2017 CONFERENCE ON REGIONAL AND METROPOLITAN PLANNING IN WISCONSIN

SESSION FIVE PRESENTATIONS

SESSION FIVE

10:15 a.m. – 12:00 p.m.

Automation has been occurring in industry for decades. Though automation of transportation has been discussed and researched for decades, only recently has development of a fully autonomous vehicle seemed like a reality. In fact, there is little doubt that multiple auto manufacturers will have models for consumers to buy within the next five to ten years. As transportation professionals and planners, we are hopeful that the touted reductions in accidents due to inattentive driving will be realized, but questions remain on when this will occur. By removing the need to have a driver, the arduousness of driving is potentially reduced. This may impact development patterns. So what is the future of autonomous vehicles and how will they impact mobility? This session will begin to explore and discuss several perspectives on the potential impacts of autonomous vehicles.

DISCUSSION QUESTIONS

- Do you think autonomous vehicles will significantly change the way we need to plan for highway infrastructure?
- How have you accommodated autonomous vehicles in your planning process?
- What kind of impact do you think autonomous vehicles will have on development patterns?

TECHNOLOGY TRENDS AND THE FUTURE OF TRAVEL

Credit: National Highway Traffic Safety Administration

PRESENTATIONS

AV TECH: (EM)BRACING THE IMPACT

Rob Fischer, Wisconsin Automated Vehicle Proving Grounds

Rob Fischer is President of GTiMA, a D.C.-based trade association that represents the geospatial transportation infrastructure mapping industry, focusing particularly on smart cities, smart infrastructure, and autonomous vehicles. He also chairs the AV Governance Program at the Wisconsin Automated Vehicle Proving Grounds and serves as Director of Policy Communications at Mandli Communications in Madison. Rob earned a master's degree in Urban and Regional Planning at UW-Madison, and holds another master's degree in Software Engineering from Cal State-Fullerton.

TECHNOLOGY TRENDS AND THE FUTURE OF TRAVEL

Joseph D. Vruwink, Baird Equity Research

Joe Vruwink, CFA, is a Vice President and Senior Research Associate at Baird, where he is a member of the Global Auto & Truck team. In addition to proprietary analysis on individual companies, the team's sector expertise encompasses the major secular trends impacting the automotive industry, including autonomous driving, efficiency/electrification, and in-vehicle technology. Mr. Vruwink received a BBA degree with majors in Finance, Investment and Banking, and in Risk Management and Insurance from the University of Wisconsin-Madison.

THE NEED FOR STEERING THE DRIVERLESS HORSELESS CARRIAGE: ANTICIPATED ENVIRONMENTAL IMPACTS OF AUTONOMOUS VEHICLES

Art Harrington, Shareholder in Godfrey & Kahn's Environmental and Energy Strategies Practice Groups

Art Harrington is an attorney with the law firm of Godfrey & Kahn, s.c. where he is a member of the environmental/energy strategies team. He also is an adjunct Professor of Law at Marquette University Law School where he teaches an Energy Law Work Shop . He has written and spoken within the past two years on the impact of the emerging autonomous vehicle technology for regulation in areas of energy, environment and urban planning.

AV Tech: (Em)Bracing the Impact

Rob Fischer

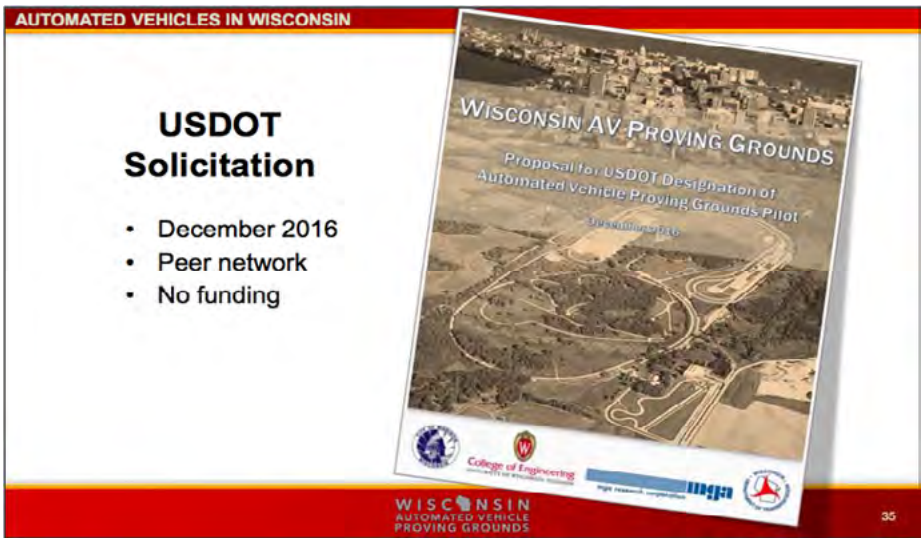
Two Hats

- GTiMA
- Wisconsin AV Proving Ground

Goals

1. Introduce WI AV Proving
2. Pop Quiz
3. Why AV's matter to you?
4. How you/we should prepare?

Who are we?



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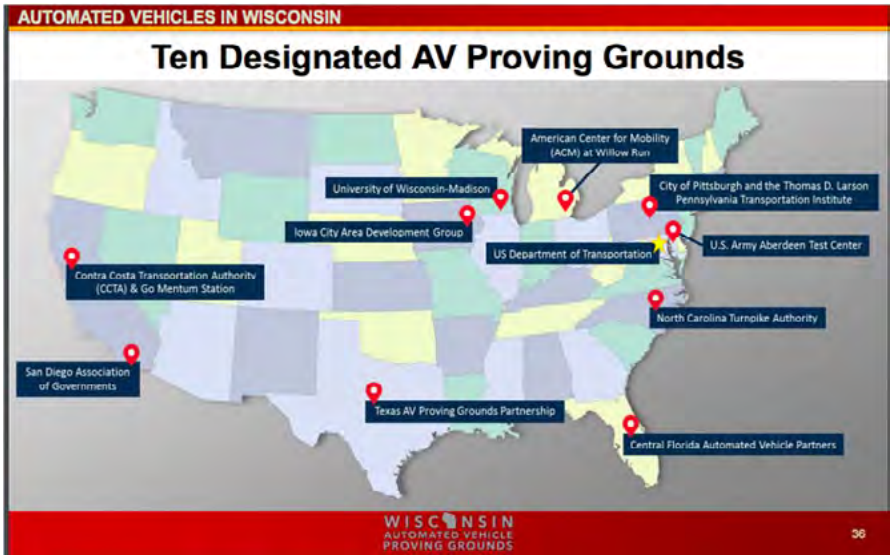
Wisconsin Automated Vehicle Proving Grounds

Who are we?



