

Global Guide to Autonomous Vehicles

2022

Grow | Protect | Operate | Finance



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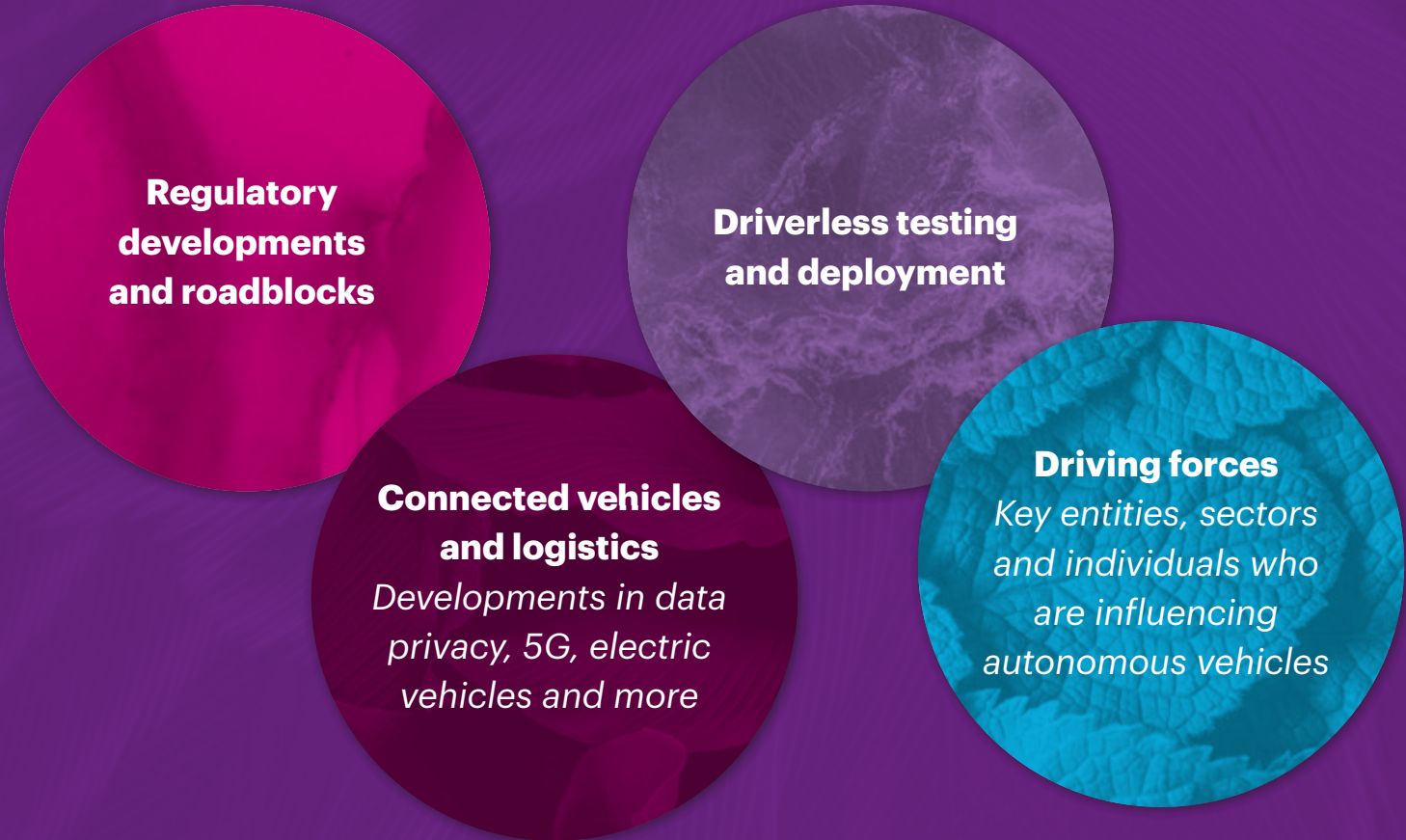
Executive summary

Companies operating in or around the autonomous vehicles industry face a growing patchwork of complex and, in some cases, underdeveloped laws, policies, and regulations. These legal and policy frameworks can vary greatly by jurisdiction, even within a single country.

Dentons’ 2022 Global Guide to Autonomous Vehicles provides a detailed roadmap of the developing policy, regulatory and legal landscape for autonomous vehicles, as well as the specific driving forces and roadblocks across key areas that will define the global mobility revolution.

WHAT DOES THE GUIDE COVER?

Authored by our global autonomous vehicles team members, the guide covers the core areas outlined below:



REGIONS

The guide focuses on the following eleven countries whose governments and automotive and technology industries have taken unique approaches to supporting the autonomous vehicles industry:

- Australia
- Canada
- China
- Germany
- Hungary
- Italy
- Poland
- South Korea
- Turkey
- United Kingdom
- United States

WE ASKED, YOU ANSWERED: KEY FINDINGS FROM OUR INAUGURAL GLOBAL AUTONOMOUS VEHICLES SURVEY

As a new addition for 2022, our guide also includes the key findings of Dentons’ inaugural global autonomous vehicles survey, which captured insights from respondents around the world.

Specifically, we have addressed the following key findings in our report:

- Impact of autonomous technologies: The need for supply chain solutions is front of mind
- Safety remains the top concern and crucial for autonomous vehicles to continue to progress
- Connected vehicles will transform society, not autonomous vehicles alone
- Electric vehicle deployment will pave the way for autonomous vehicles
- What’s on the horizon? Timeline for autonomous vehicle development
- Role of regulatory frameworks

Questions?

Should you have questions regarding any of the covered countries, please do not hesitate to contact our authors identified throughout the guide.

If you have questions of a more general nature, about the guide or the sector overall, please feel free to contact the leaders of our Global Autonomous Vehicles group, found below.



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Dentons’ Global Autonomous Vehicles group

Dentons’ global autonomous vehicles group can help you navigate the labyrinth of national, regional and local laws, regulations and guidance relating to the development and deployment of driverless vehicles. Whether you are a start-up, emerging company or multinational vehicle manufacturer, automotive OEM, vehicle or parts retailer or driverless-technology firm; a bus, taxi, transit or truck fleet operator; an auto liability insurer or finance company; or outside the sector preparing for implementation of autonomous vehicle technology or considering its implications for your business, we offer a full array of tech, regulatory, transactional and litigation support.

STAY IN TOUCH | THE DRIVERLESS COMMUTE

For more updates to help you stay connected, [click here](#) to subscribe to our autonomous vehicles blog to get the latest developments sent straight to your inbox. [The Driverless Commute](#) blog is geared to autonomous vehicles and clocking the most important technical, legal and regulatory developments shaping the path to full autonomy. www.thedriverlesscommute.com

Inaugural global autonomous vehicles survey | Key findings

This year, Dentons released its inaugural global autonomous vehicles survey seeking input to gain deeper insight into the issues, priorities, and opportunities surrounding this evolving industry. We greatly appreciate the time of all participants and value your insights provided.

By asking important questions about the future of the autonomous vehicles industry, we gathered data that can inform and shape conversations surrounding the future of autonomous mobility.

Survey information

March 30, 2022
Survey open date

April 22, 2022
Survey close date

Well over a hundred responses were received by individuals across more than 20 countries.

Anonymity of survey responses

This survey was completely anonymous. Our key findings only include aggregated data that cannot be attributed to any one individual. No personally identifiable information or contact information was captured in any of the survey response fields.

Use the links below to navigate to specific sections of our key findings

- [Impact of autonomous technologies: The need for supply chain solutions is front of mind](#)
- [Safety remains the top concern and crucial for autonomous vehicles to continue to progress](#)
- [Connected vehicles will transform society, not autonomous vehicles alone](#)
- [Electric vehicle deployment will pave the way for autonomous vehicles](#)
- [What’s on the horizon? Timeline for autonomous vehicle development](#)
- [Role of regulatory frameworks](#)

Addressing the trends important to you

We will be issuing further analysis on our survey’s key findings and the legal, regulatory and operational implications for your business. These updates will be released on our autonomous vehicles blog, [The Driverless Commute](#).

Subscribe to receive email updates from the Driverless Commute

[Click here](#) or scan the QR code below using your mobile device.





Impact of autonomous technologies: The need for supply chain solutions is front of mind

Our survey asked which use of autonomous technology would be the most transformational to society-at-large and which would be the first to see widespread deployment and consumer adoption.

Autonomous freight delivery, trucking and platooning is seen as the most transformational¹ use of autonomous technology to society-at-large. (Figure 1)

Most transformational use

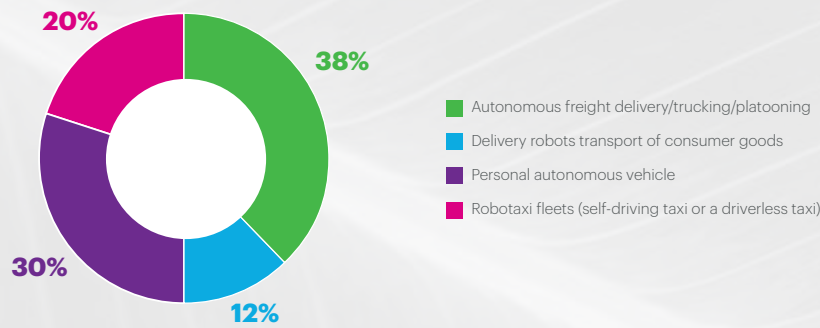


Figure 1 (above): Survey results: “Which use of autonomous technology do you expect will be most transformational to society at-large?”

Respondents expect **transport of consumer goods via delivery robots** to be the first deployment and adoption of autonomous technologies.

Almost a third of respondents think that **“autonomous freight delivery, trucking and platooning”** will be the first technology to see widespread deployment and consumer adoption.^{2 3}

However, even more respondents (41%) selected **“delivery robots transport of consumer goods”** as the autonomous technology they expect to see widespread deployment and consumer adoption first (the highest of any option). (Figure 2)

Deployment and consumer adoption

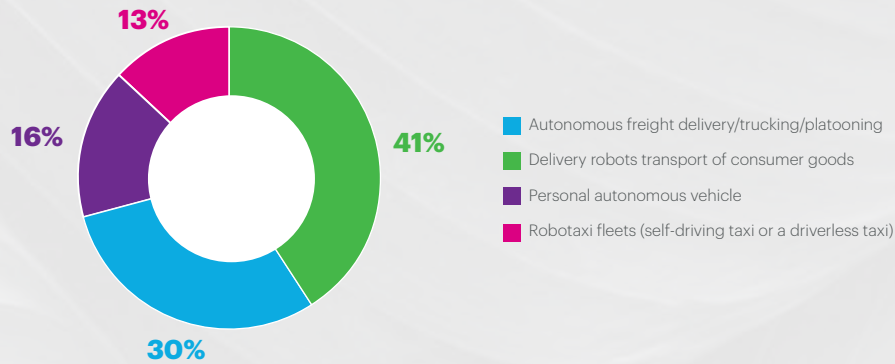


Figure 2 (above): Survey results: “Which use of autonomous technology do you expect will see widespread deployment and consumer adoption first?”

This view becomes even more prominent among those working in the automobiles and components industry.

