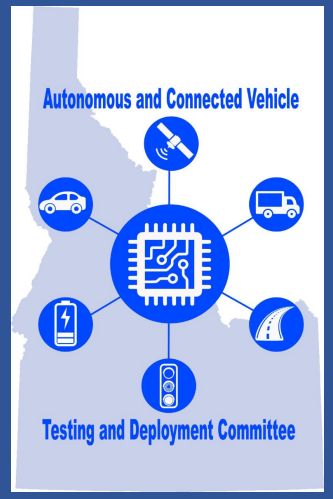


Idaho Autonomous Vehicle And Connected Vehicle

Testing and Deployment Committee

Idaho Autonomous Vehicle And Connected Vehicle Testing and Deployment Committee

Welcome!

Brian Ness

Director, Idaho Transportation Department

First Committee Report

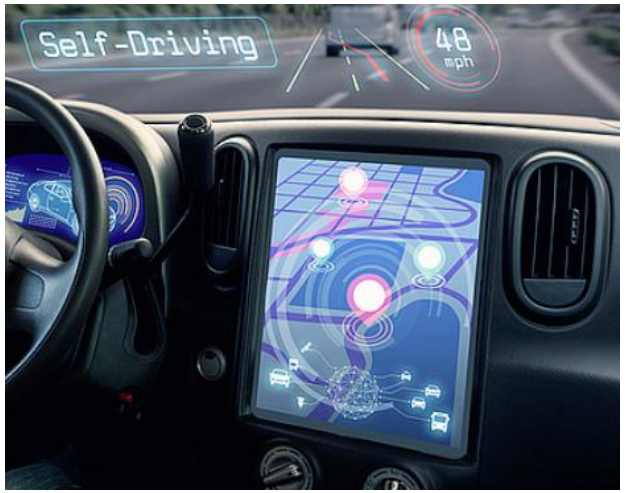
- **Due to Governor's Office:** November 1, 2018

- **Committee Meetings:** May, August, and October

  — Then as required

Vision

The state of Idaho embraces the testing and development of advanced transportation technology

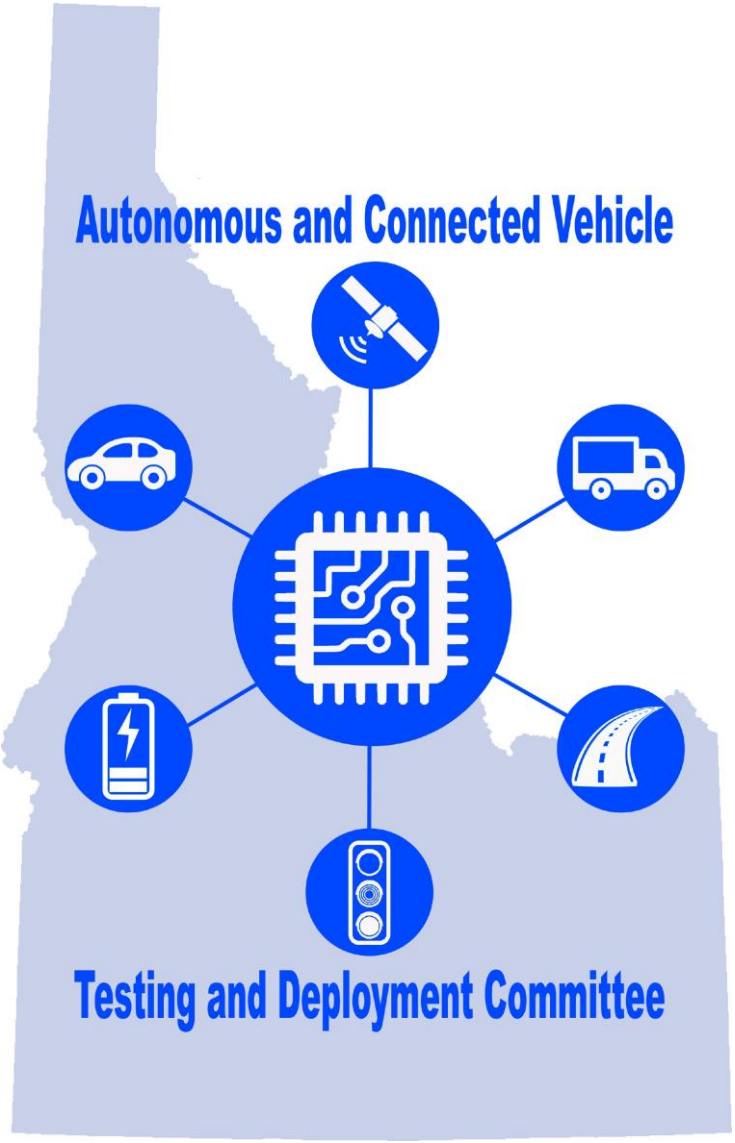


Mission

- Find out who has jurisdiction
- Coordinate road tests
- Identify legal impediments
- Identify and Leverage strategic Partnerships

Focus Areas

- **Policy Considerations**
- **Infrastructure**
- **Security and Privacy**
- **Testing and Deployment**



Committee Focus

Idaho:

Autonomous and Connected Vehicles

AASHTO:

Cooperative Automated Transportation (CAT)

Idaho Autonomous Vehicle And Connected Vehicle

Testing and Deployment Committee

Autonomous and Connected Vehicle 101

Jeff Marker

Idaho Transportation Department

Overview

- Terminology
- Automation Levels
- Federal and State Activities
- Idaho Actions and Projects

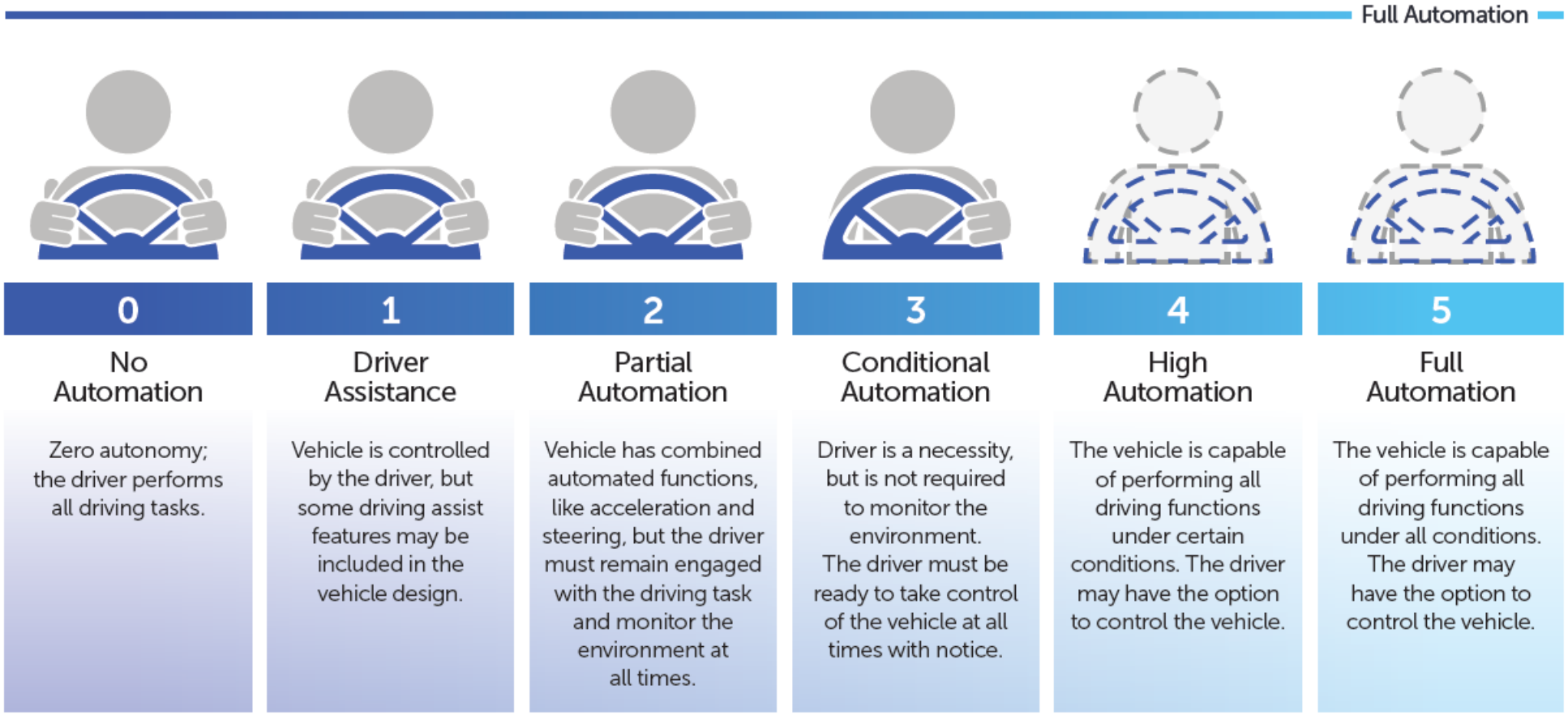
Terminology

- **Automated Driving Systems (ADS)**
  - Automated Vehicles (AV)
  - Connected Vehicles (CV)
  - Autonomous vs Automated
  - Cooperative Automated Transportation (CAT)
  - Dynamic Driving Task

- **Communications**
  - Dedicated Short Range Communications (DSRC)
  - 5G and 6G Wi-Fi Development
  - Vehicle-to-Vehicle (V2V)
  - Vehicle-to-Infrastructure (V2I)
  - Vehicle-to- “Other” (V2X)

Terminology

Society of Automotive Engineers (SAE) Automation Levels



Federal Activity

- **Federal Legislative Progress:**
  - Provides federal language for implementing AV use (AV START Act - Senate, SELF DRIVE Act - House)
  - Bills to preempt states from adopting, maintaining, or enforcing rules or standards to the contrary
  - Provides that a state may not deny issuance of a driver license for the operation or use of a dedicated highly automated vehicle in a manner that discriminates on the basis of disability
  - Provides limits on number of AVs manufactured annually

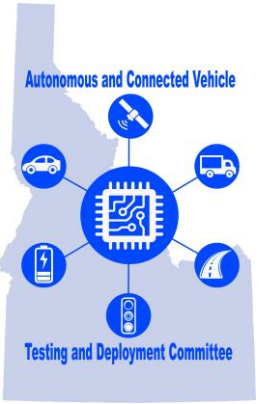
- **US DOT:**
  - Voluntary guidance - 12 priority safety design elements
  - Executed through NHTSA as recommendations; Sept. 2017
  - Limited to vehicles 10,000 pounds or less
  - NHTSA will be required to publish and finalize rules based on bill final language

State Activity

- **2015 Session**
  - Bill considered to encourage testing – No consensus on liability levels
  - Required human operator be present in test vehicles with ability to take control
  - Required vehicles meet current federal safety standards
  - Allowed local jurisdiction to close roads to testing
  - Narrowly passed Senate, Failed in House