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AV TECH: (EM)BRACING THE IMPACT

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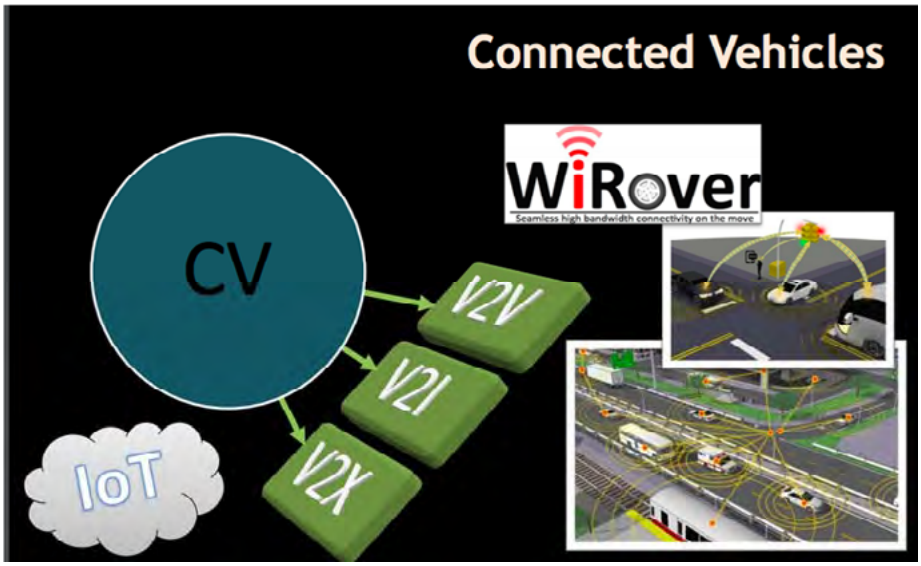
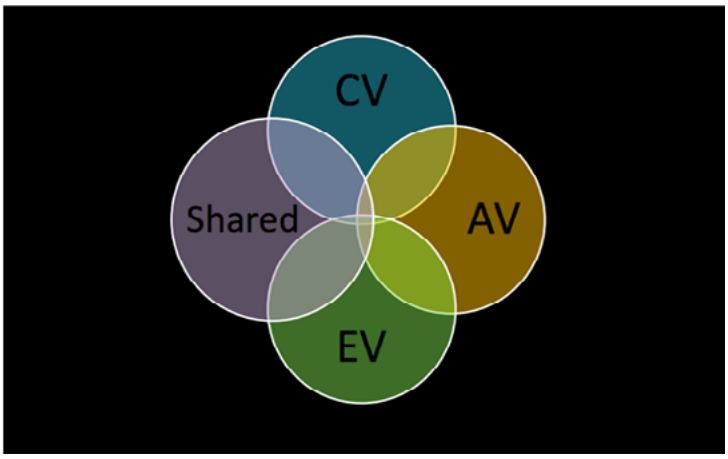


The Future of Mobility



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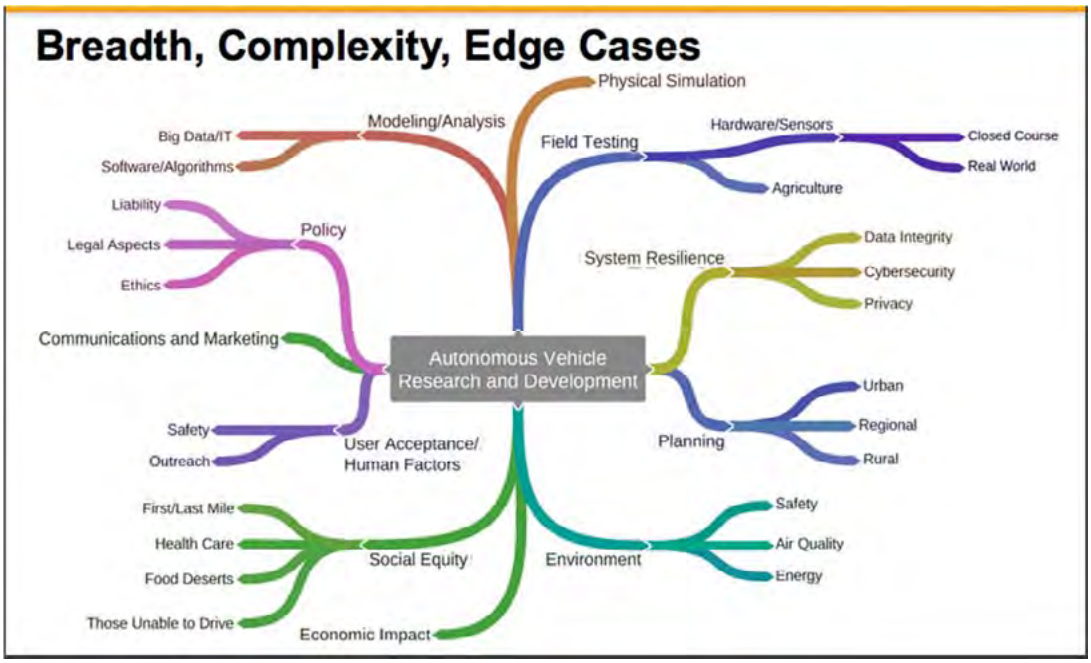

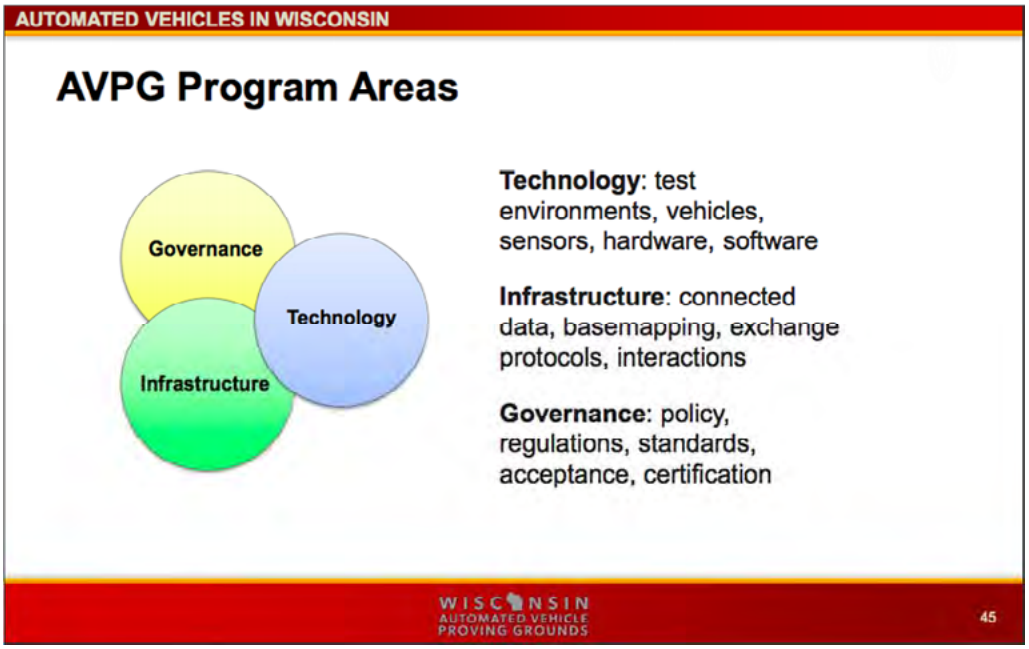

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What is an AV?

What is an AV?