Over half of respondents in the **automobiles and components industry** said that **“delivery robot transport of consumer goods”** would be the first autonomous technology to see widespread deployment and consumer adoption. (Figure 2.A)

Deployment and consumer adoption | Responses from automobiles and components industry

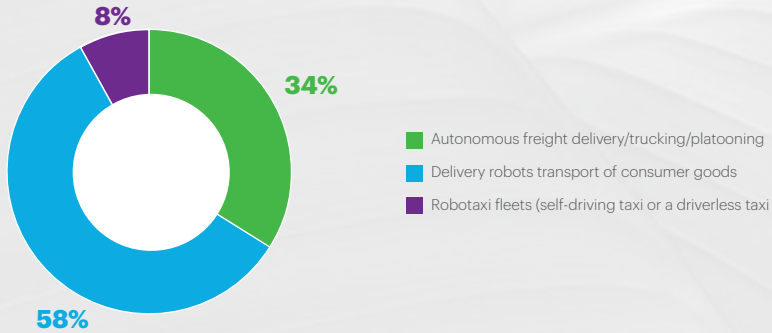


Figure 2.A (above): Survey results: “Which use of autonomous technology do you expect will see widespread deployment and consumer adoption first?” Breakdown of response category for respondents who selected “Automobiles and components” as the industry sector in which they currently work.

¹ Transformational is defined as: It completely changes the way individuals and organizations operate; similar to the airplane, train, and automobile.

² Platooning: linking of two or more trucks in convoy, using connectivity technology and automated driving support systems.

³ Widespread is defined as: Autonomous technologies are an integral part of the real traffic situation in the respective region and are used consistently in many different locales providing services. Widespread does not involve testing for future deployment.

COVID-19 IMPACT ON AUTONOMOUS VEHICLES

Additionally, a plurality of respondents (31%) said that an “increased demand for autonomous solutions to the global shipping/logistics slowdown” has been the most significant impact of the COVID-19 pandemic on the autonomous vehicle market. (Figure 3)

Impact of COVID-19

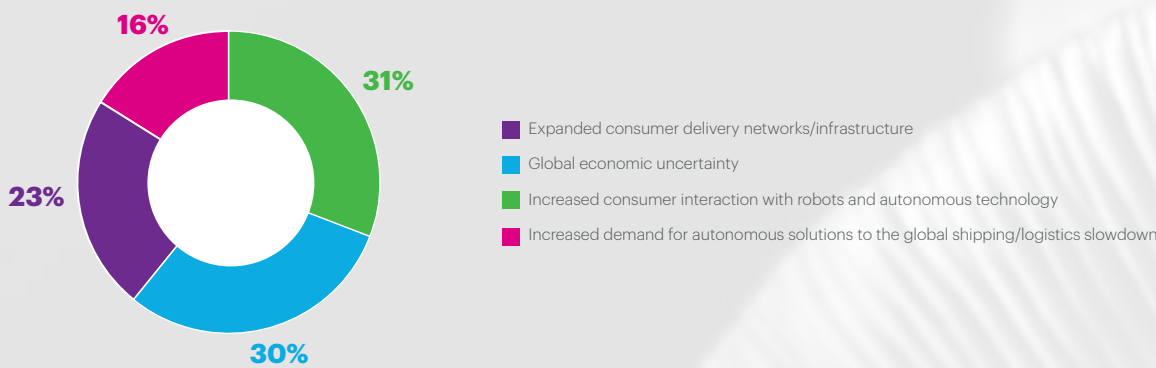


Figure 3 (above): Survey results: “What has been the most significant impact of COVID-19 on the global autonomous vehicle market?”

Safety remains the top concern and crucial for autonomous vehicles to continue to progress

“Consumer safety of individual passengers” was overwhelmingly ranked as the most significant legal and regulatory area to address for autonomous vehicle development.

70% of respondents ranked consumer safety as their first choice. (Figure 4)

Ranked in descending order from most significant to least significant

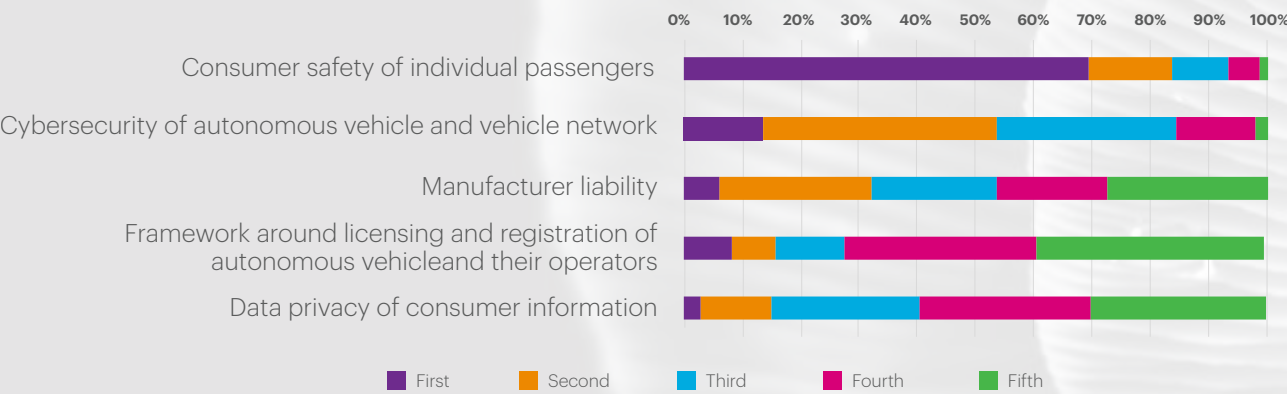


Figure 4 (above): Survey results: “What do you consider to be the most significant legal and regulatory areas to address for autonomous vehicle development?”

15-YEAR OUTLOOK

88% of respondents said that “establishing proven safety measures to reduce risk” is “very” (71%) or “fairly” (17%) important to the long-term advancement of the autonomous vehicles industry over the next 15 years.⁴(Figure 5)

Establishing proven safety measures to reduce risk

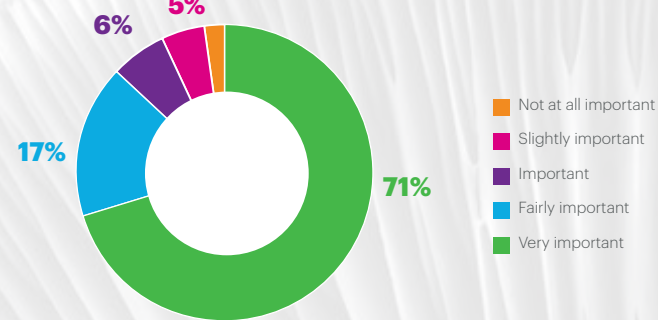


Figure 5 (above): Survey results: “How important are the following factors to the long-term advancement of the autonomous vehicles industry over the next 15 years?” – Breakdown of response option “Establishing proven safety measures to reduce risk”

5-YEAR OUTLOOK

Over 70% of respondents identified “establishing proven safety measures to reduce risk” as one of the most important priorities to autonomous vehicle development over the next 5 years, more than any other factor. (Figure 6)

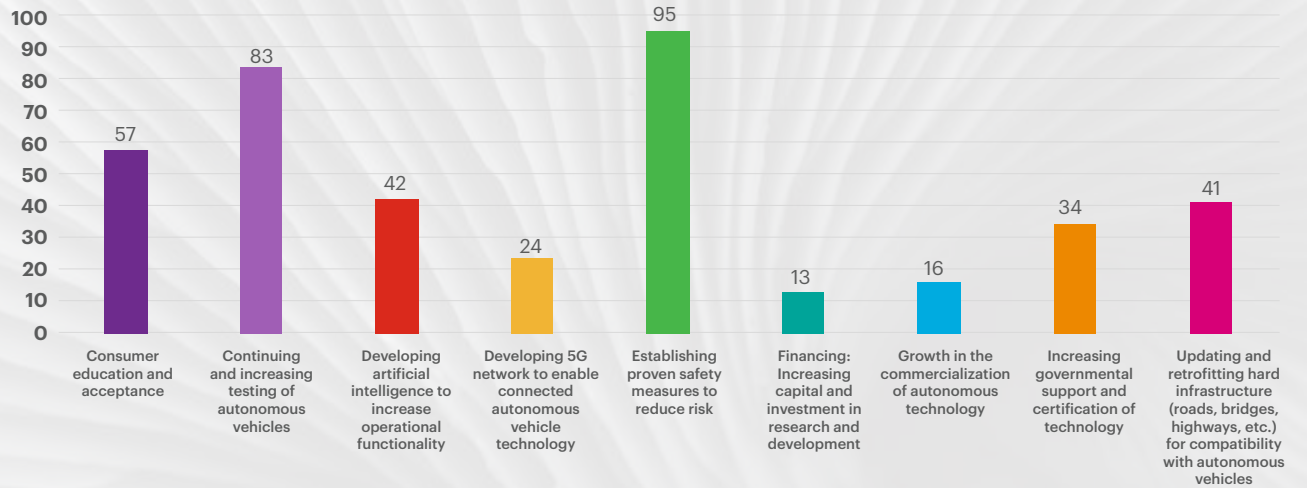
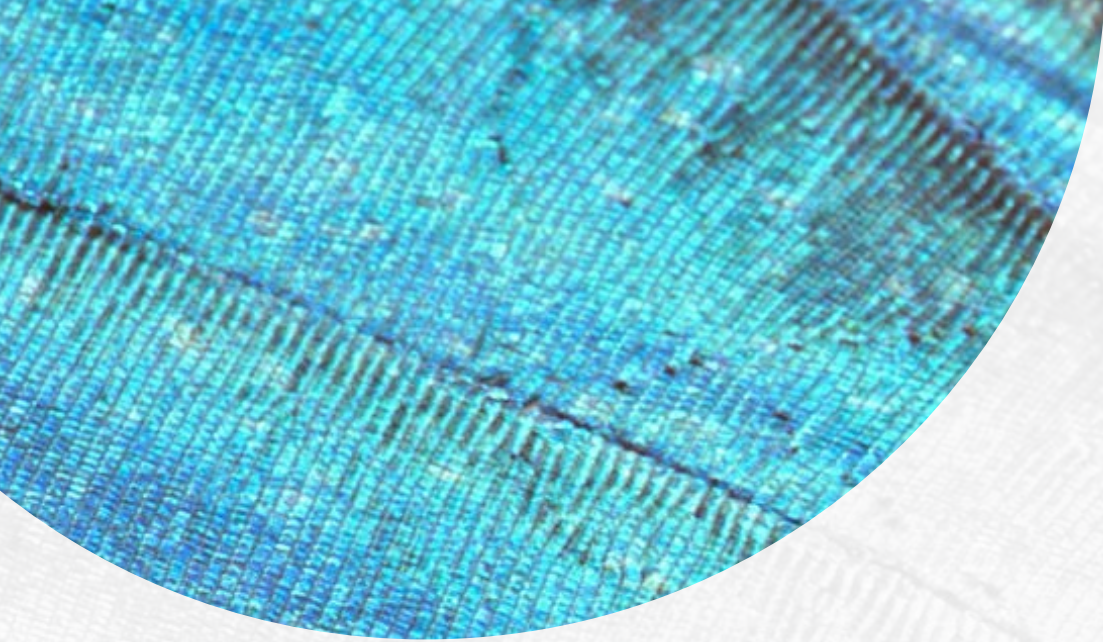


Figure 6 (above): Survey results: “In the next 5 years, what are the most important factors to autonomous vehicle development?”