- **2017 Session**
  - Information panel (DMV, Utah DOT, Idaho State Police, Manufacturer Representative, and two legislators)
    - Provided information on current status of AV's
    - Reviewed NHTSA guidelines published Sept. 2016

- **2018 Governor's Executive Order**



Idaho Actions

- **Idaho Transportation Department Activity**
  - Economic Opportunity and Mobility Strategic Team
  - Long Range Transportation Plan
  - Infrastructure Project Development

- **Projects in Idaho**
  - Idaho Transportation Department and Idaho National Laboratory
    - Signal in Idaho Falls
    - Camera Feeds to 511
  - Ada County Highway District
    - Advanced Signal Controllers

Idaho Autonomous Vehicle And Connected Vehicle Testing and Deployment Committee

Regional and National Consistency

Dale Higer
Uniform Law Commission, Drafting Committee on Highly Automated Vehicles

FEDERAL ACTION

Federal and State Regulatory Roles

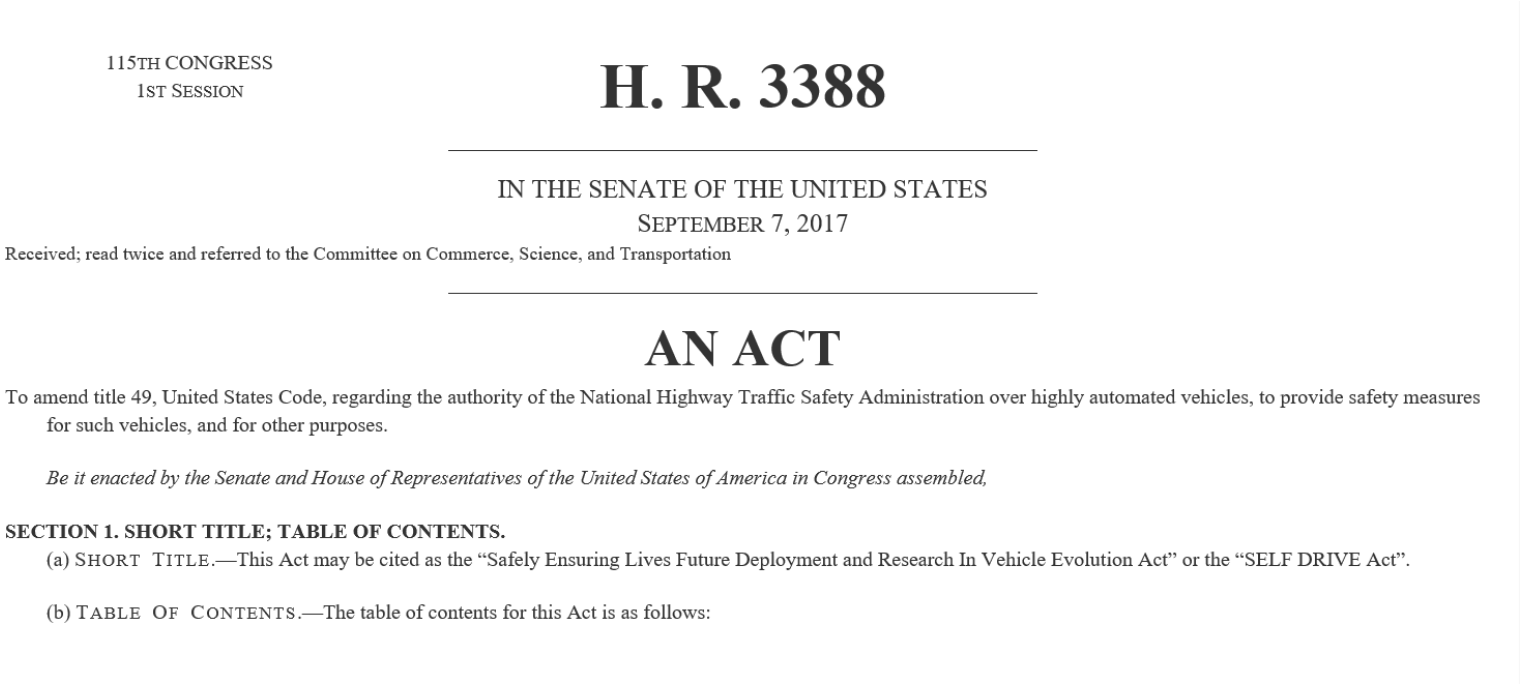
NHTSA'S RESPONSIBILITIES	STATES' RESPONSIBILITIES
• Setting Federal Motor Vehicle Safety Standards (FMVSSs) for new motor vehicles and motor vehicle equipment (with which manufacturers must certify compliance before they sell their vehicles)[33]	• Licensing human drivers and registering motor vehicles in their jurisdictions
• Enforcing compliance with FMVSSs	• Enacting and enforcing traffic laws and regulations
• Investigating and managing the recall and remedy of noncompliances and safety-related motor vehicle defects nationwide	• Conducting safety inspections, where States choose to do so
• Communicating with and educating the public about motor vehicle safety issues	• Regulating motor vehicle insurance and liability

Best Practices for Legislatures

- Provide a “technology-neutral” environment.
- Provide licensing and registration procedures.
- Provide reporting and communications methods for Public Safety Officials.
- Review traffic laws and regulations that may serve as barriers to operation of ADSs.

Federal Legislative Activity

- **House Passes Autonomous Vehicle Bill Expanding Federal Pre-emption**
  - Expansion of Federal Pre-emption
  - Updating FMVSS
  - FMVSS Exemptions
  - Advisory Council



115TH CONGRESS
1ST SESSION

H. R. 3388

IN THE SENATE OF THE UNITED STATES
SEPTEMBER 7, 2017
Received; read twice and referred to the Committee on Commerce, Science, and Transportation

AN ACT

To amend title 49, United States Code, regarding the authority of the National Highway Traffic Safety Administration over highly automated vehicles, to provide safety measures for such vehicles, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

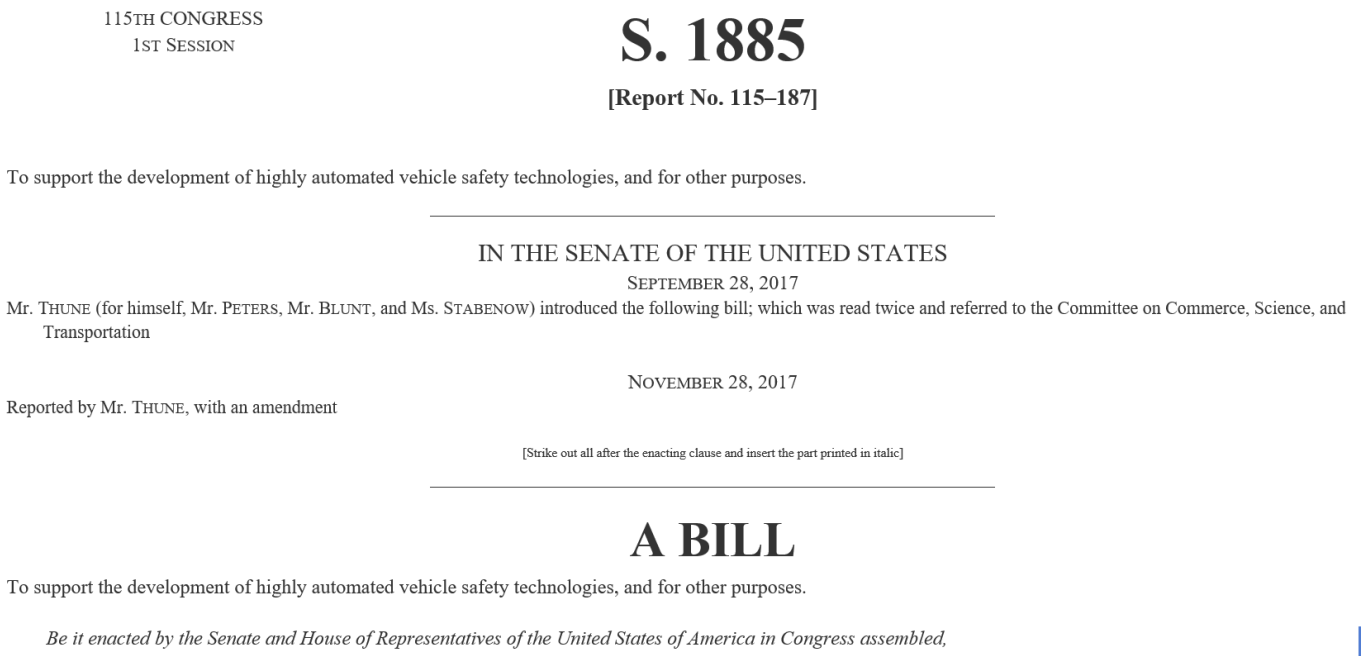
SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Safely Ensuring Lives Future Deployment and Research In Vehicle Evolution Act" or the "SELF DRIVE Act".

(b) TABLE OF CONTENTS.—The table of contents for this Act is as follows:

Federal Legislative Activity

- **Senate Releases Bipartisan Autonomous Vehicle Legislation That Pre-empts States**
  - Pre-emption
  - Updating FMVSS
  - FMVSS Exemptions
  - Safety Evaluation Report
    - System safety
    - Data recording
    - Cybersecurity
    - Human-machine interface
    - Crashworthiness
    - Documentation of capabilities



115TH CONGRESS
1ST SESSION

S. 1885

[Report No. 115–187]

To support the development of highly automated vehicle safety technologies, and for other purposes.

