Putting Rail Safety on the Map
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Federal Railroad Administration
USDOT
Overview

- Background
  - Rail Industry
  - FRA
- FRA GIS Program
- FRA’s GIS Data
- FRA’s GIS Applications
Rail Industry: Staggers Rail Act of 1980
## Classes of Railroads

<table>
<thead>
<tr>
<th>Class I Railroads</th>
<th>Class II Railroads</th>
<th>Class III Railroads</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Companies</td>
<td>~ 10 Companies</td>
<td>&gt; 500 Companies</td>
</tr>
<tr>
<td>Revenue ≥ $433.2 million per year</td>
<td>Revenue $34.7 to &lt;$433.2 million per year</td>
<td>Revenue &lt; $34.7 million per year</td>
</tr>
<tr>
<td>Large railways with interstate links</td>
<td>Service to selected regions</td>
<td>Service to small geographic areas</td>
</tr>
<tr>
<td>Mainly East–West Orientation</td>
<td>Mainly neighboring states/economic centers</td>
<td>Mostly branch lines with only one track</td>
</tr>
</tbody>
</table>
Federal Railroad Administration (FRA)

- Created by the Department of Transportation Act of 1966 (49 U.S.C. 103, Section 3(e)(1))

- The purpose of FRA is to:
  - Promulgate and enforce rail safety regulations
  - Administer railroad assistance programs
  - Conduct research and development in support of improved railroad safety and national rail transportation policy
  - Provide for the rehabilitation of Northeast Corridor rail passenger service
  - Consolidate government support of rail transportation activities.

- Today, FRA is one of ten agencies within the U.S. Department of Transportation concerned with intermodal transportation. It operates through seven divisions under the offices of the Administrator and Deputy Administrator.
FRA’s GIS Program

- Safety
- Policy and Development
- Administrator
- Chief Counsel
- Information Technology

GIS
FRA’s GIS Data Overview

- **Primary**
  - 1:100k network
  - Milepost
  - Freight Stations
  - Highway-rail grade crossings
  - Amtrak passenger stations

- **Secondary**
  - Yards
  - Subdivisions
  - Accidents
  - FRA Inspections
  - Designated Quiet Zones
  - Bridges
  - Etc.
Previous Networks

- 1:2 million (USGS): Used for cartographic representation, attributes, and routing

- 1:100,000 (Census): Had a better spatial representation but lack routability and attributes

- By 2005, the 1:2 million attributes were conflated to the 1:100,000 network & the 1:100,000 was completely routable
Spatial Improvements

- Integrating the FRA’s Automated Track Inspection Program (ATIP) Data
- The ATIP cars takes a latitude and longitude reading every foot.
Mileposts
Grade Crossings

- FRA has a Highway–Rail Crossing and Trespasser Program Division that plans, develops, and directs programs that address highway–rail safety and trespasser issues. Committed to reducing the number of collisions at highway–rail crossings and along railroad right–of–way.

- Prior to the Rail Safety Improvement Act of 2008, this information was not required and the spatial information provided could be very inaccurate. Beginning in the fall of 2010, grade crossing data collected and recorded by the state DOT or railroad had to contain spatial coordinates.

- Since 2008, FRA has provided guidance and input for the development of the policy for 911 operators and responders regarding rail accidents/incidents. This policy can be found in the NENA Railroad & PSAP Interaction Operations Information Document (OID).

- The use of GIS data and technology has been essential to the program
FRA GIS Applications

- Data Driven
  - National Transportation Atlas Database (NTAD)
    http://www.bts.gov/publications/national_transportation_atlas_database/2012/

- Web Services
  - FRA’s Main web Application
    http://fragis.frasafety.net/GISFRASafety/default.aspx
  - Popup Viewer
    http://safetydata.fra.dot.gov/OfficeofSafety/PublicSite/Crossing/Crossing.aspx
FRA Regions

- Regulatory of Safety
- Safety Disciplines
  - Hazardous Materials
  - Motive Power and Equipment
  - Operating Practices
  - Signal and Train Control
  - Track Structures
Accidents
Main GIS Web Application
Federal Railroad Administration
Office of Safety Analysis

6.02 - Generate Crossing Inventory and Accident Reports

Please click on one of the links below or enter a crossing number, pick the report type and click on the Generate Report button to produce the Report.

Report Type:
- Inventory
- Accident
- Contact Sheet

Crossings:
- 286474L

Inventory:
- Current
- History

Generate Report
Generate Map

Additional Links
- Query by Location/Railroad
- Query by Crossing
- Accident Prediction (WABPS)
- Crossing Inventory Data File Reconciliation (CIF)
- DOT Crossing Inventory Information
- Crossing Data Guide
- Maps
- Notice
- Using this Site

Crossing Inventory File [hard-copy submissions] as of 4/30/2012
Crossing Inventory File [electronic submissions] as of 2/29/2012
Accident file as of 3/31/2012

Latitude:
Longitude:
Trespassers
Mobile Application

- Mobile GIS application utilizing GPS from mobile device (iOS) and FRA’s spatial data (GX’ings)
GIS Track Inspection Dashboard

- Internal Application to view
  - Inspection Reports
  - Inspection Defects
  - Accidents
  - Automated Track Inspection Program (ATIP) Exceptions

- All filters can be queried by time and type
Basic Overview
Unique Queries
<table>
<thead>
<tr>
<th>RCode</th>
<th>RRCoName</th>
<th>ReportDate</th>
<th>PayrollID</th>
<th>ReportNo</th>
<th>Violation</th>
<th>Division</th>
<th>SubDivision</th>
<th>RRCoRep</th>
<th>RRCoTitl</th>
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<tbody>
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<td>PETERSON JR.</td>
<td>RACDM.</td>
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<td>****</td>
<td>071</td>
<td>N</td>
<td>LOUISY</td>
<td>C&amp;N</td>
<td>P. DUSHARME</td>
<td>RACDM.</td>
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<tr>
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<td>COLUMBUS &amp; OHIO RIVER RR.</td>
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<td>****</td>
<td>012</td>
<td>N</td>
<td>SYSTEM</td>
<td>C&amp;N</td>
<td>C. GREGORY</td>
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<td>****</td>
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<td>N</td>
<td>ALBANY</td>
<td>SYSTEM</td>
<td>ALLEN WENGERT</td>
<td>TRACK:</td>
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<tr>
<td>CSXT</td>
<td>CSX TRANSPORTATION INTERMODAL</td>
<td>9/23/2010 12:00:00 AM</td>
<td>****</td>
<td>008</td>
<td>N</td>
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<td>SYSTEM</td>
<td>C&amp;N</td>
<td>S. E. BIBLE</td>
<td>Track Jr</td>
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</tbody>
</table>

Total Records: 7
Conclusion

- The FRA GIS staff has made significant advancements by providing GIS expertise, spatial data, and applications in bringing additional meaning to safety data.
- The partnership with the Office of Safety, as well as others, is essential to continue the programs that utilize the current and future GIS technology.
- It is clear that there is still a lot of spatial work to do and having one centralized GIS shop for the agency is critical to continue to grow these programs in a comprehensive manner.