4 Very important equates to aspects without which the autonomous vehicles industry could not continue to progress. Important equates to aspects without which the progression of the autonomous vehicles industry would be notably hindered. Not important equates to aspects which would not have a material impact on industry advancement.



Connected vehicles to transform society, not autonomous vehicles alone

67% of respondents “agreed” (42%) or “strongly agreed” (25%) with the statement: “Connected autonomous vehicles will transform society, not autonomous vehicles alone.”

Only 12% of respondents “disagreed” (9%) or “strongly disagreed” (3%).⁵ (Figure 7)

Connected autonomous vehicles are defined as vehicles equipped with V2X (vehicle-to-everything) technology that communicates with other vehicles and smart infrastructure, in addition to autonomous vehicles capabilities.

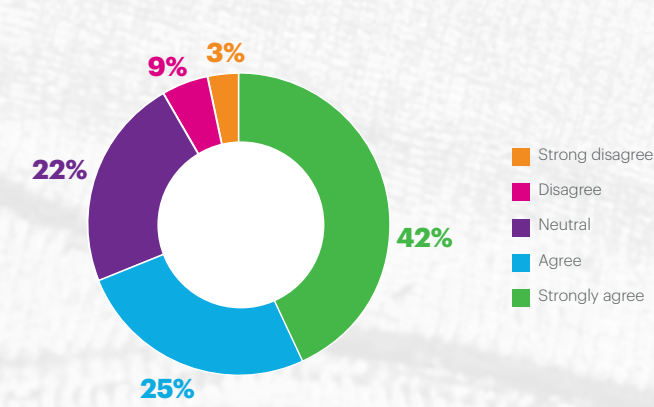


Figure 7 (above): Survey results: “Do you agree/disagree with the following statement: Connected autonomous vehicles will transform society, not autonomous vehicles alone.”

Electric vehicle (EV) deployment will pave the way for autonomous vehicles

Electric vehicles and autonomous vehicles have always been linked together due to the reciprocal relationship between the technologies. In the future, most autonomous vehicles will be electric.

Electric vehicles continue to grow in prominence. Respondents overwhelming said that widespread⁶ EV acceptance and deployment across consumers, manufacturers and governments was important for the autonomous vehicles industry. (Figure 8)

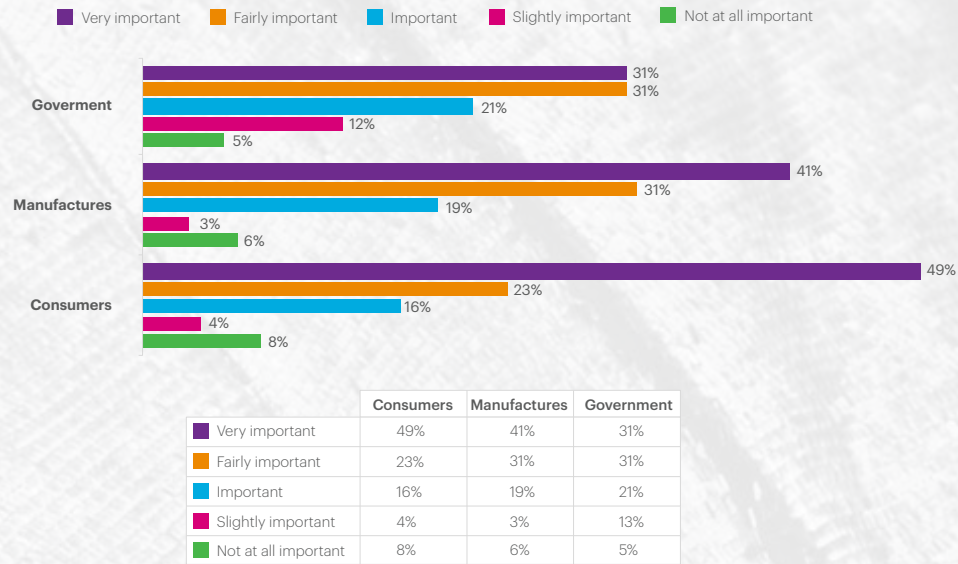


Figure 8 (above): Survey results: “How important is widespread electric vehicle (EV) acceptance and deployment by consumers, manufacturers, and government officials to the autonomous vehicle development of the autonomous vehicle industry?”

CONSUMERS ARE KEY

Among the three groups, respondents placed a particular emphasis on consumers’ role in electric vehicles. **89%** of respondents ranked consumer acceptance and deployment as “important” or higher. (Figure 9)

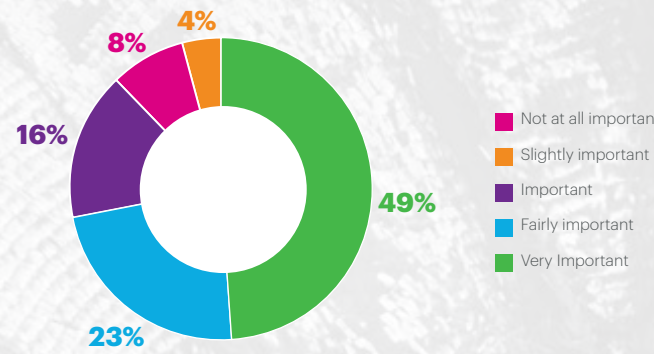


Figure 9 (above): Survey results: “How important is widespread electric vehicle (EV) acceptance and deployment by consumers, manufacturers, and government officials to the autonomous vehicle development of the autonomous vehicle industry?” – Breakdown of response category: Consumers

⁶ Widespread is defined as: Little to no range anxiety; consumers are just as likely, if not more, to purchase an EV when they decide to shop for cars; manufacturers produce as many, if not more, EVs than gas-powered cars; government is actively supporting electric vehicles, for example, through financial assistance for purchase, tax incentives, and continued expansion and improvement of charging infrastructure.

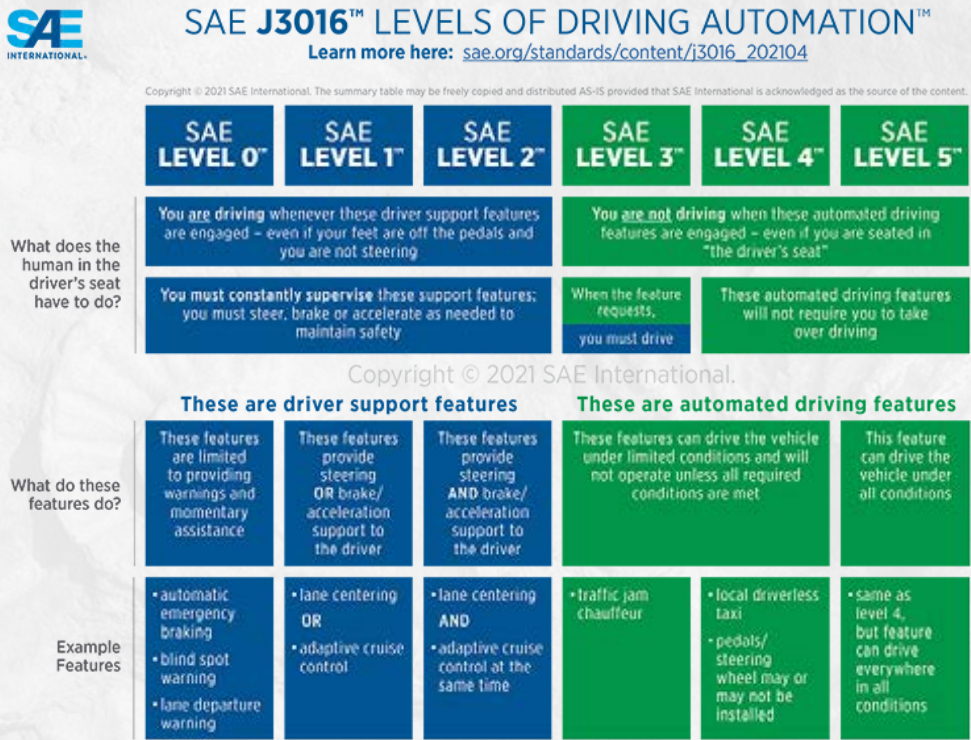


What’s on the horizon? Timeline for autonomous vehicle development

It is hard to accurately predict how soon autonomous vehicles will become a reality. Unforeseen challenges and the demand for rigorous safety measures can cause deadlines to be missed and predictions to be unmet.

However, with increased testing and regulatory acceptance, autonomous vehicles are closer to widespread deployment than ever before.⁷

The SAE (Society of Automotive Engineers) International defines levels of driving automation as seen in the chart below.



Source of summary table: SAE International J3016 Levels of Driving Automation, Revised 4/30/2021

We asked respondents how many years until they expect there will be widespread deployment of SAE Levels 3-5 of driving automation on public roads. (Figure 10)

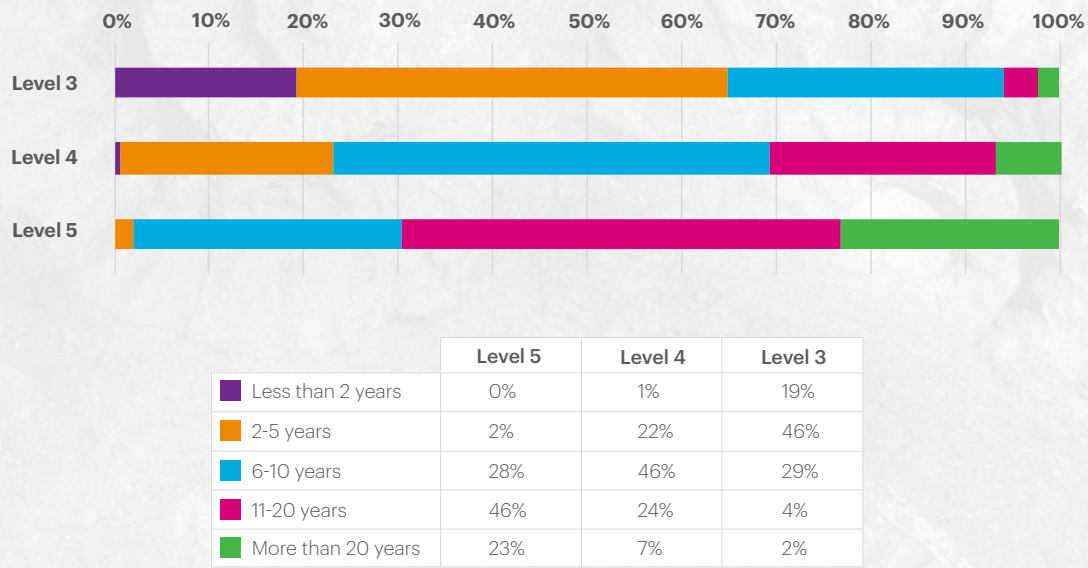


Figure 10 (above): Survey results: “How many years until you expect there will be widespread deployment of SAE Levels 3-5 of driving automation on public roads?”

Level 3 autonomy is just around the corner: 65% of respondents expect that widespread deployment of Level 3 autonomous vehicles is less than 5 years away. **94%** believe that it will occur in the next 10 years.

Respondents expect level 4 autonomy in the next decade: Less than 1% of respondents expect widespread deployment of Level 4 technology to occur in less than 2 years. **22%** expect it to occur in the next 2 to 5 years and **46%** of respondents believe that Level 4 technology will see widespread deployment in 6 to 10 years.

Respondents say Level 5 autonomy is still more than a decade away: Lastly, 69% believe widespread deployment of Level 5 autonomous vehicles is still more than a decade away.

