

THE NEAR FUTURE OF AUTONOMOUS VEHICLES AND THE STATES' REGULATORY PUSH TO PREPARE

By Ted E. Smith

50 minute program – one (1) non-ethics, CLE hour



INTRODUCTION

TED E. SMITH

- Tasked with removing dangerous drivers from Kansas roadways (i.e. alcohol impairment, medical issues)
 - Deputy General Counsel with the Kansas Department of Revenue
 - Tasked with ensuring the Integrity of State's Vehicle Titling System (registering and/or titling the State's 2.7 million vehicles)
 - Tasked with compelling proper insurance coverage for State drivers and vehicles being operated on Kansas roadways
 - Tasked with keeping state informed on the developing trend in the vehicle industry. (i.e. autonomous vehicles)
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INITIAL QUESTIONS TO AUTONOMOUS VEHICLES

If?

Should We?

When?

How?



IF – ARE AUTONOMOUS VEHICLES POSSIBLE?

Three barriers have been preventing fully autonomous cars from hitting the road:

- 1) high technological component prices;
- 2) varying degrees of consumer trust in the technology; and
- 3) Nascent (NHTSA) or nonexistent (Kansas) laws and/or regulations.

However, in the past year, there have been many advances in overcoming these barriers. For the sake of this presentation, we will assume the technical side is resolved (IT ISN'T) The next few slides provide a high level overview of the technical side of AV. Example of remaining technical issues:

- Benign vs. Non-Benign Operating Environments
- Logic When Dealing with Accident Situations where all Alternatives are Bad Ones.

TYPES OF COMPUTER ASSISTED DRIVING

Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I)

- The federal government has supported development of Dedicated Short-Range Communications (DSRC) applications that would allow V2V and V2I communications and has reserved electromagnetic spectrum for this use.
 - In the future, it is anticipated that there may be “Vehicle2Pedestrian” that incorporates handheld devices and vehicles, and related applications.

Autonomous Vehicles (AV) (NHTSA Guidelines¹)

- SAE Level 0: the human driver is in complete control of all functions of the car.
- SAE Level 1: an automated system on the vehicle can sometimes assist the human driver conduct some parts of the driving task.
- SAE Level 2: an automated system on the vehicle can actually conduct some parts of the driving task, while the human continues to monitor the driving environment and performs the rest of the driving task/
- SAE Level 3: an automated system can both actually conduct some parts of the driving task and monitor the driving environment in some instances, but the human driver must be ready to take back control when the automated system requests.
- SAE Level 4: an automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated system can operate only in certain environments and under certain conditions; and
- SAE Level 5: the automated system can perform all driving tasks, under all conditions that a human driver could perform them.

VEHICLE TO VEHICLE AND VEHICLE TO INFRASTRUCTURE

Types of Warnings Initiated by V2V or V2I:

Blind spot warning

Curve speed warning

Do not pass warning

Emergency electronic brake light

Forward collision warning

Intersection movement assist

Lane change warning

Right turn in front



ADAPTIVE AND AUTONOMOUS VEHICLE TECHNOLOGY CURRENTLY EXISTS IN MANY OF YOUR VEHICLES – SAE LEVELS ONE TO THREE

Forward collision and lane departure warning systems

Sideview (blind spot) assist

Adaptive headlights

Navigational system

Park distance

Adaptive cruise control

Automated parking

It has been suggested that nearly a third of crashes and fatalities could be prevented if these features were incorporated into all vehicles.(IIHS, 2010)