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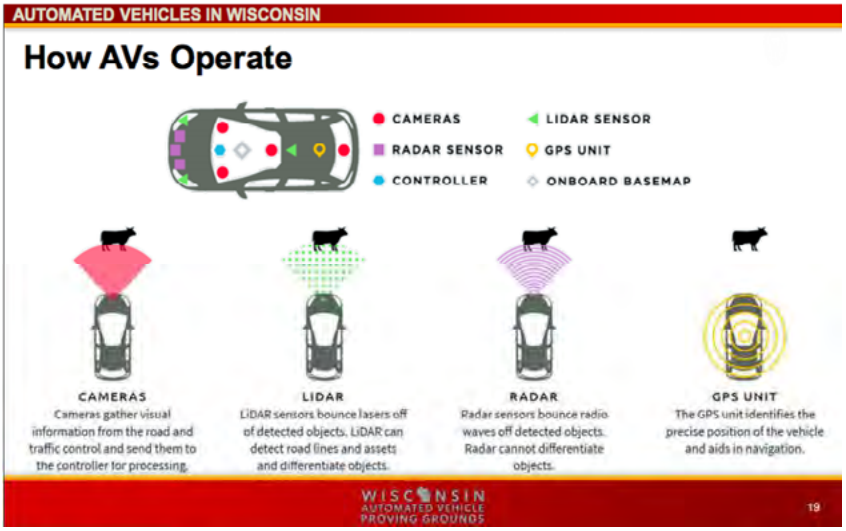
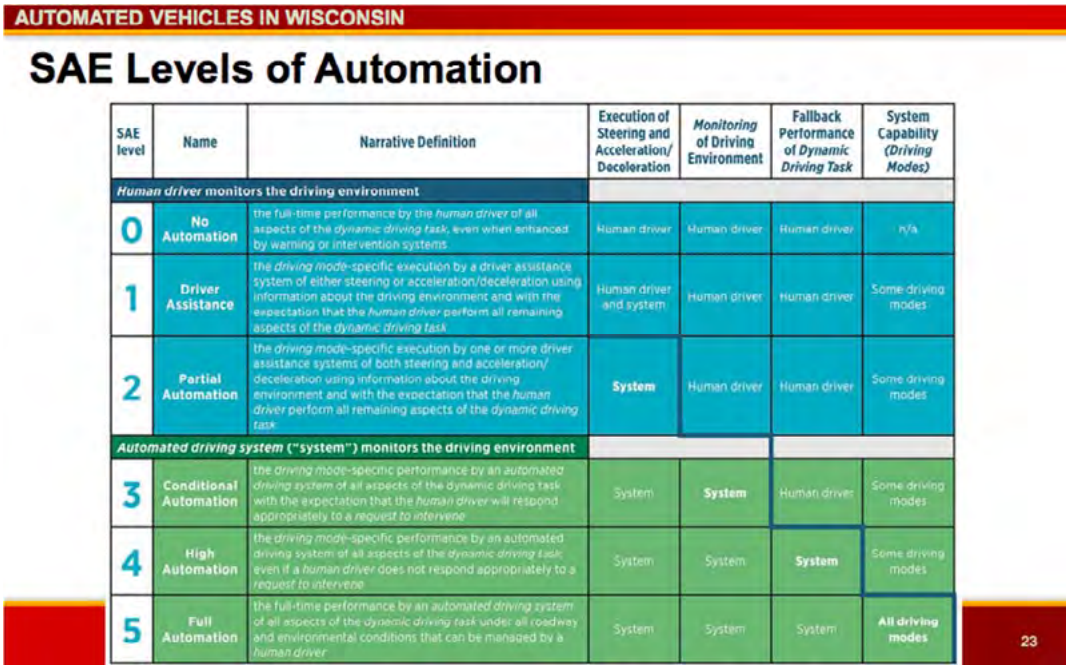
Sensors Form ADAS





SAE level	Name	Narrative Definition	Execution of Steering and Acceleration/ Deceleration	*Monitoring* of Driving Environment	Fallback Performance of *Dynamic Driving Task*	System Capability *(Driving Modes)*
***Human driver* monitors the driving environment**						
0	No Automation	the full-time performance by the *human driver* of all aspects of the *dynamic driving task*, even when enhanced by warning or intervention systems	Human driver	Human driver	Human driver	n/a
1	Driver Assistance	the *driving mode*-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	Human driver and system	Human driver	Human driver	Some driving modes
2	Partial Automation	the *driving mode*-specific execution by one or more driver assistance systems of both steering and acceleration/ deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	**System**	Human driver	Human driver	Some driving modes
***Automated driving system* ("system") monitors the driving environment**						
3	Conditional Automation	the *driving mode*-specific performance by an *automated driving system* of all aspects of the dynamic driving task with the expectation that the *human driver* will respond appropriately to a *request to intervene*	System	**System**	Human driver	Some driving modes
4	High Automation	the *driving mode*-specific performance by an automated driving system of all aspects of the *dynamic driving task*, even if a *human driver* does not respond appropriately to a *request to intervene*	System	System	**System**	Some driving modes
5	Full Automation	the full-time performance by an *automated driving system* of all aspects of the *dynamic driving task* under all roadway and environmental conditions that can be managed by a *human driver*	System	System	System	**All driving modes**

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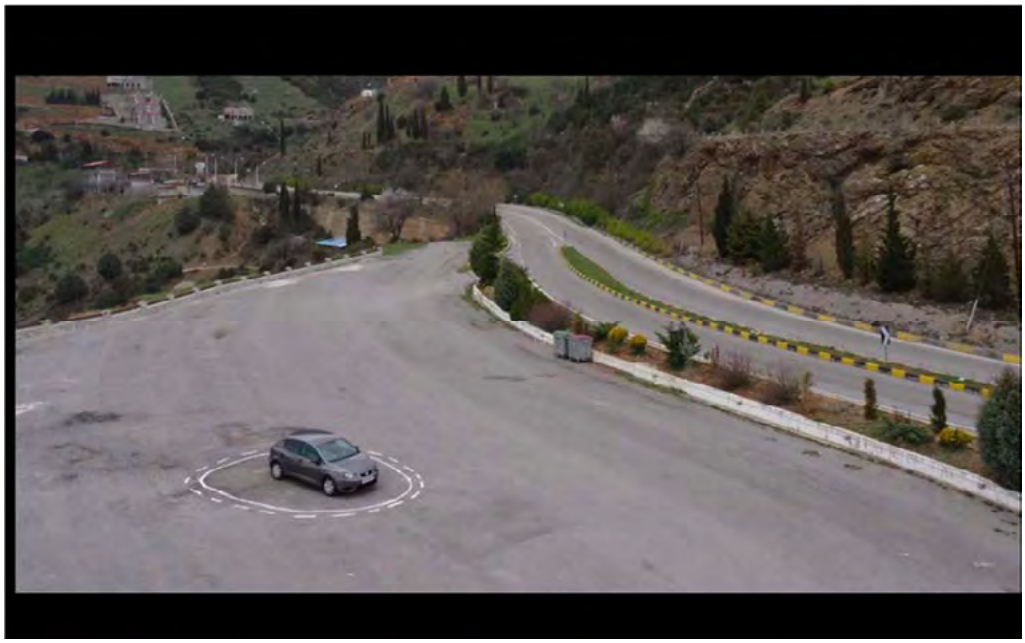


Pop Quiz

- National Leagues of Cities
- Conducted a content analysis of city and regional transportation planning documents from the 50 most populous US cities, as well as the largest cities in every state – a total of 68 communities.

Pop Quiz Question 1

- How many of your long-term plans consider the potential effect of driverless technology?

National Trend

- 6%
- Despite the fact that communities will need to determine whether to create separate lanes or zones for AVs as well as what to do with acres of potential unnecessary parking.

Pop Quiz Question 2

- How many of your plans plans take into account private transportation network companies (TNC) (ie Uber)?

National Trend

- 3%
- As TNC's grow in popularity and services that are using buses to carry multiple passengers, the networks will be in direct competition with public agencies

Pop Quiz Question 3

- How many of your plans contain explicit recommendations for new highway construction?

