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PART I: ALL THINGS AUTONOMOUS—REGULATORY AND COMMERCIAL CONSIDERATIONS FOR AVS

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Morgan Lewis Automotive Hour Webinar Series

Series of automotive industry focused webinars led by members of the Morgan Lewis global automotive team. The 8-part 2022 program is designed to provide a comprehensive overview on a variety of topics related to clients in the automotive industry. Upcoming sessions:

JUNE 15 | Automotive Finance and Consumer Protection Developments

JULY 13 | Part II: All Things Autonomous—Regulatory and Commercial Considerations for Delivery Robots (On and off campus), Escooters, and Drones

SEPTEMBER 14 | Part I: All Things EV—Regulatory and Commercial Considerations

SEPTEMBER 28 | Part II: All Things EV—Finance and Transactional Considerations

NOVEMBER 9 | European Antitrust and Other Regulatory Updates for the Automotive Industry

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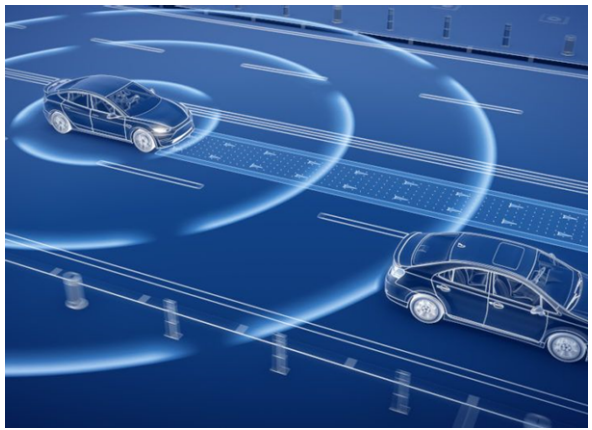

Autonomous Vehicle Regulations at the Federal Level

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There Are None…Yet

- The federal government has issued voluntary guidance for the regulation of autonomous vehicles (AVs) since 2016.

- Policy Rationale: To allow the technology to organically develop at different paces that is driven by:
  - Private investment by companies
  - Incentivization by state governments

- Eleven years later, calls for a federal regulatory framework continues to build.

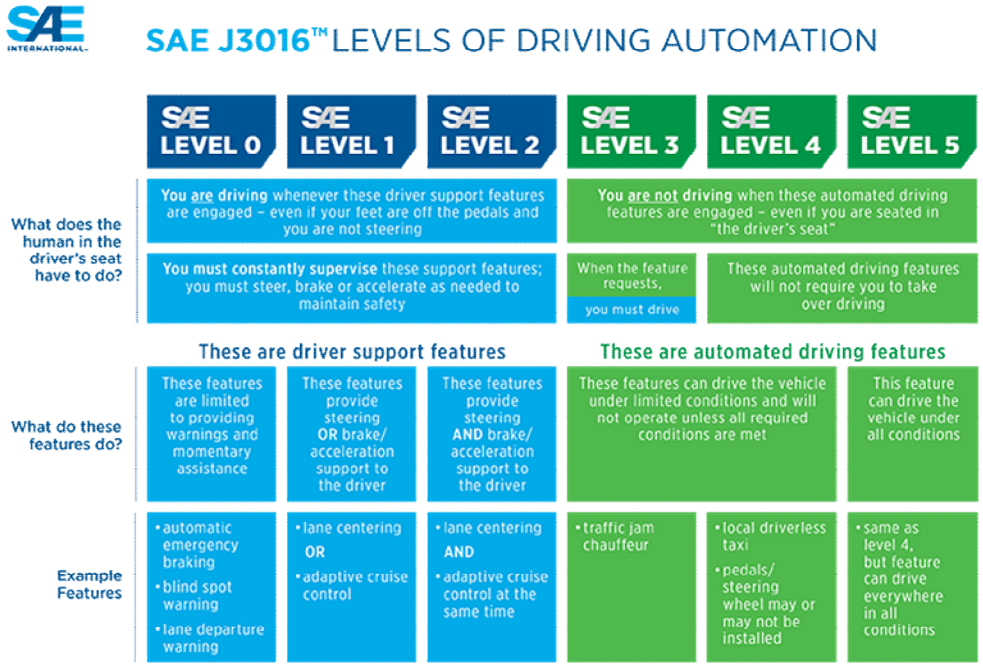
Federal Automated Vehicles Policy ("FAVP")

- In September 2016, NHTSA released its Federal Automated Vehicles Policy (FAVP), which is updated (in part) annually to address emerging tech.
  - Section 2 of FAVP establishes a Model State Policy (MSP) that delineates between federal vs. state authority for AV regulation.
    - Federal → Setting motor vehicle safety standards
    - States → Primary regulator for licensing, registration, traffic law enforcement, safety inspections, infrastructure, and insurance and liability.