Role of regulatory frameworks

More than half of respondents “agreed” (32%) or “strongly agreed” (19%) that to grow and reach its full potential, the autonomous industry in their primary country needs more government oversight than exists in the current regulatory framework. (Figure 11)

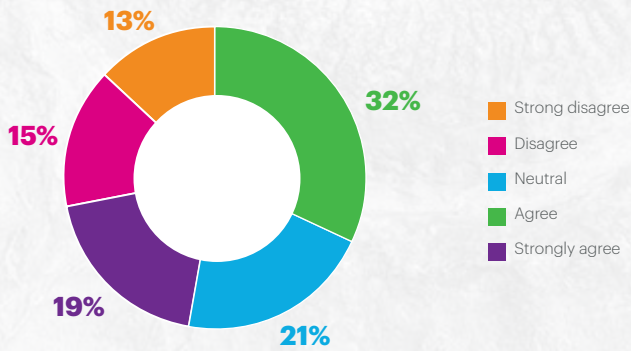


Figure 11 (left): Survey results: “Do you agree/disagree with the following statement: To grow and reach its full potential, the autonomous industry in your primary country needs more government oversight than exists in the current regulatory framework.”

⁷ For this question, widespread is defined as: Autonomous technologies are an integral part of the real traffic situation in the respective region and are used consistently in many different locales providing services. Widespread does not involve testing for future deployment.

Australia

Regulatory developments and roadblocks

Timeline of major developments

DEPARTMENT OF TRANSPORT AND MAIN ROADS, QLD

High Definition Map Collaboration Essential to Automated Vehicle Success

Media statement released 28 January 2021

- The Queensland Department of Transport and Main Roads (**TMR**), Queensland University of Technology (**QUT**), iMOVE Cooperative, Research Centre (**iMOVE**), and Royal Automobile Club of Queensland (**RACQ**) partnership has been investigating how existing infrastructure such as signage and line markings will affect the major operational capabilities and the reliability of an automated vehicle?
- The entities published a report on their research: **P1-007: How Automated Vehicles Will Interact with Road Infrastructure Now and in the Future.**
- Among the key findings, the report highlighted that the availability and use of prior maps of the environment is a critical factor to improved performance of automated vehicles.
- The report examined government's role in creating, monitoring and maintaining HD maps to deliver accurate, real-time information to help safely guide automated vehicles to their destination.
- This project is expected to inform the scope of further study on the matter.

“We found that, unlike core autonomous vehicle technology driven primarily by tech companies, governments could and have been more involved in the discussion of how HD maps are created, used and maintained, especially in continents like Europe. This is exciting from a technology standpoint because there's still the possibility of further home-grown HD mapping developments in a collaboration between government, private industry and the research sector.”

- Professor Michael Milford, Queensland University of Technology

NATIONAL TRANSPORT COMMISSION (NTC)

A national in-service safety law for automated vehicles

Policy paper released 22 June 2021

- Following the presentation of the policy at the Infrastructure and Transport Ministers' Meeting (**ITMM**) in May 2021, the policy paper was released 22 June 2021.
- Follows Infrastructure and Transport Ministers' endorsement of a national regulatory approach to the in-service safety of automated vehicles.
- Ministers agreed to a new national law that will establish:
 - a general safety duty on entities responsible for automated driving systems;

- due diligence obligations on their executive officers; and
- a new national regulatory framework for in-service safety of automated vehicles.
- The paper further develops the content of the national law, recommending prescriptive duties on:
 - regulated parties;
 - management of market exit of regulated parties;
 - modifications to automated vehicles and aftermarket installations; and
 - the regulator's functions and powers.
- The paper offers an explanation as to how the national law will work under two different legislative implementation models, and recommends further developments for these models such that the policies aforementioned are achieved.

AUSTRALIAN PARLIAMENT

Introduction of Road Vehicle Standards Act 2018 (Cth) (RVSA)

In force as of 1 July 2021

- As at 1 July 2021, the Road Vehicle Standards Act 2018 (Cth) (RVSA) replaced the Motor Vehicle Standards Act 1989 (Cth) (**MVSA**).
- 12-month transition period began on 1 July 2021.
- Some MVSA approvals will continue to remain in force to ensure a smooth transition to the new regulatory framework.

QUEENSLAND UNIVERSITY OF TECHNOLOGY

Applicability of State and Territory Roadside Enforcement Powers to Automated Vehicles

Report for the NTC released 7 September 2021

- The report proposes a state and territory roadside enforcement power.
- Raises concerns and makes findings in relation to current state and territory roadside enforcement powers in the context of automated vehicles (**AVs**) in relation to:
 - powers to stop and interact with AVs;
 - powers to investigate crashes involving AVs;
 - powers to enforce road rules and vehicle compliance rules with AVs;
 - powers to access information from AVs relating to data of automated driving functions; and
 - powers of roadside enforcement agencies to share and disclose vehicle information and data with other entities.
- It includes an analysis of whether these powers are suitable for ensuring the safe operation of automated vehicles on the road and identification of gaps (if they exist).

AUSTROADS

Minimum Physical Infrastructure Standard for Operation of Automated Driving

Report released January 2022

- The report focuses on the minimum physical infrastructure needed for automated driving.
- It also includes recommendations for the short term (next five years) such as:
- increasing the interpretability of Traffic Control Devices (**TCDs**); and
 - increasing governmental investment in the use of intelligent equipment and signs at temporary work zones.



16TH INFRASTRUCTURE AND TRANSPORT
MINISTERS’ MEETING’ (ITMM)

Meeting, 11 February 2022

- Ministers agreed that the future of Automated Vehicle Safety Law will be implemented through Commonwealth law to deliver a nationally consistent regulatory approach.
- Ministers agreed that an Intergovernmental Agreement will be developed to support the new automated vehicle regulatory governance arrangements by late 2023.
- A future decision on drafting instructions will be made by ministers for the new law in late 2022 through an ITMM.
- Complementary state and territory law amendments will support the national regulatory framework for automated vehicles.
- The Automated Vehicle Safety Law is expected to commence by 2026.

Driverless testing
and deployment

RULES AND REGULATIONS LARGELY
UNCHANGED

- Trialing of driverless vehicles is permitted in Australia upon grant of a relevant permit from each relevant state/territory. Generally, “trial permits” are granted on a case-by-case basis.
- Certain states (such as Victoria) require the application for a trial permit to include a safety management plan that complies with NTC guidelines. Regardless of jurisdiction, appropriate safety hardware/software must be established in a safety management plan that complies with NTC guidelines. Whether or not vehicles must have the capability to be remotely operated is dependent on the safety management plan. Typically, Australian road rules require a person to be seated in the driver’s seat. Certain states, such

as New South Wales and South Australia require the trialing organization to have third-party policy and/or public liability insurance.

- A human driver is required in the vehicle unless a specific exemption or permit has been granted. As such it is possible that vehicles trialed in Australia will not have human drivers. In this case, trialing organizations simply need to demonstrate how they have addressed the relevant safety risks of not having the backup of a human driver.
- Where there is a human driver, associated human factor risks will also need to be considered, including such behavioral requirements as alertness and ability to resume the entire driving task if requested or if there is an evident vehicle system failure.
- To that end, while not driving, the human driver must not engage in activities that prevent him or her from responding to takeover demands. Activities not in line with the intended use of the automated driving function or prohibited by law include:
 - reading or viewing a device or thing unrelated to navigation or driving (ARR, Rule 299);
 - using a laptop (ARR, Rule 299); and
 - using a mobile phone, except in permitted circumstances (ARR, Rule 300).
- Throughout vehicle testing, record keeping requirements apply. Generally speaking, trialing organizations should comply with all relevant crash reporting requirements and report on incidents involving the automated driving system to authorities.
- The Australian Government’s Department of Infrastructure classifies autonomous vehicles into six different levels, according to a standard developed by the Society of Automotive Engineers (SAE). More information on the SAE Levels of Driving Automation may be found [here](#).

- Automation levels are based on the amount of human input required to operate the vehicle from Level 0 (driver must perform all driving tasks) to Level 5 (vehicle can drive itself without any human involvement).

LIABILITY

- In the event of a crash involving an autonomous vehicle:
 - the Australian Consumer Law (ACL) provides a regulatory system of obligations and warranties in order for manufacturers to meet quality and safety standards; and
 - each state and territory has its own Civil Liability Act for personal injuries caused by motor vehicle accidents.
- While the usual negligence principles apply, there will be additional issues regarding liability for compensation. For example, there will be issues as to who will bear responsibility for harm with respect to higher levels of automation. Under the ACL, manufacturers and suppliers (such as sellers and resellers) may be held liable.
- In October 2017, the NTC released a discussion paper titled “Changing driving laws to support automated vehicles” (Discussion Paper).² **The discussion paper provides in-depth analysis of the need to legally recognize an ADS in Australia. It explains that an automated driving system (ADS) is a system – not a person – so it cannot be held responsible for its actions. An entity needs to be responsible for the actions of an ADS to ensure they can operate safely.**
- In its Automated Vehicle Program³ released in October 2019, the NTC confirmed it will consider data from insurers to assess and manage liability for road traffic law breaches and crashes.

PROGRESS AND NEWS RELEASES

South Australia Government Department for
Infrastructure and Transport

Progress of Murray the Autonomous Vehicle

News article published 8 February 2021

- An EasyMile EZ10 electric shuttle bus carrying up to five passengers at a time has been established via trail in the Renmark community of South Australia.
- Phase 2, deployed in 2021, focused on Renmark’s tourism industry, providing a scenic drive for tourists and residents.
- The route helps service people with limited mobility.

ABC NEWS

Dubbo autonomous vehicle trials to begin
in 2022

News article published 8 December 2021

- Autonomous vehicle on-road trial to begin in 2022 in Dubbo, NSW.

Connected vehicles
and logistics

TELECOMMUNICATIONS AND 5G

- Following industry consultation, the Australian Communications and Media Authority introduced the Radio Communications (Intelligent Transport Systems) Class License 2017, which will support the use of complying wireless technologies and devices. The regulations allow the 5.9 GHz band to be used for ITS in Australia and are consistent with the ITS arrangements in major vehicle markets such as the US and EU.⁴ In the Australian context, short-range 5.9 GHz radios accommodate 4G C- V2X technology.

1 https://www.infrastructure.gov.au/sites/default/files/documents/16th_itmm_communique_11_february_2022.pdf

2 [https://www.ntc.gov.au/Media/Reports/\(E5695ACE-993C-618F-46E1-A87639188CD9\).pdf](https://www.ntc.gov.au/Media/Reports/(E5695ACE-993C-618F-46E1-A87639188CD9).pdf)

3 <https://www.ntc.gov.au/transport-reform/automated-vehicle-program>

4 <https://www.acma.gov.au/Industry/Spectrum/Spectrum-planning/About-spectrum-planning/acma-introduces-new-regulations-to-support-intelligenttransport-systems>

TELECOMMUNICATIONS AND 5G DEVELOPMENTS

Australian Defence Magazine

Rheinmetall received 5G grant to develop autonomous vehicle technology

News article published 30 August 2021

- Rheinmetall, an automotive and arms manufacturer, has been named a recipient of the Australian government's 5G Innovation Initiative, a competitive grants program to help small to large businesses in Australia test and develop 5G uses, applications, services and products, including Internet of Things applications, which will help build Australia's 5G ecosystems.
- The grant will provide a first time partnership between Rheinmetall and Telstra. Telstra is an Australian company which builds and operates telecommunications networks and markets voice, mobile, internet access, pay television and other products and services. It is Australia's largest telecommunications company.
- Working with Telstra, Rheinmetall plans to use an unmanned aerial vehicle (UAV) to create a communications relay device to develop a 5G network for remote firefighting vehicles.
- Rheinmetall has invested over \$10 million into advanced autonomous systems research and development.