National Trend

- 50%
- Highlight the fact that many cities have not yet realized the potential of new mobility trends….represents classic model: grow infrastructure to handle congestion.
- Only 12 percent of plans are clear that no new highways are under consideration

Quiz Results

- **You pass, but we are still utterly unprepared**

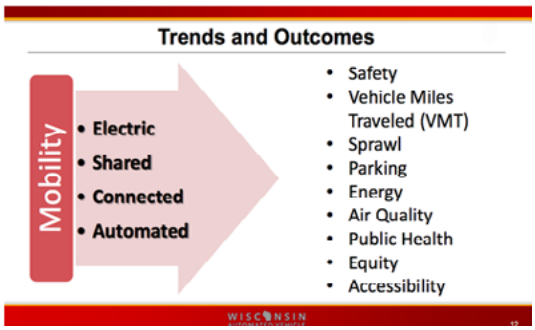
Why do AV's matter to you?

Why do AV's matter to you?

1. Because they are coming, and it's your job to plan for them.

Why do AV's matter to you?

1. Because they are coming, and it's your job to plan for them.
2. The upside is potentially huge



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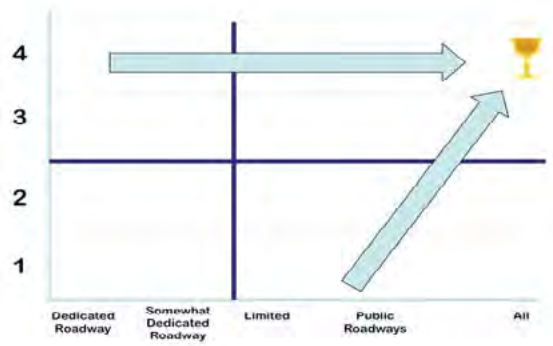
How do you/we prepare for AV's?

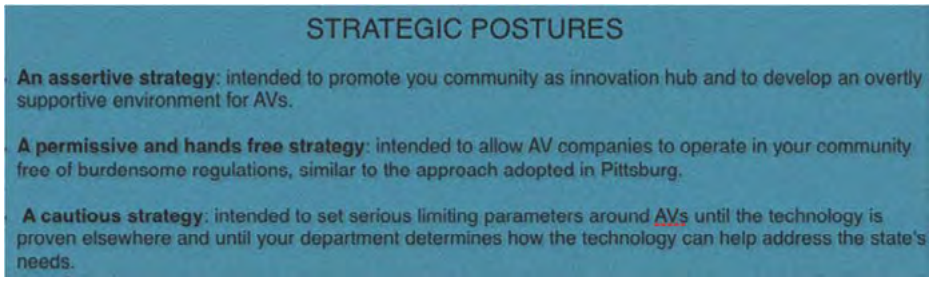
How do you/we prepare for AV's?

1. Pick your wine glass



How do you/we prepare for AV's?

1. Pick your wine glass
2. Pick your strategic posture and **work with the technology companies** to explore how their technology can help your community


STRATEGIC POSTURES

- **An assertive strategy**: intended to promote you community as innovation hub and to develop an overtly supportive environment for AVs.
- **A permissive and hands free strategy**: intended to allow AV companies to operate in your community free of burdensome regulations, similar to the approach adopted in Pittsburg.
- **A cautious strategy**: intended to set serious limiting parameters around AVs until the technology is proven elsewhere and until your department determines how the technology can help address the state's needs.

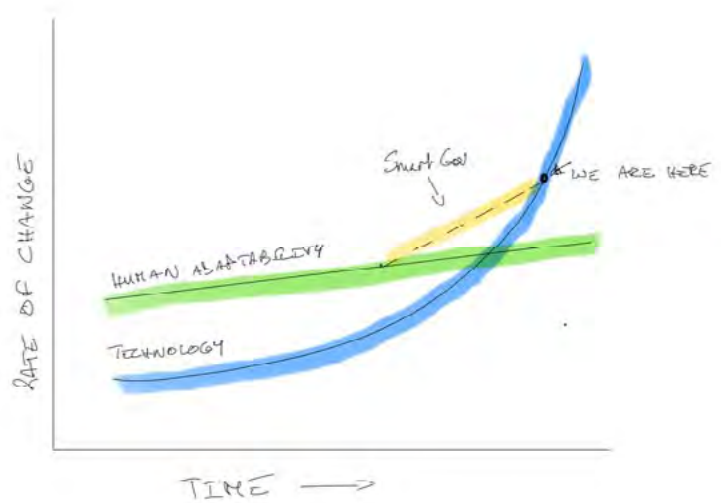
How do you/we prepare for AV's?

1. Pick your wine glass
2. Pick your strategic posture and work with the technology companies to explore how their technology can help your community
3. Select a technology

How do you/we prepare for AV's?

1. Pick your wine glass
2. Pick your strategic posture and work with the technology companies to explore how their technology can help your community
3. Select a technology
4. Implement

Process and Timing



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Conclusion

- Pick your wine glass
- Work with Tech Companies
- Implement
- Be open minded to changing your planning/hiring/training process (smart gov.)
- Never forget: Technology is just a tool!

WI AV Proving Ground Invitation

- Form a working group
- Partner with M2C3
- Join/Participate in our monthly AV talks

Contact Info

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Global Auto & Truck Markets

Autonomous Driving and the Future of Travel

October 31, 2017

JOE VRUWINK, CFA
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Today's Agenda

- **Introduction** – why now?
- **Availability** – when will self-driving cars arrive?
- **Adoption** – how quickly will this proliferate?
- **Implications** – what might this mean for future cities and living?

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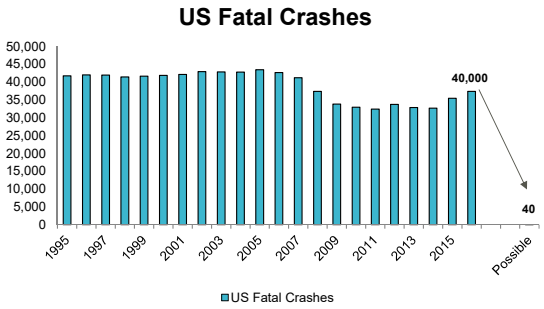
Introduction

- **Why now?**
- U.S. traffic fatalities have increased two-consecutive years
- Technology in development today has the potential to virtually **eliminate** traffic accidents



Source: NHTSA, Mobileye

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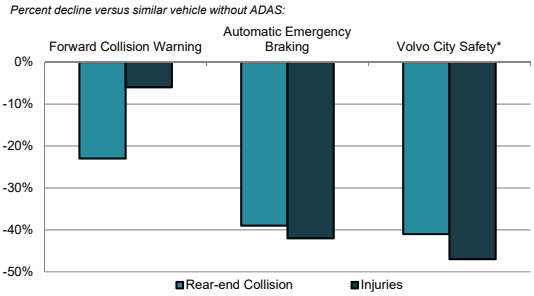
Introduction

- **Why now?**
- Even the intermediate step of offering *active safety* and *highly automated driving* offers immense societal benefits



Source: IIHS

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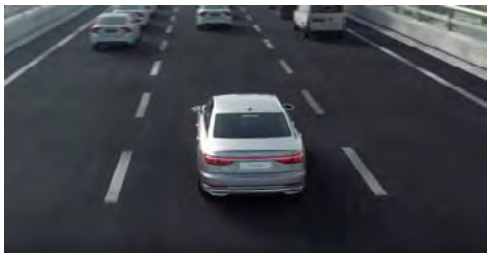
Availability

