

# How Our Cities Can Plan for Driverless Cars

*September 17, 2015*



# They're coming ...

*The state of autonomous vehicle technology seems likely to advance with or without legislative and agency actions at the federal level. However, the manner in which autonomous vehicle technologies progress and will eventually be implemented depends heavily on these efforts. Intelligent planning, meaningful vision, and regulatory action and reform are required.*

- “Preparing a Nation for Autonomous Vehicles: Opportunities, Barriers, and Policy Recommendations,” Eno Center for Transportation

# Discussion Topics

- Autonomous Vehicles (AV) 101
- Our AV Future
- Current Status of Government with AV
- Proposed Actions for State and Local Governments Regarding AV



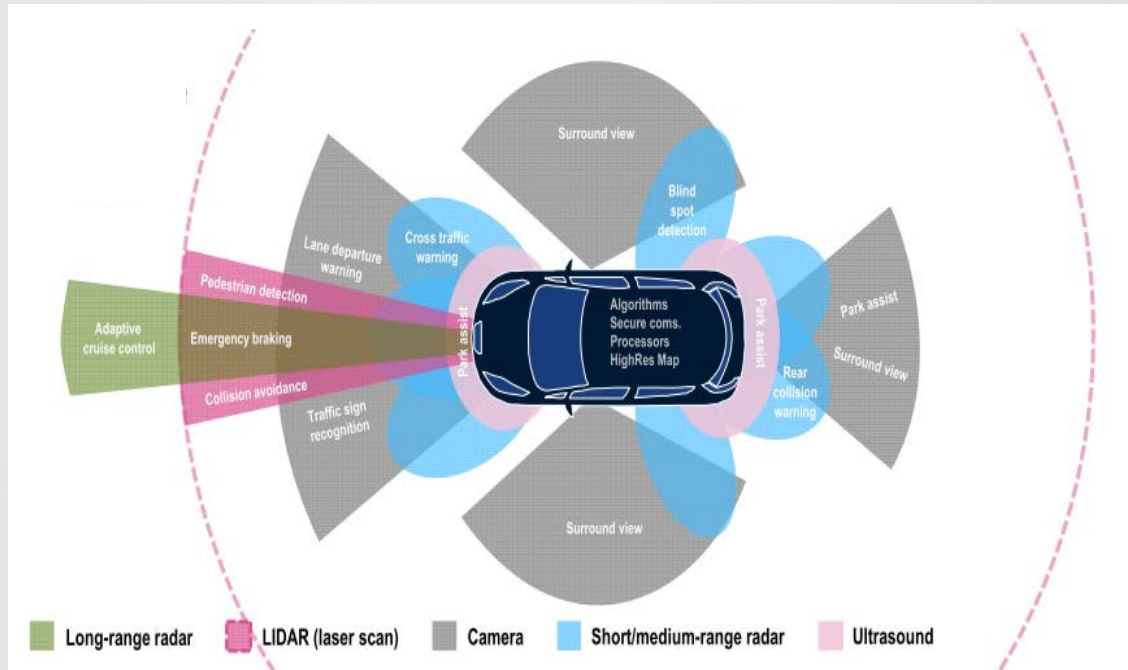


# Autonomous Vehicles (AV) 101

# AV Definition

NHTSA defines “Full Self-Driving Automation” as:

*“designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip. Such a design anticipates that the driver will provide destination or navigation input, but is not expected to be available for control at any time during the trip.”*



Source: [http://www.internationaltransportforum.org/Pub/pdf/15CPB\\_AutonomousDriving.pdf](http://www.internationaltransportforum.org/Pub/pdf/15CPB_AutonomousDriving.pdf)

# NHTSA's Definition of Vehicle Automation

## Level 0 (Non-Automation)

The driver is in complete and sole control of the primary vehicle controls – brake, steering, throttle, and motive power – at all times.



## Level 1 (Function-Specific Automation)

Automation at this level involves one or more specific control functions.



## Level 2 (Combined Function Automation)

Automation of at least two primary control functions designed to work in unison to relieve the driver of control of those functions.