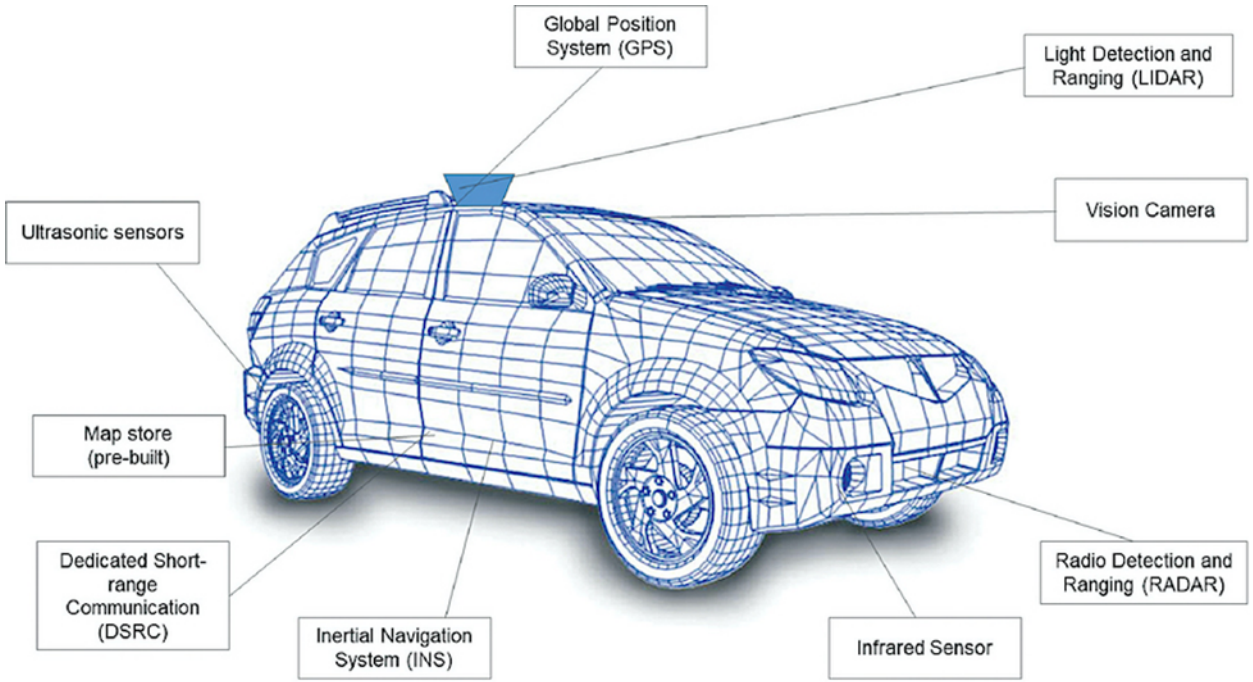
- FAVP lays out some possible policy changes that could help it better respond to new AV technology.

U.S. DOT's Autonomous Vehicle Policies

- In September 2016, U.S. DOT published its "AV Policy 1.0," which aimed to integrate autonomous vehicles onto U.S. roadways, formally adopted the definitions for levels of automation established by the Society of Automotive Engineers (SAE).



U.S. DOT's AV Policies – Safety Framework



Pecking of AV Sensory Systems:

1. GPS
2. LIDAR
3. Vision Cameras
4. RADAR
5. Infrared Sensors
6. Ultrasonic Sensors
7. DSRC
8. INS
9. Pre-Built Maps
10. Odometer Sensors*

U.S. DOT's AV Policies 2.0 & 3.0

- In late 2017, DOT issued AV Policy 2.0, which largely carried over the guidance of AV Policy 1.0.
- In October 2018, DOT released AV Policy 3.0.
  - Updates: Expanded the scope of autonomous vehicles to include all surface on-road transportation systems.
    - Many automotive & mobility commentators criticized AV 3.0 as yet another preservation of the "voluntary" status quo.

U.S. DOT's AV Policy 4.0

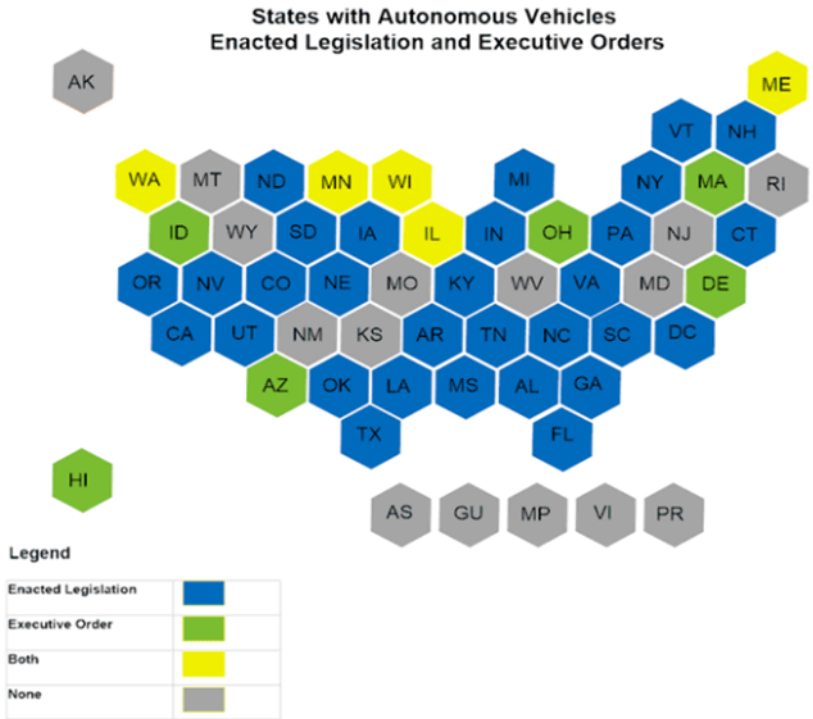
- In January 2020, U.S. DOT introduced *Ensuring American Leadership in Automated Vehicle Technologies: Automated Vehicles 4.0* (AV Policy 4.0), the latest and most comprehensive guidance on developing autonomous vehicle technology.