IF – AVAILABLE TODAY – LEGAL ROAD USE

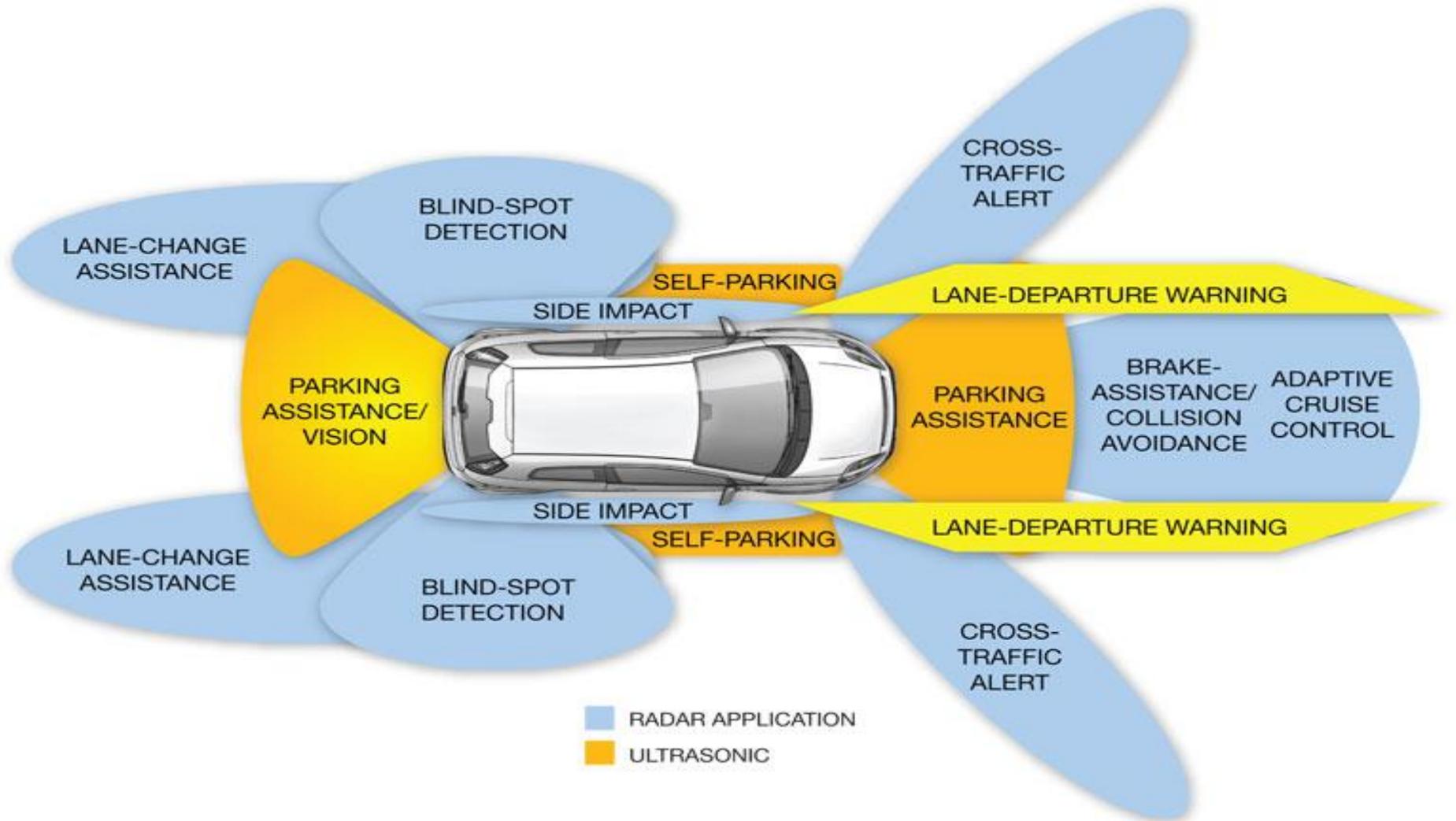


Figure 2 Several driver-assistance systems are currently using radar technology to provide blind-spot detection, parking assistance, collision avoidance, and other driver aids (courtesy Analog Devices).

WHEN

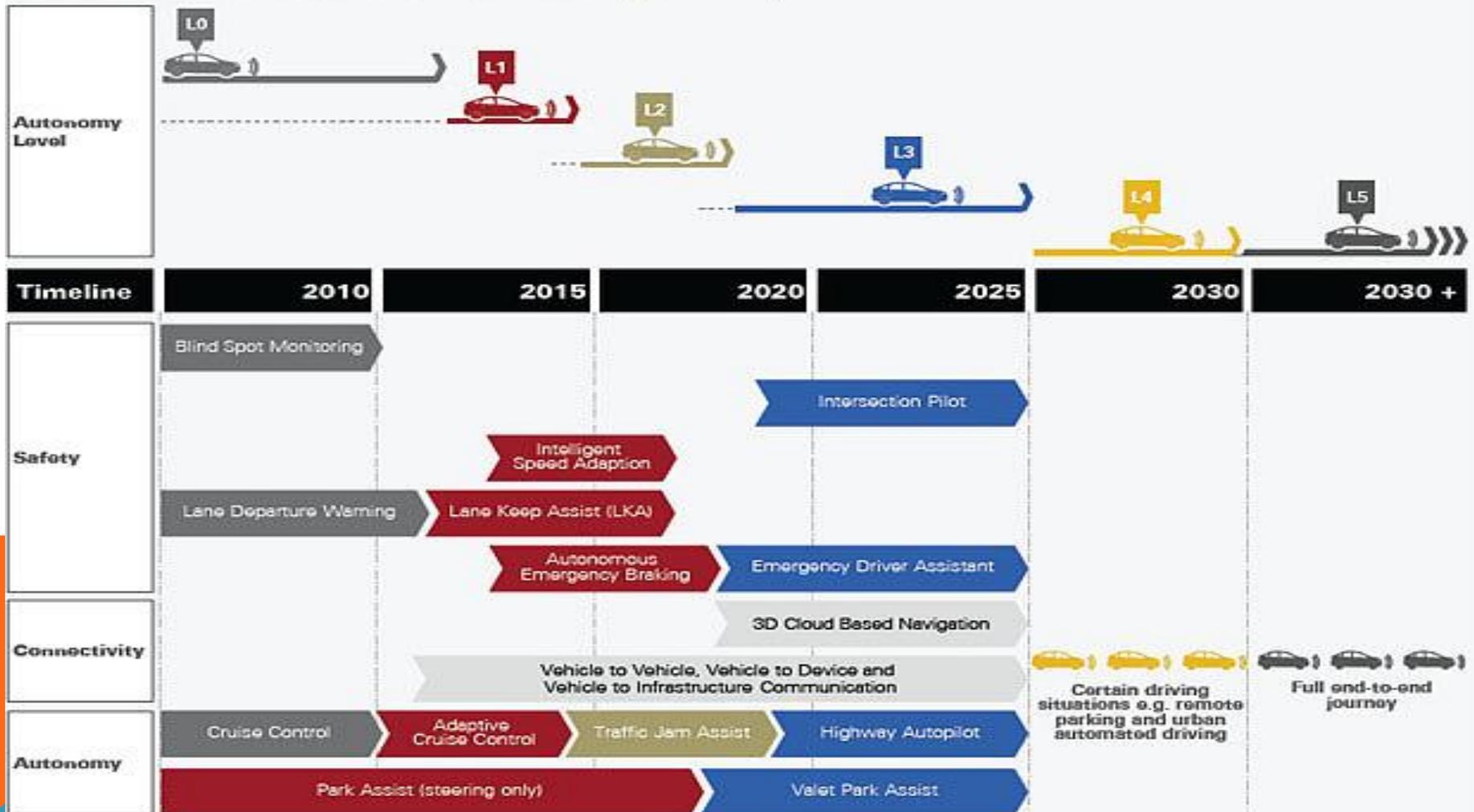
- 1. Gradual Evolution - Autonomous technology will evolve functionally, first assisting the driver with singular tasks (lane control, collision warning, adaptive cruise control). More and more functions will be integrated until the car is able to drive autonomously in all situations. This is the currently dominant view, but it ignores much of the economic implications and transformation potentials of the technology.**
- 2. Mobility Service Provider - Driverless cars will be introduced in high density urban centers where the percentage of non-car owners is already high, parking space is at a premium and most trips are relatively short-distance. IMPORTANT – Cost per Mile**
- 3. Avalanche - Driverless car technology will gradually mature to a point where its economic and transformative potential becomes obvious. Decision makers realize that this technology will switch a large part of the mobility market from individual ownership to a mobility service provider / car-sharing model.**

