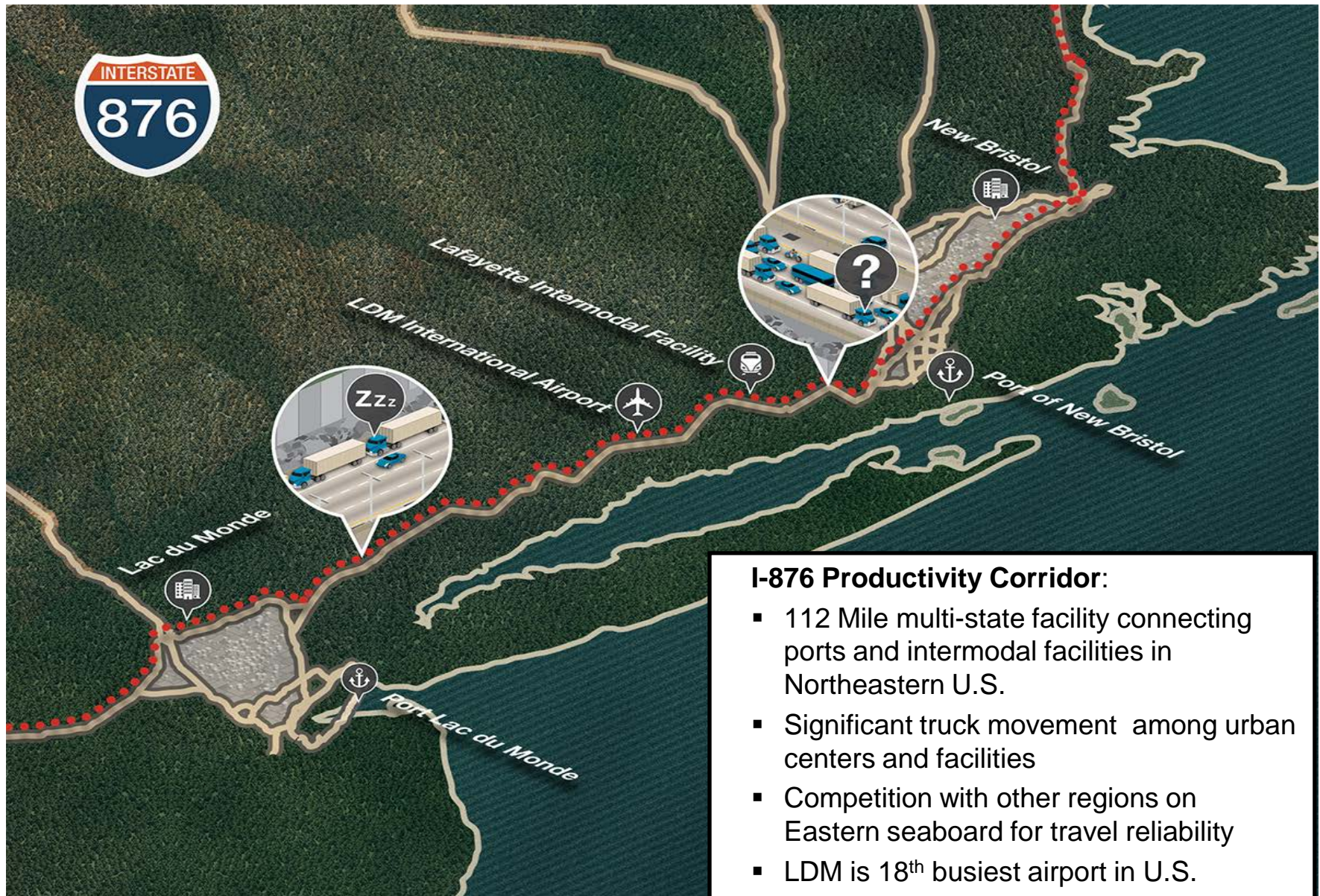




Example CV Pilot Deployment Concepts: I-876 Productivity Corridor

Randy Butler (FHWA)

I-876 Productivity Corridor



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

Metrics	Targets
Improve Truck Travel Times	Reduce freight vehicles travel times by 17%
Reduce Number of Wasted Trips	Reduce the number of wasted trips by 15%
Improve truck safety	Reduce truck-related conflicts by 30%



Applications Considered for Improving Freight Reliability

V2I Safety

Red Light Violation Warning
Curve Speed 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)

