Connected Vehicles

Is Your City Ready for this New Technology?

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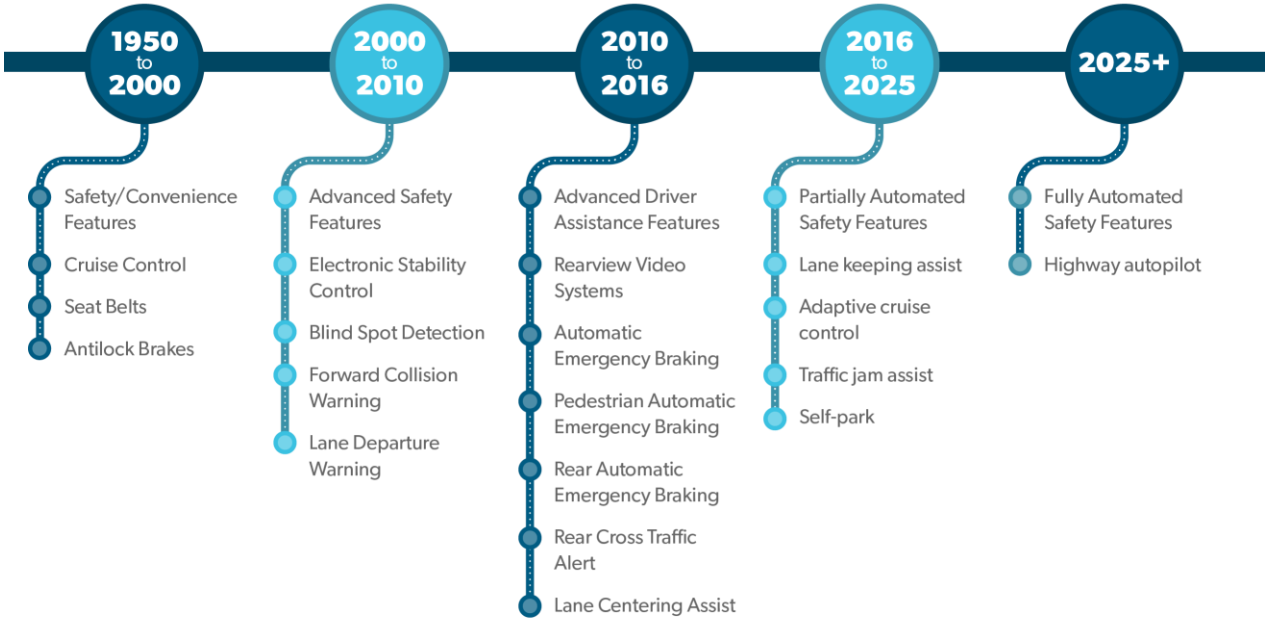
NLC

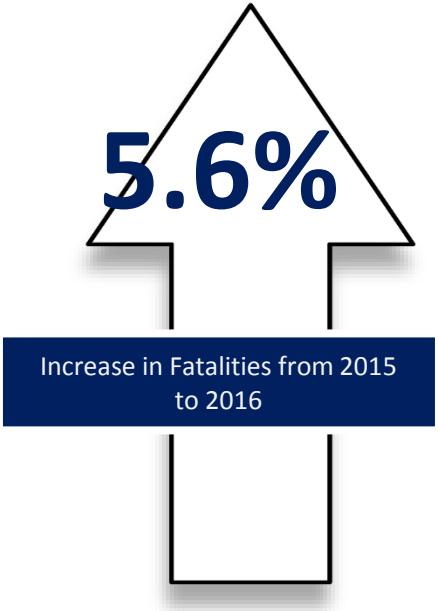
Imagine a Transportation System in which
VEHICLES CAN SENSE & COMMUNICATE
Things That You Can't.