IN THE SENATE OF THE UNITED STATES

SEPTEMBER 28, 2017

Mr. THUNE (for himself, Mr. PETERS, Mr. BLUNT, and Ms. STABENOW) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

NOVEMBER 28, 2017

Reported by Mr. THUNE, with an amendment

[Strike out all after the enacting clause and insert the part printed in italic]

A BILL

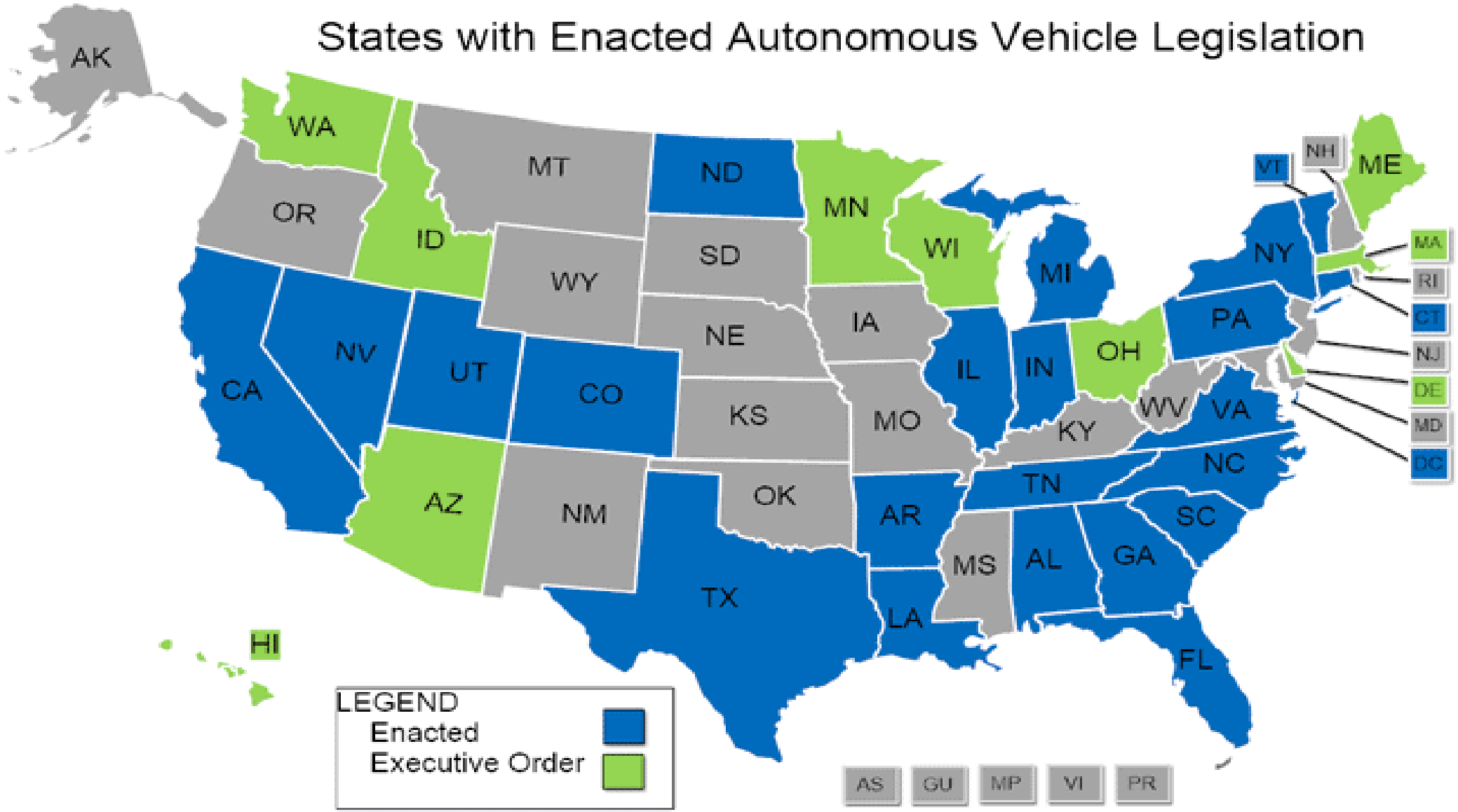
To support the development of highly automated vehicle safety technologies, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Federal Legislative Activity

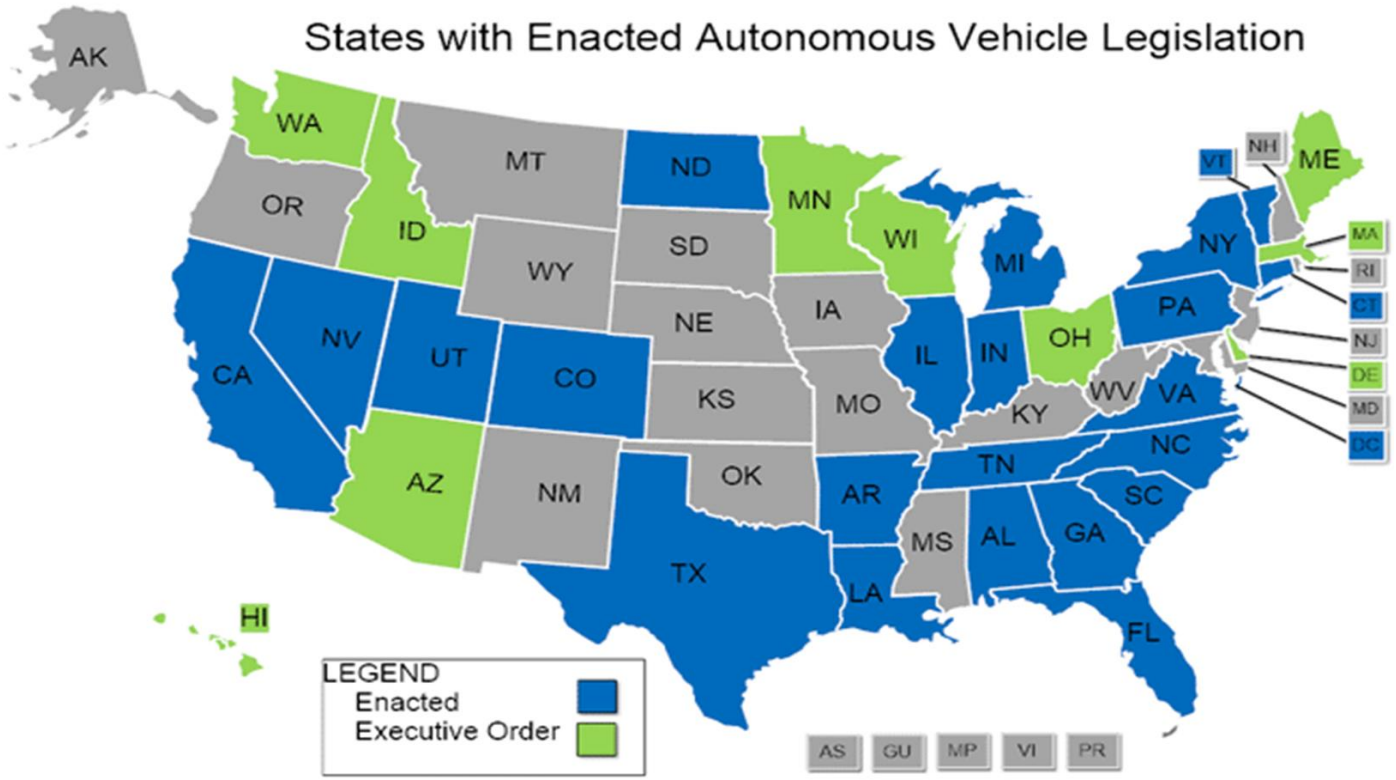
- **Senate Releases Bipartisan Autonomous Vehicle Legislation That Pre-empts States (Continued)**
  - Post-crash behavior
  - Account for applicable laws
  - Automation function
- Advisory Council
- Traffic Safety and Law Enforcement

State Legislation



State Action

- Nevada
- California
- Arizona
- North Dakota
- Utah
- Michigan
- Colorado
- Hawaii
- Washington



Idaho Autonomous Vehicle And Connected Vehicle Testing and Deployment Committee

National Safety Policy

John Tomlinson
Idaho Transportation Department

Federal and State Roles

- **National Highway Traffic Safety Administration (NHTSA) Roles**

- **States' Responsibilities**

Recommendations

Licensing Drivers to Operate Self-Driving Vehicles for Testing

Ensure driver understands how to operate a self-driving vehicle safely

Recommendations

State Regulations Governing Testing of Self-Driving Vehicles

- Minimizes risks to other road users
- Suitable for the capabilities of the tested self-driving vehicles
- Reporting requirements

Recommendations

Basic Principles for Testing Self-Driving Vehicles

- Transitioning process
- Capabilities when system malfunctions
- Does not disable any federally required safety features or systems

Regulations

Governing Operation of Self-Driving Vehicles for Purposes Other than Testing

Not recommended at this time

Model State Policy

- **Administrative**
- **Application for manufacturers or other entities to test HAVs on public roadways**
- **Jurisdictional permission to test**
- **Testing by the manufacturer or other entity**

Model State Policy

- Deployed vehicles: “Drivers”
- Deployed vehicles: Registering and Titling
- Law enforcement considerations
- Liability and insurance

Idaho Autonomous Vehicle And Connected Vehicle Testing and Deployment Committee

Break

Idaho Autonomous Vehicle And Connected Vehicle Testing and Deployment Committee

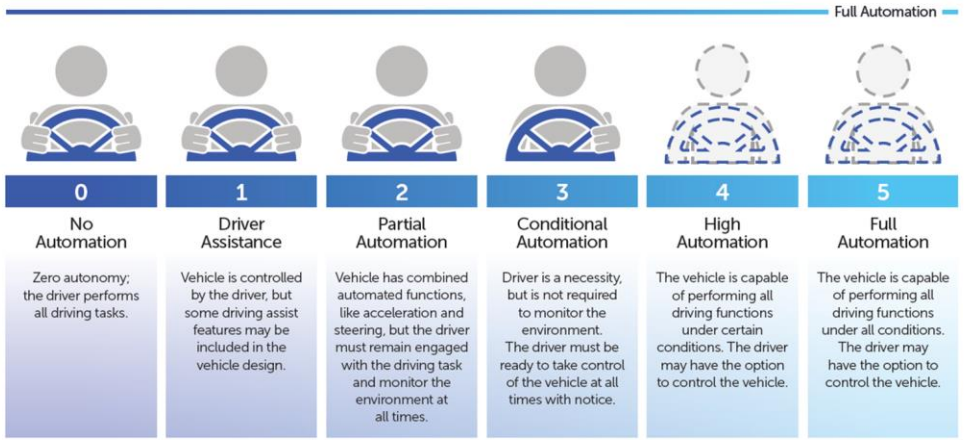
Liability Considerations

Jeff Marker
Idaho Transportation Department

Liability Considerations

Personal Liability Insurance

- **Autonomous vs. Connected Vehicle Technologies**
- **Connected Vehicle Implications**
  - Data on driving habits
- **Autonomous Vehicles**
  - Benefits – Safety, Mobility, Insurance costs
  - Cost increase due to complexity of vehicle systems
  - Shift in liability
  - Dynamic driving tasks
  - Product liability law determined by state



State Actions

- **AV Laws:**
  - 25 States with legislation (plus D.C.)
  - 8 States with Executive Orders
- **Platooning**
- **Liability Not Addressed**
- **Liability for Original Manufacturer Limited for Third Party Conversions**
  - Michigan – Additionally exempts mechanics/repair shops from liability on fixing AVs
  - Nevada
  - Washington D.C.
- **Tennessee -** Specifies that the ADS shall be considered a driver for liability purposes when it is fully engaged and operated properly.


