Applying Real-Time Weather Information for the Railroad with Web Maps
Real-Time Weather Services

Presenters

• Elvis Higgins – Technical Director, CSX
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• Ethan Knocke – GIS Coordinator / Meteorologist, AccuWeather
Presentation Outline

- Railroading and GIS
  - Continental scope, micro/macro scale geography
- Railroading is an outdoor sport
  - Integration with AccuWeather’s new technology
- Safety is a way of life
  - Real weather, real railroading
- Future Plans
  - Other business drivers
- Questions
Railroading and GIS...

CSX Corporation

- CSX is one of the nation’s 7 major freight railroads—eastern footprint
- CSX provides rail, intermodal, and rail-to-truck transload services, integrating with more than 500 regional and passenger railroads

GIS Technology at CSX

- Enterprise approach – build web services useful to full range of constituents
- Guiding principles—data quality, information stewardship, common tools
Long history of accessing weather data

Then, weather alerts sent to field by Train Dispatcher

Now, leverage GIS to communicate Company-wide
Railroading is an Outdoor Sport...

...with many mobile and interdependent parts—MapCSX enables a ‘common operating picture’

- Access point for spatial business data and 3rd party web services
- Basis for future app design and systems integration
Integration of AccuWeather with GIS...

...turns traditional, report-based alerts into...
Custom SkyGuard Warning specs for railroad operations

- Tornadoes within 3 miles
- Winds $\geq$ 50 mph on track
- Sustained winds $\geq$ 35 mph near lift bridges
- Snow $\geq$ 2” across track network
- Accumulating ICE
- Cold Temp Warning: Temperature $\leq$ 0 deg longer than 4 hrs.
- Cold Temp Alert: Temp $\leq$ 10 deg (8+ hours)
- High Temp Warning: $\geq$ 90 deg (4+ hours)
- Temp change: 30 deg change in 3 hrs or less
- Earthquakes of 5.0 -5.4 within 30 miles, 5.5-5.9 within 50 miles, 6.0-6.9 within 100 miles, $\geq$ 7.0 within 150 miles
- Tornado Watches
- Severe Thunderstorm Watches
- Hurricane / Tropical Storm Forecasts for Atlantic and Gulf Coast
Real-Time Weather Services tailored to the Railroad

AccuWeather meteorologists monitor the weather at your exact location.

Severe weather occurs.

Warnings are sent using the most effective methods for your operations, including email, web, mobile, voice and more.

Confirmations are monitored and, if necessary, follow-up phone calls are made by AccuWeather meteorologists.
Real-Time Weather Services – how it works now...

1. SkyGuard Warnings Issued for CSX Track by AccuWeather Meteorologist

2. Warning XML Files Received and Processed by Internal AccuWeather GIS Scripts

3. ESRI Geometry and Attributes Created for Warnings

4. Java SDE API used to load Warnings and Other Live Weather Data to ArcSDE Feature Layers

5. Spatial Views of Warnings and Weather Layers Securely Exposed to CSX as Real-Time ArcGIS Server REST Services

6. CSX Developers add Warnings and Live Weather REST Endpoints to MapCSX as Dynamic Layers to Visualize Proximity of Hazards to Fixed and Mobile CSX Assets
Safety is a way of life...not just a slogan

Safety is a Way of Life is one of CSX's five core values. More than a reminder to our employees, it's an ongoing commitment that factors into every aspect of our company's operations. Whether it's on behalf of our employees, our customers or the communities we serve, our goal when it comes to safety is simple:

To achieve zero incidents and zero accidents.

In 2011, the company successfully reduced our number of employee injuries and accidents involving trains, and continued to invest in a growing number of company initiatives designed to improve employee safety, health and wellness, and to further reduce the potential for accidents in the communities we serve.

Even with our achievements, we recognize that safety is one area where consistent, continuous improvement must be standard operating procedure year in and year out.
Weather & GIS Integration well received...
Real-Time Weather, Real Life Railroading

Information when you need it
Custom SkyGuard Warnings in MapCSX...
Public Safety Crisis App built on same services...
Future Plans

- Additional services
  - Public warnings
  - River gauge reports
  - Lightning strikes
- Additional mapping utilities and mobile deployment
- Notification Integration
- Weather Trending
- Correlation between weather events and railroad performance
  — better planning and response
Questions?

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