WILMERHALE

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WILMERHALE WEBINAR

# *What Happens When Autonomous Vehicles Become Fatal? Insights on Policy, Liability and Technology in a Developing Industry*

APRIL 17, 2019

Speakers: David Cavanaugh and Brent Gurney

# *Webinar guidelines*

- Participants are in listen-only mode
- Submit questions via the Q&A feature
- Questions will be answered as time permits
- Offering 1.0 CLE credit in California and New York*

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WEBINAR

# *Speakers*

**David Cavanaugh**
Partner
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# *Defining autonomous vehicles*

Cars **sense their surroundings** and move **without human input**

**Advantages**

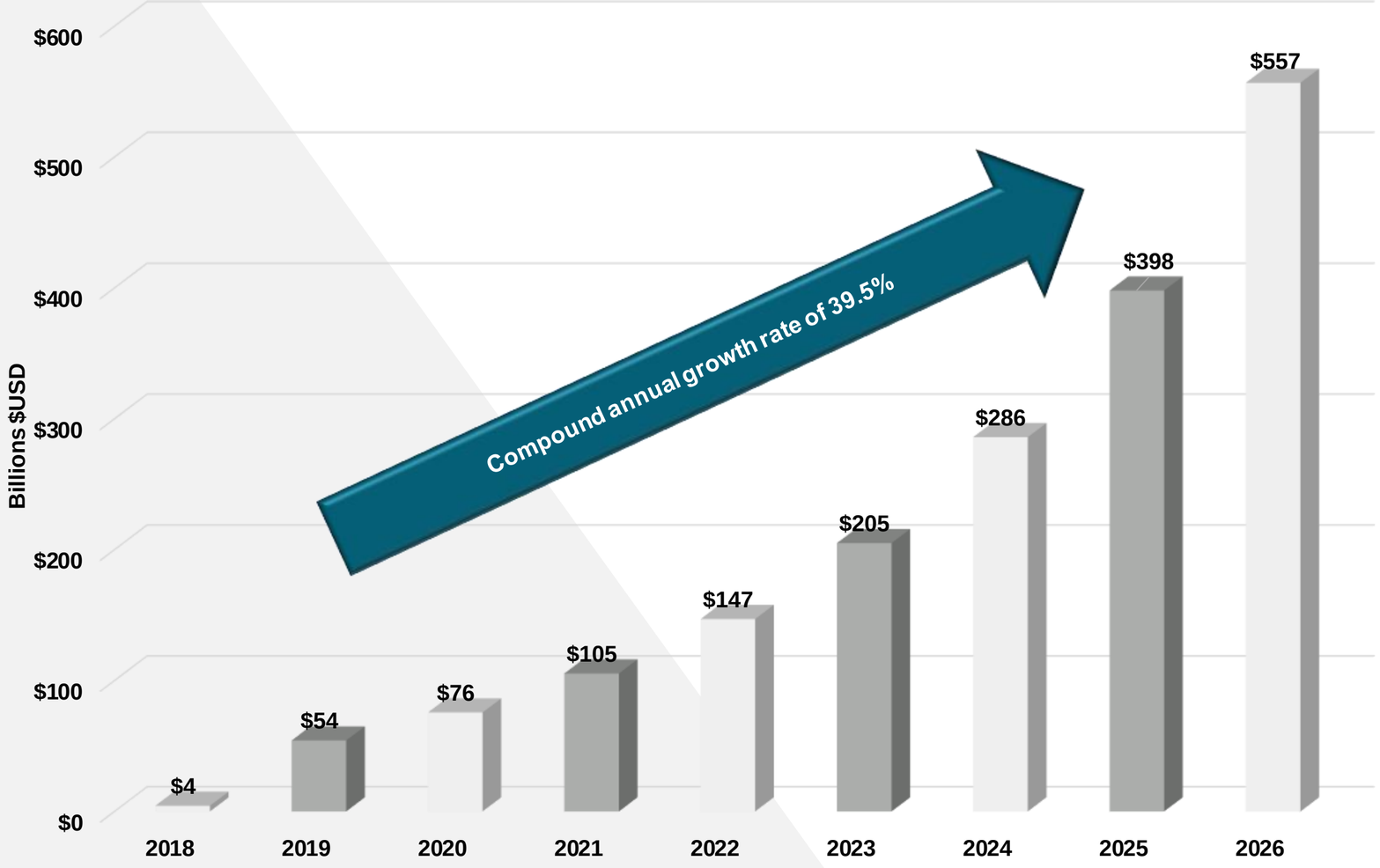
**"There will be 21 million autonomous vehicles on the world's roads by 2035"**

**Disadvantages**

- Reduced cost of accidents
- Increased safety
- Reduction in traffic collisions and injuries
- Increased traffic flow
- Environmentally friendly
- Increased human welfare
- Lower operational costs

- Legal framework and government regulations
- Loss of privacy; security concerns
- Loss of driving jobs in road transport
- Increased suburbanization
- Potential worsening of urban congestion

