Implementing Mobile GIS in the Rail Industry
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Presenters

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Presentation Outline

• North American Railroads
• About CSX
• Business Uses for GPS Enabled Mobile GIS
• Office Car Tracking
• WIU Inventory
• PTC Power
• PS&E SPCC Tank Inspections
• PTC Change Management
• Lessons Learned
• Questions?
The Scope of N.A. Railroad Infrastructure

• Railroad “classes” are defined by operating revenue.
  • Class I: Revenue > $347 Billion
    • 7 US, 2 Canadian, 2 Mexican
  • Class II, Class III
    • 33 Regional, 320 Local Line Haul, 200 Switching & Terminal RR
• Railroads account for more than 40% of all US freight transportation.
• Freight railroads receive no public funding for infrastructure or rolling stock.
• 40% of revenue goes to capital expenditures for track and equipment.
• Coal, intermodal, chemical, and grain traffic are major commodities.
N.A. Railroads by the Numbers

• Railroads own and maintain 173,000 mi of track in 140,000 mi of right of way.
• Amtrak owns and maintains 750 mi & operates on 22,000 mi owned by others.
• 1.5M freight cars in service < 50% owned by the major RRs.
• 24,000 locomotives in service
• 12M containers & trailers in Intermodal business.
• 226,000 employed in rail industry.
• Average length of haul is 900 miles.
• CSX pays property tax in 22 states, 2 provinces, 968 counties on 360,000 acres of real estate.
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About CSX

• CSX Corporation is one of the nation’s leading transportation suppliers.
• CSX provides rail, intermodal, and rail-to-truck transload services.
• The CSX network spans 21,000 miles with service to 23 eastern states and the District of Colombia.
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CSX System Map
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CSX Technology / GIS

- Mission: Provide GIS services for CSX Corporation
  - Application Development
  - Data Development
  - Routing
  - Geocoding
  - Geofence Integration
  - Mapping and Analysis
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Business Uses for GPS Enabled Mobile GIS

• Basic Accuracy – Basic Tracking and Routing
  – Office Car Tracking

• Medium Accuracy – Feature Collection
  – WIU Inventory
  – PTC Power
  – SPCC Tank Inspections

• High Accuracy – Feature Survey Collection
  – PTC Change Management
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Office Car Tracking

• Displays current location of train on Closed Circuit TVs.
• Constantly pings underlying cache data for attribute information.
• Shows current city, state, county, subdivision, speed, heading and more.
• Displayed data is SDC data format.
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WIU Inventory

- Collection of all Wayside Interface Units.
- 12 Trimble Juno SCs.
- Dynamically “on-the-fly” built forms based on featureclass data model.
- Connect to CSX network via built-in cellular modems.
- Users can fully sync data, by subdivision, in the field.
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PTC Power

- Facilitates the planning for the location of new power features in dark territories.
- Supports the digitization of new power poles and houses.
- Data is extracted based on contractor’s needs.
- Synced to the network via USB cable.
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PS&E SPCC Tank Inspections

- Monthly inspections of storage tanks and other features.
- Several dozen devices in use at once.
- Data selectively synced via USB based on facility name.
PTC Change Management

- Survey new or changed features in a timely manner.
- A seamless part of a bigger work flow.
- Flexible enough to handle any scenario in the field.
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Lessons Learned

• Don’t try to build an ArcMap for the field.
• Caching half of the country on an SD card can be challenging.
• Integrating mobile into the enterprise is more difficult than it sounds.
• Must be able to work around the inevitable hardware / software issues.
• Cache checksums can become out of sync.
• Versioning or landing tables are a must.
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Questions?