## Level 3 (Limited Self-Driving Automation)

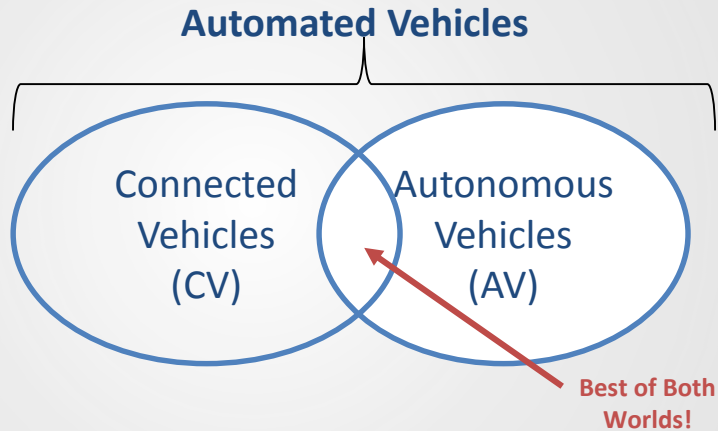
Automation enable the driver to cede full control of all safety-critical functions under certain traffic or environmental conditions. The driver is expected to be available for occasional control, but with sufficiently comfortable transition time.



## Level 4 (Full Self-Driving Automation)

The vehicle is designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip. Such a design anticipates that the driver will provide destination or navigation input, but is not expected to be available for control at any time during the trip.

# Definitions: Autonomous vs Connected Vehicles



# Potential Impact of AVs on Society

## Positives

- Safety improvements
- Improved mobility for youth, elderly, and disabled
- Improved traffic circulation
- Reduced need for parking
- Improved travel time reliability
- Reduced GHG emissions
- Reduced need for private car ownership and private auto insurance

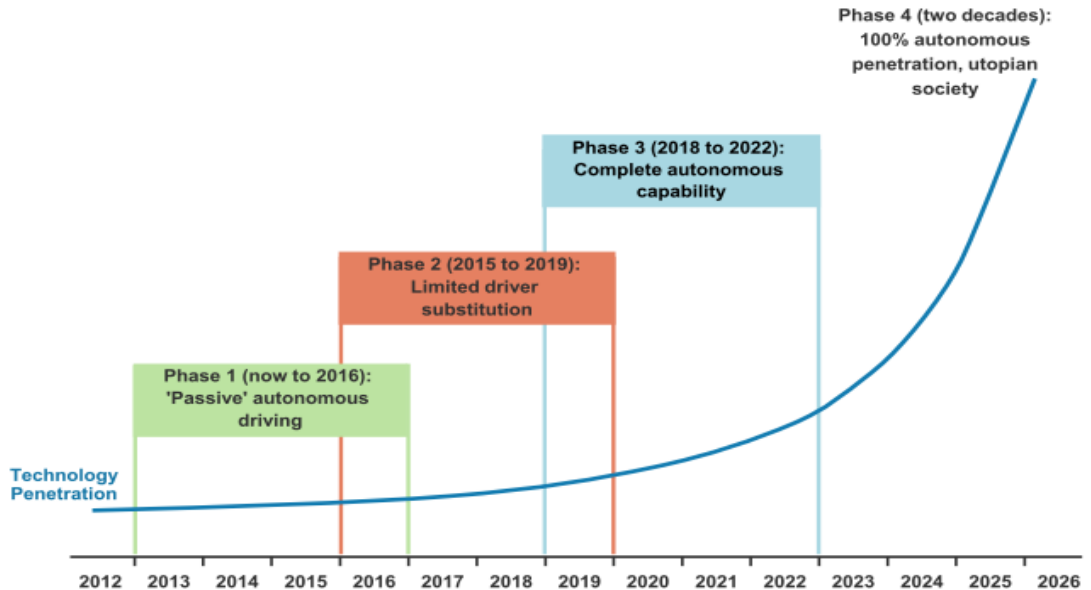
## Negatives

- Increased “VMT”
- Insurance policy disruption
- Increased urban sprawl
- Job loss





# AV Adoption Timeline

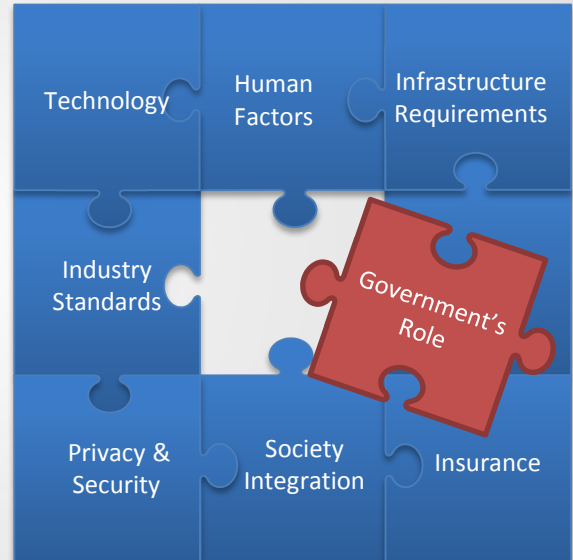


Source: Company Data, Morgan Stanley Research

Source: Morgan Stanley

# AV Today

- Technology development continues to be the main focus; however, other considerations are being researched as well
- Governments around the world are developing partnerships and conducting research to determine how they should regulate the industry in order to ensure public safety