# *The autonomous vehicle market is growing rapidly*



# *Automated technologies could lead to breakthrough gains in transportation safety*

**35,000+**
fatalities from motor vehicle crashes in the U.S. each year

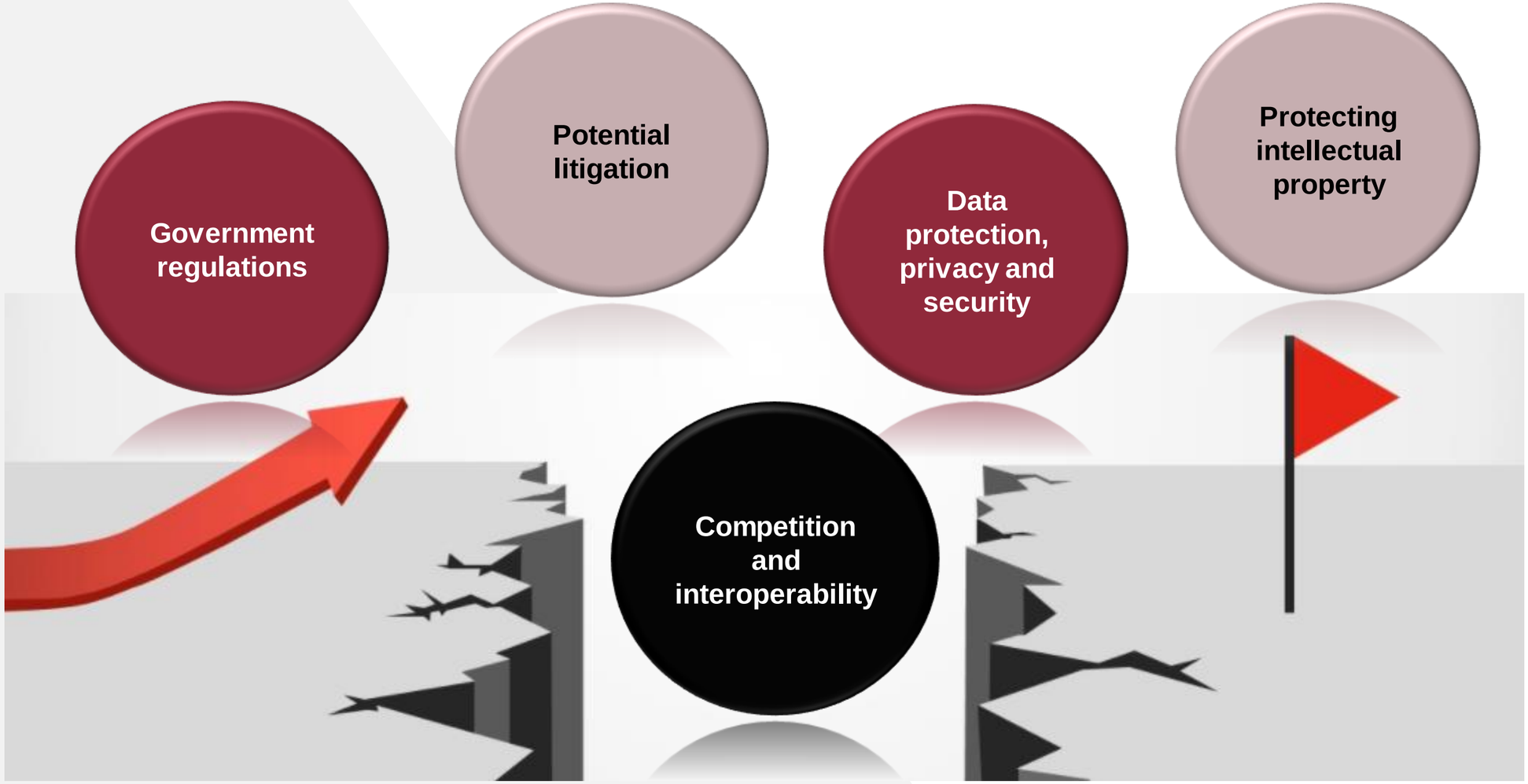
**94%**
involve driver-related factors, such as impaired driving or speeding

**6,000**
pedestrians are killed by motor vehicles each year

# *But there have been several accidents involving vehicles equipped with automated technology, including three U.S. fatalities*

- **May 7, 2016:** Driver of Tesla car on Autopilot mode is killed in Florida when car **fails to identify a truck making a left turn in front of it** and drives into the side of the truck
- **March 18, 2018:** Autonomous car operated by Uber **strikes and kills a pedestrian** on a street in Tempe, Arizona
- **March 23, 2018:** Driver of Tesla car on Autopilot mode is killed in California when car **accelerates and collides with median**
- **Over 100 additional accidents** have been reported to regulators