- AV Policy 4.0 was a joint effort between the USDOT and the White House Chief Technology Officer.

- AV Policy 4.0's voluntary guidelines expanded on three previous versions of the framework and placed a stronger emphasis on passenger safety, modernization, and remaining technology neutral.

- AV Policy 4.0 also updated the guidance on privacy, cybersecurity, patents, and accessibility of vehicles.

The States are Leading the Way



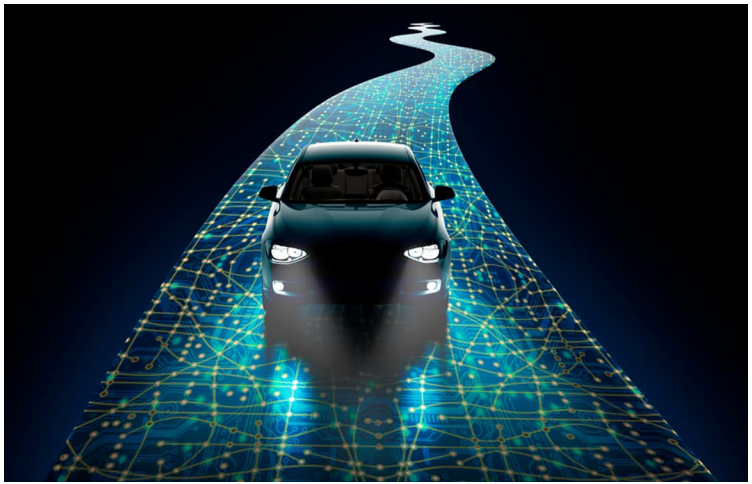
- The federal government's approach has paved the way for states to regulate autonomous vehicles for safety at the state level.
  - As a result, 40 states (and Washington, D.C.) allow for AV operations through either executive order, enacted legislation, or both.
    - Enacted Legislation: 35 states
    - Executive Order: 6 states
    - Both: 5 states

Federal Initiatives to Pass AV Legislation

- *Safely Ensuring Lives Future Deployment and Research in Vehicle Evolution Act* (the "SELF DRIVE Act"), H.R. 3388 – 115th Congress (2017-2018)
  - U.S. House of Representatives passed the SELF DRIVE Act with sweeping bipartisan support.
  - The SELF DRIVE Act, which aimed to create clear rules of the road for the safe testing and deployment of self-driving cars in the United States.
  - The SELF DRIVE Act was approved unanimously 54–0 out of the Energy and Commerce Committee and passed the US House of Representatives by voice vote.
  - However, the SELF DRIVE Act was not acted upon and failed in 2018.

Federal Initiatives to Pass AV Legislation (Cont'd.)

- *American Vision for Safer Transportation through Advancement of Revolutionary Technologies Act* (the "AV START Act"), S. 1885 – 115th Congress (2017-2018)
  - U.S. Senate considered the AV START Act, which was the companion bill to the SELF DRIVE Act.
  - The AV START Act failed in the Senate that led to criticism from House of Representatives that warned the United States was on the verge of losing its "innovation edge" against China, Singapore, and Germany in this space.



Federal Initiatives to Pass AV Legislation (Cont'd.)

- On January 6, 2022, Secretary Buttigieg called for federal AV regulations during his keynote address at the Consumer Electrics Show in Las Vegas.

"[C]onsider autonomous vehicles. For all their potential, they've also raised complicated—even philosophical—questions about safety, equity, and our workforce. It's why, last year, we at DOT announced a standing general order that requires crash reports and information from testers, operators, and manufacturers of those vehicles, so that we can identify safety concerns and collaborate to address them early."

International AV Compliance Standards

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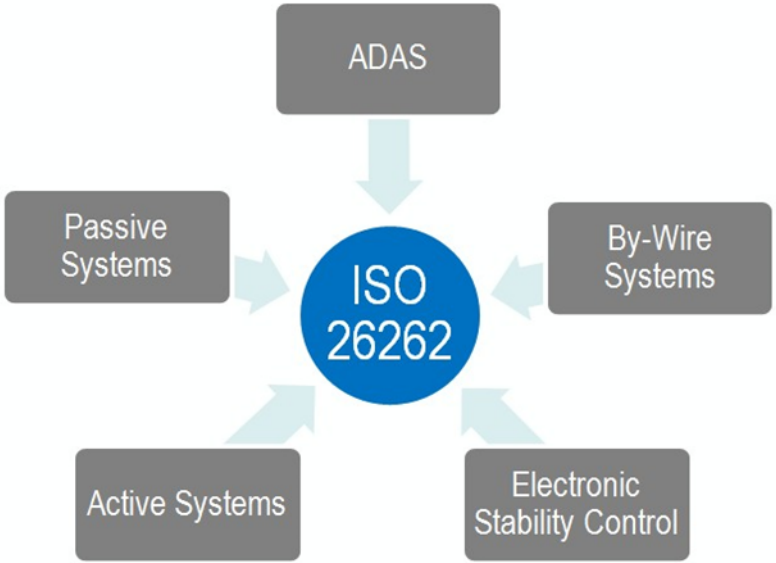
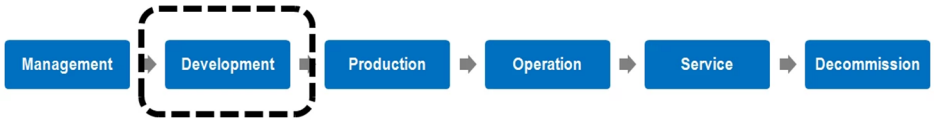
ISO 26262 – Road Vehicles / Functional Safety