"The Rheinmetall Advanced Firefighting Concept (AFC) program is an innovative Australian research enterprise to develop autonomous vehicles capable of fighting bushfires in extreme environments."

- Rheinmetall Defence Australia Managing Director, Gary Stewart

PRIVACY

Laws remain largely unchanged but are under review

- The Privacy Act 1988 (Privacy Act) (and its accompanying Australian Privacy Principles (APPs)) regulates the management, storage, access and correction of personal information about individuals. This includes the collection of information from use of autonomous vehicles.
- An autonomous vehicle will also likely collect information about its users for the purpose of access (for example, facial recognition information) as well as location information (where a person goes, how long a person was at a location for, the next destinations) and preferences (for example, air conditioning temperature, music etc.). Some of this information about users will likely be classified as personal information and as such, any collection and use will be subject to the Privacy Act 1988 requirements.
- Data is only allowed to be stored and transmitted if:
 - collection of personal information is relevant to the functions and activities of the vehicle;
 - a person is aware of personal information collection and how that information is used through an up-to-date privacy policy and collection notices provided at the time information is collected;
 - use and disclosure of personal information is consistent with the purpose for which it is collected, has the individual's consent, and is for limited other purposes; and
 - personal information is secure.
- Consumers have the right to alter and correct their own personal information. An APP entity must take reasonable steps to destroy personal information or ensure it is de-identified if it no longer needs the information for any purpose for which it may be used or disclosed under the APPs. However, in Australia, we do not have the equivalent "right to be forgotten" under the GDPR.

- Cybersecurity is regulated by the Privacy and its APPs. For example, the APPs prescribe that:
 - organizations must take reasonable steps to protect personal information that they hold from misuse, interference, loss and unauthorized access, modification or disclosure; and
 - organizations must also take reasonable steps to destroy or de-identify personal information they hold if it is no longer needed to any purpose for which it may be used or disclosed, it is not contained in a Commonwealth record, and the entity is not required by or under an Australian law or a court or tribunal order to retain it.
- More recently, the Australian federal government introduced the Notifiable Data Breaches Scheme to manage cybersecurity accountability.
- The Privacy Act is currently under review, the details of which are set out below.

PRIVACY DEVELOPMENTS

Attorney-General's Department, Australian Government

Privacy Act Review – Discussion Paper

Media released, published 25 October 2021

- The discussion paper covers a broad range of topics, including:
 - the scope and application of the Act; and
 - the protections contained in the Australian Privacy Principles, outlining how the Act is regulated and enforced.
- It also proposes changes to the Privacy Act that would provide:
 - consumers with greater transparency and protections in relation to their personal information; and
 - the OAIC with a raft of expanded enforcement mechanisms and powers

ATTORNEY-GENERAL'S DEPARTMENT, AUSTRALIAN GOVERNMENT

Landmark privacy reforms to better protect Australians online

Media released, published 25 October 2021

- Attorney General (Michaelia Cash) released an exposure draft of the Privacy Legislation Amendment (Enhancing Online Privacy and Other Measures) Bill 2021 (Online Privacy Bill).
- Occurring alongside the Privacy Act Review, the Privacy Legislation Amendment (Enhancing Online Privacy and Other Measures) Bill 2021 (the Online Privacy Bill) will give effect to the Australian government's commitment to strengthen the Privacy Act 1988.
- It enables the introduction of a binding online privacy code for social media and certain other online platforms and increases penalties and enforcement measures.
- The Online Privacy Bill importantly seeks to add to Section 13G of the Privacy Act – increasing the penalty applicable for a contravention of this section by a body corporate from AU\$2.22 million to the greater of the following:
 - AU\$10,000,000;
 - (if able to be determined) three times the value of the benefit that the body corporate (and, if applicable its related body corporate) obtained from the conduct constituting the contravention; or
 - if the court cannot determine the value of that benefit derived from the conduct, 10 percent of the body annual corporate's turnover from the year before the conduct commenced.
- S13G relates to serious and repeated interferences with privacy of and in individual or more than one individual.

NEW TECHNOLOGIES

American Association for the Advancement of Science (AAAS)

X-Ray technologies developed in Australia
News article released 1 November 2021

- Australian researchers at the **iMOVE Cooperative Research Centre**, in collaboration with the **University of Sydney’s Australian Centre for Field Robotics** and Australian connected vehicle solutions company, **Cohda Wireless**, have released new findings in a final report following three years of research and development.
- The new technology would allow autonomous vehicles to track running pedestrians hidden behind buildings, or cyclists obscured by larger cars, trucks and buses.
- The technology’s applications will be commercialized by Cohda.

Driving forces

Smart Innovation Centre Transport for NSW

Transport for NSW partner with Motional to law foundations for driverless future
Media release, published 26 October 2021

- New South Wales is one step closer to autonomous mobility with Transport for New South Wales launching a plan to investigate driverless rideshare services.
- Joost de Kock, Deputy Secretary Customer Strategy and Technology, Transport for New South Wales, said the plan will help lay the foundation to prepare the launch a future robotaxi service in what would be an Australian-first.

“We need to start thinking about a number of factors such as locations and infrastructure, passenger demand, connections to public transport, and the benefits to local communities.”

- “Joost de Kock, Deputy Secretary Customer Strategy and Technology, Transport for New South Wales”

MEET THE AUTHOR



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Canada

Regulatory developments and roadblocks

REGULATORY OVERVIEW

In Canada, autonomous vehicles are subject to regulation at all three levels of government: (i) federal; (ii) provincial and territorial; and (iii) municipal. At present, most of the regulatory activity is concentrated at the federal level, in the provinces of British Columbia, Ontario and Quebec, and in a few major municipalities.

The federal government is responsible for regulating manufacturing and infrastructure as it relates to vehicles. The provinces and territories are responsible for the licensing of drivers, vehicle registration and insurance, and laws and regulations regarding the safe operation of vehicles on public roads. Our earlier **Global Guide to Autonomous Vehicles 2021** details the regulatory agencies in all the major jurisdictions.

FEDERAL

Key development: Guidelines for Testing Automated Driving Systems in Canada: Version 2.0¹

Purpose

In August 2021, Transport Canada released the *Guidelines for Testing Automated Driving Systems in Canada: Version 2.0* (Testing Guidelines) replacing the earlier 2018 edition. Developed in consultation with provincial and territorial representatives of the Canadian Council for Motor Transport Administrators

(CCMTA), these guidelines establish “a baseline of nationally consistent best practices to direct the safe conduct of trials involving vehicles equipped with automated driving systems (ADS).” The purpose of the new guidelines is “to clarify for trial organizations the various roles and responsibilities of federal, provincial and territorial, as well as municipal governments in approving and facilitating trials of ADS-equipped vehicles.”²

Scope

The Testing Guidelines apply to any organization that is conducting research and development trials of ADS-equipped vehicles in Canada (SAE levels 3 - 5). These guidelines are intended to apply to temporary trials of ADS-equipped vehicles, not their permanent market deployment – the requirements for which will be developed by federal, provincial, and territorial jurisdictions as ADS equipped vehicles continue to mature and evolve. Testing Guidelines primarily focus on operational safety practices for on-road testing.³

1

2

3

Transport Canada, “Guidelines for testing automated driving systems in Canada”, online: <https://tc.canada.ca/en/road-transportation/innovative-technologies/connected-automated-vehicles/guidelines-testing-automated-driving-systems-canada#_Toc78892210>.

Ibid.

Ibid.

ONTARIO

Key development: Ontario Vehicle Innovation Network (OVIN)

“As a result of OVIN, Ontario is now a global leader in driving the future of automotive and mobility through the development of a model that leverages Ontario’s regional strengths and assets to support the commercialization of new technologies that will drive economic and social benefits in the province.”⁴

- Grant Courville, VP, Products and Strategy, BlackBerry QNX

Ontario’s 2021 Budget⁵ announced further support for the auto sector by investing \$56.4 million over the next four years to build on the successful elements of Autonomous Vehicle Innovation Network (AVIN) and create the Ontario Vehicle Innovation Network (OVIN). Combined with the province’s \$85 million investment, Ontario’s total investment in this flagship initiative is almost \$142 million.

OVIN’s expanded mandate will help foster the next generation of **electric, connected,** and **autonomous** vehicle and mobility technologies in Ontario.⁶ As an initiative of the Government of Ontario and led by the Ontario Centre of Innovation (OCI), OVIN works to:

- Foster the commercialization of Ontario-made advanced automotive technologies and smart mobility solutions;

- Showcase Ontario as the leader in the development, testing, piloting and adoption of the latest transportation and infrastructure technologies;
- Drive innovation and collaboration among the growing network of stakeholders at the convergence of automotive and technology;
- Leverage and retain Ontario’s highly skilled talent;
- Harness Ontario’s regional strengths and capabilities and support its clusters of automotive and technology.⁷

Labour shortage

Ontario’s connected and autonomous vehicle (C/AV) sector segment (i.e., the segment that involves the research, design, development, testing, and operation management of C/AV technologies for cars, shuttles, trucks, buses, delivery vehicles and drones) is facing considerable gaps between skills required by employers and skills available in the labour market.

Key stats

As of 2020, some of the top emerging skills in the C/AV segment were technical and functional skills ranging from system development (up by 50%) and continuous integration and delivery (up by 59%) to controls engineering (up by 39%) and test-driven development (up by 69%). As these skills become more in demand, employers are facing increasing difficulty in filling roles that require these skillsets.⁸

Solution

The Talent Strategy & Roadmap is positioning Ontario’s automotive and mobility sector for long-term success by outlining key objectives and initiatives to help achieve OVIN’s 2030 vision for Ontario’s automotive and mobility workforce: to have a highly skilled, adaptable, and diverse workforce in the sector, reinforced by a global-leading network that provides tailored and responsive initiatives that meet the workforce’s evolving needs.⁹

BRITISH COLUMBIA

“As of last count, there were more than 54,000 electric vehicles on our roads — the highest rate of sales in North America,” said **Minister of Finance Selina Robinson**, in the budget speech given in Victoria. “We are building on the momentum by helping more people go electric, expanding the charging network, and electrifying more school buses and ferries.”¹⁰

The Ministry of Transportation and Infrastructure has an AV Working Group that monitors progress within the AV field, but there is no timetable for testing policies. Nothing related to developing the AV industry was included in the 2020 BC budget.

While there was nothing that would address the AV industry directly, the 2021 BC Budget continued investments in the transition to cleaner vehicles with \$130 million to support incentives for zero

emissions vehicles, electric charging stations, technological development, and the electrification of school buses, ferries and government fleets, including:

- \$94 million in the Go Electric program, which provides rebates for purchases of zero-emissions vehicles, charging stations and supports the commercialization of heavy-duty vehicles.
- \$18 million to support active transportation infrastructure like bike lanes, sidewalks, and multi-use pathways.
- A Provincial Sales Tax exemption on electric bikes that will save British Columbians an estimated \$7 million annually.
- \$10 million to further develop policy on reducing the carbon intensity of fuel and developing the hydrogen economy here in B.C.¹¹

QUEBEC

The Société de l’assurance automobile du Québec (SAAQ) has opened the door to the implementation of pilot projects to test AVs. The *Highway Safety Code* (HSC) was amended in 2018 to introduce the definition of an “autonomous vehicle” and create an avenue for a pilot project approval.