# *Legal challenges faced by manufacturers*



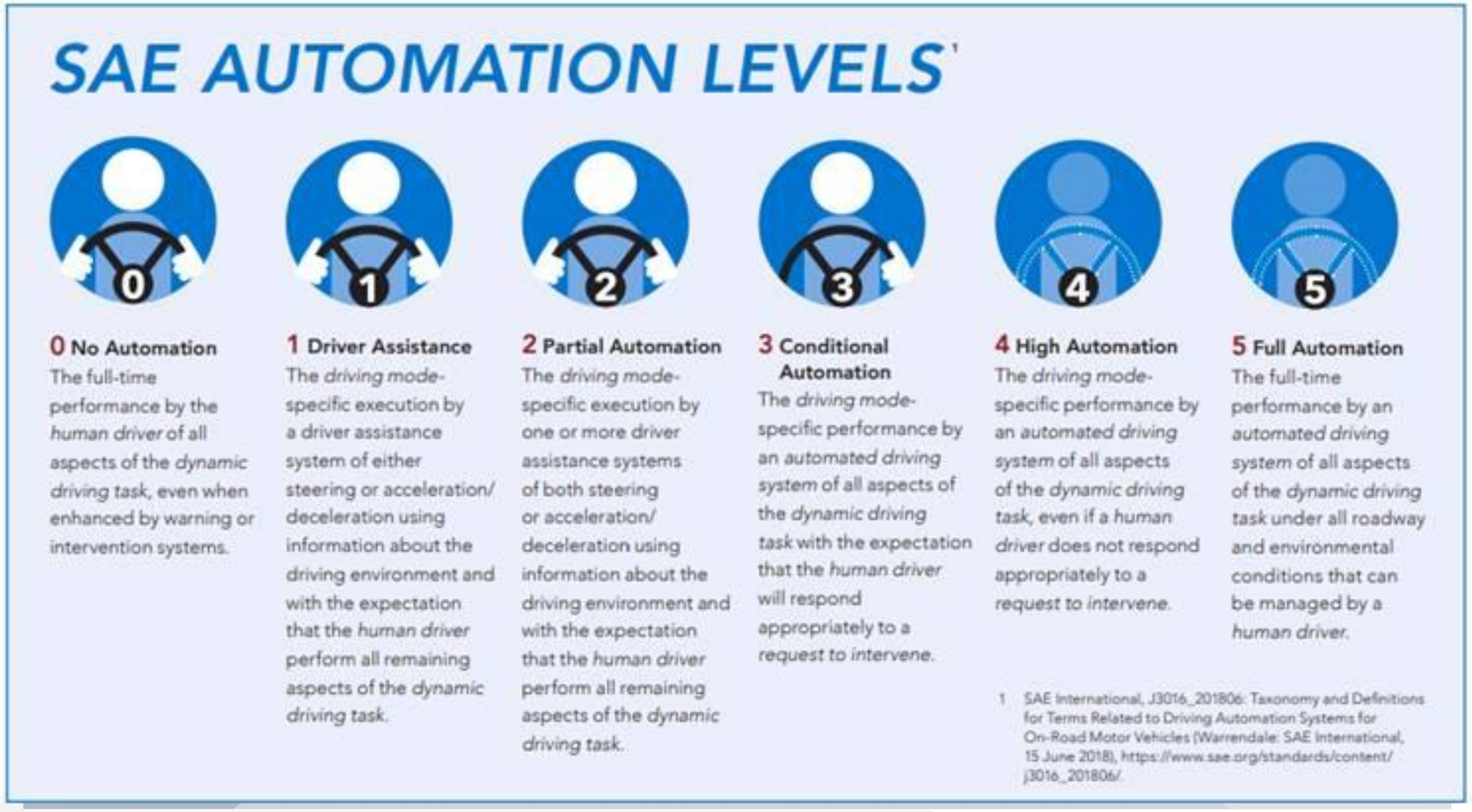
# *Technology*

# *Autonomous driving – moving technology forward*

- Autonomous driving vehicles present a unique opportunity to push the boundaries of innovation to:
  - Improve safety
  - Increase efficiency in transit both in cities areas and interstates
  - Reduce impact on the environment
  - Increase mobility and independence for those with disabilities