- **When will this arrive?**
- Automakers have a clear product development roadmap of offering higher levels of autonomy
- Until this year, safety systems required constant human monitoring of the driving environment
- The all-new Audi A8 is the first vehicle where human involvement is not a constant requirement (depending on the specific driving task)



Source: Audi

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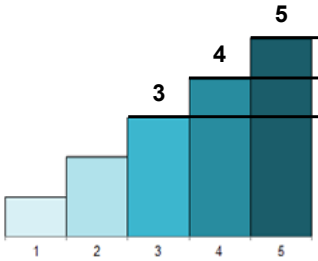
Availability

- **SAE defines five levels of automated driving**



Full automation: no human controls
Available: 2025+

High automation: the driver is just a passenger (in a given environment)
Available: 2021

Conditional automation: driver responds when requested
Available: today

Source: SAE

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Adoption

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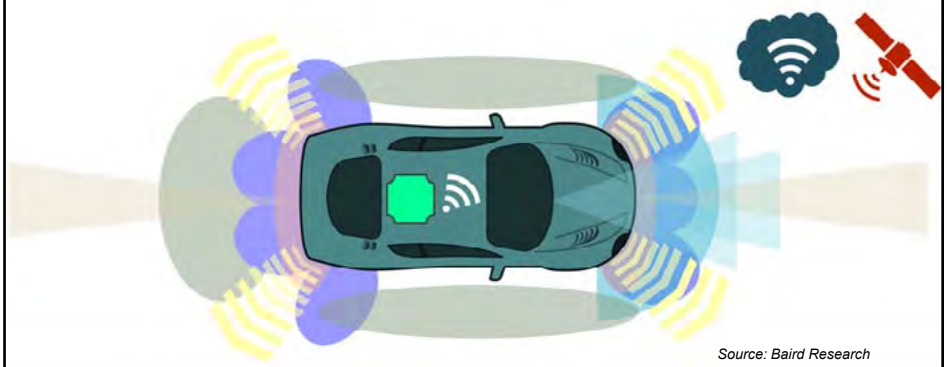
- **The "core" hardware for automated driving is available…but costly**
  - Tier 1 suppliers estimate $5,000+ of system cost to the OEM to achieve Level 4 capability in 2020



Source: Baird Research

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Adoption

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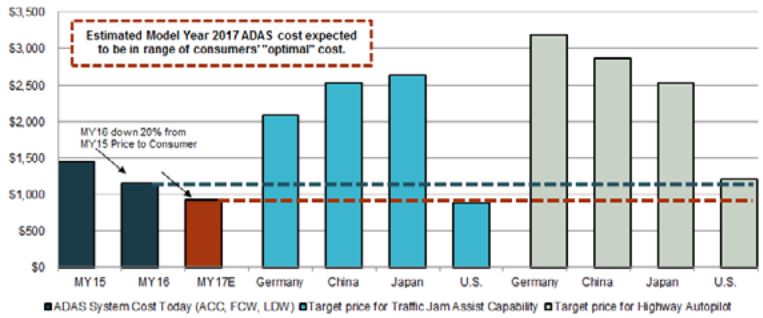
- **Significant strides to reduce costs already being achieved**
  - Driver assist has already achieved optimal price for mass adoption in most regions of the world



Source: Baird Research, Company reports

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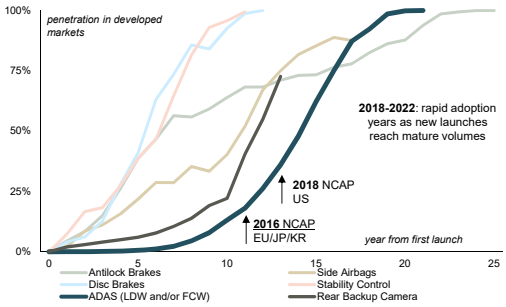
Adoption

- **Technology adoption follows an S-Curve**
  - Without regulation, technologies proliferate over 4-5 design cycles or 20-25 years
  - With mandates, adoption can be much quicker (~10 years)
  - Assuming "normal" adoption curves, **Level 4/5 vehicles proliferate by 2040-2050**



Source: Baird Research, Ward's Automotive

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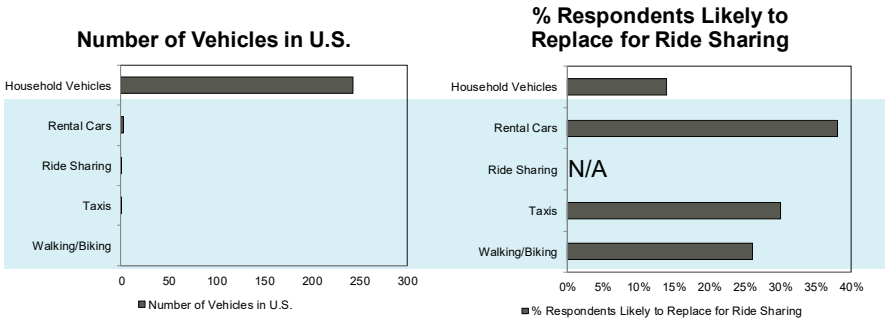
Implications

- **Baird's view:** people will continue to own cars, whether driven or autonomous
- **Autonomous shared mobility disrupts… shared mobility**



Source: DOT, KBB, Baird estimates

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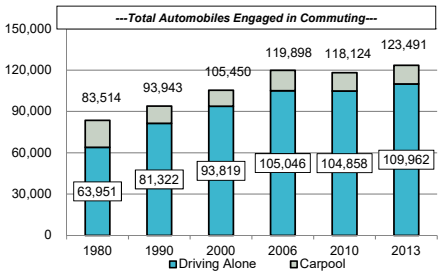
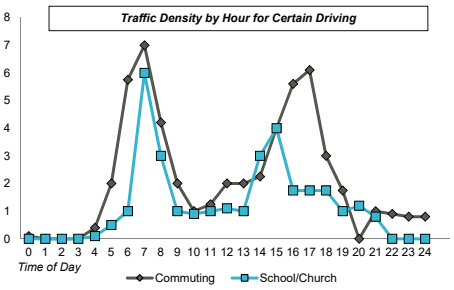
Implications

- **Typical vehicle use case (i.e., commuting) prevents greater reductions in fleet density**
  - Vehicles are utilized at the same time each day





Source: US Census Bureau, FHWA

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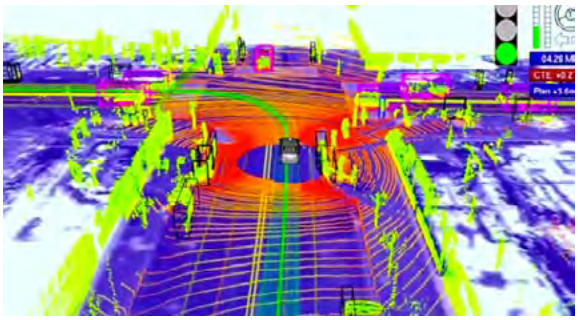
Implications

- **Greatest changes to travel likely to come in high density areas…** the very environment Level 4 vehicles are first being deployed