Texas Transportation Institute - Navistar

Liability Considerations

- **AV / CV Systems in Idaho**
  - State Infrastructure Responsibility
    - Build and maintain
    - Infrastructure through third party
      - State must be indemnified, hold harmless
      - Sovereign Immunity
  - Cyber Security

Idaho Autonomous Vehicle And Connected Vehicle Testing and Deployment Committee

Policy Focus Area Discussion

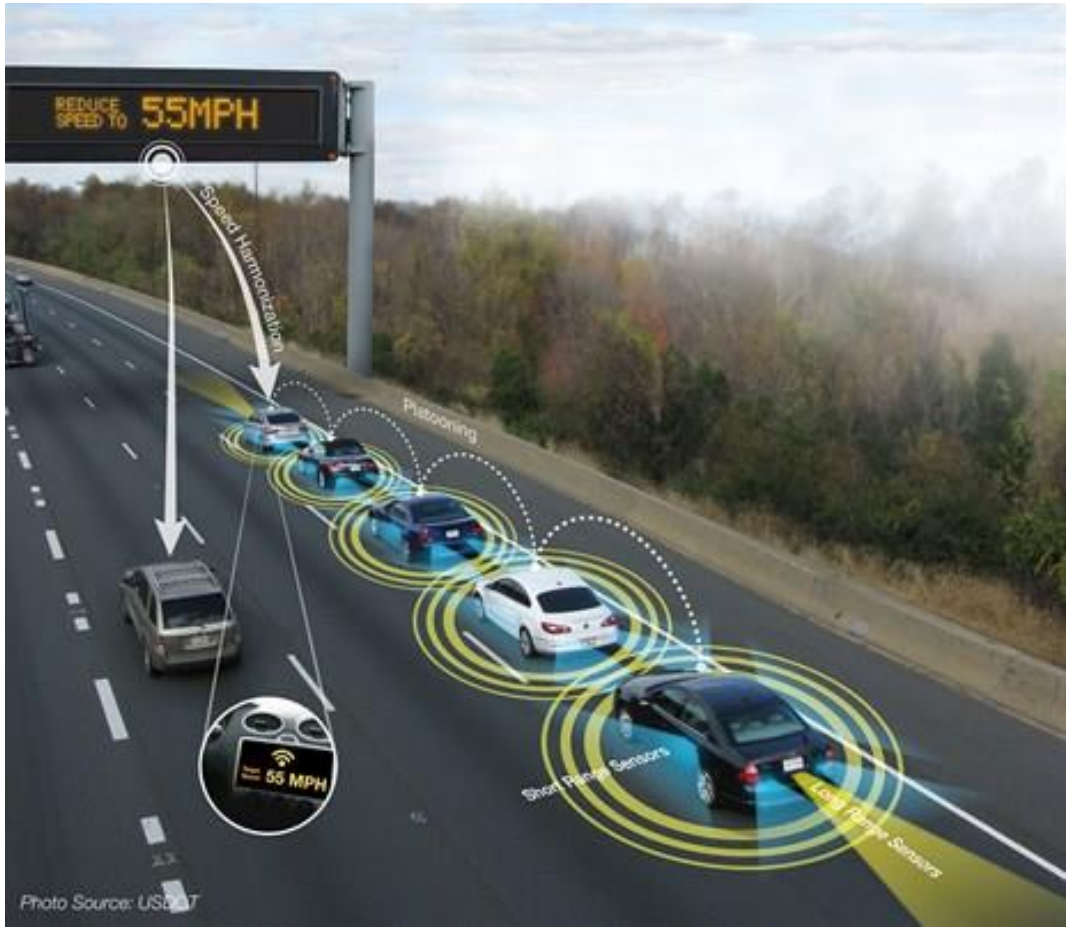
Idaho Autonomous Vehicle And Connected Vehicle Testing and Deployment Committee

INFRASTRUCTURE

Ed Bala, PE
District 5 Engineer ITD

Overview

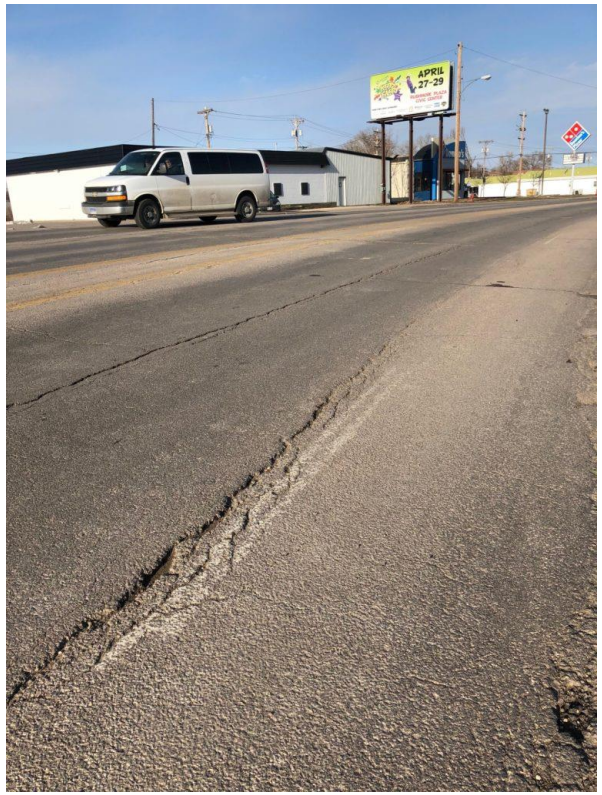
- **The Future Will be Here Sooner Than We Think**
  - Infrastructure Needs of AV/CV
  - Future Capacity Needs
  - AV Rollout
  - Funding Implications



Infrastructure Needs

Improved Striping/Signs

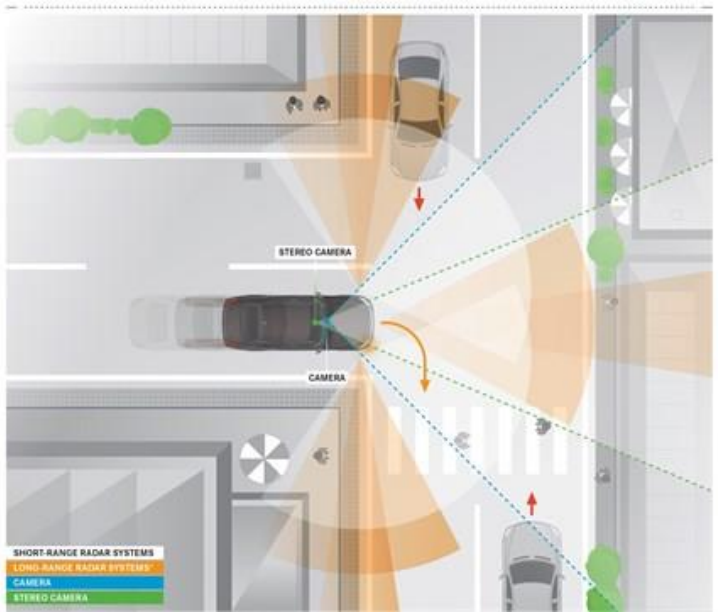
- Sensors Need to “Find” Clues



Infrastructure Needs

Even With Better Marking, Sensors Can Have Problems

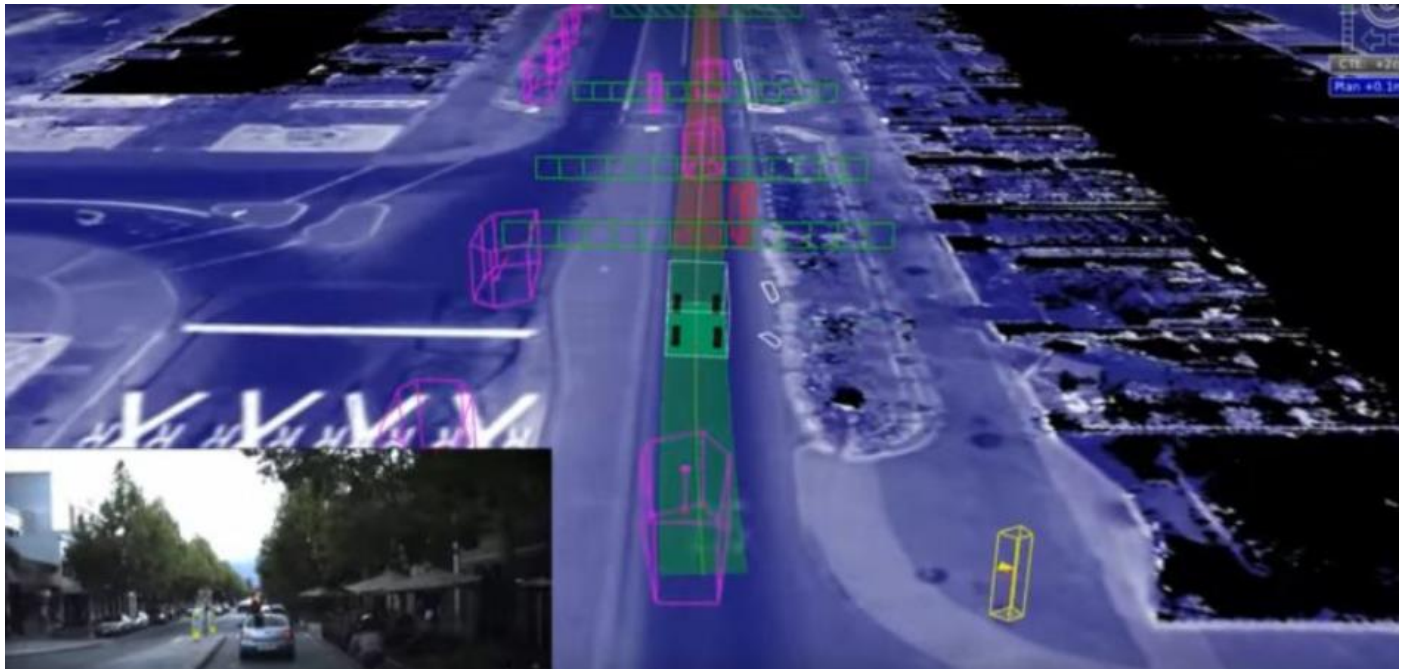
- **Glare/Rain**
- **Misidentification**