# *What do we mean by "autonomous driving"*

Autonomous Driving Levels 0 to 5



# *Autonomous driving levels – safety challenges*

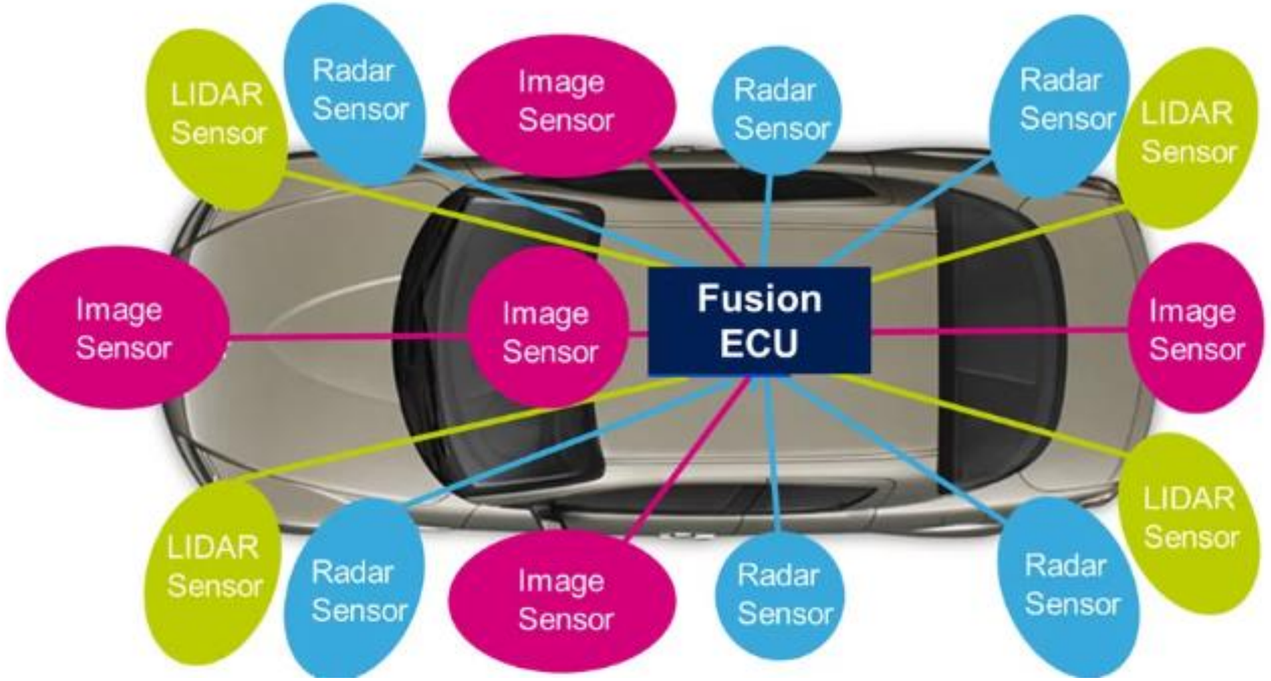
| Level 2 | Level 3 | Level 4 & 5 |
|---|---|---|
| • Driver still has the main role in driving<br>• Certain functions are automated<br>  • Automated steering<br>  • Lane shift<br>  • Emergency braking<br>  • Park assist<br>• **Safety issues associated with human error** | • Driver still alert when the vehicle's self-driving functions are active<br>• Car can ask driver to take back control of the vehicle at any time<br>• **Safety issues associated with how quickly a driver can regain control to alleviate issue automated driving could not control** | • Fully automated driving<br>• Driver can completely disengage and vehicle will take over<br>• **Safety issues associated with how vehicle will respond to emergency situations and potential failures in automated systems** |

# *Potential for technological innovations in safety from Level 2 to Levels 3 - 5*

- Increasing number and sophistication of sensors to replace human sight and situational awareness
- Improved on board computer processors to process and cause the vehicle to act on large volumes of information inputs
- Improved navigation systems that provide real time dynamic road conditions
- Vehicle to everything (V2X) communications
- Next generation user interfaces that allow users to interact with vehicle while ensuring safety
- Potential for new categories of vehicles that operate as caravans on new road systems designed for autonomous vehicles

# *Potential for technological innovations in safety from Level 2 to Levels 3 - 5*

- Replacing human sight and situational awareness with array of sensors
  - LiDar
    - Short range senor that can detect shapes of objects
- Radar sensors
  - Can sense objects in the distance through fog and rain
- Cameras
  - 2-D and 3-D cameras with high dynamic range
  - Geo-location sensors




https://www.sensorsmag.com/components/three-sensor-types-drive-autonomous-vehicles

https://spectrum.ieee.org/transportation/self-driving/accelerating-autonomous-vehicle-technology