The testing of an autonomous vehicle is only authorized on a public road when it is part of a pilot project. The Minister of Transport has the authority to allow pilot projects to test new modes of transportation that make use of technological innovations while ensuring that the safety of road users. Pilot projects generally last for 5 years, but can be extended up to 2 years.¹²

4 Ontario Vehicle Innovation Network, “Driving the future of automotive and mobility”, online: <<https://www.ovinhub.ca/#>>.
5 Government of Ontario, “2021 Ontario Budget: Ontario’s Action Plan — Protecting People’s Health and Our Economy”, online (pdf): <<https://budget.ontario.ca/2021/pdf/2021-ontario-budget-en.pdf>> at 108 and 114.
6 Ontario Vehicle Innovation Network, “Driving the future of automotive and mobility”, online: <<https://www.ovinhub.ca/>>.
7 Ontario Vehicle Innovation Network, “Talent Strategy & Roadmap for Ontario’s Automotive and Mobility Sector” (January 24, 2022), online (pdf): <https://ovin-navigator.ca/wp-content/uploads/2022/01/OVIN_TalentStrategyRoadmap-English-2021.12.17-FINAL-ua.pdf> at 11.
8 Ontario Vehicle Innovation Network, “Talent Strategy & Roadmap for Ontario’s Automotive and Mobility Sector” (January 24, 2022), online (pdf): <https://ovin-navigator.ca/wp-content/uploads/2022/01/OVIN_TalentStrategyRoadmap-English-2021.12.17-FINAL-ua.pdf> at 36, referring to Accenture (2020), Ontario’s C/AV Talent Strategy & Roadmap Report, Prepared for Invest Ottawa.

9 Ontario Vehicle Innovation Network, “Talent Strategy & Roadmap for Ontario’s Automotive and Mobility Sector” (January 24, 2022), online (pdf): <https://ovin-navigator.ca/wp-content/uploads/2022/01/OVIN_TalentStrategyRoadmap-English-2021.12.17-FINAL-ua.pdf>.
10 British Columbia, “Budget 2021 Speech”, online: <<https://www.bcbudget.gov.bc.ca/2021/speech.htm>>; Also see Luke Sarabia, “B.C. budget’s \$506 million in ZEV and cleantech investments keeps EV momentum building”, Electric Autonomy (April 27, 2021), online: <<https://electricautonomy.ca/2021/04/27/bc-2021-budget-zev/>>.
11 Budget 2021, “Stronger BC for everyone”, online (pdf): <https://www.bcbudget.gov.bc.ca/2021/pdf/2021_Highlights.pdf>.
12 Société de l’assurance automobile du Québec, “Modes of Transportation” (July 21, 2021), online: <<https://saaq.gouv.qc.ca/en/road-safety/modes-transportation/autonomous-vehicles>>.



OTHER JURISDICTIONS

On March 4, 2020, the Province of Manitoba introduced legislation to allow the safe testing of automated vehicles in Manitoba. Bill 23 enacts the Vehicle Technology Testing Act and amends various Acts.¹³

In 2020, Saskatchewan amended the Traffic Safety Act to include detailed rules and regulations with regards to automated and connected vehicles.¹⁴

Nova Scotia’s Traffic Safety Act, Bill No. 80 received royal assent in 2018. Although it has been not proclaimed yet, it incorporates the definition of “autonomous vehicle” and “autonomous mode”.¹⁵

Driverless testing and deployment

The Canadian federal government has taken on a leadership role to ensure consistency across all jurisdictions by providing guidance on the future of the AV industry. Canada is consistently ranked highly in the area of autonomous vehicle readiness as countries continue to move forward with testing. The current regulatory environment in Canada is supportive of the development and use of AVs and Ontario is the leader for testing and developing AV technology in the country.¹⁶

The main federal and provincial/territorial schemes regarding AV testing and deployment are summarized below:

Region	Agency
Federal	<p>At the federal level, section 7(1)(a) of the <i>Motor Vehicle Safety Act</i> permits testing. Section 7(1)(a) provides for an exception that allows people or companies to temporarily import a vehicle that does not comply with the Canadian Motor Vehicle Safety Standards, if the vehicle is for testing, demonstration or evaluation.¹⁷ Transport Canada’s Innovation Centre permits testing of AV truck platooning. The federal government also amended the Motor Vehicle Safety Regulations,¹⁸ adding section 11.1, to give more flexibility on the length of time that an automated or other temporarily imported vehicle may be imported into account beyond the one-year limit that previously existed in Schedule VII of the Regulations. This will allow more time to evaluate the technology before the requirement of destruction or exportation.</p> <p>Update</p> <p>As stated in the previous section, Transport Canada released the Guidelines for Testing Automated Driving Systems in Canada: Version 2.0 in August 2021. The new guidelines seek to clarify for trial organizations the various roles and responsibilities of federal, provincial and territorial, as well as municipal governments in approving and facilitating trials of ADS-equipped vehicles. These guidelines establish safety best practices that trial organizations should follow when conducting research and development testing of ADS-equipped vehicles in Canada.¹⁹</p>
British Columbia	<p>British Columbia does not have any AV testing regulations. The province will likely follow the <i>Automated Driving Systems in Canada: Version 2.0</i> Testing Guidelines when implementing testing regulations but at present the vehicle must comply with <i>Motor Vehicle Safety Act</i> regulations. Additionally, the company conducting AV trials will likely have to make a declaration that they have addressed any safety concerns associated with the trial AVs.</p>

13 The Vehicle Technology Testing Act (Bill 23), online: <<https://web2.gov.mb.ca/bills/42-2/b023e.php>>.

14 Traffic Safety Amendment Act, 2020, SS 2020, c 36, <<https://www.canlii.org/en/sk/laws/astat/ss-2020-c-36/178292/ss-2020-c-36.html>>.

15 Nova Scotia Legislation, “Traffic Safety Act - Bill 80”, online: <<https://nsllegislature.ca/legislative-business/bills-statutes/bills/assembly-63-session-2/bill-80>>.

16 Ontario, “Driving Prosperity: The Future of Ontario’s Automotive Sector”, online: <<https://www.ontario.ca/page/driving-prosperity-future-ontarios-automotive-sector#ref-2>>.

17 Motor Vehicle Safety Act, SC 1993, c 16.

18 Motor Vehicle Regulations, CRC, c 1038.

19 Transport Canada, “Guidelines for testing automated driving systems in Canada”, online: <https://tc.canada.ca/en/road-transportation/innovative-technologies/connected-automated-vehicles/guidelines-testing-automated-driving-systems-canada#_Toc78892210>.



Region	Agency
Ontario	<p>Ontario is the first Canadian province to allow on-road testing of autonomous vehicles. As of January 2019, Ontario amended its pilot regulation to align with other global AV testing jurisdictions.²⁰</p> <p>The Ontario Ministry of Transportation (MTO) Automated Vehicle Pilot Program permits companies to apply to test driverless vehicles on public roads. The program prohibits the use of AVs (levels 4 and 5) except as permitted by the pilot project. If the vehicle was originally manufactured as an AV, the owner must be the original manufacturer and be a company as defined by the Motor Vehicle Safety Act. If the vehicle was converted into an AV, the owner must be the person who converted the vehicle, and must be a technology company, research institution or AV manufacturer. The Registrar must be satisfied that the owner has expertise to properly convert vehicles into AVs. In addition, the vehicle must have a disengagement/engagement mechanism, failure alert, and mechanism enabling the driver to take over all dynamic driving tasks. Finally, companies must obtain approval from the MTO in order to test AVs (levels 4 and 5) and a minimum CA\$5 million in liability insurance and CA\$8 million for vehicles with a seating capacity of eight or more passengers.</p> <p>Pilot project applications must be evaluated and accepted by the Minister.</p> <p>Update</p> <p>West Rogue Automated Shuttle</p> <p>The City of Toronto, Toronto Transit Commission and Metrolinx concluded the West Rouge Automated Shuttle Trial in Toronto. “Despite not offering service to the public, the City and its partners tested the automated shuttle service for two months in the fall of 2021 and gathered data about how automated vehicle technologies operate, their different requirements when compared to conventional transit vehicles, the current limitations of the technology and the range of solutions available in the market. The insights gained from the trial will support future decision-making and planning for automated vehicles in transit and the broader transportation system.”²¹</p> <p>Setback</p> <p>Local Motors, the manufacturer of the West Rouge Automated Shuttle and Whitby Autonomous Electric Vehicle recently ceased operations and is no longer available to provide technical and operational support. Furthermore, the Ministry of Transportation suspended its approval to operate the trial in Toronto due to an incident with a Local Motors shuttle in December 2021.²²</p>

Region	Agency
	<p>Takeaway</p> <p>“The learnings from this deployment will help to shape the future of mobility within our local communities and across the globe,” Tenille Houston, CEO of AutoGuardian by SmartCone. “The integration of automated technology at this level takes innovation, collaboration, and a forward-thinking mindset. I am thankful to all the project partners and the community for coming together to make it happen.”²³</p> <p>Hamilton</p> <p>In 2020, the City of Hamilton announced details about upcoming testing on city streets. More recently, the Centre for Integrated Transportation and Mobility has installed “smart city” technology on at least three Hamilton Mountain intersections now part of ‘connected vehicle’ test site to collect data.²⁴</p> <p>McMaster University</p> <p>On February 2, 2022, Cubic Transportation Systems and McMaster University launch Centre of Excellence for Artificial Intelligence and Smart Mobility to “develop the building blocks to design the future of inclusive mobility through innovation and technology collaboration between government, academia, and the public and private sectors.”²⁵</p>

20 Ontario, “Driving Prosperity: The Future of Ontario’s Automotive Sector”, online: <<https://www.ontario.ca/page/driving-prosperity-future-ontarios-automotive-sector#ref-2>>.

21 City of Toronto, News Release, “TTC and Metrolinx conclude on-road testing of the West Rouge Automated Shuttle” (Jan 28, 2022), online: <<https://www.toronto.ca/news/city-of-toronto-ttc-and-metrolinx-conclude-on-road-testing-of-the-west-rouge-automated-shuttle/>>.

22 Connect Whitby, “Whitby Autonomous Vehicle Electric Shuttle Project”, online: <<https://connectwhitby.ca/ridetheWAVE>>.

23 Kristen Calis, “Whitby self-driving bus ending its route”, Toronto Star (February 16, 2022), online: <<https://www.thestar.com/local-whitby/news/2022/02/16/whitby-self-driving-bus-ending-its-route.html>>.

24 Matthew Van Dongen, “Three Hamilton Mountain intersections now part of ‘connected vehicle’ test site”, Hamilton Spectator (April 13, 2021), online: <<https://www.thespec.com/news/hamilton-region/2021/04/13/hamilton-autonomous-vehicle.html>>.

25 Centre for Integrated Transportation and Mobility, “Cubic Transportation Systems and McMaster University launch Centre of Excellence for Artificial Intelligence and Smart Mobility” (February 2, 2022), online: <<https://citm.ca/news/cubic-transportation-systems-and-mcmaster-university-launch-centre-of-excellence-for-artificial-intelligence-and-smart-mobility/>>.