THE EVOLUTION OF AUTOMATED SAFETY TECHNOLOGIES



•Source: USDOT NHTSA *Automated Driving Systems 2.0: A Vision For Safety*

Automated Vehicles Offers Transformative Safety Benefits for Transportation



Automated Vehicle Technologies Can Reduce Vehicle Crashes

Source: NHTSA

Automated Vehicles Could Have Significant Impacts on Mobility

INRIX Traffic Data 2016

INRIX US Traffic Hotspot Study 2017

- New York had more traffic hotspots than any other city, ***costing drivers $64 billion by 2026***
- Los Angeles has 10 of the 25 worst traffic hotspots in America, ***costing L.A. drivers an estimated $91 billion over the next 10 years***
- I-95 in Washington D.C. was the worst overall traffic hotspot, which ***caused 1,384 traffic jams, stretched 6.4 miles and lasted 33 minutes on average***

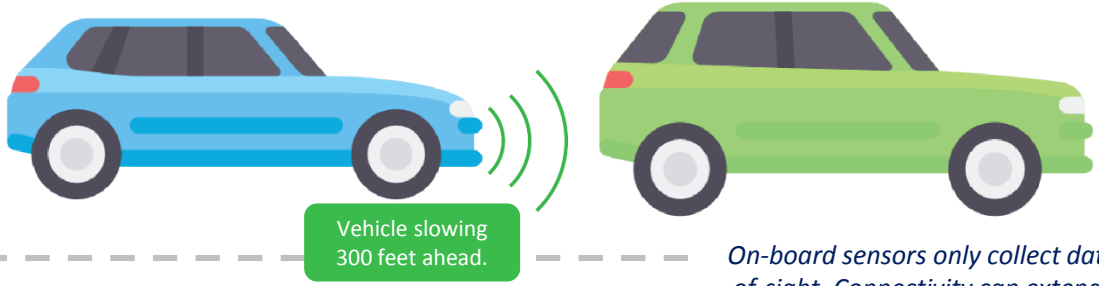
The fast-rising VMT is making things worse

What is Connectivity?

- **Vehicle-to-vehicle** and **vehicle-to-infrastructure** communications enable the vehicle to exchange data with nearby vehicles and roadside infrastructure
- Different communications technologies are utilized depending on the performance requirements of the applications

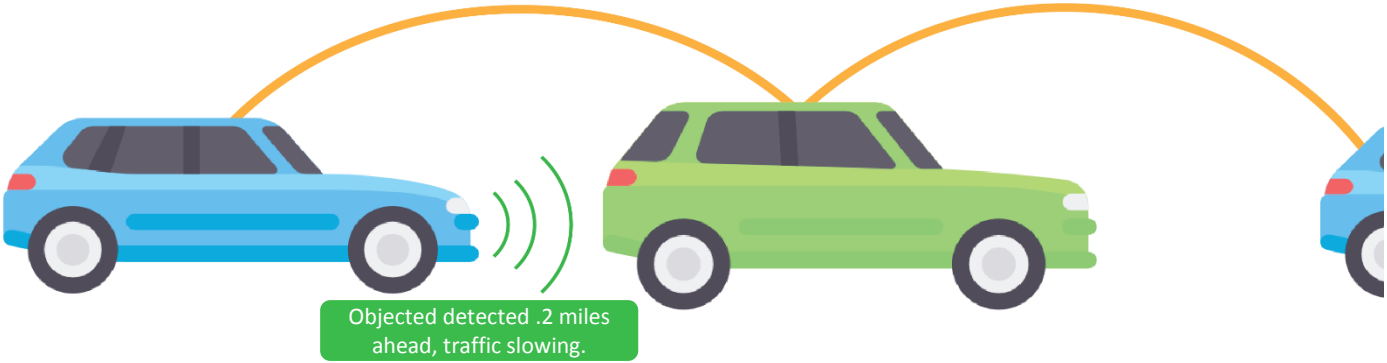
Connectivity Can Provide Additional Data

Non-Connected Automated Vehicles



On-board sensors only collect data within their line-of-sight. Connectivity can extend upon and provide additional information.