# *Potential for technological innovations in safety from Level 2 to Levels 3 - 5*

Improved processor systems

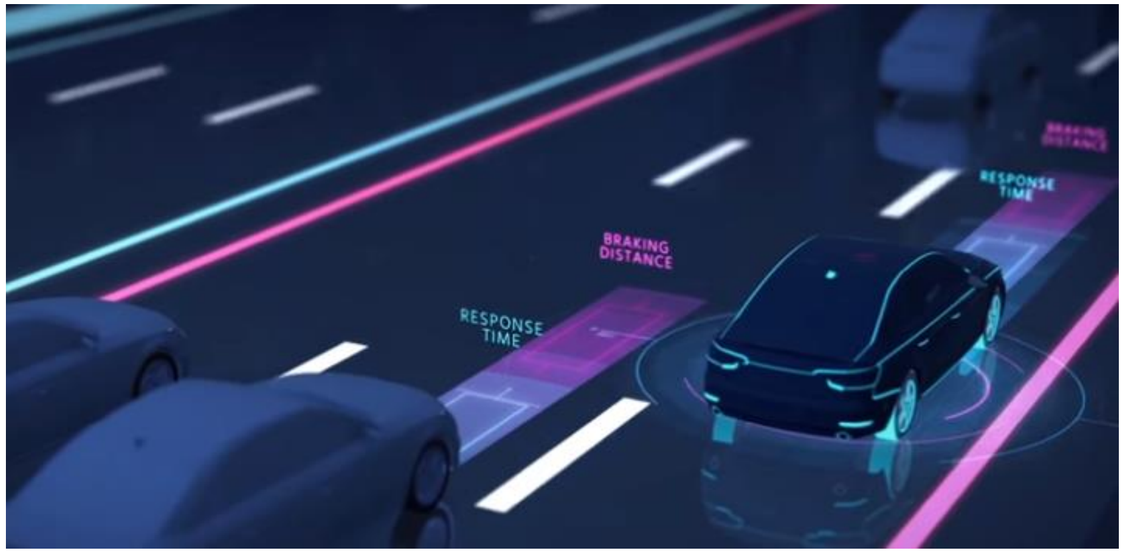
- Processing technology to understand sensed conditions and initiate action in response much more complex
  - Software has to process large amount of information coming into the car, make the right decision about what to do and then cause vehicle to act in response
    - Compare with simpler driver assist functions like adaptive cruise control or emergency braking

*Automated vehicles that accurately detect, recognize, anticipate, and respond to the movements of all transportation system users could lead to breakthrough gains in transportation safety.*

https://www.transportation.gov/sites/dot.gov/files/docs/policy-initiatives/automated-vehicles/320711/preparing-future-transportation-automated-vehicle-30.pdf

# *Potential for technological innovations in safety from Level 2 to Levels 3 - 5*

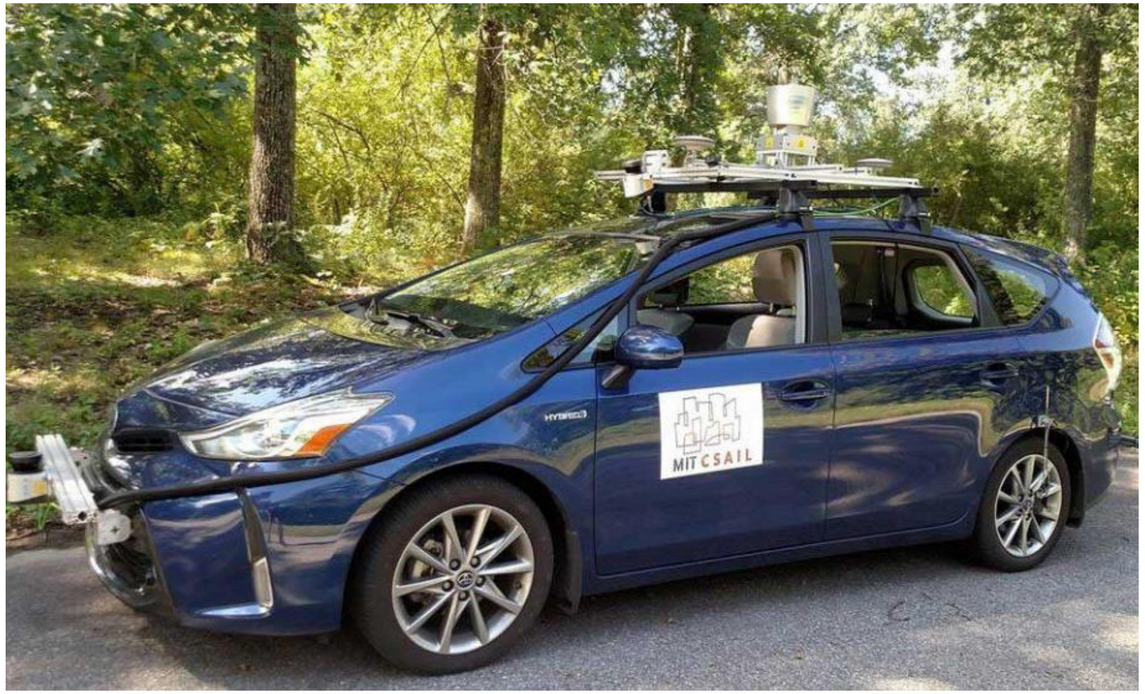
- Software complexity required for autonomous vehicles likely greater than that of aircraft
  - Software must make multiple decisions per second and continually sense changing conditions surrounding the vehicle
    - May lend itself to standard platform architecture
  - Compare with aircraft flying through relative open air with few changing conditions
- Developing models and algorithms that are incorporated into software to ensure autonomous vehicles respond in a predictable way to unpredictable external situations
  - For example, Responsibility-Sensitive Safety (RSS) is open standard developed by Intel and Mobeleye




https://www.mobileye.com/responsibility-sensitive-safety/

# *Potential for technological innovations in safety from Level 2 to Levels 3 - 5*

- Improved navigation systems
  - High precision GPS systems provide improved accuracy for autonomy vehicles
  - Map-less navigation uses a combination of sensors and GPS data to observe conditions and detect roads in real time




https://www.rdmag.com/article/2018/05/new-navigation-system-helps-autonomous-cars-tackle-country-roads