Region	Agency
Quebec	<p>Quebec’s <i>Highway Safety Code</i> (HSC) allows for AV testing applications but does not specify terms for AV testing if the application is approved. The <i>Guidelines for Testing Automated Driving Systems in Canada: Version 2.0</i> will likely be followed when the province implements testing regulations. The vehicle must comply with Motor Vehicle Safety Act regulations and the company conducting AV trials will likely have to make a declaration that they have addressed any safety concerns associated with the trial AVs. Section 633.1 of the HSC provides successful applicants with a three-year period to conduct tests in the province, which the Minister may extend by up to two years if the Minister considers it necessary.²⁶</p> <p>In Quebec, companies must obtain consent pursuant to An Act to amend the HSC and other provisions to put an AV (SAE level 3–5) on the road, and in other jurisdictions, companies must obtain the Registrar’s consent.</p> <p>Autonomous Buses and Minibuses</p> <p>Candiac</p> <ul style="list-style-type: none">• The first test project carried out as part of the pilot project for autonomous buses and minibuses in Québec took place in Candiac and was implemented by Keolis Canada Innovation, S.E.C.²⁷ <p>Montreal</p> <ul style="list-style-type: none">• During the summer of 2019, Transdev, in partnership with the City of Montreal and the manufacturer EasyMile, implemented two autonomous shuttles on a route with a round-trip distance of 2.8 km. The project ended on August 4, 2019.²⁸ <p>More recent</p> <p>Plaza St-Hubert shuttle - Montreal</p> <ul style="list-style-type: none">• The City of Montreal deployed two autonomous shuttles along Plaza St-Hubert in fall 2021. The second phase will start in spring, going from May until July 2022.• “With Plaza St-Hubert, what we want to do is learn more about the behaviours of the shuttle buses in really dense urban environment,” said Sophie Mauzerolle, the city’s executive committee member in charge of the electrification of transportation.²⁹
All jurisdictions	Underwriters Laboratories (UL) has released UL 4600, “Standard for Evaluation of Autonomous Products” which is the first dedicated safety standard for fully autonomous vehicles.

26 Highway Safety Code, 1986, C-24.2.

27 The SAAQ, “Autonomous Buses and Minibuses”, online: <<https://saaq.gouv.qc.ca/en/saaq/documents/pilot-projects/autonomous-buses-minibuses>>.

28 Ibid.

29 CBC News, “Self-driving shuttle bus will transport shoppers around Plaza St-Hubert this fall” (September 11, 2021), online: <<https://www.cbc.ca/news/canada/montreal/saint-hubert-plaza-shuttle-bus-self-driving-1.6169252>>.

Connected Vehicles
and Logistics

5G

1. Canada’s spectrum regulator, Innovation, Science and Economic Development (ISED) has implemented a variety of approaches to spectrum sharing to support the deployment of 5G wireless networks and systems in Canada, including:
 - a. a policy to allow terrestrial mobile and fixed services to share the millimeter wave bands (26.5-27.5 GHz , 27.5-28.35 GHz, and 37-40 GHz) with fixed satellite service;
 - b. allowing licence-exempt use of the 64-71 GHz band on a no-interference, no-protection basis;
 - c. decisions to issue flexible-use licences in the 600 MHz, 3500 MHz, and 3800 MHz bands to enable both mobile and fixed operations, thereby enabling spectrum sharing with existing services when practicable;
 - d. allocating 1200 MHz in the 5925-7125 MHz frequency range to Radio Local Area Network (RLAN) applications, including allowing higher power RLAN operations in 950 MHz of this spectrum in which sharing of spectrum will be managed through automated frequency coordination systems.
2. In parallel with this yeoman’s work from ISED, Canada’s telecommunications regulator (the CRTC) and the telecommunications industry in Canada have done the necessary work to implement telephone numbering resource policies and procedures to prepare for the proliferation of devices in the Internet of Things (IoT) universe).
3. While both the CRTC and ISED have adopted many strategies over the course of the past two years to enable more efficient spectrum use and innovative new wireless applications, 5G network deployment has been slow in Canada. Thus far, the three dominant Canadian mobile wireless carriers’ 5G deployments have been confined to limited local deployments.
4. This slowness may be due to a number of factors: (i) the relatively small size of the Canadian wireless subscriber market (as compared to its vast geographic expanse); (ii) the pace at which ISED has auctioned licensed 5G spectrum, which generally lags behind the US and other OECD countries by at least one and in some cases two or more years; (iii) wireless carriers in Canada individually have access to lesser amounts of contiguous spectrum given that spectrum set asides and caps have been a constant feature of each and every commercial mobile spectrum auction in Canada in since 2007; and (iv) lingering uncertainty surrounding the Government of Canada’s decision not to decide whether Huawei network equipment would be permitted in Canadian 5G networks.
5. Or it may be the case that the phenomenon of working from home during COVID-19 related lockdowns has made closing the ever-present broadband connectivity gap between rural/remote Canada and urban Canada the undisputed telecommunications policy priority over 5G deployment. Between March 2015 and March 2022, the Government of Canada has announced CAD \$7.2 billion in available funding and various provincial governments have made approximately CAD \$10 billion available for rural and remote Internet infrastructure to help ensure that all Canadians have access to fast and reliable Internet no matter where they live or work. Added to this major policy impetus is the fact that Canada’s second largest telecom (Rogers) and its fourth largest (Shaw) have largely been in a holding patten given that in March 2021, Rogers announced that it would be purchasing all of the issued and outstanding shares of Shaw in a CAD \$20 billion deal.
6. There are no spectrum auctions scheduled to proceed in 2022 – the 3800 MHz auction is slated for Q1 2023 in Canada. However, Q4 2021 saw a spate of announcements announcing the selection of core 5G equipment vendors by Rogers Communications, Xplornet, and Videotron. With the Rogers-Shaw deal anticipated to close at the beginning of Q2 2022 and with

COVID-19 restrictions beginning to lift, 5G use cases and network deployments will undoubtedly take centre stage once again in Canada as in the rest of the world.

DATA PRIVACY AND SECURITY

In recent years, vehicles have evolved from being simply a means of transportation to complex computers on wheels amassing tons of information not only about the vehicle, but also about anyone at the wheel or in proximity the vehicle. “Connected cars” have the potential to track and record large amounts of data, including personal information, ranging from infotainment preferences to telematics to driver behaviours.

Autonomous vehicles (AVs) are often considered as connected or smart devices. While there are no statutes specific to Internet of things (IoT) technologies, to the extent this data involves personal information, the processing of data through these technologies are governed by Canada’s privacy laws. Generally, the processing of this data is governed by the federal and provincial private-sector statutes, as applicable, however, in certain circumstances, public-sector statutes may also apply. This can result in a complex regulatory framework. For example, in the case of public-private partnerships where a private entity is providing a service to a public institution, each participating entity may be governed by different privacy legislation, making the collection, use and disclosure of personal information subject to different requirements or restrictions.

CONSIDERATIONS FOR BUSINESSES

AVs contain complex software capable of collecting vast amounts of data. While AVs are growing in popularity and availability, consumers remain concerned about privacy and how their personal information could be used or to whom it may be disclosed. Information collected from AVs could expose very private details of a person’s life such as travel patterns that reveal where an individual lives and works and other establishments they may frequent.

Here are some key considerations for organizations operating in the AV space.

1. Transparency is key

As required under law, organizations must ensure that their privacy policies are drafted in plain language, widely accessible and sufficiently detailed such that individuals can provide meaningful consent to the processing of the data. Individuals should not first have to purchase a vehicle or service in order to access and review the organization’s privacy policy.

2. Purpose Limitation

The potential for the information collected via connected cars is infinite. That said, before an organization collects personal information, it must identify the purpose for which it needs the information, keeping in mind that the purpose must be reasonable in the circumstances. Under law, information collected for a purpose cannot be reused, in its identifiable form, for another purpose without prior consent.

3. Implement appropriate security safeguards

AVs present specific threats and vulnerabilities relating to personal safety and security. Consumers often voice concerns about AVs being vulnerable to malicious actors who could gain control of their vehicle. The risk is high; while bugs may be manageable in other connected devices, these could be catastrophic in AVs. Organizations must establish a robust security program to assess the need for security safeguards and ensure careful implementation.

TRENDS TO WATCH

Canada’s privacy laws are being modernized and changes are expected to come into force in the coming years. At the federal level, a new version of Bill C-11, the now-defunct bill intended to modernize the federal private sector law, is expected in 2022. Provinces have also started reviewing their own privacy laws. Québec’s Bill 64, An Act to modernize legislative provisions as regards the protection of personal information, received assent

on September 22, 2021 and sets a precedent for important reform in Canadian private-sector privacy law. In light of the actual and expected upcoming changes, organizations should prepare for changes, including:

- De-identified data: Currently, data that is anonymized generally falls outside the scope of privacy law; however, because of policy concerns that anonymization may be difficult or impossible in light of the volume of personal information available on the Internet and the capacity to match data, a different approach may be taken under new and proposed legislation. Bill 64 regulates both de-identified and anonymized information and sets out permitted uses for either type of information. Organizations should consider using anonymized data where possible such as, for example, to train self-driving algorithms, to program traffic signal systems or to assist transportation planners.
- Cross-border transfers: Some legislation imposes conditions on cross-border data transfers. Bill 64 will require that any communication of personal data outside Québec be subject to a privacy impact assessment to determine, prior to communicating the information outside of the province, that protection in the receiving jurisdiction would be “adequate” according to privacy principles. Organizations who use service providers in other jurisdictions, for example, must ensure they are compliant with applicable law before transferring personal information. Data privacy and security

In recent years, vehicles have evolved from being simply a means of transportation to complex computers on wheels amassing tons of information not only about the vehicle, but also about anyone at the wheel or in proximity the vehicle. “Connected cars” have the potential to track and record large

amounts of data, including personal information, ranging from infotainment preferences to telematics to driver behaviours.

Autonomous vehicles (AVs) are often considered as connected or smart devices. While there are no statutes specific to Internet of things (IoT) technologies, to the extent this data involves personal information, the processing of data through these technologies are governed by Canada’s privacy laws. Generally, the processing of this data is governed by the federal and provincial private-sector statutes, as applicable, however, in certain circumstances, public-sector statutes may also apply. This can result in a complex regulatory framework. For example, in the case of public-private partnerships where a private entity is providing a service to a public institution, each participating entity may be governed by different privacy legislation, making the collection, use and disclosure of personal information subject to different requirements or restrictions.