Source: Alphabet, IEEE

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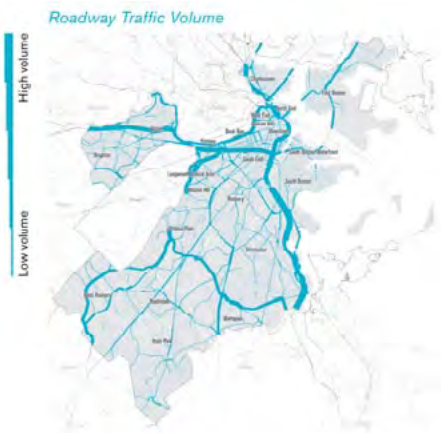
Implications

- **Case Study:** "Go Boston 2030"
- Commute (one-way): 29 minutes
- Primary transport: Driving alone (39%)
  Public transit (34%)
  Walk/bike (20%)
  Carpool (6%)
- Trips ending in Boston: 395,300
- Accidents: 200+ per year



Source: City of Boston, Central Transportation Planning Staff

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Implications

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Benefits

- **Productivity** (1.2B hrs of driving saved)
- **Traffic efficiency** (30% reduction in time)
- **Traffic density** (10-30% fewer vehicles)
- **CO2 Emissions** (down ~70%)
- **Parking** (40-50% fewer spaces)
- **Safety** (90% fewer accidents)

Source: BCG

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THE NEED FOR STEERING THE DRIVERLESS HORSELESS CARRIAGE: ANTICIPATED ENVIRONMENTAL IMPACTS OF AUTONOMOUS VEHICLES

2017 CONFERENCE on REGIONAL and METROPOLITAN PLANNING IN WISCONSIN

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The Need for Steering the Driverless Horseless Carriage: Anticipated Legal and Environmental Impacts of Autonomous Vehicles

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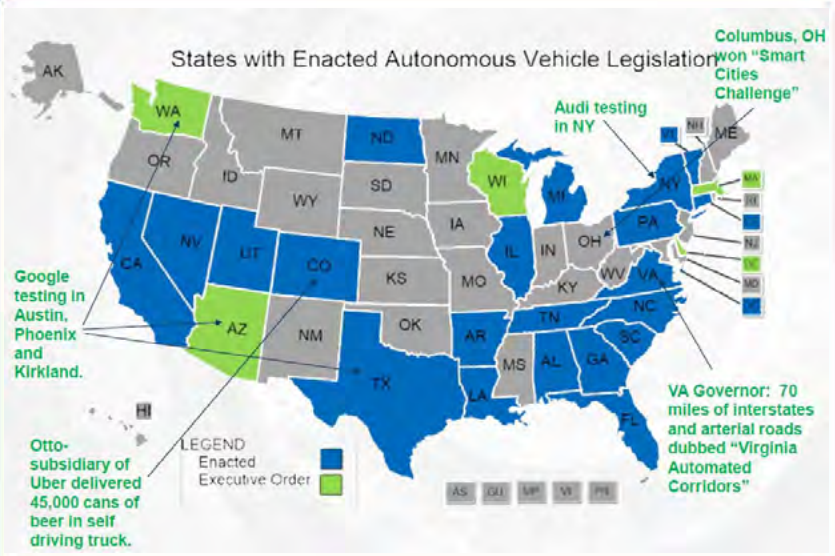
October 31, 2017

GODFREY KAHN S.C. 17972495



Source: National Conference of State Legislatures

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THE NEED FOR STEERING THE DRIVERLESS HORSELESS CARRIAGE: ANTICIPATED ENVIRONMENTAL IMPACTS OF AUTONOMOUS VEHICLES

State Laws: Michigan

- Michigan passed 4 bill package in 2016
  - Eases testing restrictions
  - Allows autonomous vehicles to be driven on roads in the state when they are sold to the public.
  - Allows for truck platooning
  - Finalized American Center for Mobility

Source: National Conference of State Legislatures

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Governor Walker's Steering Committee on Autonomous and Connected Vehicle Testing and Deployment

Executive Order #245 (5/18/17)
COMMITTEE ROSTER

Secretary Dave Ross, Chair, ex officio Wisconsin Department of Transportation	Representative Adam Neylon, Wisconsin State Assembly
Steven Caya, Roadview	Commissioner Ted Nickel, ex officio Wisconsin Commissioner of Insurance
Steven Cyra, HNTB Corporation	Dr. David Noyce, University of Wisconsin – Madison
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Senator Frank Lasee, Wisconsin State Senate	Tom Still, Wisconsin Technology Council
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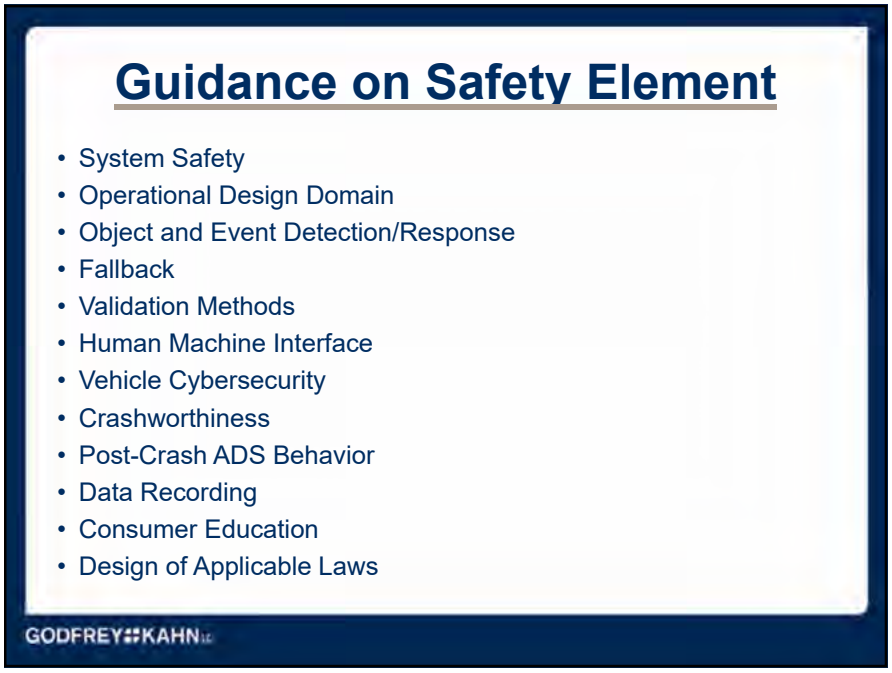

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Best Practices for Legislation

- 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

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Best Practices for State Transportation Official

- Administrative
- Application for Entities to Test ADSs on Public Roadways
- Permission for Entities to Test ADSs on Public Roads
- Specific Considerations for ADS Test Drivers and Operations
- Considerations for Registration and Titling
- Working with Public Safety Officials
- Liability and Insurance

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THE NEED FOR STEERING THE DRIVERLESS HORSELESS CARRIAGE: ANTICIPATED ENVIRONMENTAL IMPACTS OF AUTONOMOUS VEHICLES

Potential Impacts on the Built and Natural Environment

- Urban sprawl and the "Horseless Carriage"
- Environmental Implications of Urban Sprawl
  - More mobile source pollution
  - Disproportionately impacts low-income communities
  - Parking requirements produce non-point surface water pollution
  - Disrupts wildlife habitats

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Urban Sprawl Implications for AV

- Increase or decrease in vehicle miles travelled?
- Impact of reducing road lane widths and takings
- Reduction in surface parking needs in urban areas
- Los Angeles: 14% (665 sq. miles or 13 City of San Francisco's) of all land used for parking