Infrastructure Needs

Carmakers Are Responding to These Problems

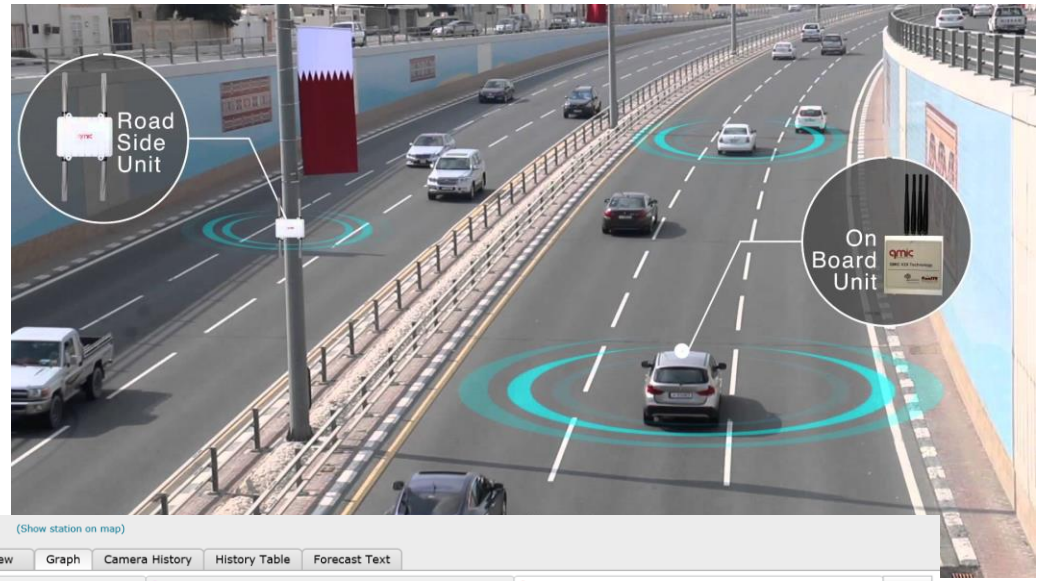
- **23+ Sensors – Lidar, Radar, etc**
- **Highly Accurate 3D Mapping/GPS**
- **Better AI – Sense/Decide 20x per Second**

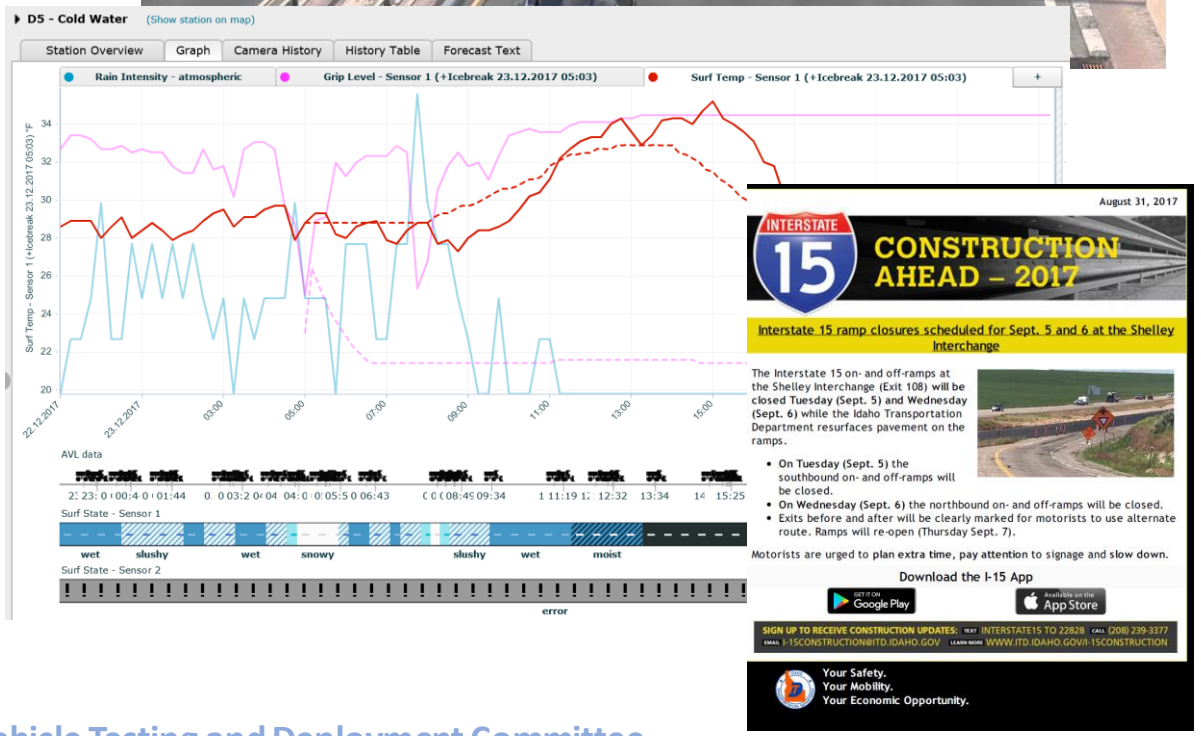


Infrastructure Needs

More Information is Helpful

- **V2I – Audi Pioneering Signal Info**
  - Las Vegas
  - Houston
  - Dallas
  - Portland
- **Could Share Weather/Road Data**
  - ITD RWIS Network- Partner w/INL
  - Bluetooth/Algorithms
  - ??

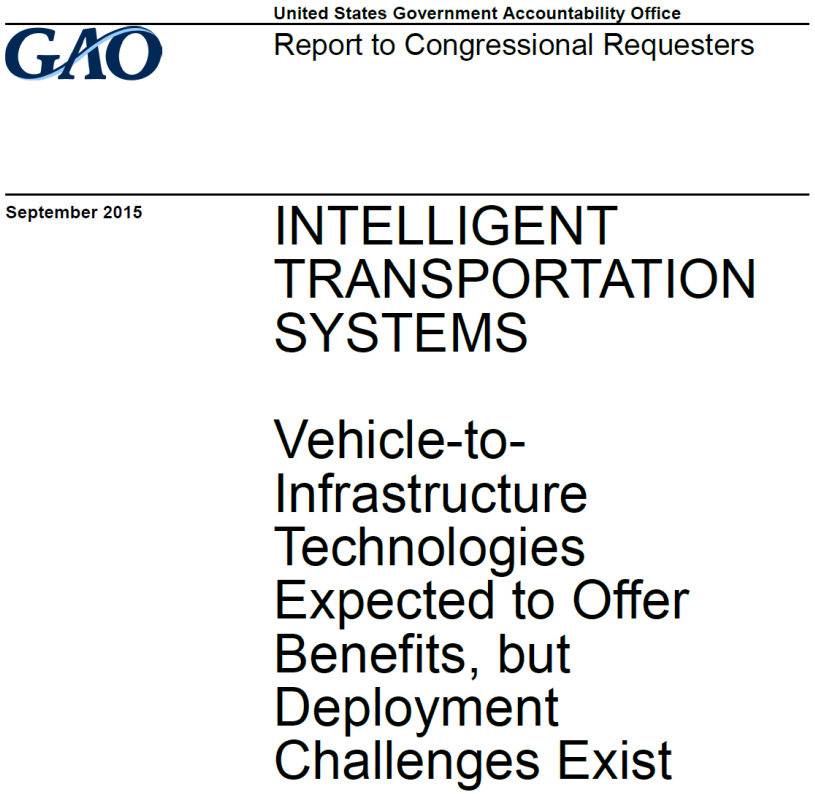




Infrastructure Needs

Difficulties in Sharing Infrastructure Data

- **Deployment Not Uniform**
- **Security Concerns**
- **Liability Issues**
- **Technical Issues w/Spectrum Sharing**


United States Government Accountability Office

GAO

Report to Congressional Requesters

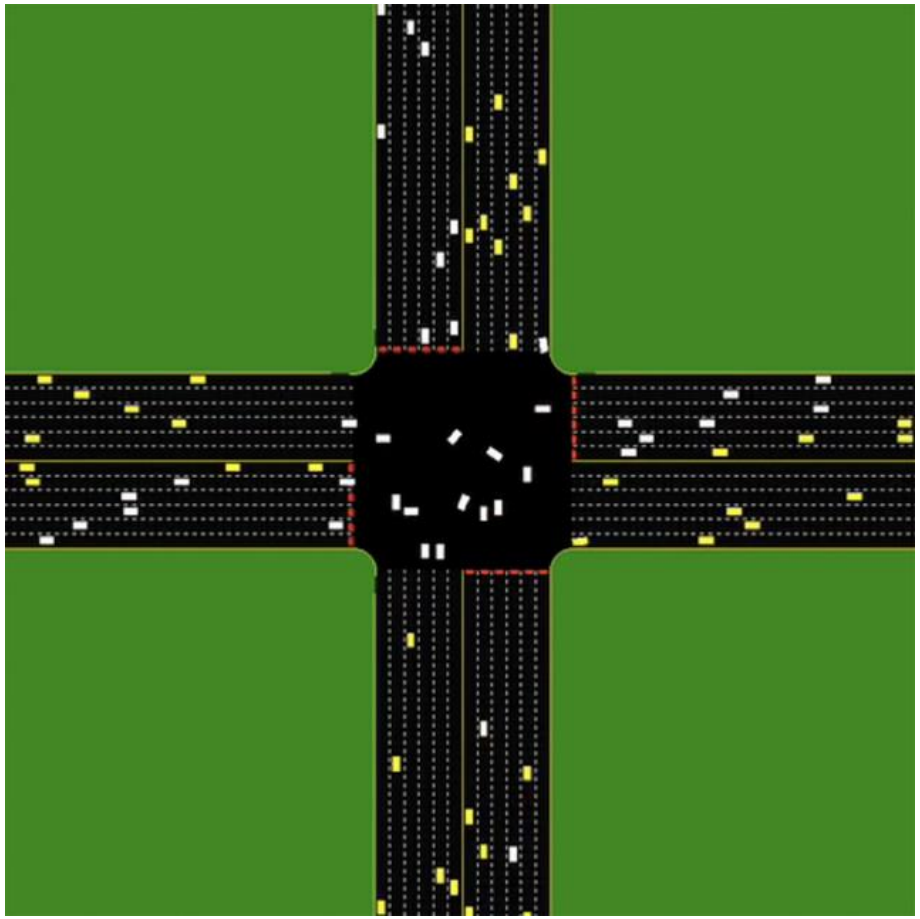
September 2015

INTELLIGENT TRANSPORTATION SYSTEMS

Vehicle-to-Infrastructure Technologies Expected to Offer Benefits, but Deployment Challenges Exist

Future Capacity Needs

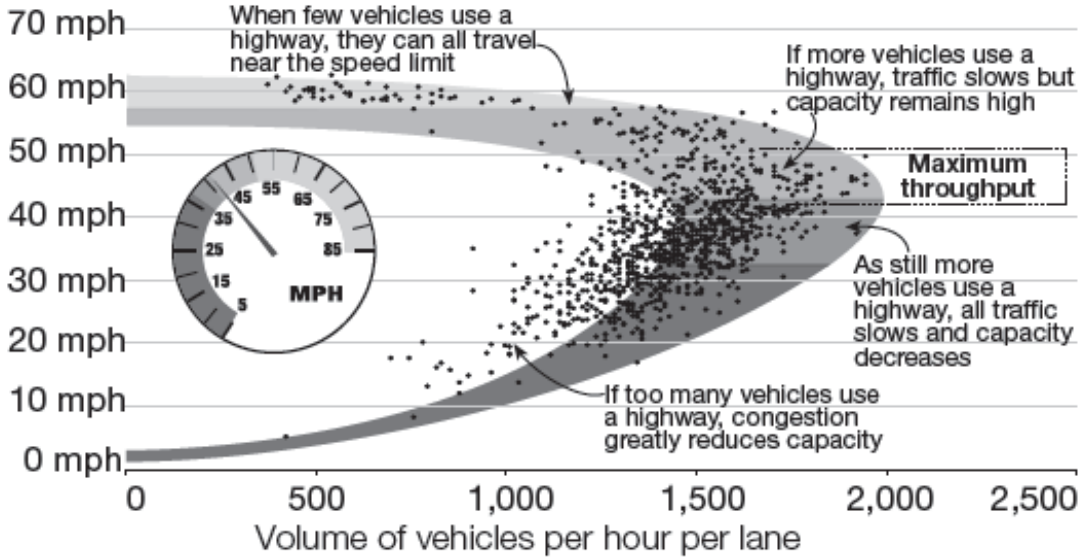
- **Capacity Inadequate Now**
- **Computers Make Better/Faster Decisions Than Us**
  - 8/8/80 @ Full Autonomy