Connected Automation



Connectivity Offers Potential Solutions

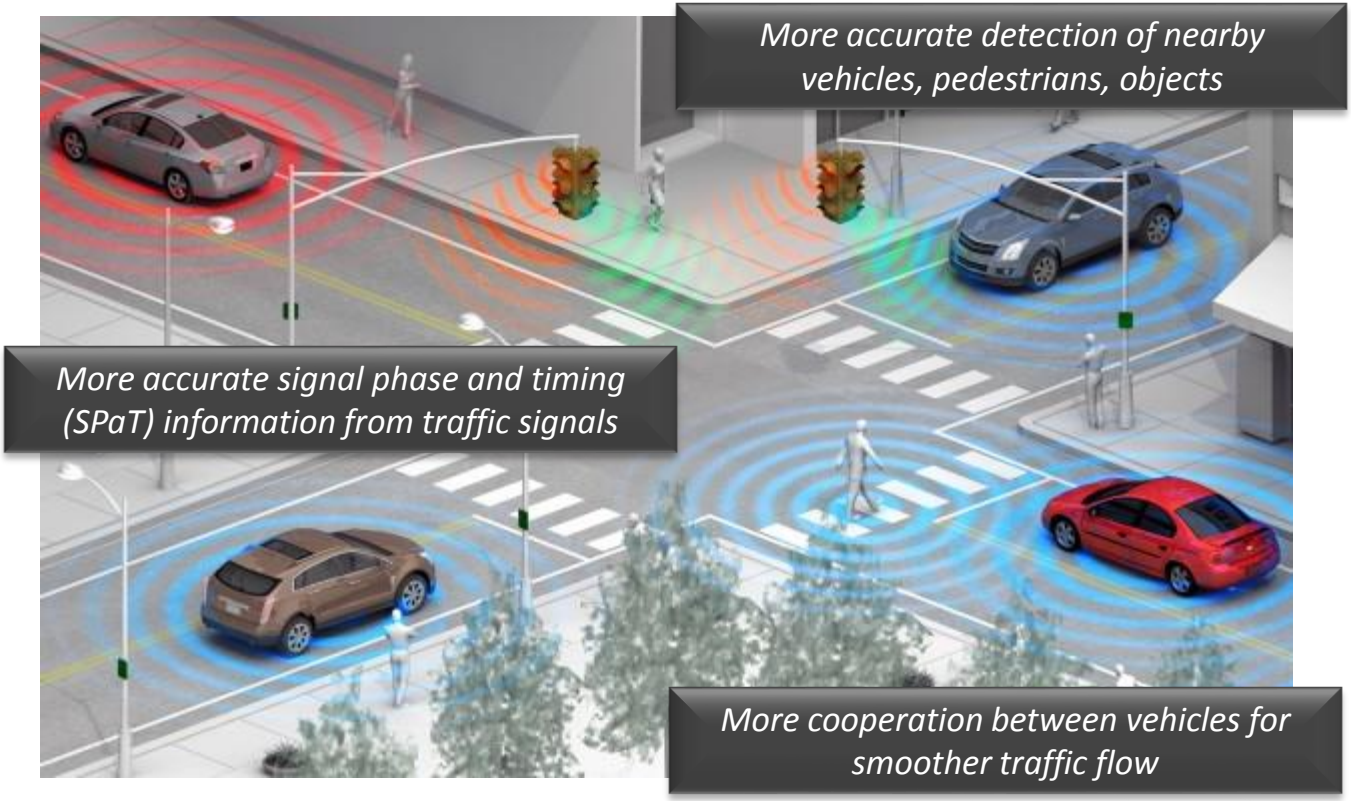


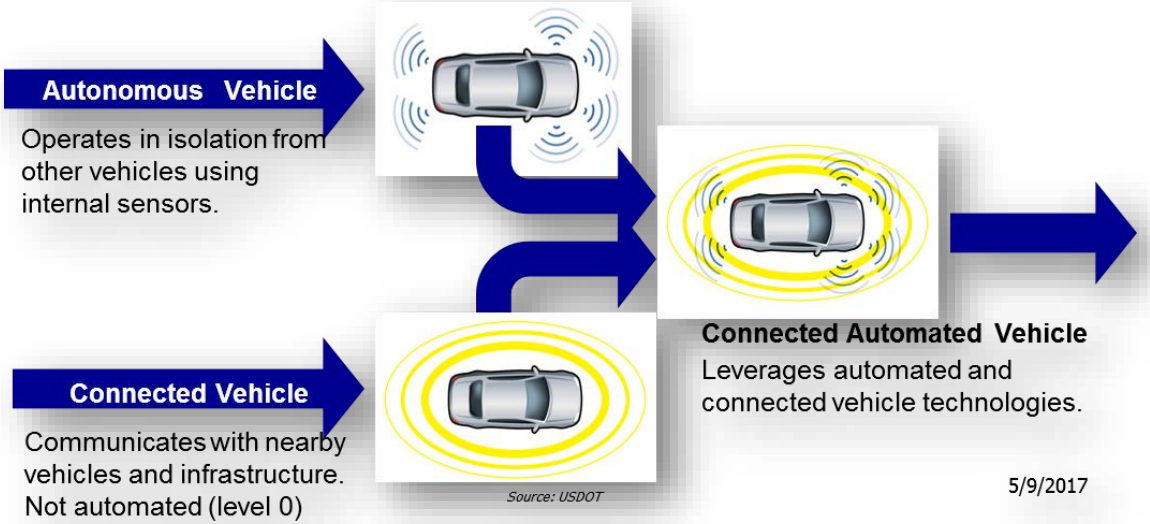
Image Source: https://blog.caranddriver.com/vehicle-to-vehicle-communications-are-the-next-big-thing-in-auto-safety/

Signalized Intersection Approach and Departure

Full Video
https://www.youtube.com/watch?v=I753gGLJAcg

- Allows vehicles to approach and depart an intersection in an coordinated manner
- Increases efficiency and decreases fuel consumption by enabling V2I communications with intersections on the roadway.
- Signalized Intersection Approach & Departure project results:
  - 22% fuel economy improvement with partial automation
  - Time saved from reducing start-up loss

Connectivity Enables Cooperative Automation



Cooperative Automation

- Uses vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) connectivity.
- Enhances the safety and efficiency of Automated Driving Systems.
- Provides greater situational awareness and efficiency.

CONNECTED VEHICLE PILOT
Deployment Program

ITS Joint Program Office

https://www.its.dot.gov/pilots/

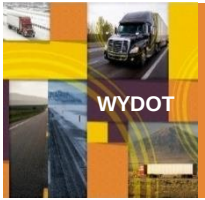
CV Pilot Organizing Principles

- CV Pilots are real-world deployments
  - The successful, deployed technologies are expected to remain as permanent operational elements