- Published in June 2009
  - ISO 26262 has gained traction in the automotive industry
- Because a public draft standard is available, lawyers treat ISO 26262 as the technical state of the art.
  - The technical state of the art is the highest level of development of a device or process at a particular time.
  - Under German law, car producers are generally liable for damage to a person caused by the malfunction of a product.



ISO 26262 – Road Vehicles / Functional Safety (Cont'd.)



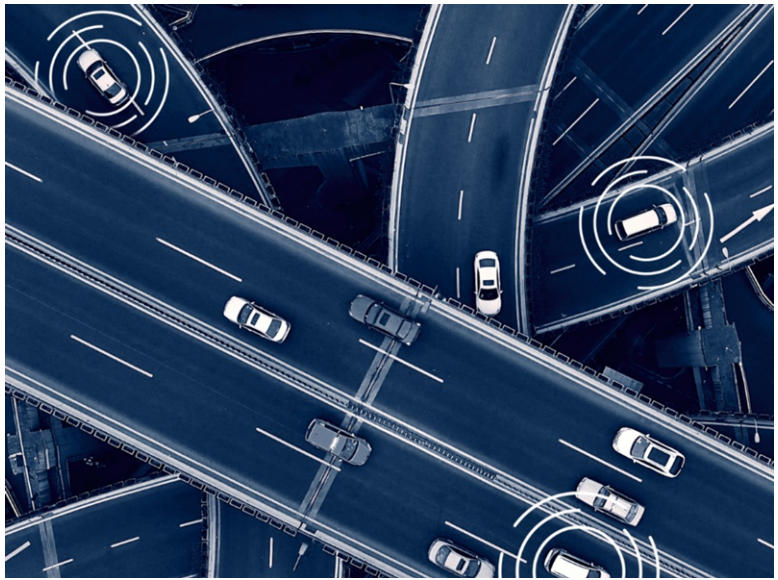
- ISO 26262 provides regulations and recommendations throughout the product development process, from conceptual development through decommissioning.

- ISO 26262 details how to assign an acceptable risk level to a system or component and document the overall testing process.
  - Provides an automotive safety lifecycle (management, development, production, operation, service, decommissioning) and supports tailoring the necessary activities during these lifecycle phases
  - Provides an automotive specific risk-based approach for determining risk classes ("Automotive Safety Integrity Levels, ASILs")
  - Uses ASILs for specifying the item's necessary safety requirements for achieving an acceptable residual risk
  - Provides requirements for validation and confirmation measures to ensure a sufficient and acceptable level of safety being achieved

UL 4600 – Standard for Safety for the Evaluation of Autonomous Products

- In April 2020, UL 4600 was published as the first standard designed for automated and connected vehicle technologies. UL 4600 addresses:
  - The ability of autonomous products to perform safely and as intended without human interaction.
  - The reliability of the hardware and software necessary for machine learning, sensing of the operating environment and other safety aspects of autonomous operation.

UL 4600 – Standard for Safety for the Evaluation of Autonomous Products (Cont'd.)



- UL 4600 uses a claim-based approach which prescribes topics that must be addressed in creating a safety case.
  - Security is addressed as a requirement, but the details of compliance are currently outside the scope of UL 4600.
  - UL 4600 does not cover performance criteria or define pass/fail criteria for safety; nor does it benchmark the road testing of prototype vehicles.
  - UL 4600 remains technology neutral, meaning that it does not mandate the use of any specific technology in creating the autonomous system, and it also permits design process flexibility.

Autonomous Vehicle Regulations at the State Level: Michigan, California, & Arizona

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State of Michigan

- Home to the U.S. "Big Three" Automakers
  - Numerous automotive suppliers and manufacturers
- In 2013, former Gov. Rick Snyder signed Sect. 257.665 into law, which was one of the most progressive AV legal frameworks in the U.S.
  - Goal: Develop a balanced industry-friendly and safety conscious regulatory scheme that would allow Michigan to become the U.S. cradle of connected vehicles and next-gen mobility
  - Regulatory Agencies: MDOT (enforcement) – Michigan Council of Future Mobility, Secretary of State (licensing, M-Plates)

State of Michigan – Mich. Comp. Laws § 257.665

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- Mich. Comp. Laws § 257.665 allows non-OEM companies that manufacture, supply, and/or upfit automated vehicle technologies to test their AV prototypes on public roads.