# *Potential for technological innovations in safety from Level 2 to Levels 3 - 5*


https://www.electronicdesign.com/automotive/v2x-here-stay-now-let-s-use-it-autonomous-cars

- Vehicle to everything communications
  - Allows cars to communicate with each other to create network
  - Technology enabling communication between vehicles regarding speed, trajectory, malfunction may reduce potential for collisions

# *Potential for technological innovations in safety from Level 2 to Levels 3 - 5*

- Next generation user interfaces
  - Build trust in users that system is functioning including detecting and responding to external conditions
    - Ease transition for users with combination of manual and automated controls
  - Infotainment systems combine entertainment with vehicle controls and information

https://www.theverge.com/2018/1/12/16880978/gm-autonomous-car-2019-detroit-auto-show-2018

# *Potential for technological innovations in safety from Level 2 to Levels 3 - 5*

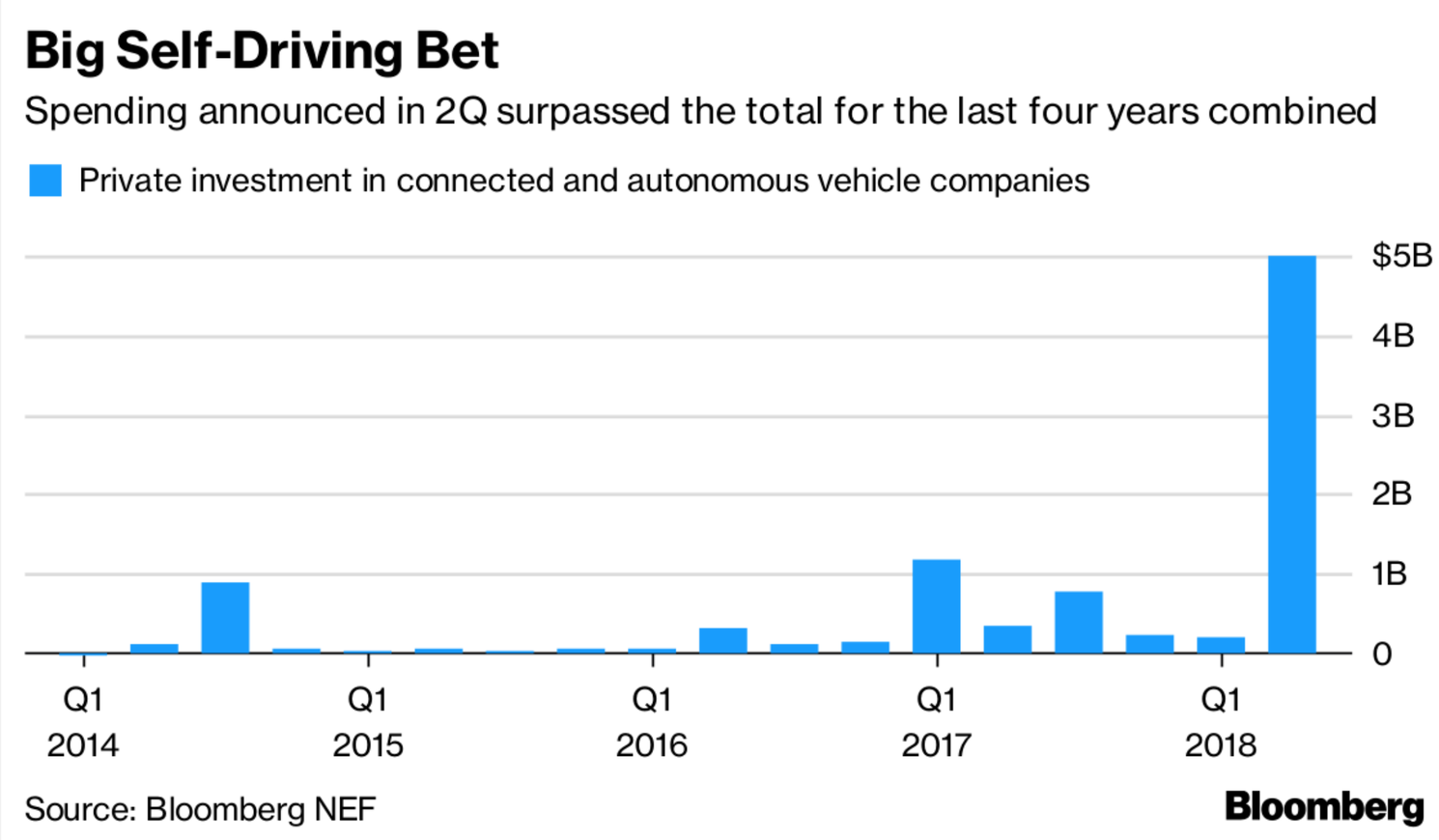
- Potential for new categories of vehicles that operate as caravans on new road systems designed for autonomous vehicles
  - Cost of technology to ensure safety may make Level 4 and 5 cars prohibitively expensive
  - Opens opportunity for innovation in ride-sharing and other non-single owner vehicle transit


