GIS for Public Transit Safety

Ed Wells, GIS Manager
Washington Metropolitan Area Transit Authority (WMATA)

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National Transportation Safety Board
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Purpose: Show how GIS can be used to support public transit safety

• Challenges
• Foundations
• Possibilities (general capabilities, not specific WMATA capacities or plans)
• Principles for implementation
GIS integrates geography and relational databases

- Geographic data capture and display
- Geographic analysis
- Geographic data base management
- Data integrity
- Data integration
Challenge: Scope and Scale of Services

- **WMATA** provides passenger transit rail, bus and paratransit services for DC and surrounding areas of MD and VA (1,500 sq mi).
- **Rail**: 103 mi track; 86 stations; 850 railcars; 217M annual ridership
- **Bus**: 11,500 stops; 350 routes; 1,480 buses; 124M annual ridership
- **Paratransit**: 600 vehicles; 2.4M annual ridership
- **Infrastructure**: Structures, track, power, signals, HVAC, drainage, IT networks, etc.
- **Support**: Safety; Police; Planning; Real Estate; Environmental Management
Transit GIS Challenges

- Location
- Precision
- Time
- Transit network
- IT span
- Data Integration
**Strategic Portfolio of Enterprise Transit GIS**

**Fixed Asset Management**
- Parcel
- Facility
- Amenity

**Transit Operations**
- Rail, Bus, Van, Road Network
  - Stops, time points, chain markers, waypoints
  - Patterns, routes, lines, transfers
  - Performance (vehicles, trips, blocks)

**Support Operations**
- Safety, Police, Planning, Real Estate; Environmental
• Enterprise GIS software
• Data, data models, and data maintenance procedures
• Servers, storage, network
• Production, staging, development environments
• Desktop, web, application access
• Internal and public information
• Scale-up capacity
• Security and disaster recovery
# Roadway Access Guide

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*Note: Data are fictional*
Worker Safety

- Roadway Access Guide, mapped
Worker Safety

- Map, with emergency phones added
Asset Safety: Inventory and Location

- Asset inventory and maps

Note: Data are fictional
• Assets requiring inspection, maintenance, etc. (from work order management system)

Note: Data are fictional
Asset Safety: Views and Documentation

- Detailed documentation and context views.

Note: Data are fictional
Asset Safety: Monitoring

- Assets within camera viewsheds

Note: Data are fictional
Situational Awareness

- Routes and Stops
Bus and train locations (updated every 90 sec.)
• Alerts, incidents, delays
Situational Awareness

- Crime mapping
Building Mapping

- Floor plan
Building Mapping

- Georeferenced, and superimposed on imagery
• 3-D exterior view
• Interior view
Building Mapping

- Recomputed view
• 360° Imagery
More Complex Applications

- Incident analytics
- Safety dashboards
- Impact zone and plume dispersion overlays
- Geo-data feeds to external fusion centers
- Station or rail evacuation planning
- Preset map configurations for emergency planning scenarios
• Build from simple to complex.
• Write once, use many. (Integrate, don’t replicate.)
• Build a close partnership between IT and business departments.
• Use and improve on legacy data.
• Set strategy first, then obtain system infrastructure; then data and maintenance processes. Build applications only after they have a solid foundation.
Questions and Discussion

Ed Wells, ewells@wmata.com

Washington (DC) Metropolitan Area Transit Authority