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THE NEED FOR STEERING THE DRIVERLESS HORSELESS CARRIAGE: ANTICIPATED ENVIRONMENTAL IMPACTS OF AUTONOMOUS VEHICLES

Impacts of AV on Traditional Environmental Policies

- Smart Growth
- Mobile source planning for ozone non-attainment
- Urban Brownfield policies
- Renewable energy policies

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Smart Growth

- Smart Growth planning
  - Should promote efficient and substantial land development
  - Optimize use of prior infrastructure and minimize footprint of developed land
- EPA promotes use of Smart Growth to address
  - Climate change
  - Water quality
  - Brownfield development
  - Open space conservation
- Smart Growth implication of AV technology
  - Public transportation
  - Parking requirements
  - Local street systems
  - Impacts of large, centralized fleet operations
  - Reuse of parking structures

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Mobile Source Planning for Ozone Non-Attainment

- Overview of New 2015 Ozone Standards
- Implications of AV technology on State Implementation Plans (SIPs)
  - Transportation measures are key components of SIP
  - AV technology within next two decades are an important element
- Key SIP planning for AV technology
  - Increase or decrease vehicle miles travelled?
  - Will AV technology reduce emissions by more efficient traffic movement?
  - Will automated traffic controls reduce idling emissions?
  - Will AV technology decrease use of mass transit?

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Urban Brownfield Redevelopment

- Reuse of contaminated properties may be impacted by AV technology
- Will decrease use of parking structures make more contaminated land in urban areas available for redevelopment?
- If AV technology increases urban sprawl, will causes negative implication to urban Brownfields redevelopment?

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Tax Incentives and Renewable Energy Policies

- Tax policies for efficient vehicles
  - Credit for plug-in vehicles
  - Authorized tax credit for charging stations (expired 12/31/16)
  - State road use taxes for electronic hybrids
- How will AV technology impact these tax/fueling use policies?
  - Impacts on electrification needs on utilities
  - Will centralized fueling stations be more efficient and less harmful to the environment?
  - How will all these developments impact future tax and grant incentives?

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Thank You.

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U.S. Department of Transportation issues new Automated Driving Systems (ADS) guidance

On Sept. 12, 2017, the U.S. Department of Transportation, through the National Highway Traffic Safety Administration (NHTSA), issued new federal guidance called "Automated Driving Systems: A Vision for Safety 2.0." The **new federal guidance**, composed of an industry-facing section called "Voluntary Guidance" and a state-facing section called "Technical Assistance to States," replaces the Federal Automated Policy released in 2016. This newsletter provides an overview of both sections.

This guidance will be an important roadmap for businesses interested in supplying parts and services that are integrated into the supply chain for the development of autonomous vehicles. In addition, the businesses in this market sector should be vigilant to ensure that the best practices highlighted in this guidance for legislatures regulating autonomous vehicles are followed.

Section 1: Voluntary guidance

The Voluntary Guidance, although lacking a compliance requirement or enforcement mechanism, is intended to support entities that are designing ADS for use on public roads in the United States. These entities include traditional vehicle manufacturers as well as other entities involved with manufacturing, designing, supplying, testing, selling, operating or deploying ADS, including equipment designers and suppliers; entities that outfit any vehicle with automated capabilities or equipment for testing, commercial sale and/or for use on public roads; transit companies; automated fleet operators; "driverless" taxi companies; and any other individual or entity offering services utilizing ADS technology (referred to collectively as "entities" or "industry").

The Voluntary Guidance outlines 12 safety elements, which the NHTSA believes represents industry consensus, that are widely considered to be the most important design aspects to consider and address when developing, testing and deploying ADSs on public roads. Entities are encouraged to publish a Voluntary Safety Self-Assessment demonstrating how the 12 safety elements are being addressed. Each of these safety elements is discussed below:

1. **System safety:** Entities are encouraged to use a systems-engineering approach with the goal of designing ADS free of unreasonable safety risks. System safety considerations should consider many factors, such as design architecture, sensors, communication failure, potential software errors, loss of traction or stability, and potential collisions with environmental objects and other road users. All system safety decisions should be tested, validated and verified as individual sub-systems and as part of the entire vehicle architecture.

2. **Operational Design Domain:** An Operational Design Domain (ODD) defines where (e.g., road type, speed limits) and when (under what conditions such as time of day, weather, etc.) an ADS is designed to operate. Entities are encouraged to document the ODD for each ADS available on their vehicles as tested or used on public roads, as well as document the process and method for assessing, testing and validating ADS functionality with a prescribed ODD. An ADS should be able to operate safely within the ODD for which it is designed, as well as transition to a minimal risk condition if conditions dynamically change to fall outside of an ADS's ODD.

3. **Object and Event Detection and Response:** Object and Event Detection Response (OEDR) refers to detection by the driver or ADS of any information necessary to the immediate driving task, as well as the implementation of the appropriate driver or system response to a particular circumstance. Entities are encouraged to have a documented process for assessing, testing and validating their ADS's OEDR capabilities, which should include being able to detect and respond to other vehicles, pedestrians, bicycles, animals and other objects that could affect safe operation of the vehicle.

4. **Fallback (minimal risk condition):** Entities are encouraged to have a documented process for transition to a minimal risk condition when a problem occurs or the ADS cannot safely operate. In addition to detecting when an ADS is malfunctioning, ADS should be able to notify the human driver of an error event in a way that allows the driver to regain proper control of the vehicle or allows the ADS to return to a minimal risk condition independently.

5. **Validation methods:** Entities are encouraged to develop validation methods to appropriately address any safety risks associated with their ADS approach. Whether testing is done by the entities themselves or by an independent third party, such testing should demonstrate the behavioral competencies an ADS would be expected to perform during normal operation, the ADS's performance during crash avoidance situations, and the performance of fallback strategies relevant to the ADS's ODD.

6. **Human machine interface:** Entities are encouraged to consider and document a process for assessing, testing and validating the design of a vehicle's human machine interface, which refers to interactions between a vehicle's ADS and the driver.

7. **Vehicle cybersecurity:** Entities are encouraged to follow a comprehensive product development process to minimize risks to safety from cybersecurity threats and vulnerabilities. The NHTSA encourages entities to consider and incorporate voluntary guidance, best practices and design principles from relevant organizations, such at the National Institute of Standards & Technology and the Alliance of Automobile Manufacturers.

8. **Crashworthiness:** Entities are encouraged to consider how to best protect vehicle occupants during a crash. Entities should also evaluate and implement countermeasures to protect occupants and maintain an ADS's intended performance level during this event.

9. **Post-crash ADS behavior:** Entities are encouraged to consider how to return ADSs to a safe state immediately after being involved in a crash. Additionally, entities should consider having documentation available that facilitates the maintenance and repair of ADSs before they can be put back into service.

10. **Data recording:** Entities are encouraged to establish a documented process for testing, validating and collecting necessary information related to the occurrence of ADS malfunctions, degradations or failures in a way that can be used to establish the cause of any crash.

11. **Consumer education & training:** Entities are encouraged to develop, document and maintain employee, dealer, distributer and consumer education and training programs to inform the public regarding differences in the use and operations of ADS from those of the conventional vehicles owned and operated on the road today.

12. **Federal, state and local laws:** Entities are encouraged to document how they intend to account for all applicable federal, state and local laws in the design of their vehicles and ADS.