https://www.motor1.com/news/174615/continental-cube-autonomous-taxi-concept/

# *Potential for technological innovations in safety in Levels 4 and 5*

- In Levels 4 and 5, occupants of vehicles will turn from drivers to passengers
- Technology related to safety may turn inward, to the passenger
  - Sensors could detect medical emergency and reroute vehicle to a hospital
- Vehicle may be able to self-diagnose and remedy electrical or mechanical issues on the road
- Vehicles may be able to ensure safety while displaying other forms of information

# *Investing in autonomous vehicle innovations*




https://www.bloomberg.com/news/articles/2018-08-09/ford-is-far-from-first-in-driverless-vehicles-and-investors-want-in

# *IP can encourage innovation and collaboration*

- Large potential for IP on development of new technologies for autonomous vehicles, including:
  - New sensor technology
  - Processors for handling large volumes of input data from sensors
  - Dedicated systems on a chip (SoC)
  - Navigation systems
  - Interactions between users and vehicle
  - Software algorithms and machine learning tools may develop as combination of open source and proprietary material
- Potential for standardization in vehicle to everything connectivity, user interfaces

# *IP can encourage innovation and collaboration*

- Opportunity for smaller and non-traditional automotive companies to contribute
  - New companies can make a splash in the industry and obtain patents that may be valuable to car companies
  - Individual software solutions for discrete problems
- Car companies can build on existing technologies to develop aspects of autonomous vehicles

# *Opportunities and challenges in IP*

- Subject matter eligibility under 35 U.S.C. § 101 for algorithms and machine learning tools relating to autonomous driving
- Public policy surrounding securing patents, i.e., the right to exclude others, for technology related to safety
- Incentives for companies to develop safety technologies that they may later be required to give away for free or at low cost
- Developing standards for implementing autonomous driving algorithms and associated technologies like vehicle to everything (V2X) platforms

# *Policy*

# *Manufacturers face the prospect of regulation at the federal and state level*

**Federal regulation**

- No **federal statute** expressly regulates autonomous vehicles
- Instead, the **National Highway & Traffic Safety Administration (NHTSA)** has taken the lead on regulation of passenger cars

**State regulation**

- Over **30 states** have passed statutes or issued administrative guidance regulating the use of autonomous vehicles

# *The federal government has largely taken a hands-off approach*

- **Department of Transportation** has focused on eliminating barriers to the development of autonomous vehicles, including:
  - Redefining safety standards that explicit reference **"drivers" and "operators"**
  - Making it easier to **obtain an exemption from standards**

# *Bills introduced in the last Congress would have largely supported current policy efforts*

**SELF DRIVE Act**
H.R. 3388

- Would have **supported current efforts** by:
  - Establishing timelines by which NHTSA was required to amend or enact new safety standards
  - Increasing the number of available exemptions
- **Passed the House by voice vote** in September 2017

**AV START Act**
S. 1885

- **Generally aligned** with SELF Drive Act
- But was **somewhat more prescriptive** regarding NHTSA's duties
- **Stalled in the Senate** and never reached the floor

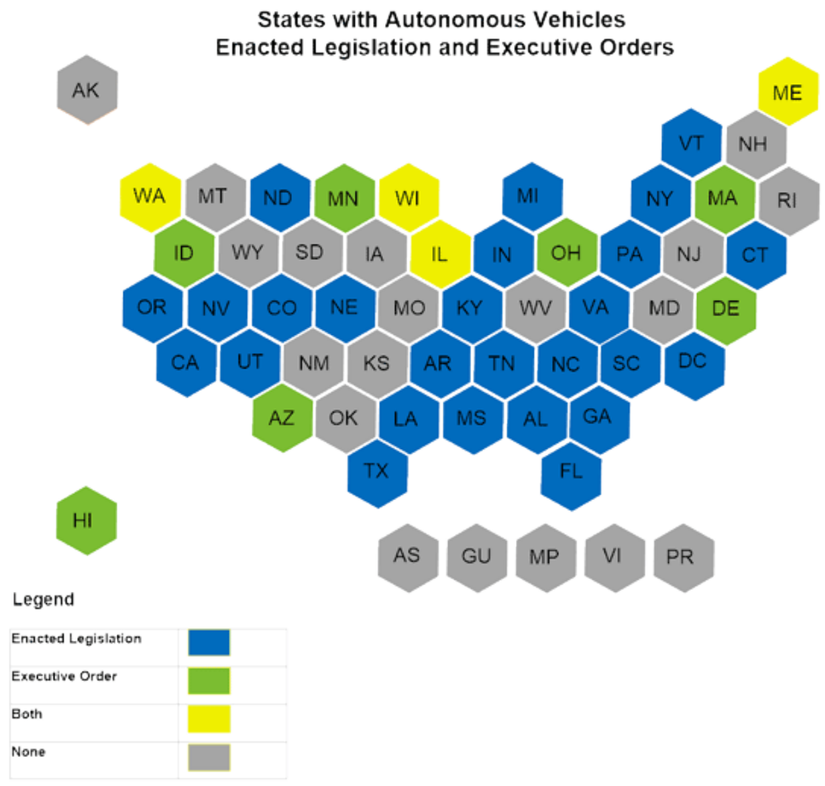
# *Each of the bills contained different language regarding preemption of state law*