Future Capacity Needs

AV Will Affect Freeway Capacity

- Saturated at 2000 V/LH With Humans
- Estimated at 4000 V/LH With AI
- No Capacity Benefit Until 75% AV

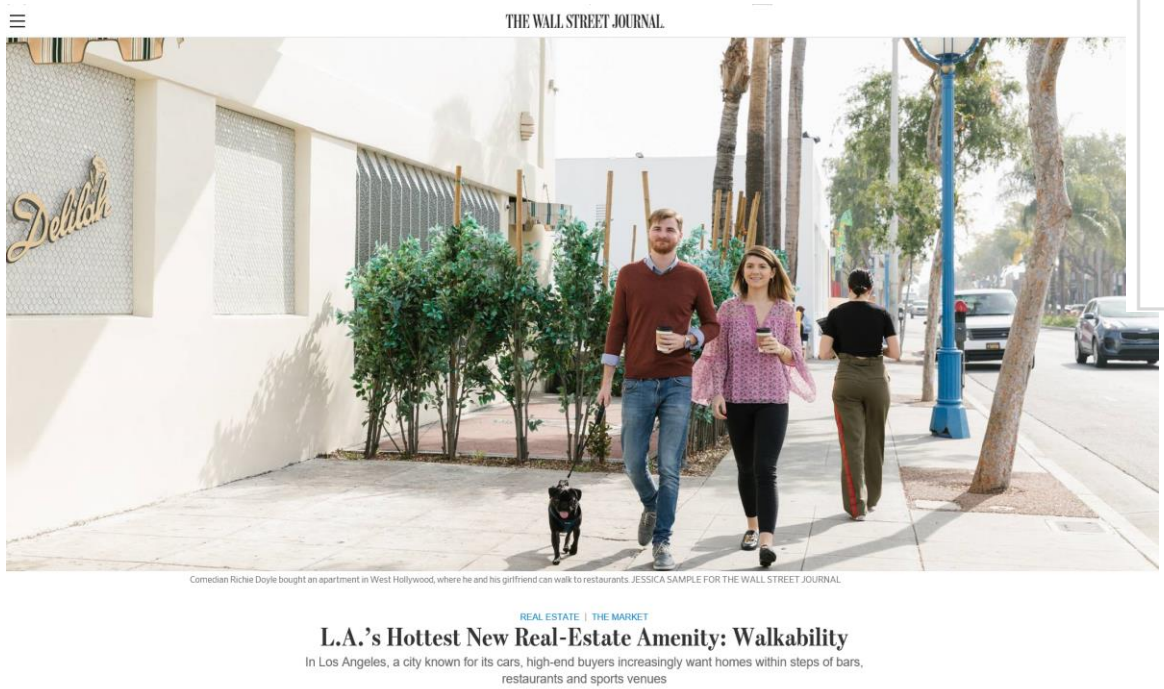


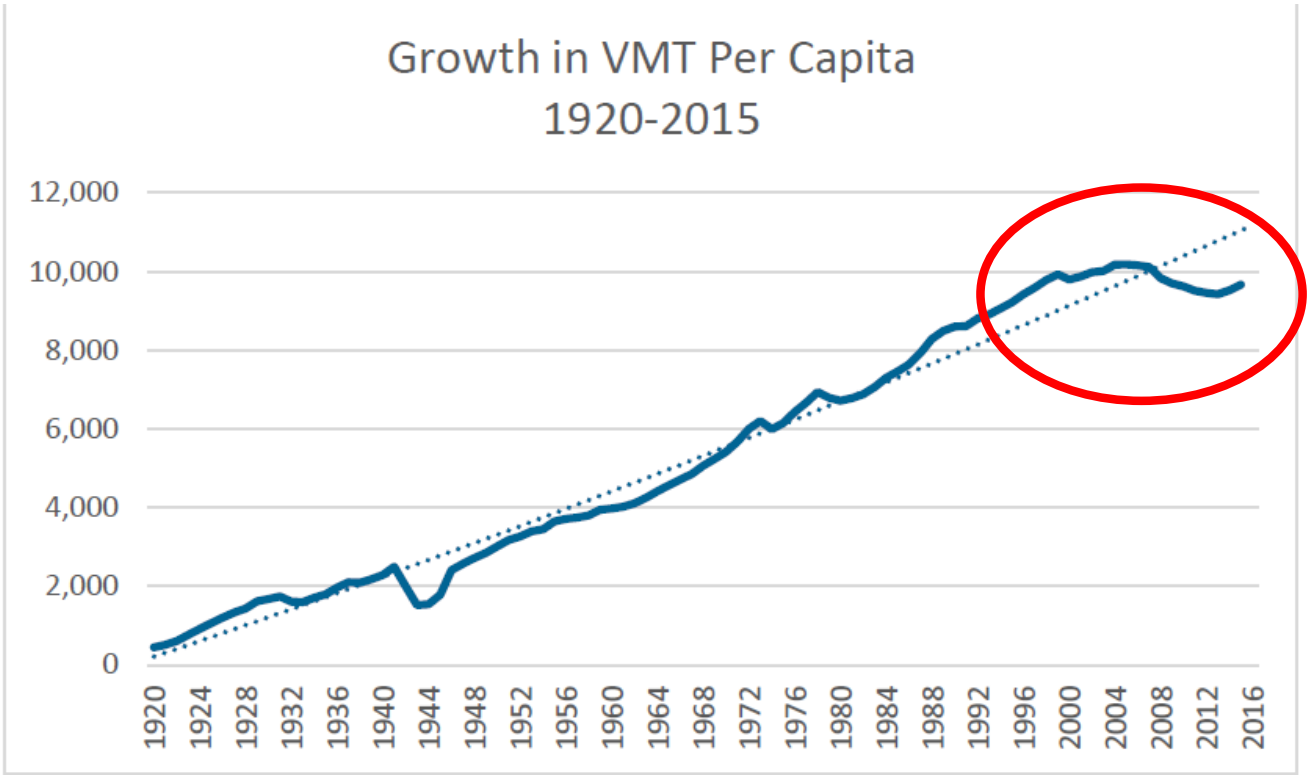
PRINCETON UNIVERSITY

Future Capacity Needs

Humans Also Affect Capacity

- **Millenials**
  - Work where you live
- **Boomers**
  - Retiring – not commuting