Attribution: Dr. Alexander Hars, "Paths to adoption of driverless vehicles"

WHEN?

British road map – Example of Gradual Evolution – See “Connected and Autonomous Vehicles – The UK Economic Opportunity”

Connected and autonomous vehicle technology road map



SHOULD WE?

This technology could greatly increase road safety, efficiency, and customer convenience by removing the driver out of the loop and relying on vehicles to navigate themselves through traffic.



2011 statistics show that 2.2 million injuries and 32,000 fatalities occurred as a result of motor vehicle traffic crashes in the United States. (39% of crash fatalities involved alcohol use by one of the drivers) Driver error is by far (95%) the most common factor playing a role in such accidents.(End note 1)

Will autonomous vehicles help the States accomplish the National Safety Council's goal of a "ROAD TO ZERO" (End note 2)

The growing use of smartphones is a growing negative variable in vehicle road safety.

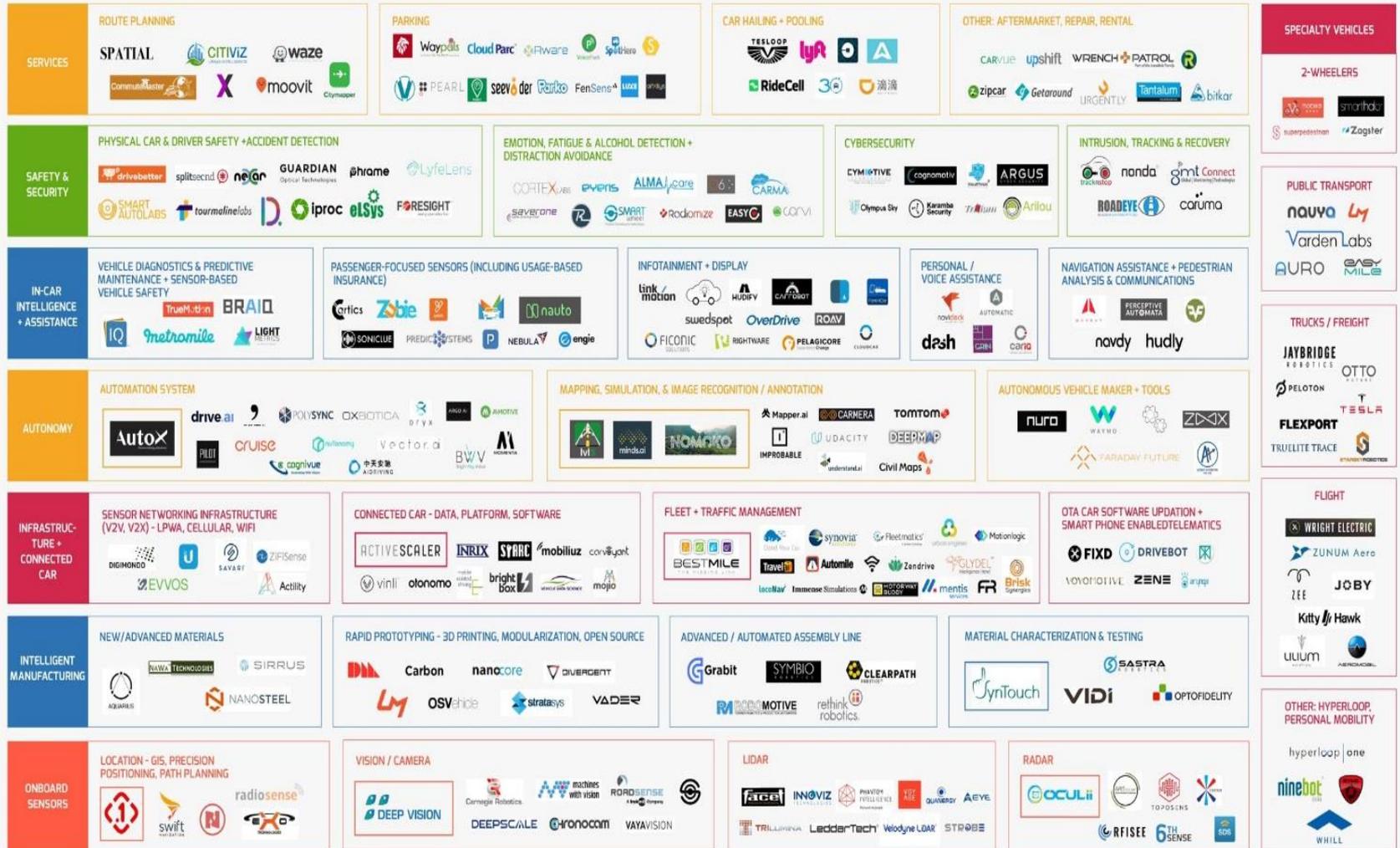


COMPANIES IN THE AV MARKET

(END NOTE 3)

THE FUTURE OF TRANSPORTATION STACK

COMET LABS



WHO COULD BENEFIT

Individuals experiencing lower levels of cognitive and/or visual function.

Elderly drivers

The young and young inexperienced drivers

Individuals with alcohol or drug problems

Individuals with financial problems that prohibit them from clearing their driving record or affording vehicle liability insurance

Individuals that can not afford a vehicle.

Individuals living in high population density urban areas where parking is expensive.



SHOULD WE?