- <u>M-Plate Application Requirements</u>:
  - Apply for M-Plates that allow for the testing of AV with the Secretary of State.
  - Submit proof of sufficient motor vehicle collision inclusion.
  - Submit plan for AV testing within the State of Michigan that sufficiently details the scope of activities.

State of Michigan – Mich. Comp. Laws § 257.665 (Cont'd.)

- AV Testing Requirements:
  - The vehicles must be driven by authorized, trained employees of the M-Plate holder (usually called a safety drivers/engineers)
  - Safety drivers must be able to monitor the vehicle's performance while it is being operated on public roads and, if necessary, promptly take control of the vehicle's movements.
  - Safety drivers must have a valid U.S. license to drive a vehicle.
  - Safety drivers must ensure that the vehicle complies with Michigan traffic laws.

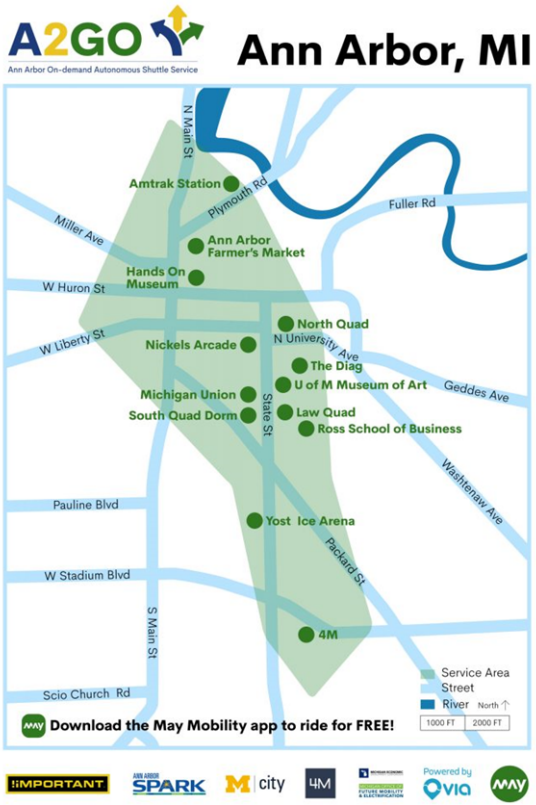
State of Michigan – SAVE Project

- Because of the rapid evolution of AV technology, in 2016, Michigan enacted the SAVE Project laws to ensure that the State remains the automotive capital of the world.
  - Mich. Comp Laws § 257.665b.

- <u>Key Legislative Expansion</u>:
  - SAVE Project authorizes eligible "motor vehicle manufacturers" to establish on-demand AV transportation services for the public.
  - Unlike Sect. 257.665, which is reserved for AV testing, the SAVE Project does not prohibit companies for charging the public for on-demand AV transportation.

State of Michigan – SAVE Project (Cont'd.)

- SAVE Project Participant Requirements:
  - In order to be considered a "motor vehicle manufacturer," the applicant must have:
    - Manufactured AV in the United States that are certified to comply with all applicable federal motor vehicle safety standards.
    - The entity must have tested the AV driving system for at least 1,000,000 miles on U.S. roads.
    - The entity must have at least $10,000,000 in insurance.
- SAVE Project participants must designate a geographic operating area and work with State and local governments about operations.