- Deployment concepts are <u>needs-driven</u>
  - Each site has different needs, focus and applications
    - The deployments will address critical needs
    - The needs will drive the deployment process

- The Pilot deployments are <u>*large-scale with multiple applications*</u>
  - <u>*Large-scale*</u> to provide a measurable impact
  - And <u>*multiple applications*</u> to demonstrate a variety of transferable solutions

THE THREE PILOT SITES



- Reduce the number and severity of adverse weather-related incidents in the I-80 Corridor in order to improve safety and reduce incident-related delays.
- Focused on the needs of commercial vehicle operators in the State of Wyoming.

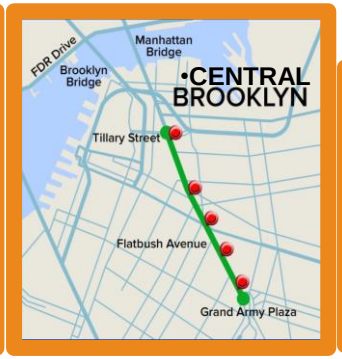
- Improve safety and mobility of travelers in New York City through connected vehicle technologies.
- Vehicle to vehicle (V2V) technology installed in up to 8,000 vehicles in Midtown Manhattan, and vehicle to infrastructure (V2I) technology installed along high-accident rate arterials in Manhattan and Central Brooklyn.

- Alleviate congestion and improve safety during morning commuting hours.
- Deploy a variety of connected vehicle technologies on and in the vicinity of reversible express lanes and three major arterials in downtown Tampa to solve the transportation challenges.