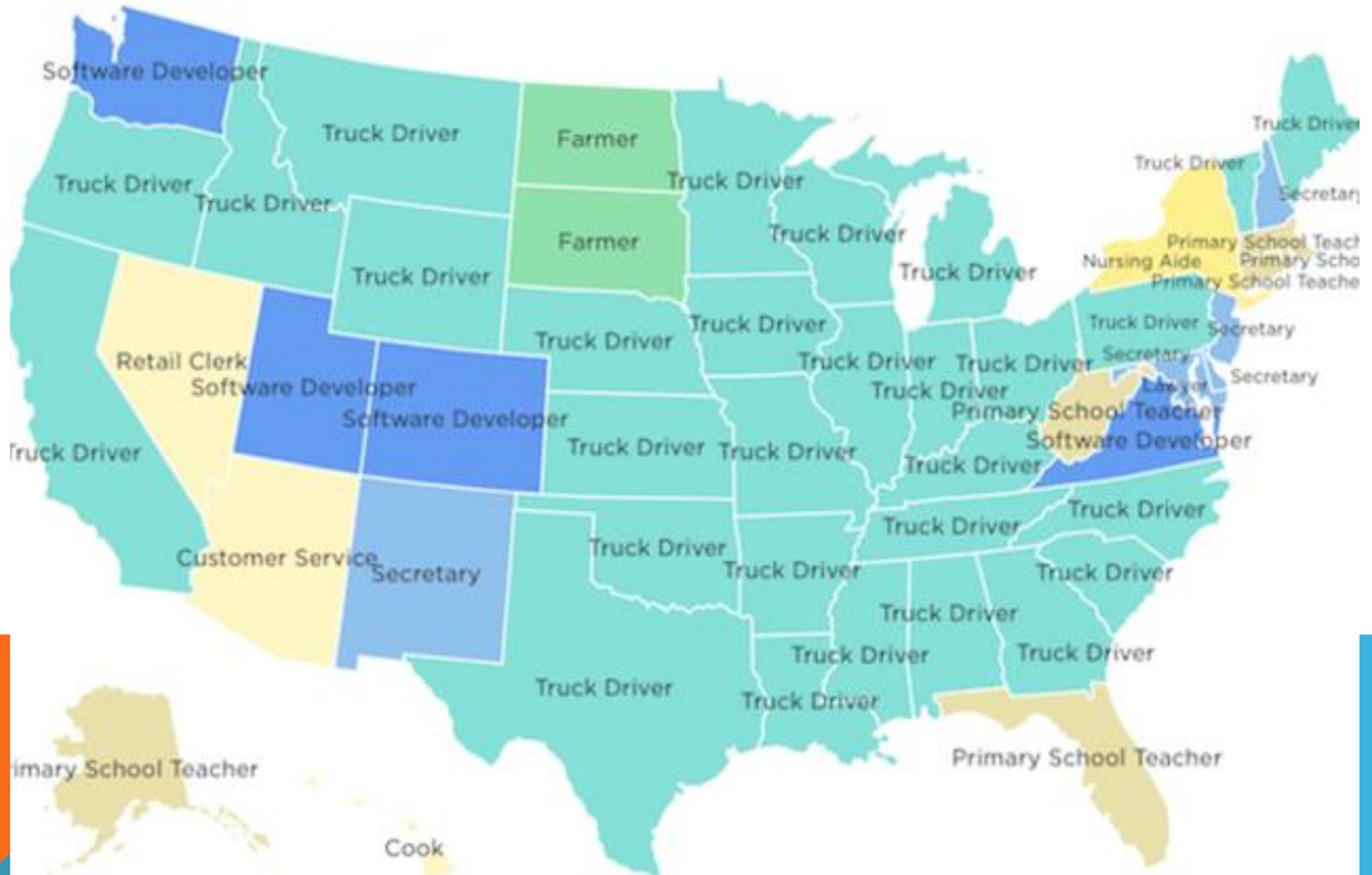


SHOULD WE?

- 1. Potential increase in vehicle miles travelled(VMT).**
 - Increased fuel consumption, congestion, and suburban sprawl.
 - 2. Municipalities may lose revenue due to less parking.**
 - 3. Focus on AV distracts public from current public transportation.**
 - 4. Jobs may be lost. Professions requiring a commercial driver's license. Presently, a CDL driver is required to be behind the wheel.**
 - 5. AVs will most likely be more expensive than conventional cars.**
 - 6. AV could have a disruptive effect on the "crash economy." Driver's spend \$157 billion on automobile insurance premiums.**
 - 7. Is it realistic to project zero deaths under any plan?**
 - 8. How do the states and federal government adjust the current highway funding models based on motor fuels taxes?**
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MOST COMMON JOBS BY STATE

IMAGE CREDIT: PLANET MONEY



- 1. Vehicle safety and compliance is normally handled at the federal level.(DOT, NHTSA)**
- 2. Highway safety, efficiency and design is normally managed at the state level.**
- 3. Driver's authority and qualification normally handed at the state level.**
- 4. Liability Issues are addressed by the federal and state courts and primarily state legislatures.**
- 5. Insurance standards normally handled at the state level.**
- 6. Enforcement of traffic laws (state, county, municipal law enforcement)**
- 7. Maintenance of motor vehicle fleets, motor carriers, and for hire transportation is normally handled at the state level or by FMSCA**
- 8. Cybersecurity and protection of information? What is the expectation of privacy of a vehicle occupant on a road or highway regarding the information associated with destinations?**

HOW ?

VEHICLE SAFETY AND COMPLIANCE

National Highway Traffic Safety Administration (NHTSA) release policy statement providing guidance for states permitting testing of emerging vehicle technology. (May 30, 2013)

NHTSA released a published bulletin on the topic of AV use – See Federal Register, Vol. 81, No. 185 Final Action (Sept. 23, 2016)

NHTSA releases 15 point safety assessment to set clear expectations for manufacturers developing and deploying automated vehicle technologies. (Sept. 19, 2016)

NHTSA sets out “Model State Policy” and states out its territory. (Sept. 19, 2016)

NHTSA Federal Automated Vehicles Policy Accelerating the Next Revolution in Roadway Safety. (September 2016)

NHTSA Automated Driving Systems 2.0, A Vision for Safety. (September 2017)

**Governmental Functions
Affected by Autonomous
Vehicles**

Vehicle safety and compliance is normally handled at the federal level.(DOT, NHTSA)



**GOVERNMENTAL FUNCTIONS
AFFECTED BY AUTONOMOUS
VEHICLES**

SELF DRIVE ACT - H.R. 3388 (2017)

