The Special Challenges of Rural Transit & Implications for Connected Vehicles

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Typical Characteristics of Rural Transit

- Mostly small agencies, small vehicles w/limited in-house technology resources
- Demand-responsive or flexible services
- Many agencies serving similar riders in the same area
- Significant proportion of senior and disabled riders and medical trips
- Diverse mix of riders (and payment methods) on any given vehicle

Source: Northeast Pennsylvania Area Transportation Authority
Source: "Technology Adoption by Small Urban and Rural Transit Agencies," Small Urban & Rural Transit Center, Upper Great Plains Transportation Institute, North Dakota State University. June 2010
Typical Characteristics of Rural Transit, cont.

• Geographically large service areas often with widely scattered origins and destinations
• Relatively long average trip lengths
• Service areas may include diminishing but still significant data communications “dead zones”
• Operate on high speed, intercity roadways
• Traditionally high levels of customer satisfaction and service quality

Source: Images and text - Federal Highway Administration; http://www.fhwa.dot.gov/publications/publicroads/03jan/04.cfm
Associated Challenges

• Relatively few incidents (crashes, security, breakdowns) but when they occur:
  – They are often remote, possibly in communications dead spots
  – More likely to have passengers on-board with medical issues
  – More likely to be serious/fatal

• Difficult to achieve high efficiencies within an agency and across a region (across multiple agencies)

• Implementation and O&M of high-technology systems especially challenging

• In 2006, 66 percent of rural drivers killed in crashes died at the scene, compared to 51 percent of urban drivers. Seventy-two percent of drivers who died en route to a hospital were in rural areas.

• Nearly 50 percent of total highway fatalities occur on two-lane rural roads. The fatality rate overall on local roads is more than twice that of interstates.

Source: The U.S. Department of Transportation
Rural Safety Initiative, February 2008
http://www.dot.gov/affairs/ruralsafety/ruralsafetyinitiativeplan.htm
Current Utilization of Advanced Technologies

- Computer-aided scheduling and dispatching
  - Client records management
  - Reporting functions
- Automatic vehicle location (AVL) systems w/mobile data terminals (and associated voice and data comm.)
  - Dynamic scheduling and routing
  - Schedule adherence
  - Mayday

Source: Volpe National Transportation Systems Center Transit Technology Fact Sheets; http://www.pcb.its.dot.gov/factsheets/avl/avlRural_overview.asp
Current Utilization of Advanced Technologies, cont.

• Maintenance management systems
• Accounting/billing systems
• Interactive voice response traveler information systems

Source: Area Transportation Authority of North Central Pennsylvania

Source: Federal Transit Administration & Volpe National Transportation Systems Center; http://www.pcb.its.dot.gov/factsheets/maint/mntOve_print.htm
Connected Vehicle Opportunities

- Fill the gap for agencies currently lacking ITS systems
- Enhance the effectiveness of maintenance management by adding real-time vehicle health monitoring
- Improved response to crashes based on on-board sensor data (air bag, accelerometer data, roll-over, etc.)

Connected Vehicle Opportunities, cont.

- Collision avoidance systems focusing on poor sight distances, non-signalized intersections, tight curves, poor visibility conditions
- Driver assist technologies, e.g., lane keeping
- Inter-agency coordination
  - Interagency dynamic scheduling (“dynamic transit operations”)
  - Trip transfers (“connection protection”)
  - Dynamic customer trip eligibility determination
  - Interagency payments

Source: USDOT Rural Safety Initiative; Wisconsin DOT; http://www.its.dot.gov/rural/rural_approach.htm#co

Placement of Equipment for Rural Intersection Collision Avoidance System Test Site in Minong, Wisconsin
Keys for Moving Forward

• A user needs-driven approach but…
  – Recognize that users may not understand the solutions that are available (educate)

• Accompanied by professional capacity-building
  – Systems engineering approach
  – Enterprise architecture planning
  – Change management

“Prerequisites conditions” for transit technology success:
• Informed and supportive agency leadership
• A vision for how technology will permeate the agency linked to a clear plan
• An organizational culture that supports technology and embraces change
• A supportive community that values transit

Keys for Moving Forward, cont.

• Sustainable, full life-cycle finance strategy

• Leverage existing programs and embed w/in broader contexts, e.g.
  - USDOT United We Ride/Mobility Services for All Americans initiative
    - Travel Management Coordination Center
  - USDOT Rural Safety Initiative
  - FTA Rural Transit Assistance Program
Thank you!

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