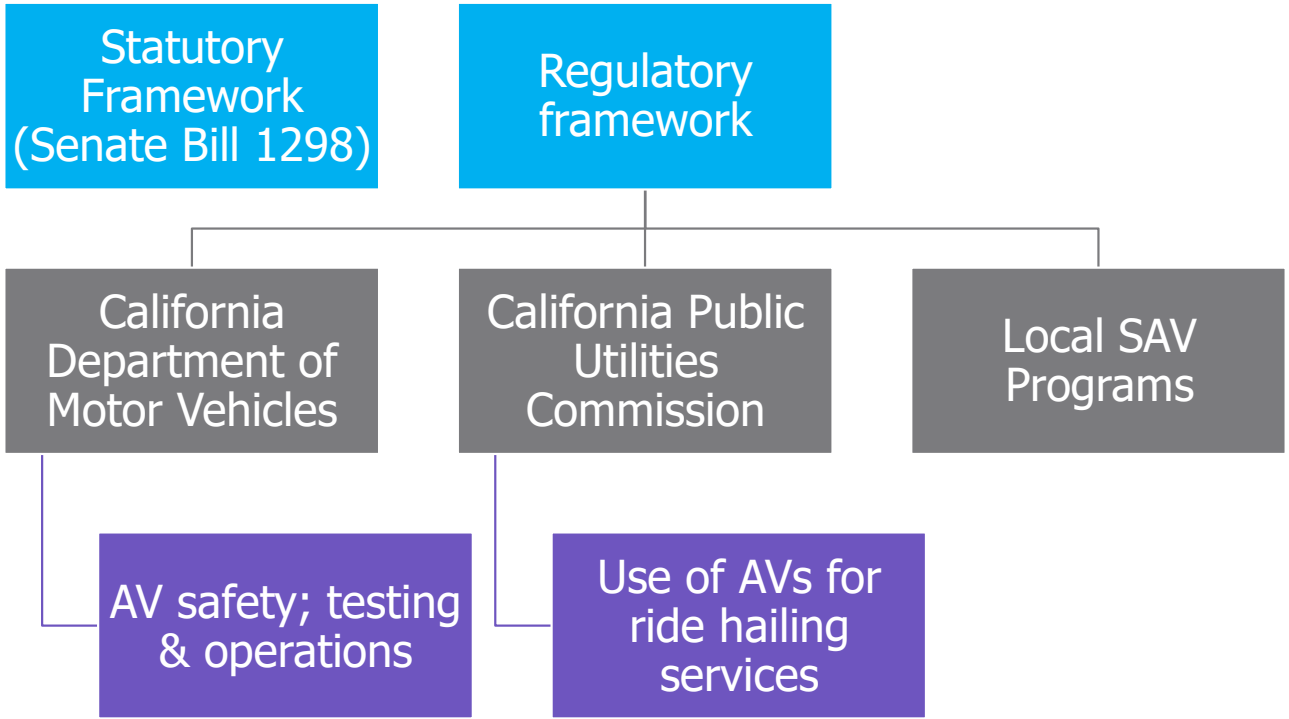
State of Michigan – CAV Corridor

- Connected and Automated Vehicles (CAV) Corridor
  - First-in-the-nation 40-mile dedicated corridor for AV and connected vehicles between Detroit and Ann Arbor.
    - Includes an AV-lane on Michigan Avenue in downtown Detroit.
  - Creates innovative infrastructure solutions that allows for a mix of connected and autonomous vehicles, traditional transit vehicles, shared mobility, and freight and personal vehicles to operate safely on the same roadways.

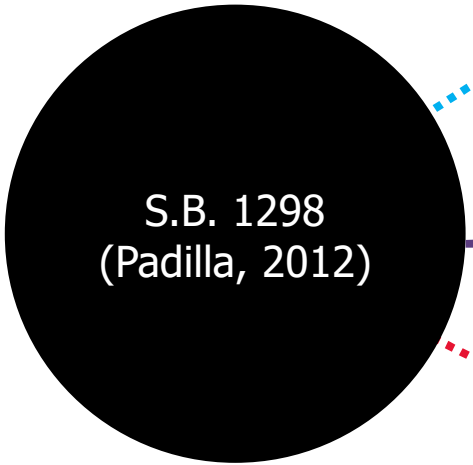
State of Michigan – Support for AV Tech Companies

- M-City
  - Fully-integrated AV testing facility with more than 60 automotive industry partners at the University of Michigan in Ann Arbor
- Ann Arbor SPARK
  - Public/private economic development arm that works with AV technology companies to continue investment in Ann Arbor
  - Manages AV operation zones along with the University of Michigan and City Council
- American Center for Mobility
  - Comprised of government, industry and academic organizations that are focused on accelerating the mobility industry through research, testing, standards development and educational programming.
  - Located in Ypsilanti, Michigan

State of California – Deep Dive



State of California –Legislation



ADDS DIVISION 16.6 (§ 38750 ET SEQ.) TO THE CALIFORNIA VEHICLE CODE

AUTHORIZED AV TESTING ON PUBLIC ROADS

REQUIRED DMV TO ADOPT REGULATIONS TO ADDRESS:

- **Requirements related to insurance**
- **Application and permitting process for drivered and driverless AVs**
- **Testing, equipment and performance standards**

State of California – Regulatory Framework

- **DMV Regulations (Cal. Code Regs., tit. 13 §§ 227 *et seq*.)**
  - Adopts SAE classification system: levels 3-5 qualify as AV
  - Authorizes public passenger transport in test vehicles, *without compensation*
  - Provides for separate permits for **testing** and **deployment** of **drivered** and **driverless** vehicles
  - Manufacturers only
  - $5 million in insurance required for either program
  - Prohibits AV trucks (>10,000 lbs) and motorcycles

State of California – Testing Programs

DMV "Autonomous Vehicle Tester Program"

- Established in 2014
- Stringent test driver requirements
- Requires reporting of unanticipated disengagements of autonomous technology annually
- Two year term
- Manufacturers must identify specific test vehicles and describe technology
- Currently 60 manufacturers hold testing permits

DMV "Autonomous Vehicle Tester (AVT) Driverless Program"

- Established in 2018
- Notify local authorities in writing
- Remote operator with two-way continuous communication link
- Maintain training program with remote operators
- Require reporting of unanticipated disengagements of autonomous technology annually
- Establish means of communication with third parties in event of collision
- Provide law enforcement interaction plan
- Currently four permit holders: Waymo, Nuro, Zoox, and AutoX

State of California – Public Utilities Commission

Decision 18-05-043

- CPUC authorized two pilot programs for AV passenger transport
  - "Drivered AV Passenger Service"
  - "Driverless AV Passenger Service"
- Must possess parallel DMV permit for drivered or driverless operation
- Restricted from collecting fares and passengers must provide explicit consent
- Quarterly trip data submission
  - Miles traveled, idle time, occupancy, accessible ride data
- "Driverless" entities must record remote operator/passenger interactions and retain for one year
- Currently 7 "Drivered" AV Permits issued; No "Driverless" AV Permits Issued
  - Zoox, AutoX, Pony.ai, Waymo, Aurora Innovation, Cruise, Voyage

State of California – Local SAV Projects

- SAVs - Shared Autonomous Vehicles
- Bishop Ranch – San Ramon SAV Project
  - Shared autonomous vehicle testing at business park in San Ramon, CA
  - On hold pending NHTSA certification of new SAV models
    - Testing currently taking place at local AV testing facility
- Livermore Amador Valley Transit Authority SAV Project
  - On-street testing began in June
  - SAVs hold up to 6 passengers, travel at 13 MPH and must have an operator at all times
  - Provide reliable, safe and eco-friendly transport between bus routes and BART

State of Arizona

- Executive Order 2015-09
  - Directing agencies to "undertake any necessary steps to support the testing and operation of self-driving vehicles on public roads in Arizona."