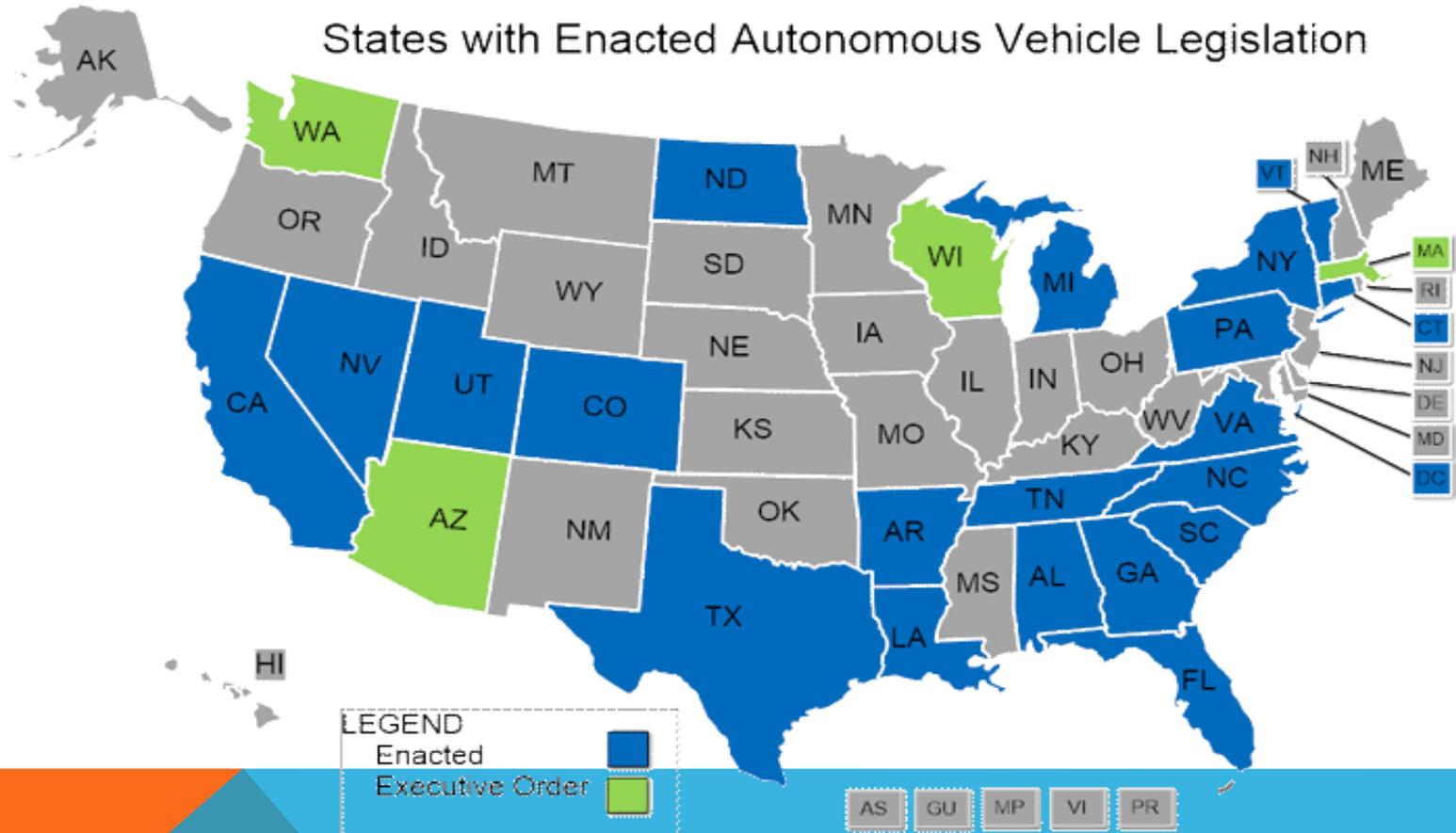
The House Energy and Commerce Committee unanimously approved the AV Legislation and Full House approved with bilateral support. Marked up by Senate and Committee (Oct. 4, 2017) and waiting action by full Senate.

- Updates Federal Motor Vehicle Safety Standards (FMVSS) to account for advances in AVs.
- Act would permit automakers to obtain safety exemptions for no more than 25,000 vehicles in year one, and later years the ceiling would eventually increase to 100,000 vehicles deployed
- Safety exemptions would only be granted to AVs if the manufacturer can demonstrate that their vehicles provide an overall safety level that is at least equal to the overall safety level of non-exempt vehicles. Preempt States.
- Act only applies to non commercial motor vehicles that are 10,000 pounds or less. - Senate version may revisit this issue.

STATE LEGISLATIVE AND REGULATORY TRENDS

- 1. Authorizing AV Use as Long as AV Complies with all Applicable State and Federal Rules**
 - 2. Broad Grant of Regulatory Authority for Agency to Administer AV Rules and Industry**
 - 3. Exceptions from Licensing Rules when Occupant is in Fully Autonomous Vehicle Mode**
 - 4. Creation of AV Testing Program and Assignment of Agency Authority**
 - 5. Creation of Geo-fenced Locations in State for AV Testing**
 - 6. Authorize Further Research on AV and Safety – Permitting Limited Use/Demonstration of AV in State**
 - 7. Creation of Joint Legislative Committee to Explore AV Usage**
- For More Information on State Activities – See Attachment A to this Presentation**

STATES ADDRESSING AUTONOMOUS VEHICLE



COURTESY OF NAT. CONF. OF STATE LEGISLATURES:
[HTTP://WWW.NCSL.ORG/RESEARCH/TRANSPORTATION/AUTONOMOUS-VEHICLES-SELF-DRIVING-VEHICLES-ENACTED-LEGISLATION.ASPX](http://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx)

STATE AND LOCAL PUBLIC POLICY – NECESSARY STAKEHOLDERS

STATE

- STATE LEGISLATURE
- AGENCIES – KDOR, KDOT, KHP, KCC, INSURANCE COMMISSIONER, KANSAS DEPARTMENT OF LABOR

LOCAL

- REGIONAL PLANNING ORGANIZATIONS
- TOLL AUTHORITIES
- COUNTIES AND MUNICIPALITIES
- LOCAL LAW ENFORCEMENT

State Model Framework Should Consist of:

- **Administrative structure and processes that States can set up to administer requirements regarding the use of public roads for HAV testing and deployment in their States;**
- **Application by manufacturers or other entities to test HAVs on public roads;**
- **Jurisdictional permission to test;**
- **Testing by the manufacturer or other entities;**
- **Drivers of deployed vehicles;**
- **Registration and titling of deployed vehicles – cease and desist authority;**
- **Law enforcement considerations; and**
- **Liability and insurance.**
- **Highway safety, efficiency & design is normally managed at the state level.**

With passage of H.R. 3388, testing would be become purview of NHTSA.