# Our AV Future

# Our Mobility Future

## Influencers

- Level of vehicle sharing
- Level of ride sharing
- Level of AV proliferation
- Number of people able to “drive”
- Land use
- Fuel economy of vehicles
- Mobility options and pricing














## Impacts

- VMT
- Number of vehicles
- Level of throughput

# Potential Future Scenarios



# Changes from Today's Society

	AV Nightmare	AV Utopia
Safety		
VMT		
GHG Emissions		
Urban Sprawl		
Parking Req'ts	No Change	
Roadway Maintenance Req'ts		
Low Income Mobility		



# Current Status of Government with AV

# Current Role of U.S. Government

## Federal

- Established classification system for various levels of automation of cars
- Research and funding focused on connected vehicles (minimal autonomous)
- Rule-making is delegated to state-level

## State

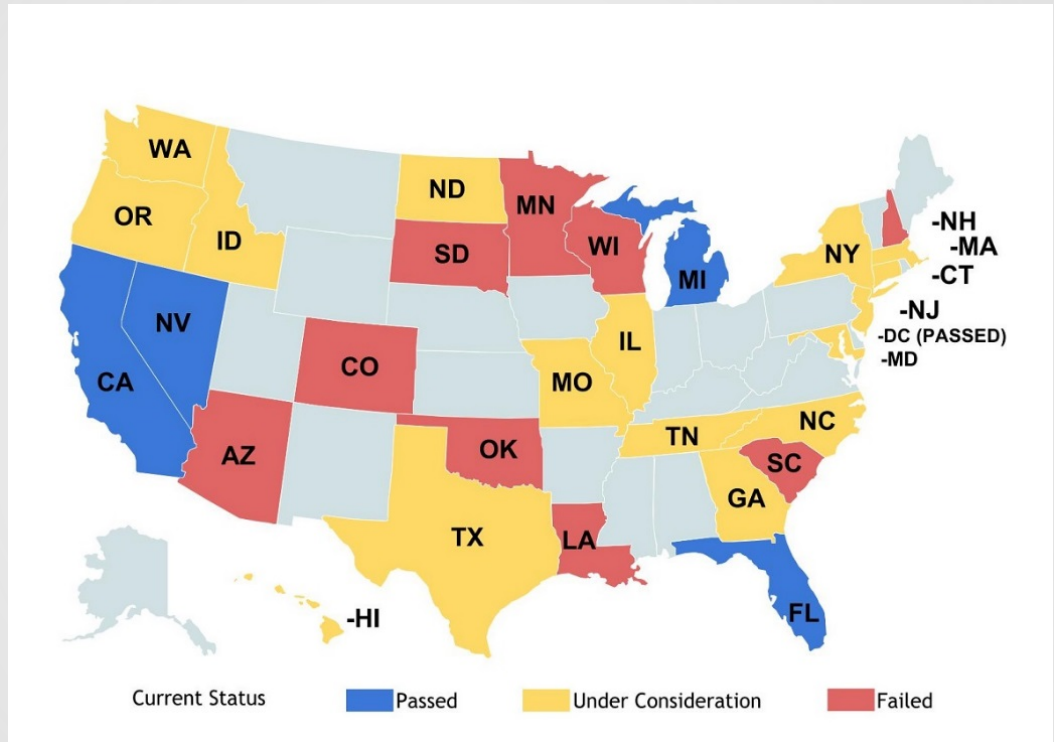
- State roles vary significantly. Some have enacted legislation allowing testing and, in some cases, requiring licensing or safety guidance

## Local

- Some cities, transit agencies, and other local government organizations are partnering with technology developers to support testing

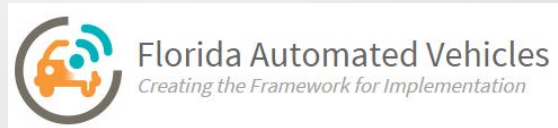


# U.S. States' AV Legislative Update



As of August 2015, California, Michigan, Florida, Nevada, Tennessee, and Washington D.C. have enacted legislation allowing autonomous vehicle testing on public roadways.