| SELF DRIVE Act<br>H.R. 3388 | AV START Act<br>S. 1885 |
|---|---|
| — Prohibited states from regulating **"design, construction, or performance"** of AVs | — Contained similar language, <u>but</u> authorized states to enact and enforce regulations **"identical to"** federal standards |
| — Expressly authorized states to regulate **"the sale, distribution, repair, or service"** of AVs | — Again contained similar language, but also authorized states to regulate **registration / licensing** |
| — Preserved current law regarding **non-preemption of state tort law** | — Arguably tried to **expand scope of non-preemption provision** |

# *Manufacturers instead largely face state regulation*

- **Twenty-nine states** have passed legislation regulating autonomous vehicles, and governors in ten more have **issued executive orders**

- The rules established by these laws and executive orders **vary state by state**, but most authorize testing and, in some cases, operation of AVs




Source: National Conference of State Legislatures

# *Manufacturers face strategic choice between federal and state regulation*

## Continue to support state regulatory efforts

- Many states so far have sought to provide **innovation-friendly rules**
- On the other hand, inevitable that some states will **eventually try to restrain the industry**
- Difficult to maintain compliance with **50 different laws**

## Push for increased federal role in regulating industry

- Federal regulators so far have indicated desire to **encourage innovation**
- One source of regulatory authority arguably easier to comply with
- Federal regulation could also have **preemptive effect** vis-à-vis the states

# *Liability*

# *Experts agree that liability will quickly migrate "up" from negligence to products liability*

- Civil liability may **begin with negligence suits against operators** and move toward suits against manufacturers
  - **"Frightened horse" phenomenon**: the early lawsuits following an innovation consist of **idiosyncratic fact patterns**

- ***Brouse v. United States***, 83 F. Supp. 373 (D. Ohio 1949): "The obligation of those in charge of a plane under robot control to keep a proper and constant lookout is unavoidable."

# *Product liability lawsuits generally allege one of three kinds of defects*

**Manufacturing defects**

- A product contains a **manufacturing defect** when it "**departs from its intended design** even though all possible care was exercised in the preparation and marketing of the product"

**Design defects**

- A product is **defective in design** when "the foreseeable risks of harm could have been reduced or avoided by the adoption of a reasonable alternative design … and the omission of the alternative design renders the product **not reasonably safe**"

**Warning defects**

- A product is defective due to a **failure to warn** when "the foreseeable risks of harm posed by the product could have been reduced or avoided by the provision of **reasonable instructions or warnings** … and the omission of the alternative design renders the product **not reasonably safe**"

# *Suits predicated on alleged design defects may turn in part on the test adopted*

**Cost-benefit test**

Do the **benefits** provided by a particular design outweigh the **costs** associated with using it?

*v.*

**Consumer expectations test**

Is the design **more dangerous than an ordinary consumer would expect** when used as intended?

# *Would federal regulation preempt tort suits?*

- At the most aggressive, Congress could pass statute **expressly shielding industry from liability**

- A **pair of Supreme Court cases** creates some uncertainty regarding whether and when **federal safety regulation** might preempt tort suits
  - *Geier v. American Honda Motor Co.* (2000): Federal **air bag** safety standard **does** preempt state tort law
  - *Williamson v. Mazda* (2011): Federal **seatbelt** safety standard **does not** preempt state tort law

- Manufacturers might even argue that **current hands-off policy** preempts particularly rigorous state law

# *Autonomous vehicles also raise complex questions about criminal liability*

- Generally, **neither NHTSA or the National Transportation Safety Board (NTSB)** exercises jurisdiction over criminal investigations

- But manufacturers **could face complex and novel issues relating to criminal** liability, as recent events indicate:
  - **March 2019:** Arizona state investigators announce they will not prosecute Uber for the March 2018 Tempe crash
  - **April 2019:** Justice Department initiates criminal probe into Boeing's certification process for 737 MAX

# *Questions?*

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