TRB TRANSPORTATION RESEARCH BOARD OF THE NATIONAL ACADEMIES

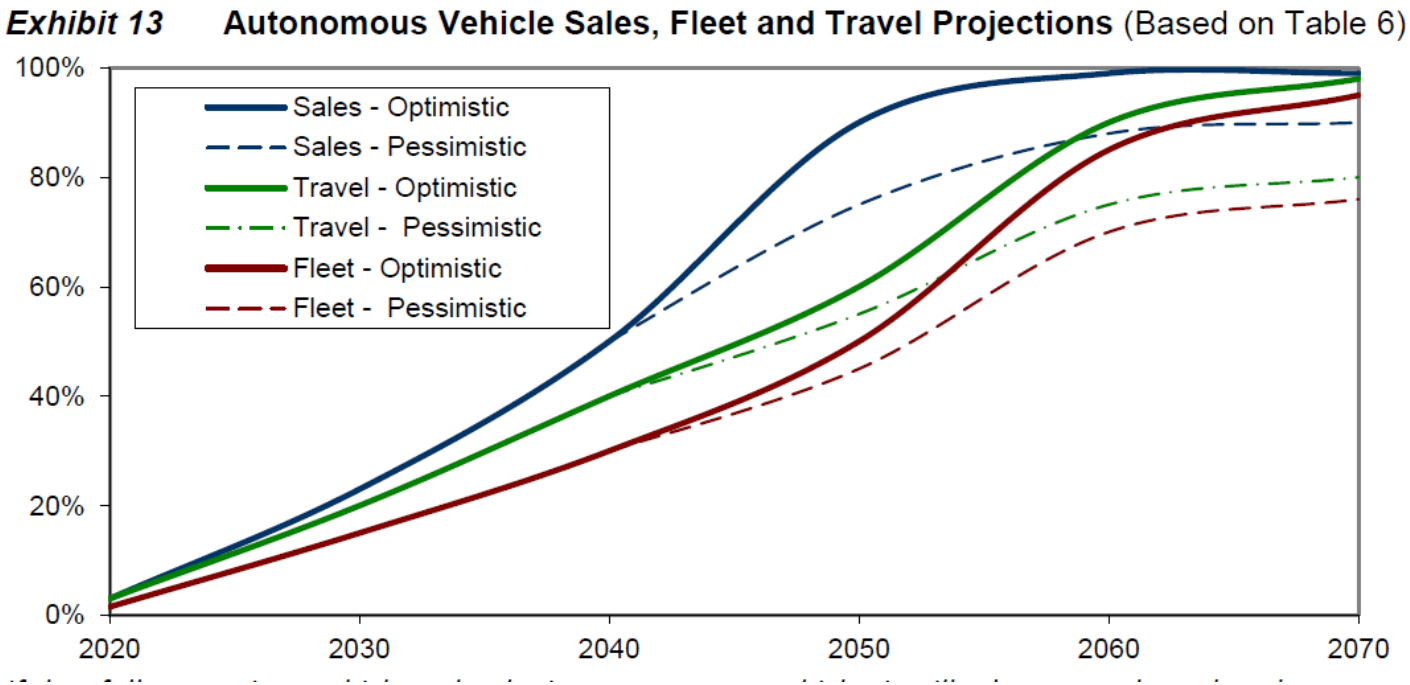
Autonomous Vehicle Rollout

Driven by Competing Business Agendas – Not Public Policy

Autonomous Vehicle Rollout

AV Estimated Percentage of Fleet

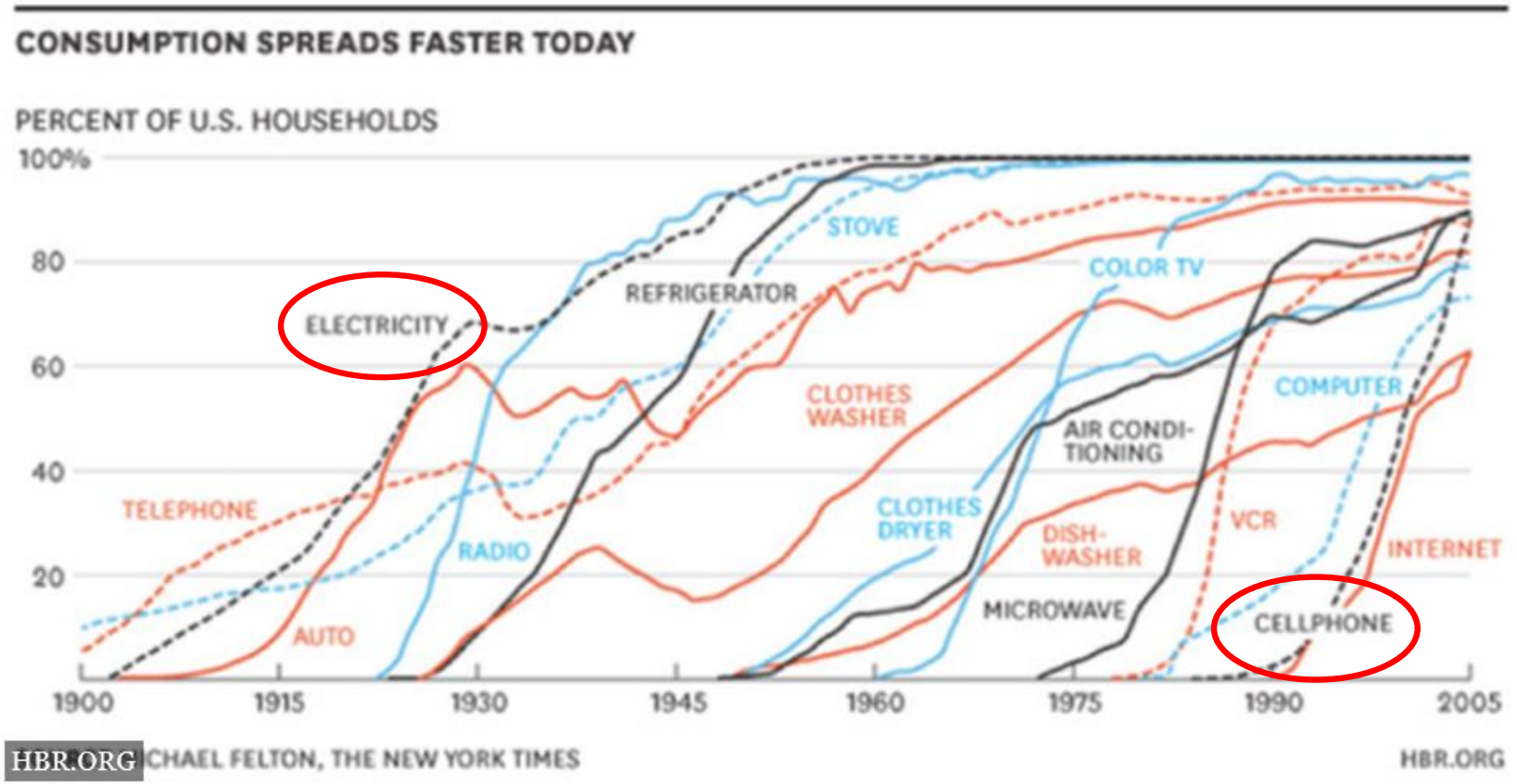
- Forbes – 25% by 2030
- Victoria Transport Policy Institute – 40% by 2050
- RAND Corporation – 80% by 2060



Autonomous Vehicle Rollout

Factors Affecting Rollout

- Pace of Change Faster Than Ever before

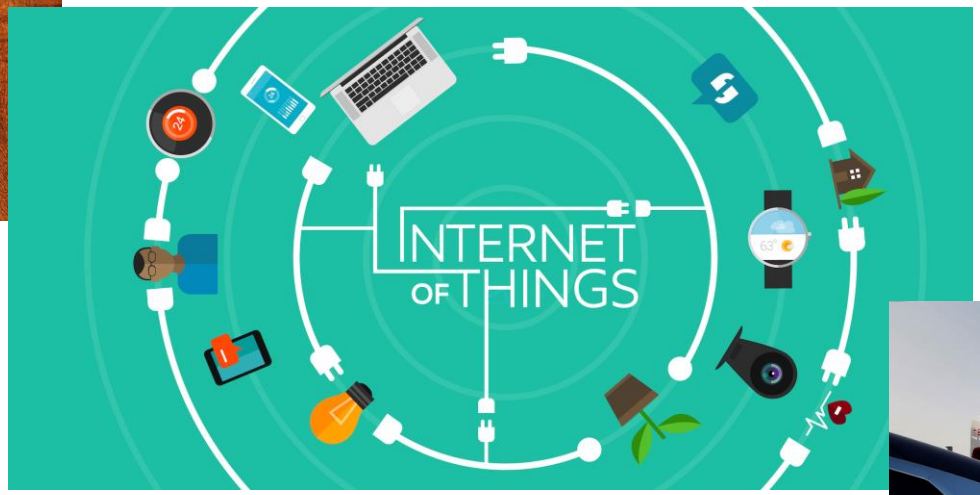


HBR.ORG

Autonomous Vehicle Rollout

Factors Affecting Rollout

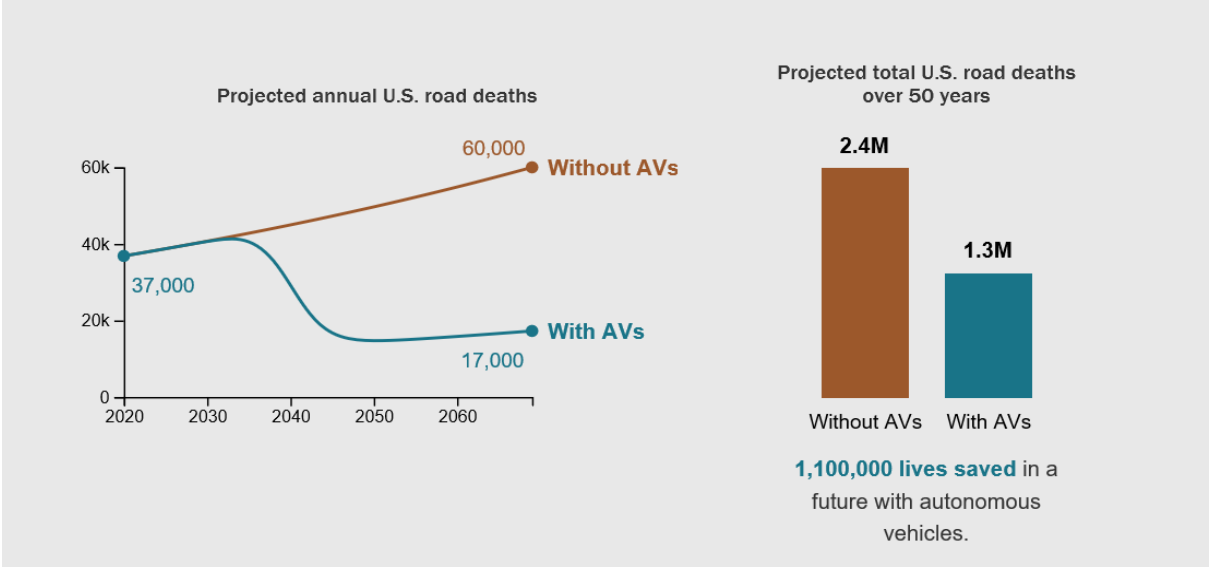
- **Technology Revolution– These Didn't Exist 10 Years Ago**