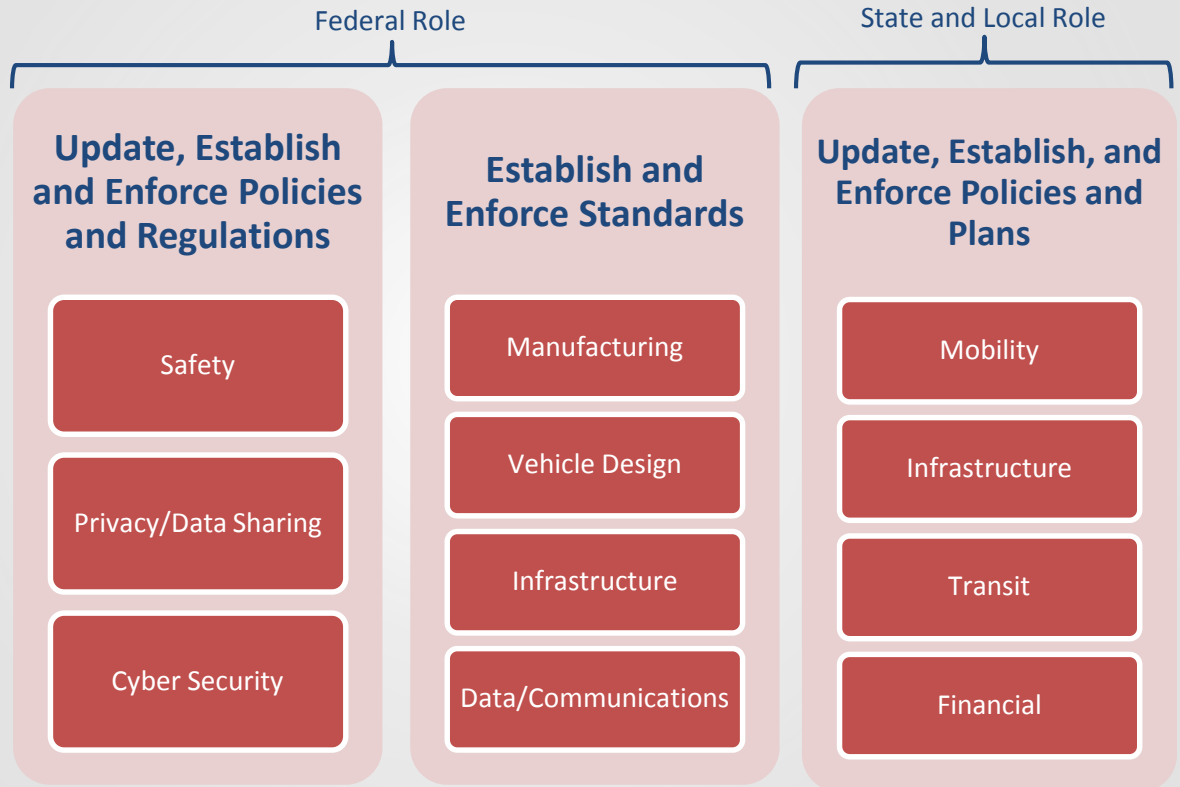
# AV Test Sites Involving Local Gov't (Sampling)





## Proposed Actions for State and Local Governments Regarding AV

# Proposed Government Role in AV



# Local Government Recommendations

What can be done now?

Support testing activities

Stay educated on AV progress

Establish communications and/or coalition with AV stakeholders

Establish policies and plans with consideration for the future

Encourage open data sharing

# Local Government Recommendations

What can be done in the medium (1-2 years) to long-term (3-5 years)?

## Planning

- Update travel demand model
- Evaluate road capacity needs
- Assess transit requirements
- Forecast financial implications

## Infrastructure Modifications

- Certify roads for AV usage
- Update traffic signs and markings
- Reduce lane width
- Alter speed limits
- Adjust traffic signal locations and timing
- Eliminate/reduce parking and add more “drop-off/pick-up” locations
- Develop new predictive models for pavement maintenance

## Miscellaneous

- Update enforcement function within the government
- Update incident management function within the government
- Update government workforce to match needs

# Local Government Recommendations

What policy changes can be made by local governments to influence potential AV impacts in our cities?

Update roadway policies and infrastructure to manage the VMT impact

Adjust land use policies to reduce urban sprawl

Adjust the tax/fee structure to disincentivize car ownership and/or parking

Alter parking policies to reduce the need for private parking

Change transit pricing



STAY TUNED...

*Local Government Response to  
Driverless Cars Planning Guide  
Is UNDER DEVELOPMENT*



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## Blog:

### Driving Towards Driverless Cars



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#### Driverless Cars: What they Are and What they Are Not

Posted on March 3, 2015

I'm realizing that I'm writing about driverless cars and yet I haven't explicitly defined them.

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