Example CV Pilot Deployment Concepts: I-876 Productivity Corridor

Randy Butler (FHWA)
I-876 Productivity Corridor:

- 112 Mile multi-state facility connecting ports and intermodal facilities in Northeastern U.S.
- Significant truck movement among urban centers and facilities
- Competition with other regions on Eastern seaboard for travel reliability
- LDM is 18th busiest airport in U.S.
Stakeholders Convene and Identify Key Transportation Challenges

- **Freight Productivity**
  - Heavy congested freeways interferes with timely and reliable freight movement and hinders economic development
  - Underutilized freight facilities, infrastructure, and mobile assets
  - Frequent empty moves within the corridor create non-optimal utilization of assets
  - Port, airport and inter-modal access subject to surge demand and long waits

- **Truck Safety**
  - Truck-vehicle conflicts in hilly merge/weave sections near interchanges
  - Truck-involved crashes caused by lane changing and blind spots
Stakeholder Set Three Key Improvement Targets

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Targets</th>
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<tbody>
<tr>
<td>Improve Truck Travel Times</td>
<td>Reduce freight vehicles travel times by 17%</td>
</tr>
<tr>
<td>Reduce Number of Wasted Trips</td>
<td>Reduce the number of wasted trips by 15%</td>
</tr>
<tr>
<td>Improve truck safety</td>
<td>Reduce truck-related conflicts by 30%</td>
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</table>
## Applications Considered for Improving Freight Reliability

### V2I Safety
- Red Light Violation Warning
- Curve Speed Gap Warning
- Stop Sign Gap Assist
- Spot Weather Impact Warning
- Reduced Speed/Work Zone Warning
- Pedestrian in Signalized Crosswalk Warning (Transit)

### V2V Safety
- Emergency Electronic Brake Lights (EEBL)
- Forward Collision Warning (FCW)
- Intersection Movement Assist (IMA)
- Left Turn Assist (LTA)
- Blind Spot/Lane Change Warning (BSW/LCW)
- Do Not Pass Warning (DNPW)
- Vehicle Turning Right in Front of Bus Warning (Transit)

### Environment
- Eco-Approach and Departure at Signalized Intersections
- Eco-Traffic Signal Timing
- Eco-Traffic Signal Priority
- Connected Eco-Driving
- Wireless Inductive/Resonance Charging
- Eco-Lanes Management

### Mobility
- Advanced Traveler Information System
- Intelligent Traffic Signal System (I-SIG)
- Signal Priority (transit, freight)
- Mobile Accessible Pedestrian Signal System (PED-SIG)
- Emergency Vehicle Preemption (PREEMPT)
- Dynamic Speed Harmonization (SPD-HARM)
- Queue Warning (Q-WARN)
- Cooperative Adaptive Cruise Control (CACC)
- Incident Scene Pre-Arrival Staging Guidance for Emergency Responders (RESP-STG)
- Incident Scene Work Zone Alerts for Drivers and Workers (INC-ZONE)
- Emergency Communications and Evacuation (EVAC)
- Connection Protection (T-CONNECT)
- Dynamic Transit Operations (T-DISP)
- Dynamic Ridesharing (D-RIDE)
- Freight-Specific Dynamic Travel Planning and Performance
- Drayage Optimization

### Agency Data
- Probe-based Pavement Maintenance
- Probe-enabled Traffic Monitoring
- Vehicle Classification-based Traffic Studies
- CV-enabled Turning Movement & Intersection Analysis
- CV-enabled Origin-Destination Studies
- Work Zone Traveler Information

### Smart Roadside
- Wireless Inspection
- Smart Truck Parking

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# Applications Considered for Improving Truck Safety

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- Emergency Electronic Brake Lights (EEBL)
- Forward Collision Warning (FCW)
- Intersection Movement Assist (IMA)
- Left Turn Assist (LTA)

## Road Weather
- Motorist Advisories and Warnings (MAW)
- Enhanced MDSS
- Vehicle Data Translator (VDT)
- Weather Response Traffic Information (WxTINFO)

## Environment
- Eco-Approach and Departure at Signalized Intersections
- Eco-Traffic Signal Timing
- Eco-Kamp Metering
- Low Emissions Zone Management
- AFV Charging / Fueling Information
- Eco-Smart Parking
- Dynamic Eco-Routing (light vehicle, transit, freight)
- Eco-ICM Decision Support System

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Connected Vehicle Applications Selected in Performance-Driven Approach

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Projected Synergies and Impacts from Truck Safety Apps in the Deployment Concept

- Smart Truck Parking
- Curve Speed Warning (CSW)
- Do Not Pass Warning (DNPW)
- Lane Change Warning (LCW)

Projected Impacts:
- Reduced number of truck-vehicle conflicts and crashes
- Reduced crashes improves freight reliability, particularly around hilly interchanges
- Improved freight data helps improve overall corridor mobility
Projected Synergies and Impacts from Freight Reliability Applications in the Deployment Concept

Freight Reliability Apps

- Freight Advanced Traveler Information System (FRATIS)
- Drayage Optimization (DRG-OPT)
- Freight Signal Priority (FSP)

Projected Impacts:
- 20% decrease in late arrival of goods
- Reduced number of empty moves
- Optimized use of freight trucks by cargo need
- Signals optimized for access to intermodal facilities when wait times are short
Integrated Concept for I-876 Corridor

Roadside infrastructure used for both electronic inspections and safety applications

In-Vehicle Truck Technologies Support Both V2V and V2I Applications

Signals Timed to Prioritize or Gate Demand at Intermodal Facilities

Intermodal Facility Wait Times Measured and Shared

Drayage Movements Dynamically Optimized
Stakeholder Q&A

Jeff Spencer (FTA)