Section 2: Technical assistance to states

This section is designed to clarify and frame federal and state roles in the regulation of ADS and lay out a framework that states may use in creating applicable laws and regulations. States are encouraged to proactively assess current laws and regulations to avoid creating barriers to ADS operation. This section consists of three parts:

1. **Federal and state regulatory roles:** In general, the NHTSA is responsible for regulating motor vehicles and motor vehicle equipment, and states are responsible for regulating the human driver and most other areas of motor vehicle operation. NHTSA responsibilities have historically involved setting Federal Motor Vehicle Safety Standards (FMVSSs) for new motor vehicles and motor vehicle equipment, enforcing compliance with FMVSSs, investigating and managing the recall and remedy of noncompliances and safetyrelated motor vehicle defects nationwide, and communicating with and educating the public about motor vehicle safety issues. State responsibilities have historically involved licensing drivers, enacting and enforcing traffic laws and regulations, conducting safety inspections, and regulating motor vehicle insurance and liability. These areas of regulatory responsibility should remain largely intact for ADSs.

2. **Best practices for legislatures:** The NHTSA has identified common components of state legislation regarding ADS and recommends the following safety-related best practices for states when crafting ADS legislation.

   - *Provide a "technology-neutral" environment*: States should not place unnecessary burdens on competition and innovation by walling off ADS testing or deployment to motor vehicle manufacturers only.

   - *Provide licensing and registration procedures*: Because states are responsible for driver licensing and vehicle registration procedures, states should consider defining "motor vehicle" to include any ADS-equipped vehicle operating on state roads and highways, licensing ADS entities and ADS test operators, registering all vehicles equipped with ADS, and establishing proof of responsibility requirements in the form of surety bonds or self-insurance.

   - *Provide reporting and communications methods for public safety officials*: States should take steps to monitor ADS operation through reporting and communications protocols so that entities can coordinate with public safety agencies.

   - *Review traffic laws and regulations that may serve as barriers to operation of ADS*: States should review their vehicles codes and applicable traffic laws to determine if there are unnecessary regulatory barriers preventing the testing and deployment of ADS on public roads.

3. **Best practices for state highway safety officials:** The following subsections are designed to assist states looking for guidance in developing procedures and conditions for ADS introduc tion onto public roads.

   - *Administrative*: States may wish to consider new oversight activities to support states' roles and activities as they relate to ADS. These activities include, but are not limited to, identifying a lead agency responsible for deliberation of any ADS testing; developing an internal process for issuing test ADS vehicle permits; and creating a technology committee composed of representatives from various departments of state government, particularly those representing transit authorities and the aging and disabled communities.

   - *Application for entities to test ADS on public roadways*: States could request that an entity submit an application to the designated lead agency in each state in which the entity plans to test ADS. This application could contain basic information (such as name, corporate physical and mailing addresses, etc.); the entity's safety and compliance plan for the ADS; evidence of the entity's ability to satisfy judgment(s) for personal injury, death or property damage caused by an ADS; and a summary of the training given to the employees, contractor and users designated by the entity as ADS test operators

- *Permission for entities to test ADS on public roads*: State and local governments may consider the following before granting permission for ADS testing on public roads: involving law enforcement agencies before responding to a particular testing application, suspending permission if the entity fails to comply with insurance or driver requirements, and requesting additional information or requiring an entity to modify its application before granting approval.
- *Specific considerations for ADS test drivers and operations*: States should consider requiring entities that use ADS test drivers to provide a summary of the training provided to the test driver, encourage test drivers to follow and traffic rules and report crashes, and ensure that licensed test drivers can responsibly operate ADS-equipped vehicles even if the automated system disengages.
- *Considerations for registration and titling*: States should consider specific identification and titling requirements for ADS-equipped vehicles, as well as notification requirements if the vehicle has been significantly upgraded post-sale.
- *Working with public safety officials*: States should consider training public safety officials in monitoring and understanding ADS operation and potential interactions, including human operator behavior changes – if any – when an ADS-equipped vehicle is in control.
- *Liability and insurance*: States should consider how to allocate tort liability among ADS owners, operators, passengers, manufacturers and other entities when a crash occurs, and determine who (ADS owner, operator, passenger, manufacturer, etc.) must carry motor vehicle insurance.

Concluding comment

The era of the development of autonomous vehicles is moving faster than anyone could have predicted a few years ago. Businesses interested in product development need to stay abreast of standards and guidances that are emerging for this sector. Members of the Environmental and Energy Strategies Practice Groups at Godfrey & Kahn are investing significant time in monitoring these developments. Please feel free to reach out to any member of the team for more information on legal developments in this market sector.

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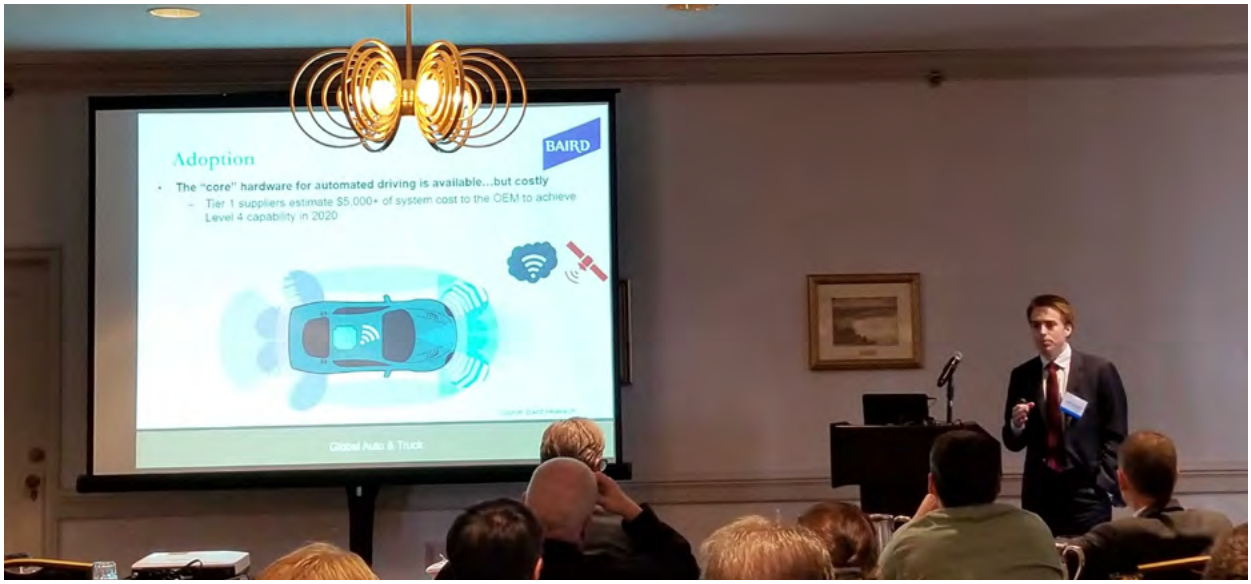
Connected Vehicles
CV


Adoption
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The "core" hardware for automated driving is available…but costly
Tier 1 suppliers estimate $5,000+ of system cost to the OEM to achieve Level 4 capability in 2020
Global Auto & Truck


Guidance on Safety Element
System Safety
Operational Design Domain
Object and Event Detection/Response
Fallback
Validation Methods
Human Machine Interface
Vehicle Cybersecurity
Crashworthiness
Post-Crash ADS Behavior
Data Recording
Consumer Education
Design of Applicable Laws
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