- Executive Order 2018-04
  - Removed requirement that safety driver be present
  - Pledges AZ to keep pace with emerging technology
  - Directs Dept. of Public Safety to work with law enforcement on first responder protocols for AVs in emergency and traffic enforcement situations

- Executive Order 2018-09 established Institute of Automated Mobility

State of Arizona (Cont'd.)

- Executive Order 2018-09 established Institute for Automated Mobility
  - Consortium designed to embrace innovation and collaboration in AV space
- Members from academia, public sector and global industry leaders
- State-of-the-art research, development, testing and evaluation of AV systems
- Vision for AV R&D facilities, simulation lab and infrastructure projects

State of Arizona – Hotbed of AV Activity

- Advertises light touch regulatory approach
  - "Where self-driving cars go to learn" – *New York Times*
  - "[P]roving ground for this transformative technology" – AZ Commerce Authority

- First state to:
  - Enact executive order supporting testing and operation
  - Allow commercial self-driving ride hailing service (launched by Waymo in various cities)

- 600+ vehicles and more than a dozen companies testing on public roads

Commercial AV Applications

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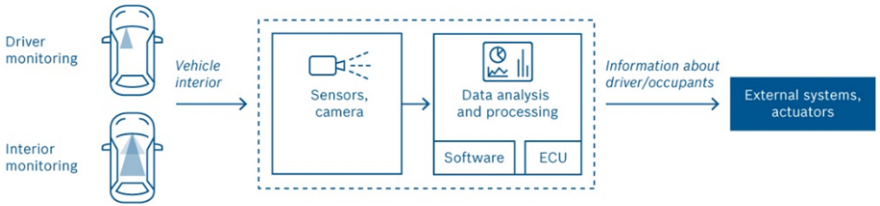
Robert Bosch GmbH – AI Monitoring System

- Launched in late 2019
- Application: When Bosch's technology senses that a driver is becoming tired or is districted, it can:
  - Warn the driver,
  - Recommend a break from driving, or
  - Reduce the speed of the vehicle.



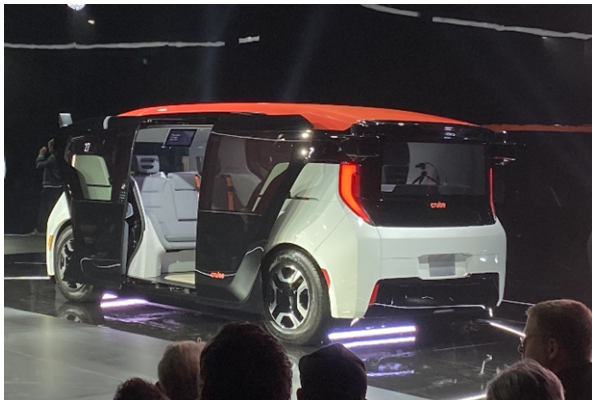
- Design: Camera is integrated in the steering wheel and can detect when drivers' eyelids are getting heavy, when they are distracted, and when they turn their head toward their passenger or the rear seats.

Waymo

- Waymo is majority owned by Alphabet, Inc., the parent company of Google
  - Operates AV ride hail services, known as Waymo One in Chandler and Phoenix Arizona
  - Developing AV technology for delivery vans and Class 8 tractor-trailers for delivery and logistics
  - Waymo has engaged in partnerships with several OEMs for AV driving system development, including Daimler AG, Nissan-Renault, Stellantis, Jaguar, Land Rover, and Volvo
- Waymo presently offering public AV ride hail services in San Francisco

Cruise

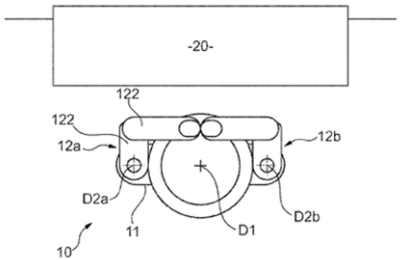
- Cruise is a subsidiary of General Motors, and headquartered in San Francisco
  - Acquired for an undisclosed amount that is estimated to be between $600 million and $1 billion
  - CEO Barra has directed GM to employ a "hands off" approach to Cruise to allow for startup growth
  - Presently offering public AV ride hail services in San Francisco



Argo AI

- Argo is AV technology company headquartered in Pittsburgh
  - Two Major OEM Investors:
    - Ford Motor Co. (40% ownership)
    - Volkswagen Group AG (40% ownership)
  - Major Partnerships:
    - Lyft (for-profit AV ride services)
    - Carnegie Mellon and Georgia Tech (R&D)
- December 2021 – Argo, Ford, and Lyft launched rideshare services in Miami-Dade County
  - Miami-Dade and Argo have agreement for 1,000 driverless AV ride hailing service permits by 2027