Governmental Functions Affected by Autonomous Vehicles

Question: Do Kansas laws prohibit driverless cars on State roads and highways?

Answer: Legislature has never analyzed the concept or potential of driverless cars. As a result the law does not expressly prohibit it or permit it. Relevant provisions in law are set forth below:

1. Driver means any every person who drives or is in actual physical control of a vehicle. K.S.A. 8-1416.
2. No person, except those expressly exempted, shall drive any motor vehicle upon a highway in this state unless such person has a valid driver's license. K.S.A. 2013 Supp. 8-235
3. Any person operating in this state a motor vehicle, . . . which is registered in this state . . . shall be the holder of a driver's license which is classified for the operation of such motor vehicle. K.S.A. 2013 Supp. 8-127.
4. The secretary of revenue shall adopt rules and regulations establishing qualifications for the safe operation of the various types, sizes and combination s of vehicles in each class of motor vehicles, established in subsection (a). K.S.A. 2013 Supp. 8-234b(d)
5. An owner of a motor vehicle shall not permit the operation, or a person shall not knowingly drive, upon a highway or upon property open to use by the public unless minimum required insurance is associated with the vehicle. K.S.A. 2013 Supp. 40-3104.

Governmental Functions Affected by Autonomous Vehicles

ISSUES OF LIABILITY

The Question revolves around what is the proximate cause of the accident. There is no doubt that increased automation will result in the liability and proximate cause of the manufacturer be increased for the accidents that still happen

A human driver, for example, is legally required to exercise due care, may be criminally liable if she drives recklessly (in some cases even if she causes no injury), and may be civilly liable if she causes injury (in some cases even if her conduct was reasonable).

An automaker is legally required to certify that the vehicles it markets meet certain safety standards, may be subject to civil fines if it does not comply with the certification requirements, and may be subject to civil liability even if it does.

-Is this an inherently dangerous activity with strict liability to the manufacturer?

-Manufacturers will need to normalize the risk and exposure before wide scale adoption – Juries and their verdicts are unpredictable

THIS PRESENTER BELIEVES THE ISSUE OF LIABILITY WILL BE THE SINGLE BIGGEST FACTOR ON HOW USE/OWNERSHIP BUSINESS MODEL WILL DEVELOP FOR AUTONOMOUS VEHICLE USAGE

IF LIABILITY NEVER GOES AWAY FROM THE VEHICLE MANUFACTURER OR AUTOMATED SYSTEM DEVELOPER, THEN AV MAY BE TOO EXPENSIVE TO PERMIT CURRENT OWNERSHIP MODEL

TED'S SOAPBOX - ELECTRONIC DATA RECORDING (EDR)

“Recording Device” means a feature that is installed by the manufacturer in a motor vehicle and that does any of the following for the purpose of retrieving information from the vehicle after an accident in which the vehicle has been involved:

- (1) records the speed and direction the vehicle is traveling;
- (2) records vehicle location data;
- (3) records steering performance;
- (4) records brake performance, including information on whether brakes were applied before an accident;
- (5) records the driver's safety belt status;
- (6) records video, radar, or lidar information; and
- (6) transmits information concerning the accident to a central communications system when the accident occurs.

TED'S SOAP BOX – EDR CONTINUED

Recording Devices for Automated Driving Systems. (a) All automated motor vehicles shall be equipped with a recording device. If an recording devices is not installed and operating in a manner required by this section, then the this act shall not apply to the motor vehicle.

(b) Information recorded or transmitted by a recording device may not be retrieved by a person other than the owner of the motor vehicle in which the recording device is installed except:

- (1) on court order;
- (2) with the consent of the owner for any purpose, including for the purpose of diagnosing, servicing, or repairing the motor vehicle;
- (3) for the purpose of improving motor vehicle safety, including for medical research on the human body's reaction to motor vehicle accidents, if the identity of the owner or driver of the vehicle is not disclosed in connection with the retrieved information;
- (4) assist a state agency in determining miles travelled and location of travel for vehicle tax or registration purposes; or
- (5) for the purpose of determining the need for or facilitating emergency medical response in the event of a motor vehicle accident.

TED'S SOAP BOX – EDR CONTINUED

- (d) For information recorded or transmitted by a recording device relating to a vehicle's location data, a court order may be obtained only after a showing that:
 - (1) retrieval of the information is necessary to protect the public safety;
 - (2) the information is evidence of an offense or constitutes evidence that a particular person committed an offense; or
 - (3) the motor vehicle was involved in a motor vehicle accident involving personal property damage, injury, or death.
- (e) For the purposes of Subsection (b)(3):
 - (1) disclosure of a motor vehicle's vehicle identification number with the last six digits deleted or redacted is not disclosure of the identity of the owner or driver; and
 - (2) retrieved information may be disclosed only:
 - (A) for the purposes of motor vehicle safety and medical research communities to advance the purposes described in Subsection (b)(3); or
 - (B) to a data processor solely for the purposes described in Subsection (b)(3).
- (f) If a recording device is used as part of a subscription service, the subscription service agreement must disclose that the device may record or transmit information as described by Subsection (i) of New Section 1.

