

Pennsylvania Turnpike Commission's Connected Vehicle Roadmap



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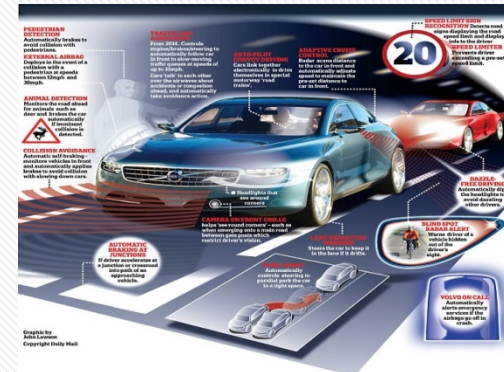
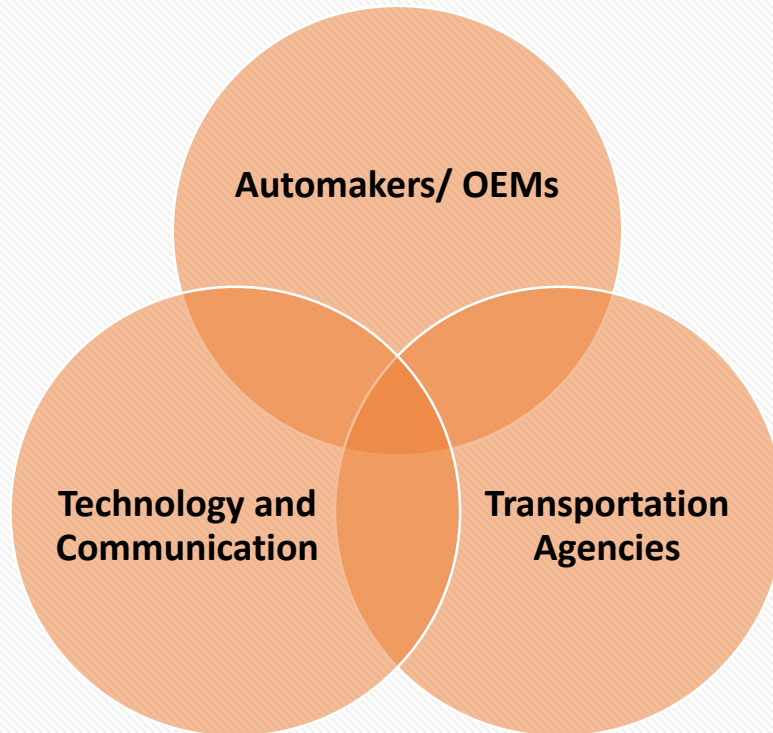
IBTTA Transportation Policy & Finance Summit

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Disruptive Change

The car as we know it, and how it's used in people's lives, is going to change really dramatically and it's going to change fast

Bill Ford Jr., Executive Chairman (April 2013)



Mixed Fleet



Traveler Information Strategies



Application Areas

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-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

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

Work Zone Applications



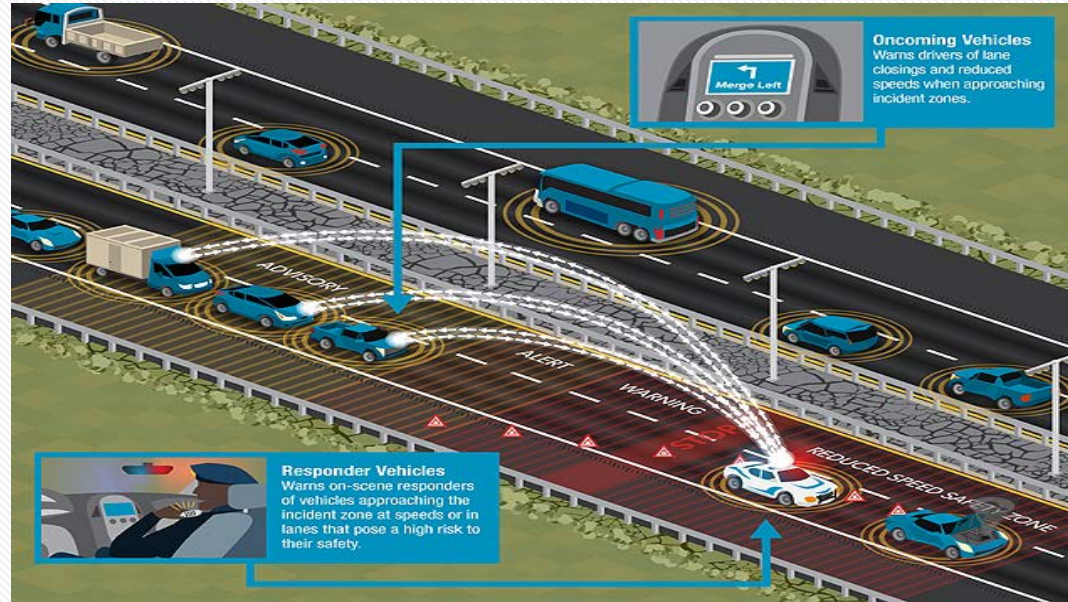
Work Zone Warning

Alerts the driver to use caution when traveling through a work zone.