BMW – Reinventing the Wheel



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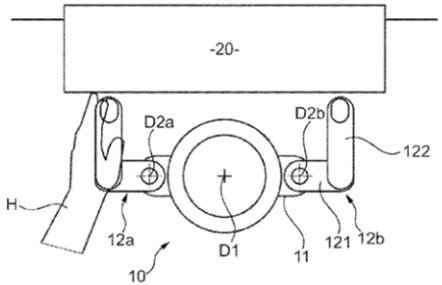

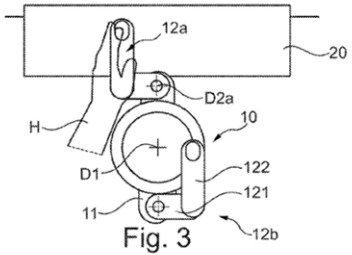

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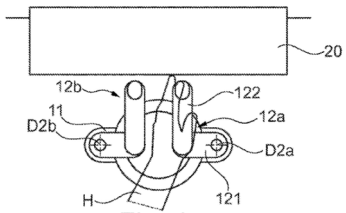

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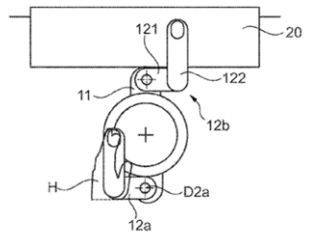

Fig. 5

Audi – Grandsphere AV Concept

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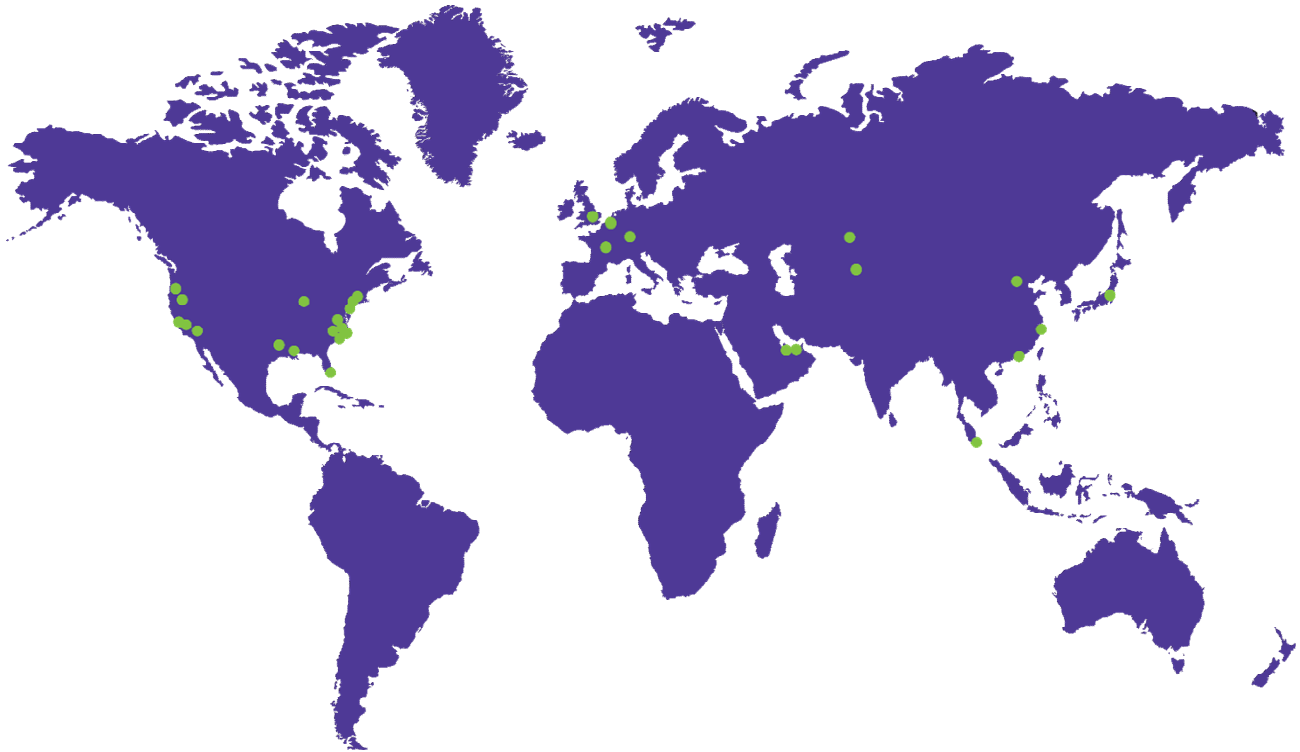
Our Global Reach

Africa
Asia Pacific
Europe
Latin America
Middle East
North America

Our Locations

Abu Dhabi
Almaty
Beijing*
Boston
Brussels
Century City
Chicago
Dallas
Dubai
Frankfurt
Hartford
Hong Kong*
Houston
London
Los Angeles
Miami
New York
Nur-Sultan
Orange County
Paris
Philadelphia
Pittsburgh
Princeton
San Francisco
Shanghai*
Silicon Valley
Singapore*
Tokyo
Washington, DC
Wilmington



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