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-Traffic Signal Priority
Connected Eco-Driving
Wireless Inductive/Resonance Charging
Eco-Lanes Management
Eco-Cooperative Adaptive Cruise Control
Eco-Traveler Information
Eco-Ramp Metering
Low Emissions Zone Management
AFV Charging / Fueling Information
Eco-Smart Parking
Dynamic Eco-Routing (light vehicle, transit, freight)
Eco-ICM Decision Support System

Improve Reliability

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

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
Smart Roadside
Wireless Inspection
Smart Truck Parking



Applications Considered for Improving Truck Safety

V2I Safety

Red Light Violation Warning
Curve Speed 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)

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-
 Connected Eco-Driving
 Wireless **Improve Truck Safety** Charging
 Eco-Lanes Management
 Eco-Speed Harmonization
 Eco-Cooperative Adaptive Cruise Control
 Eco-Traveler Information
 Eco-Ramp Metering
 Low Emissions Zone Management
 AFV Charging / Fueling Information
 Eco-Smart Parking
 Dynamic Eco-Routing (light vehicle,
 transit, freight)
 Eco-ICM Decision Support System

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

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

Smart Roadside

Wireless Inspection
Smart Truck Parking



Connected Vehicle Applications Selected in Performance-Driven Approach

Improve Freight Productivity

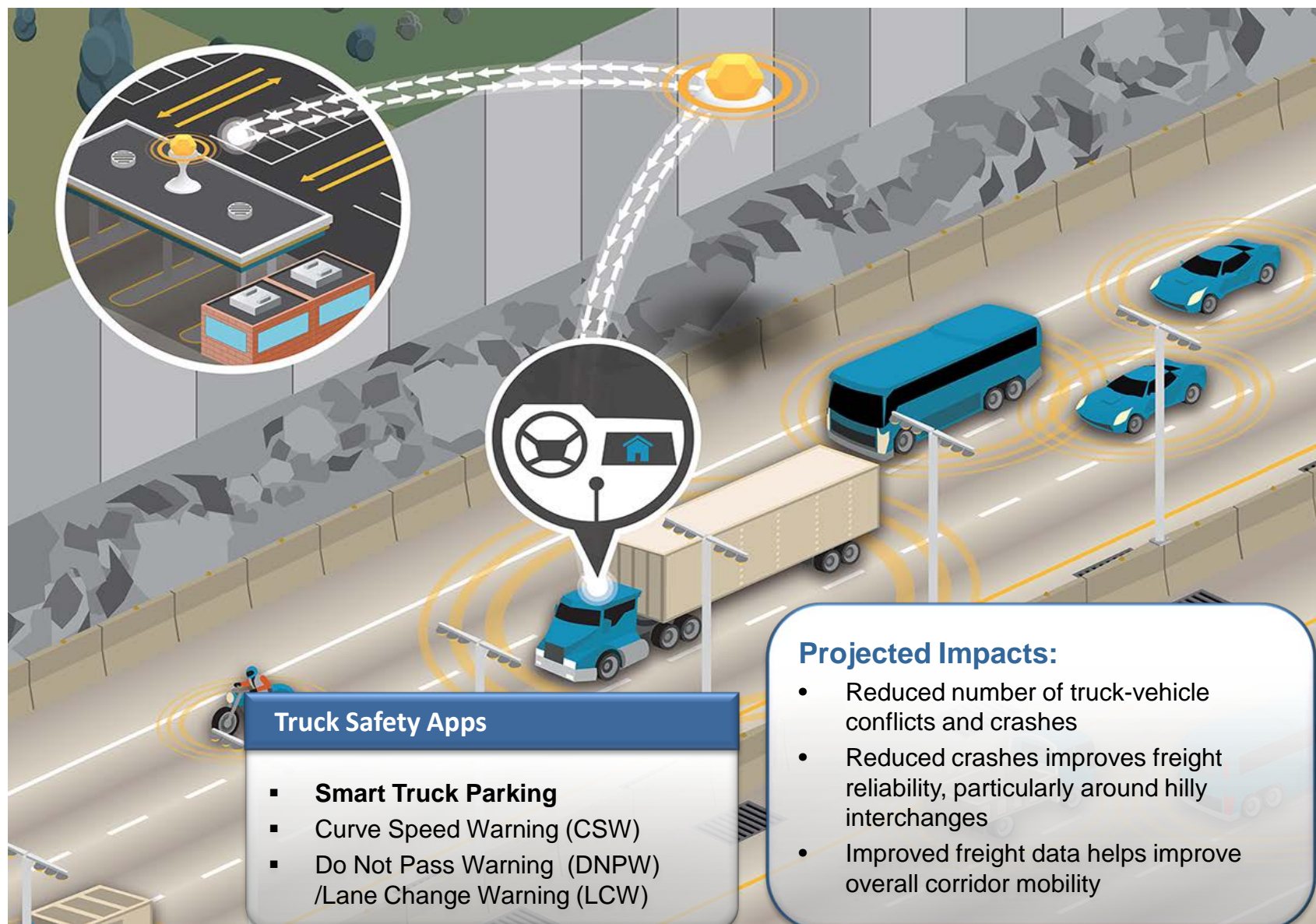
- Freight Advanced Traveler Information System (FRATIS)
- Drayage Optimization (DRG-OPT)
- Freight Signal Priority (FSP)