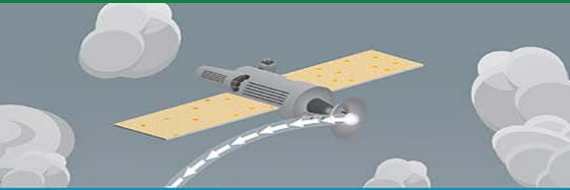
- Evaluating applications that:
 - Warn of lane restrictions and backlogs
 - Warn of mobile and maintenance patterns
- Connected Smart Work Zone Pilot starting in March 2016
 - Sharing queue, delay and incident information into Trip Talk application
- Connected Truck Mounted Attenuator Pilot
 - Developing pilot in partnership with PennDOT and possible Waze
- Autonomous Truck Mounted Attenuator
 - Conducted demo of Royal Truck Autonomous TMA
 - Make explore pilot pending legislation

Traffic Incident Management

- Evaluating applications that:
 - Warns drivers of lane closing and reduced speeds when approaching incident zones
 - Warns on-scene responders of vehicles approaching the incident zone at speeds or in lanes that pose a high risk to their safety
- Exploring procurement options to create a connected fleet

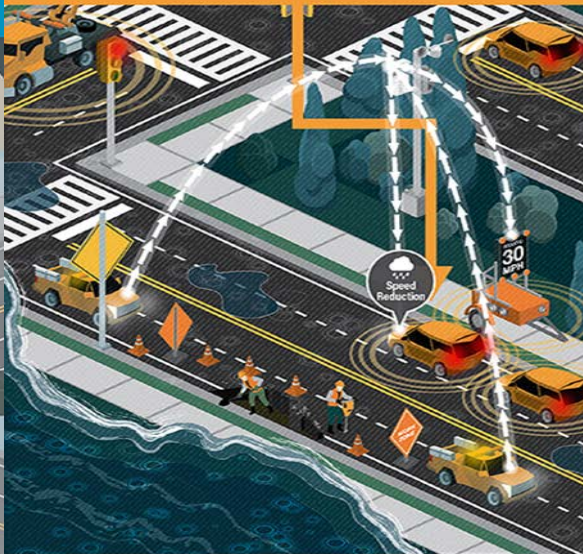
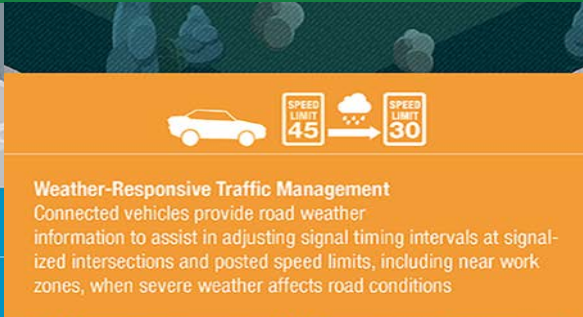


Weather Management



Motorist Advisories and Warnings

Issues alerts and advisories to travelers about deteriorating road and weather conditions on specific roadway segments



- Completing Roadway Weather Management Study
- Evaluating applications that:
 - Issues alerts and advisories
 - Provides road weather information to assist in adjusting posted speed limits
 - Connected snowplows to provide weather data

Connected and Autonomous Vehicle Road Map Project

- Completion by summer 2016
- Expand internal working group – executive, traffic operations, IT, engineering, maintenance
- Refine operational vision and proposed application areas
- Identify short-term pilot projects
- Identify communication, fleet, staffing and resource requirements
- Develop a high-level implementation schedule and capital plan for applications
- Develop an operations and maintenance strategy for applications

Next Steps

- Complete Connected and Autonomous Vehicle Road Map Project
- Participate in Joint PennDOT and PTC Connected and Autonomous Vehicle Strategic Plan
- Explore multi-state partnerships
- Participate in national discussion
- Plan and program for projects that enhance safety and mobility