Enhanced Transit Operations and Travel Experience in Connected Vehicle Environment

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Connected Vehicle Environment
Connected Vehicle Program Structure

**Applications**
- Safety
  - V2V
  - V2I
- Mobility
  - Real-time Data Capture
  - Dynamic Mobility Apps
- Environment
  - AERIS
  - Road Weather Apps

**Technology**
- International Harmonization of Standards & Architecture
- Human Factors
- Systems Engineering
- Certification
- Test Environments

**Policy**
- Deployment Scenarios
- Financing & Investment Models
- Operations & Governance
- Institutional Issues

*Image Source: Thinkstock/USDOT*
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Image Source: Thinkstock/USDOT
Safety - Transit Safety Retrofit Package (TRP)

- Pedestrian in Signalized Crosswalk Warning (V2I)
- Vehicle Turning Right in Front of Bus Warning (V2V)
- Forward Collision Warning (V2V)
- Emergency Electronic Brake Lights (V2V)
- Curve Speed Warning (V2I)
Safety Pilot Model Deployment: Transit Applications Test Locations

- University Medical Center (school/employment)
- Off campus housing (student/faculty/staff)

V2I Testing Location
V2V Test Data Collection Points

Image Source: Thinkstock/USDOT
Transit Safety Research Next Steps

- Complete TRP development and testing
- Evaluate impacts of TRP safety applications
- Identify and prioritize additional near-term safety applications
- Explore TRP utilization in Mobility and Environment areas
- Collaborate with V2I, V2V and X2P research for transit adaptation
- Promote industry awareness and professional capacity building
Applications

Technology

Policy

Safety

Mobility

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Mobility

Real-time Data Capture and Management (DCM)

- Vehicle Status Data
- Infrastructure Status Data
- Wireless Device Data
- Weather Data
- Truck Data
- Transit Data

Dynamic Mobility Applications (DMA)

- Reduce Speed 35 MPH
- Weather Application
- Real-Time Travel Info
- Fleet Management/Dynamic Route Guidance
- Safety Alerts and Warnings
- Real-time
- En-route
- Travel Apps
- Signal Phase & Timing Adjusts Real-Time Conditions

Data Environment

Image Source: Thinkstock/USDOT

U.S. Department of Transportation
Research and Innovative Technology Administration
ITS Joint Program Office
Mobility - DMA Concepts

- Enable Advance Traveler Information Systems (Enable ATIS)
- Freight Advanced Traveler Information Systems (FRATIS)
- Intelligent Network Flow Optimization (INFLO)
- Multimodal Intelligent Traffic Signal Systems (MMITSS)
- Response, Emergency Staging and Communications, Uniform Management, and Evacuation (RESCUME)
- Integrated Dynamic Transit Operations (IDTO)
IDTO Prototype Development and Testing Sites

- 1st Location: Columbus, Ohio
  - Partners: Battelle (prime), COTA, OSU (CABS, Taxi-CABS, and OSU Transit Lab), Capital Transportation, Zimride, TransSystems
- 2nd Location: Orlando, Florida (LYNX)
Conceptualization of IDTO System

[Image of a conceptual diagram showing the integration of IDTO Prototype System of Interest with Traveler UI, Driver UI, Fixed-Route/Fixed-Schedule Provider, Demand/Response Provider, and Rideshare Provider through Integrated Prototype Middleware and RDE.]
Sample User Interface for Mobile User
Environment - AERIS Concepts

- Eco-Signal Operations
- Dynamic Eco-Lanes
- Dynamic Low Emissions Zones
- Eco-Traveler Information
- Support for Alternative Fuel Vehicle Operations

Source: Federal Transit Administration (FTA)
Source: Tappan Zee Bridge/I-287 Environmental Review
For Additional Information

- Connected Vehicle webpage: [http://www.its.dot.gov/connected_vehicle/connected_vehicle.htm](http://www.its.dot.gov/connected_vehicle/connected_vehicle.htm)