Improve Truck Safety

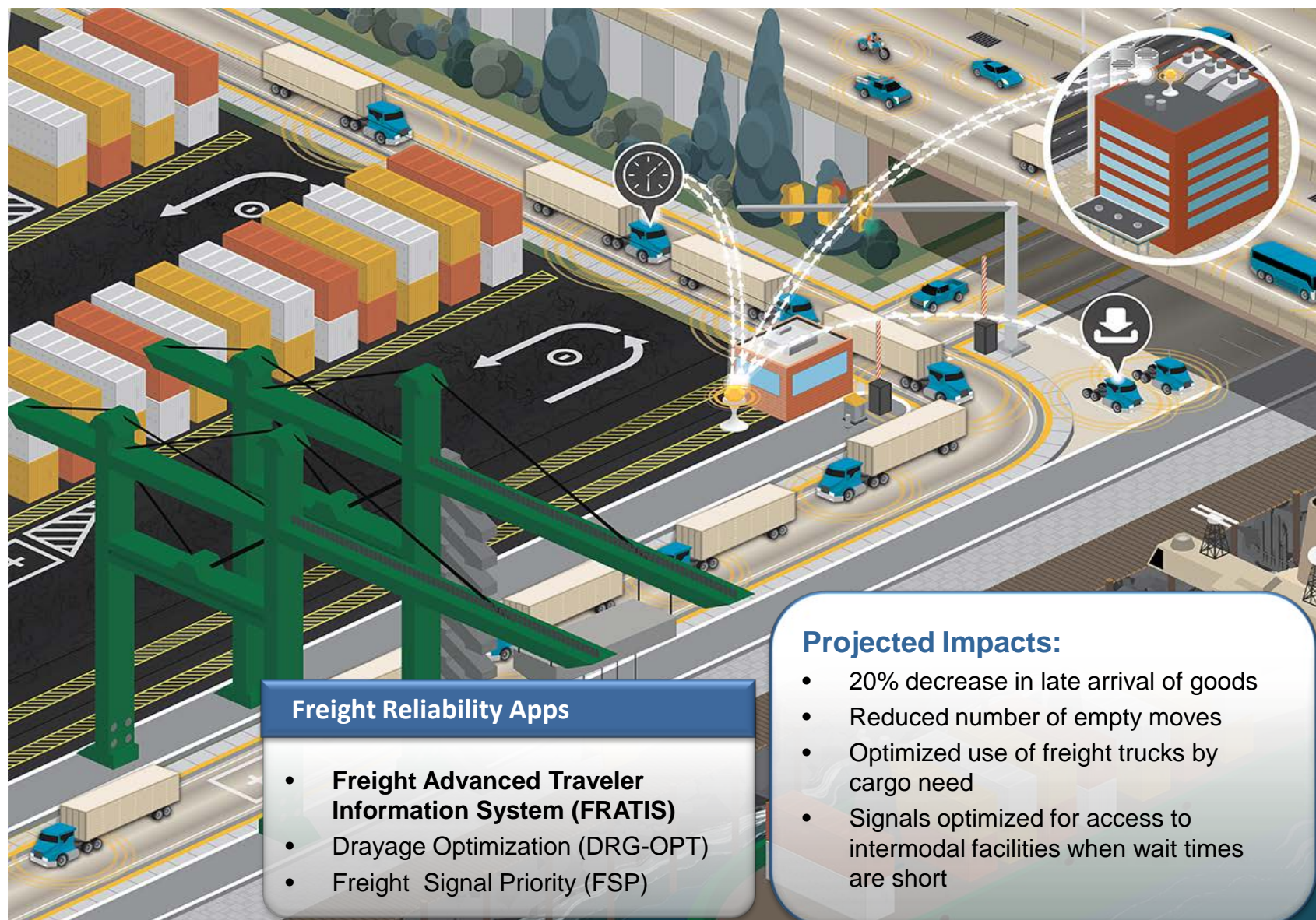
- Smart Truck Parking
- Curve Speed Warning (CSW)
- Do Not Pass Warning (DNPW) /Lane Change Warning (LCW)