CHALLENGES – OUT OF LEFT FIELD

Existing global regulations may slow development:

Article 8 Vienna Convention 1968 – the United States is a non-signatory country.

UN Regulation 79 – Steering Equipment - UN Regulation 13H – Braking.

Work Force Changes (a better description would be “out of shortstop”)

Ethical Challenges - Some road accidents are unavoidable, and even autonomous cars can't escape that fate. How do you program to optimize software to make a choice based on two bad outcomes – in effect creating a targeting algorithm.

Third Party Adoption - Adoption on private property or on tribal reservations

PEOPLE TO FOLLOW

1. Elon Musk, @elonmusk
2. Dr. Sven Beiker, Silicon Valley Mobility - @sv_mobility
4. John Krafcik, CEO Waymo - @johnkrafcik
5. Dr. Alexander Hars, frequent contributor to www.driverless-future.com
6. Bryant Walker Smith, Assistant Professor, School of Law, University of South Carolina - @bwalkersmith
7. Dorothy Glancy, Professor of Law, Santa Clara University
8. James Fackler, Michigan Department of State
9. Catherine Curtis, AAMVA Staffer

(Many of the non State specific material in this presentation are derived from the above AV experts and leaders)

CONTACT INFORMATION

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END NOTES

1. Federal Automated Vehicles Policy, September 2016 (<https://one.nhtsa.gov/nhtsa/av/av-policy.html>) and Automated Driving Systems 2.0, A Vision for Safety, 2017 (https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf)
2. National Safety Council, Road To Zero (<http://www.nsc.org/learn/NSC-Initiatives/Pages/The-Road-to-Zero.aspx>)
3. Wired.com, “Mapped: The Top263 Companies Racing Toward Autonomous Cars”, 5.10.2017

ACKNOWLEDGMENTS AND AUTHORITIES

1. Connected and Autonomous Vehicles – The UK Economic Opportunity, March 2015 , report by KPMG and commissioned by the Society of Manufacturers and Traders.
 2. American Association of Motor Vehicle Administrators’ “Autonomous Vehicle Information Library”
 3. GlobalAutoReqs.com –listing UN regulations associated with vehicles.
 4. “Road Safety with Self-Driving Vehicles: General Limitations and Road Sharing with Conventional Vehicles”, Michael Sivak and Brandon Schoettle, Transportation Research Institute, January 2015.
 5. “Lawyers and Engineers Should Speak the Same Robot Language” and “Regulation and the Risk of Inaction”, Bryant Walker Smith.
 6. Nat’l Highway Traffic Safety Admin, DOT HS 811 059, National Motor Vehicle Crash Causation Survey (2008)
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GLOSSARY

AV means autonomous motor vehicle

DOT means Federal Department of Transportation

DSRC means dedicated short-range communications

EDR means electronic data recording system

NHTSA means National Highway Traffic Safety Administration

V2I means vehicle to infrastructure

V2V means vehicle to vehicle



ATTACHMENT A – STATE ACTION ON AV

	Possible Directions	States	Complexity (10 high to 1 low)
A	Mechanism for Creation of Manufacturer Testing Programs	California (SB 1298 2012) - Expanded to Pilot Program without Driver (AB 1592 2016); Michigan (SB 169 2013); Nevada (SB 313 2013) Tennessee (HB 381 2017 SAVE)	7
A1	Permit Demonstrations of Autonomous Vehicle on Roads	New York (SB 2005 Part ff 2017) Simple	4
B	Declaration of GeoFenced Locations (Municipalities) for Testing	Connecticut (SB 260 2017); Pennsylvania (SB 1267 2016)	5
C	Authorizing Automated Driving System Use as Long as System Complies with All State and Federal Laws relating to Motor Vehicle use on state roadways. SIMPLE	Colorado (simple); Tennessee (SB 598 2015) - Opens the Doors to Use	2
C1	Authorizing Automated Driving System Use as Long as System Complies with All State and Federal Laws relating to Motor Vehicle use on state roadways. EXPANSIVE	Georgia (SB 219 2017); Texas (SB 2205 2017) - Opens the Doors to Use	4
D	Creation of Joint Legislative Committee to Review and Propose Legislation on Autonomous Vehicles	Alabama (SJR81 2016); Vermont (HB 494 2017)	1
E	Driver Assistive Truck Platooning Systems	Arkansas (HB 1754 2017); North Carolina (HB 716 2017); South Carolina (HB 3289 2017); Tennessee (SB 676 2017)	3
F	Comprehensive Bill	Florida (HB 1207 2012); Nevada (AB 2017)	9
F1	Super Comprehensive Bill	Michigan (SB 995, 996, 997 2016; SB 169 2013)	10
G	Broad Grant of Regulatory Authority to Promulgate AV Rules to State Agency	Nevada (SB 511 2011; HB 1202 2017)	2
H	Exception from Driver's Licensing Requirements when Occupant in Fully Autonomous Vehicle	North Carolina (HB 469 2017) - Opens the Doors to Use	5
I	Authorization Further Research on AV and Safety; Limited Use on Roads by Agency.	North Dakota (HB 1065 2015; HB 1202 2017); Utah (HB 373 (2015) HB 280 (2016))	1