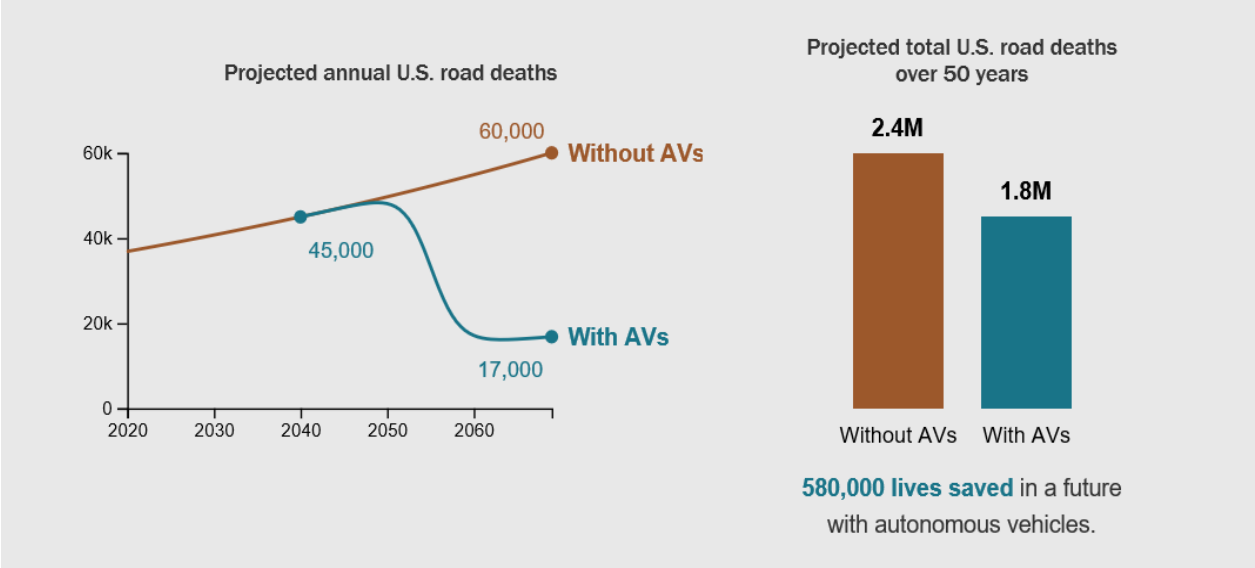
Autonomous Vehicle Rollout

Factors Affecting Rollout

- **Insurance and AV/CV**
  - RAND Study – Best Benefits From Early Adoption



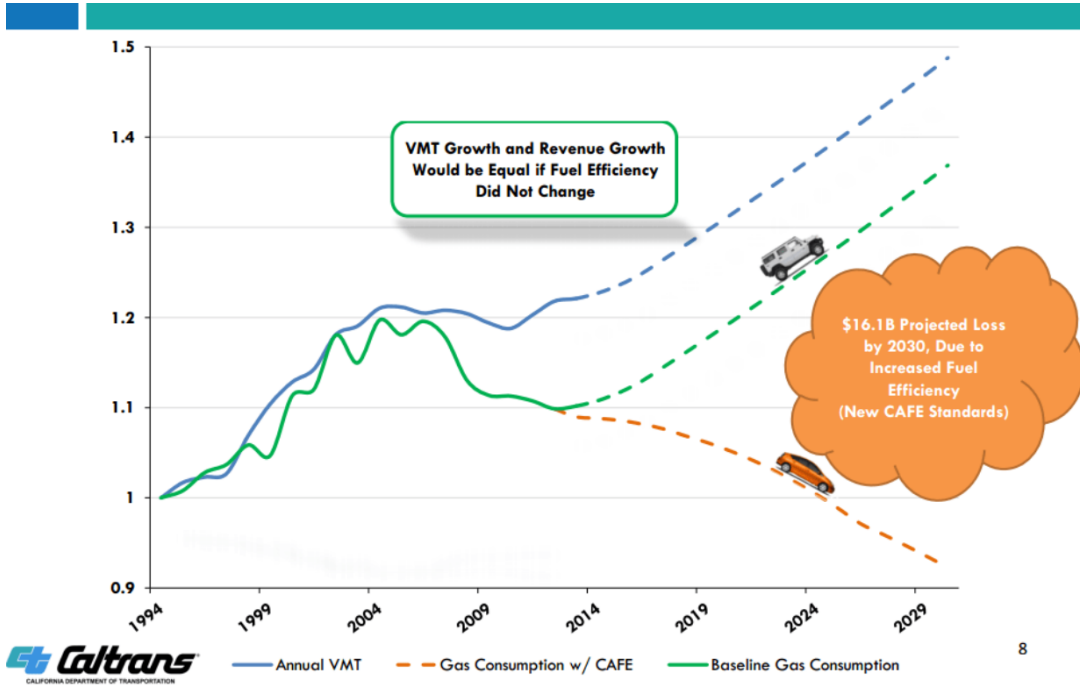
AV Rollout When Slightly Safer Than Humans



AV Rollout When Much Safer Than Humans

Funding Implications

- Need Better Infrastructure – ASCE Rates at D+
- Technology/People Will Reduce Demand – But Not Immediately
- Existing Funding Models Not Working



Funding Implications

Infrastructure and Funding Needs

— Governor's Task Force Findings — Annual, Ongoing State / Local Revenue Shortfall

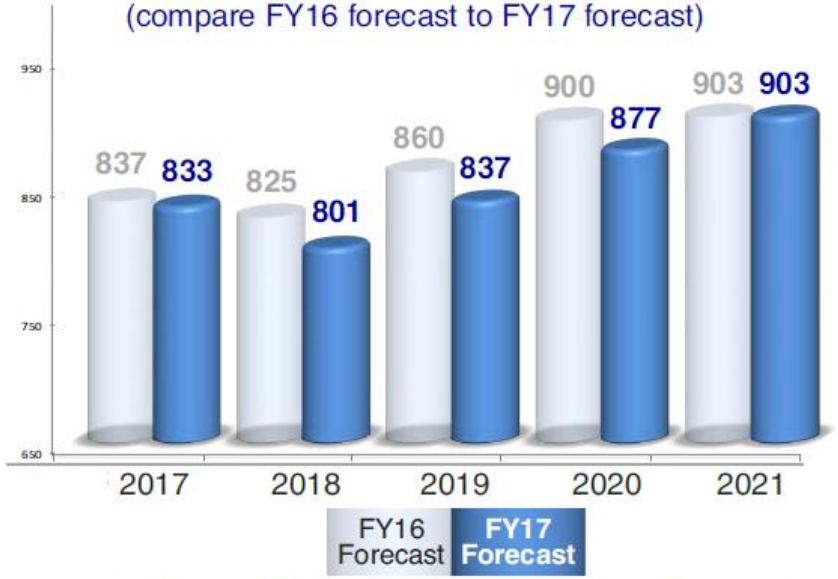
(in millions, as of June 30, 2017)

	Maintenance	Safety and Capacity	Total
Task Force Finding (2010)	**$262.0**	**$281.0**	**$543.0**
2014 Cigarette Tax*	-	$4.7	$4.7
2015 Revenue Increase**	105.6	-	105.6
2017 Congestion Mitigation***	-	$15.6	$15.6
Total Ongoing Revenue Authorized	**$105.6**	**$20.3**	**$125.9**
Remaining Annual Shortfall	**$156.4**	**$260.7**	**$417.1**

**$4.7 million per year, to assist with state-match requirement for debt service*
***Fuel and registration*
****1% of sales tax after local revenue sharing*

Progress Replacing State-System Bridges More Than 50 Years Old

(compare FY16 forecast to FY17 forecast)



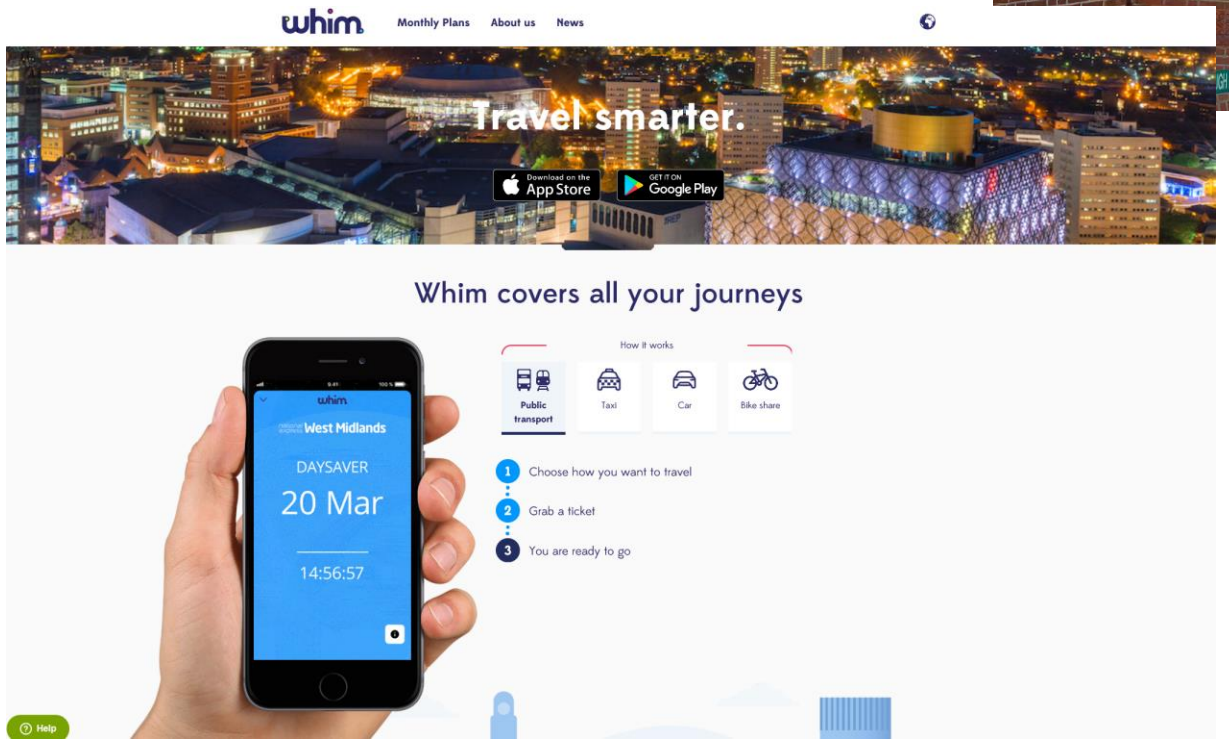
(total forecasted number of bridges older than 50 years)

We want to hear from you. Do you like this report? Would you like to send us comments?
If so, go to: https://apps.itd.idaho.gov/apps/WebCommentsV2 For more information, visit our website at www.itd.idaho.gov

Funding Implications

Partnerships/Mobility as a Service

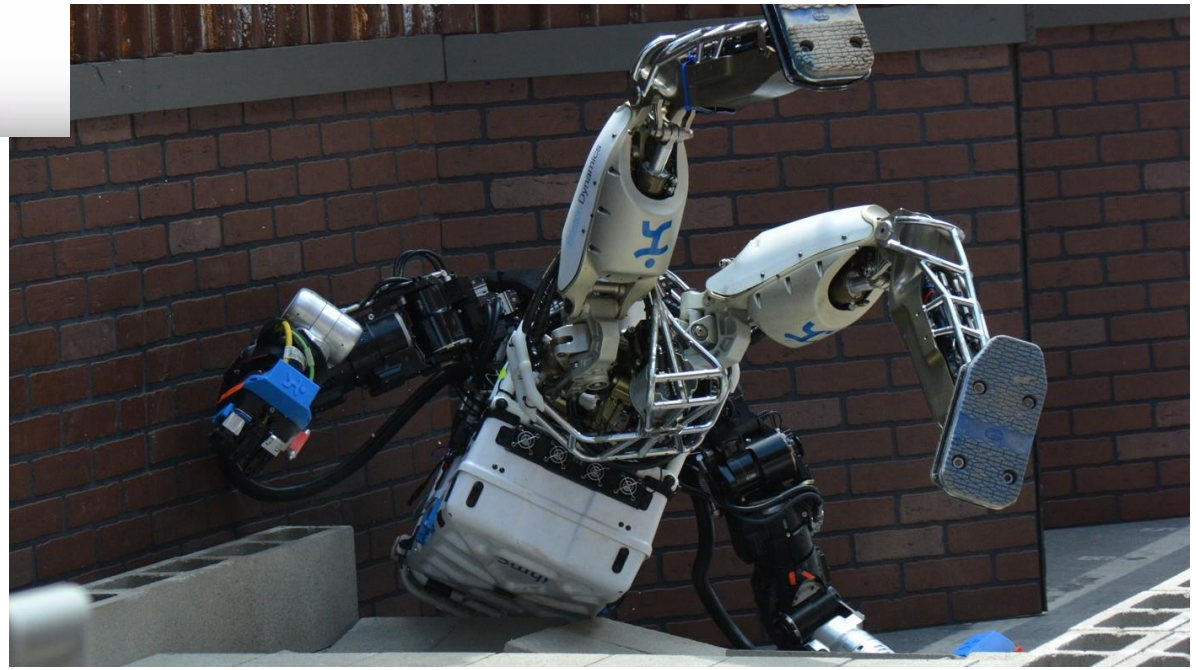
- “Big Data”
- The Value of Real Estate
- ???



One Last Note

PyeongChang 2018

DARPA



QUESTIONS?

Idaho Autonomous Vehicle And Connected Vehicle Testing and Deployment Committee

Infrastructure Focus Area Discussion

Idaho Autonomous Vehicle And Connected Vehicle Testing and Deployment Committee

Wrap-Up

Brian Ness

Director, Idaho Transportation Department

Idaho Autonomous Vehicle And Connected Vehicle Testing and Deployment Committee

Adjourned