in mid-1990s

- Client-Server version TRAGIS released late 1999

- Last iteration of old TRAGIS released in 2006
Major Improvements with WebTRAGIS

- **WebTRAGIS released in September, 2012**
  - New web browser user interface
  - Updated security features

- **Updated release in October, 2013**
  - New rail network

- **December, 2013 Updates**
  - Updated waterways and highways networks
  - Improved population data (ambient, day, night)
  - Node and link blocking
  - Selected critical infrastructure proximity to routes

- **FY14 will begin preliminary development of intermodal routing**
Initial View of WebTRAGIS

- Login screen
- Enter your
  - Username
  - Password
- Request an account

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WebTRAGIS Access

- All users need to register

- Requirements include
  - Requirement for federal sponsorship
  - No foreign users
  - No commercial users
  - Federal contractors require federal sponsorship

- Access controlled through:
  - Username
  - Password

- After approval, users can login and access TRAGIS
Route Controls Menu

- Basic information to create a route
- Scroll boxes to select an origin, destination, and optional intermediate location
  - State
  - Node name
- Users select “Run” to generate a route
Layers Display Menu

Geographic Information Science and Technology

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Layer Displays: Total Population

Geographic Information Science and Technology

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Summary Route Output

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Summary with Population by Link
December 2013 WebTRAGIS Developments

- Display HSIP critical infrastructure point features of interest
  - Police
  - Fire
  - Hospitals
  - Schools
- Route Details
- Block Nodes and Links by Bounding Box
- Provide Route Details and Population Data by Network Link
Updated Route Results

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Blocking Links and Nodes
Route Generation with Blocking
WebTRAGIS User Output

- Users may generate an output file for selected routes containing:
  - A shapefile of the route
  - A kml file of the route
  - Text files of the summary screen output
- Route Details
  - Standard route results
  - Detailed route results
  - Population by link
- Population density data
WebTRAGIS Population Density Data

• Density Data is derived for 3 categories
  – Rural (below 139 people/mi²)
  – Suburban (between 139 and 3326 people/mi²)
  – Urban (above 3326 people/mi²)

• Distance for each category is provided

• Both metric and English units provided for area and distance (default is km)

• RADTRAN compatible
  – Population risk assessment
  – Accident dosing models

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### Population Density Reporting

**Geographic Information Science and Technology**

<table>
<thead>
<tr>
<th>Route Details</th>
<th>Standard Results</th>
<th>Detailed Results</th>
<th>Route Population</th>
<th>Critical Infrastructure</th>
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<tbody>
<tr>
<td>Summarize By State</td>
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<tr>
<td>Rd (m)</td>
<td>Link Distance (m)</td>
<td>Impedance</td>
<td>Low Density Day</td>
<td>Medium Density Day</td>
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<td>0.262717</td>
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</table>
Link = 17043048980; 2.536 KM
Link = 17043048980; 2.536 KM

Area = 0.501023 Sq. KM
Total Population = 793
Pop. Density = 1,583 Person/Sq. KM

Rural: < 55 Person / Sq. KM
Suburban: 56 – 1299 Person / Sq. KM
Urban: > 1300 Person / Sq. KM

0.058 KM
Link = 17043048980; 2.536 KM

Area = 0.501023 Sq. KM
Total Population = 416
Pop. Density = 830 Person/Sq. KM

<table>
<thead>
<tr>
<th>Rural: &lt; 55 Person / Sq. KM</th>
<th>Suburban: 56 – 1299 Person / Sq. KM</th>
<th>Urban: &gt; 1300 Person / Sq. KM</th>
</tr>
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<tbody>
<tr>
<td>0.853</td>
<td>1.235</td>
<td>0.449</td>
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</table>
WebTRAGIS Highlights

- Updated networks for multiple modes
- New layer display options
- Blocking by bounding box
- Expanded route details
  - Route specifics
  - Critical infrastructure
- New population reporting
  - By link
  - By state
  - Counts and density

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- **Web Site**
  - https://webtragis.oml.gov