NYC Pilot Deployment Site

Manhattan Grid

- Closely spaced intersections (600' x 250')
- Day vs. Night conditions
- Residential/commercial mix
- High accident rate (red dot) (2012-2014)
  - 20 fatalities
  - 5,007 injuries
- 204 intersections



Central Brooklyn – Flatbush Ave

- Over-Height restrictions
  - Tillary St.; Brooklyn Bridge
- High accident rate (red dots) (2012-14)
  - 1,128 injuries
  - 8 fatalities
- Average AM speed 15 mph
- 35 intersections

Manhattan – FDR Drive

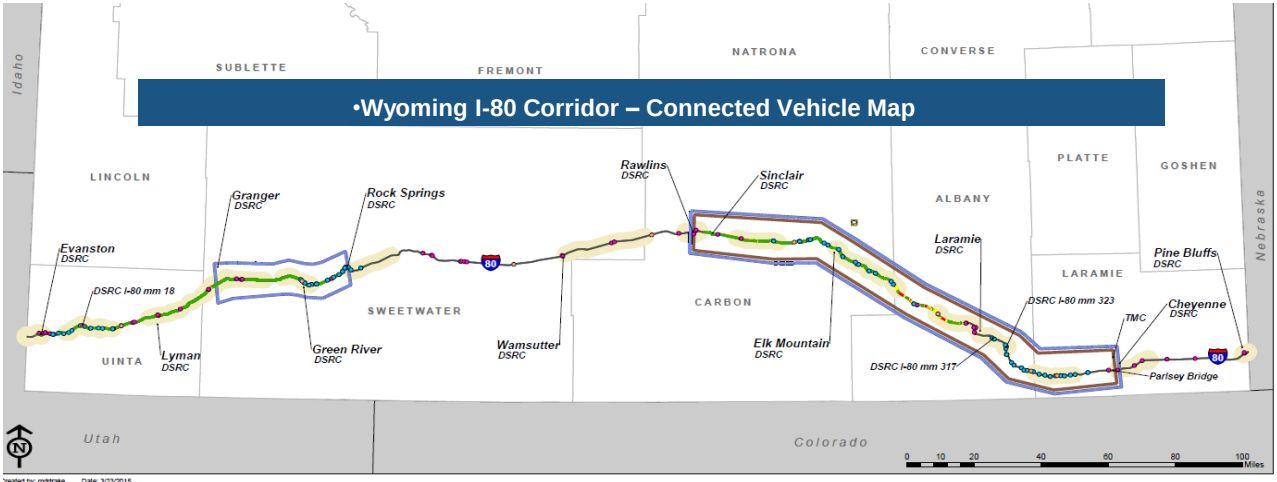
- Limited access highway
- Excludes trucks/buses
- Short radius of curvature
- Over-Height restrictions
- $1,958,497 in Over-Height incident delay costs (2014)
  - 24% of City-wide total

•Source: NYC DOT

ROLL TAPE

CV Part 3

Wyoming Pilot Deployment Site: High Priority Corridor



Created by: mddrake Date: 3/23/2015

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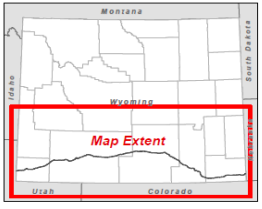
Legend

- High Profile Wind Warning Area
- AVL/Tablet Snow Plows
- STIP Areas 2015-2018

WyoLink - Signal Strength

- Good
- Spotty
- Unreliable

- I-80, Wyoming
- Possible Locations Roadside DSRC *(Going into/out ofeach town off I-80 for supportingVSL Application. These include locations with mm labels)*
- WiFi Locations (9 within 500 ft of I-80)
- VSL Devices (122 on I-80)
- Truck Parking (55 on I-80)



Source: Wyoming CV Pilot Deployment Team

ROLL TAPE

Deployer Technical Assistance: Accelerate testing and deployment of interoperable connected ITS technologies during the early stages of deployment when development of standards, best practices, and support systems and processes are also ongoing and collaboratively build upon the state of the practice.

Thank You

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