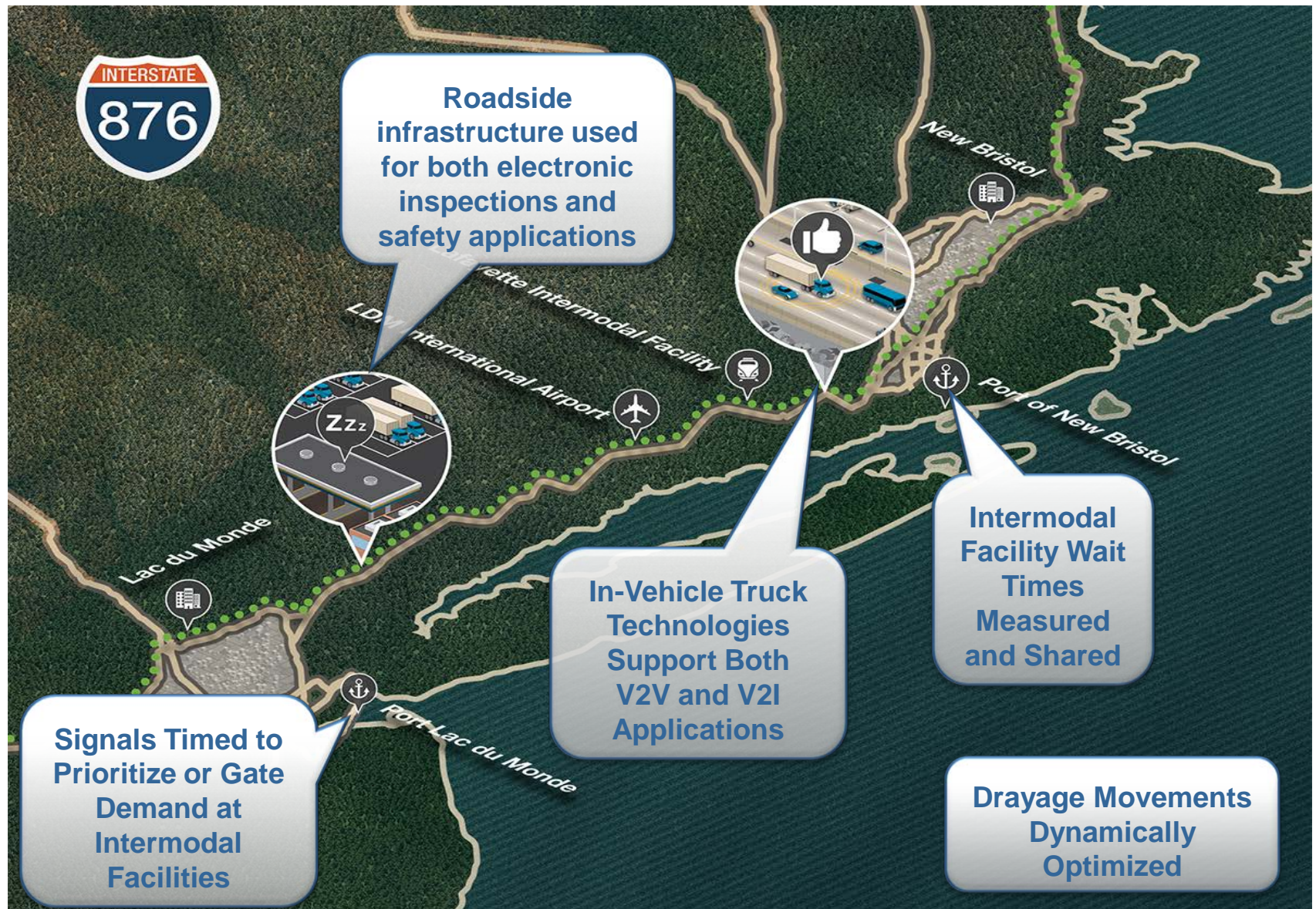
Projected Synergies and Impacts from Truck Safety Apps in the Deployment Concept



Projected Synergies and Impacts from Freight Reliability Applications in the Deployment Concept



Integrated Concept for I-876 Corridor



Stakeholder Q&A

Jeff Spencer (FTA)