ELECTRIC VEHICLES

“The federal government’s multibillion-dollar commitments to zero-emission transit speak volumes about the social, economic and environmental value of accelerating electrification. Transit remains an essential backbone of Canadian communities,” - Josipa Petrunic, President & CEO of the Canadian Urban Transit Research and Innovation Consortium (CUTRIC).³⁰

Zero Emission Transit Fund

- Through the Zero Emission Transit Fund, the Government of Canada is investing \$2.75 billion over five years, starting in 2021, to support public transit and school bus operators plan for electrification, support the purchase of 5,000

30 CISION, “Upcoming CUTRIC conference builds on zero-emission transit’s multibillion-dollar momentum” (February 3, 2022), online: <<https://www.newswire.ca/news-releases/upcoming-cutric-conference-builds-on-zero-emission-transit-s-multibillion-dollar-momentum-800962962.html>>.



zero emission buses and build supporting infrastructure, including charging infrastructure and facility upgrades.³¹

- Infrastructure Canada and the Canada Infrastructure Bank will work in collaboration in order to support the transition to zero emission buses.
- Through the Zero Emission Transit Fund, Infrastructure Canada provides funding contributions to support planning and capital projects that will reduce the barriers to procuring zero emission transit and school buses in Canada.
- Through its \$1.5 billion [Zero Emission Bus initiative](#), the Canada Infrastructure Bank provides flexible financing solutions by leveraging forecasted lifecycle operational cost savings to help offset the higher upfront costs of zero emission buses.³²
- Government of Canada has invested more than \$1 billion in measures to support increasing zero-emission vehicle adoption, including:
 - Providing \$587 million towards Transport Canada’s [Incentives for Zero-Emission Vehicles program](#), which has helped over 92,000 Canadians and Canadian businesses make the switch to zero-emission vehicles; and

- Providing more than \$460 million to support the build out of a coast-to-coast network of electric vehicle fast chargers, electric vehicle chargers where Canadians live, work and play, natural gas stations along key freight corridors, and hydrogen stations in metropolitan centres. To date these investments have supported projects that will result in more than 16,500 new electric vehicle chargers, 10 hydrogen stations, and 20 natural gas stations.
- The \$8 billion [Strategic Innovation Fund](#) - Net Zero Accelerator is advancing projects that will help decarbonize heavy industry, support clean technologies and help meaningfully accelerate domestic greenhouse gas emissions reductions by 2030, including in the auto-manufacturing sector.
- The Government of Canada is making investments to support the transformation towards electrification, including \$295 million to the Ford Motor Company of Canada’s \$1.8 billion project to build electric vehicles at its Oakville Assembly Complex.³³

Driving Prosperity: Ontario’s Automotive Plan

“The recently launched Phase 2 of that ambitious plan underscores our government’s continued commitment help grow Ontario’s auto sector and secure new investments in electric vehicles and battery manufacturing and position Ontario as a North American automotive innovation hub.” - Victor Fedeli, Ontario Minister of Economic Development, Job Creation and Trade.³⁴

In November 2021, Ontario launched Phase 2 of the Driving Prosperity: Ontario’s Automotive Plan, which focuses on supporting market-driven momentum by bolstering the auto ecosystem and supply chain to support the continued pivot to electric, low-carbon, connected and autonomous vehicles. Building on the success of Phase 1, Phase 2 focuses on transforming the auto sector by building **electric, autonomous** and **connected** vehicles and supporting a broader supply chain that includes the exploration, mining and production of critical minerals for the fabrication of electric batteries in Ontario.³⁵

Ontario Vehicle Innovation Network (OVIN)

Fueled by a \$56.4 million investment over the next four years, OVIN will create a new, regionally diverse network that incorporates electric and low-carbon vehicle technologies into its existing mandate of connected and autonomous vehicles. OVIN will support innovation and transformation within Ontario’s auto tech system through:

- **R&D Partnership Fund:** focused on electric vehicles (EV), connected and autonomous vehicles (C/AV) and WinterTech (a development stream to create a testbed for mobility products and services in severe winter weather conditions). The fund will include support for electric and low-carbon vehicle technology development projects that involve collaborations between small and medium-sized enterprise and eligible partners, including automakers, global firms and municipalities.
- **Regional Technology Development Sites:** located across Ontario and centered on local innovation. A new Northern Ontario site will be established with a focus on EV battery technologies and to increase collaborations with the mineral sector.
- **Talent Development program:** continuing to support internship and fellowship opportunities for Ontario companies working on next-generation vehicles.
- **Central Hub:** will connect and coordinate Ontario’s EV and C/AV ecosystems to attract and create partnerships as well as provide networking opportunities, including for EV-related sectors.³⁶

Previously, the Canadian Urban Transit Research and Innovation Consortium (CUTRIC) received over \$1 million in funding from its partners and the federal government to establish the National Academic Cluster for Smart Vehicles (NAC-SV). They are working to standardize the technology needed to use in transit and mass-mobility and are hoping to achieve multi-manufacturer interoperability to allow cities and transit agencies more choice in the autonomous shuttles and suppliers that they are using.³⁷

31 Infrastructure Canada, “Zero Emission Transit Fund”, online: <<https://www.infrastructure.gc.ca/zero-emissions-trans-zero-emissions/index-eng.html>>.

32 Ibid.

33 Transport Canada, “Building a green economy: Government of Canada to require 100% of car and passenger truck sales be zero-emission by 2035 in Canada”, News release (June 29, 2021), online: <<https://www.canada.ca/en/transport-canada/news/2021/06/building-a-green-economy-government-of-canada-to-require-100-of-car-and-passenger-truck-sales-be-zero-emission-by-2035-in-canada.html>>.

34 Budget 2021, “Stronger BC for everyone”, online (pdf): <https://www.bcbudget.gov.bc.ca/2021/pdf/2021_Highlights.pdf>, at 7.

35 Government of Ontario, “Driving Prosperity: Ontario’s Automotive Plan - Phase 2”, online (pdf): <<https://files.ontario.ca/medjct-driving-prosperity-ontario-automotive-plan-phase-2-en-2021-11-23.pdf>> at 4.

36 Government of Ontario, “Ontario Vehicle Innovation Network (OVIN)”, online: <<https://www.ontario.ca/page/driving-prosperity-future-ontarios-automotive-sector>>.

37 CUTRIC, “Cutric Partners Launch the First Research Group on Smart and Autonomous Vehicles” (March 5, 2020), online: <<https://cutric-crituc.org/cutric-partners-launch-the-first-research-group-on-smart-and-autonomous-vehicles/>>.

Driving forces

With world-class post-secondary institutions, a large and diverse talent pool and R&D and testing facilities like Area X.O and GM's CTC McLaughlin Advanced Technology Track (CTC MATT), acceleration for autonomous vehicles is building in Ontario.

SPOTLIGHTS: 10 SELF-DRIVING VEHICLE COMPANIES TO WATCH IN 2021:³⁸

1. **Acerta** turns complex product data into actionable insights for automotive and off-highway vehicle manufacturers.
2. **AutoGuardian by SmartCone** makes cities safer and smarter.
3. **Cyberworks Robotics** makes fully autonomous vehicles a reality.
4. **Gatik** spearheads autonomous middle-mile delivery.
5. **LeddarTech** Delivering ADAS and AD Sensing Solutions.
6. **NuPort Robotics** simplifies short-haul shuttle runs.
7. **Provectus Robotics Solutions** turns any vehicle autonomous.
8. **Sensor Cortek** improves safety for autonomous vehicles.
9. **Untether AI** builds innovative AI chips.
10. **Waabi** revolutionizes autonomous vehicle technology.

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China

Despite the COVID-19 Pandemic effects on business, the autonomous vehicle industry in China is strong.

In the past two years, China's autonomous driving industry has seen a record of new developments. Chinese government authorities are also introducing regulations and policies to promote the development of the industry and support autonomous vehicle developers to conduct more tests. The strong support from government undoubtedly provides more opportunities for the development of this industry.

According to Xinhua News Agency, China's provinces and cities have enacted provided more regulations and test demonstration zones related to driverless vehicles, with more than 3,500-kilometers of test roads. At the same time, many leading enterprises such as AutoX, Baidu, Deeproute.ai, DiDi, Momenta, Pony.ai etc. have engaged into the field of autonomous vehicle in China. Each of them has developed relevant products and conducted road tests to different degrees.

According to experts in the industry, looking into the future, China is ready to take a big leap in the field of autonomous vehicles in 2022 and beyond.

However, even if the attitude of the whole industry and the competent government departments is very positive, we must also pay attention to the difficulties that this industry may encounter in its development in China. For example, the road conditions in China are very complicated and, with current technology, driverless vehicles may only be concentrated in specific cities and roads, which means that the large-scale development of the industry is still limited. In addition, as of today, none of the cities in China have issued taxi licenses for unmanned robots to allow driverless cars to transport the public without a safe

operator. But taking autonomous robotaxi companies Waymo and Cruise in San Francisco as examples, some cities have already approved to conduct completely unmanned tests on public roads.

Regulatory developments and roadblocks

For the development of the driverless auto industry, the Chinese government has promoted regulations and policies by and large. Meanwhile, autonomous driving regulations vary among provinces and cities around China. This is mainly due to the following¹:

- The road conditions in China vary among cities. Even within one city, road quality situation can vary significantly. For instance, some can be found villages inside cities. Hence, the tests can only be carried out in specific places.
- Some local governments include intelligent transportation in local development strategy. Hence, in the absence of the corresponding laws and policies at the national level, they may informally approve enterprises to test driverless vehicles under their administration.
- To attract investment in related industries, some local governments provide incentives such as tax reduction, rent exemption and administration buildings. The policy subsidies can explain why companies in the autonomous vehicles sector mainly locate in cities with dramatic resources, such as Shenzhen, Guangzhou, Shanghai, and Suzhou.

According to Xinhua News Agency, as of January 2022, 27 provinces and cities in China have issued regulations on autonomous driving.

38 Invest Ontario, "10 Self-driving vehicle companies to watch in 2021", online: <<https://www.investontario.ca/spotlights/10-self-driving-vehicle-companies-watch-2021>>.

1 <https://techcrunch.com/2022/01/14/2021-robotaxi-china/>

FOCUS ON SHANGHAI

In 2022, the Shanghai authorities plan to adopt a series of measures to promote the development of autonomous driving technology, aiming at accelerating commercialization, by supporting companies such as Baidu and AutoX to speed up the Robotaxi service pilot in Shanghai. In Jiading District, Shanghai, the municipal government supports the operation of intelligent heavy trucks, intelligent public transportation, unmanned sanitation, and unmanned distribution. In the Pudong District of Shanghai, the government supports the legislation of driverless driving, where new progress can be expected in the development of autonomous industry due to the incentives from government supervision and policies.

At the national level, **we have sorted out the relevant policies and regulations of China in recent years in chronological order**, such as intelligent transportation, driverless driving, and personal information data collection.

- **In 2020**, the Ministry of Transport specially issued the Guiding Opinions on Promoting the Development and Application of Road Traffic Autopilot Technology.² This document expects that, by 2025, the research on the basic theory of autonomous driving will make positive progress and important breakthroughs will be made in key technologies such as intelligent road infrastructure, vehicle-road coordination and product development and test verification. It introduced several substantial standards for autonomous driving. A number of national-level autopilot test bases and pilot application demonstration projects have been built to realize large-scale application in some scenarios and promote the industrialization of autopilot technology.
- **2021** was the first year of the 14th Five-Year Plan, whose outline proposes to speed up the construction of a transportation power. Wang

Zhiqing, deputy minister of the Ministry of Transport, said that to be a powerful country in transportation, it is vital to strengthen overall planning, integration, and connectivity.

- **In January 2021**, a three-year action plan issued by this department also put forward “cultivating and strengthening new modes and formats of transportation,” which showed the positive attitude of the Chinese government in developing various modes of transportation.
- **In August 2021**, China revised the regulations for driverless vehicle testing, allowing qualified companies to conduct self-driving car tests for passengers and goods on expressways and urban roads, to accelerate the commercialization of self-driving technology.
- **In 2021**, China promulgated relevant policies. **From January 1, 2022**, two restrictions on foreign capital investments have been cancelled. One is the restriction on the ratio of foreign shares in passenger car manufacturing. The other is two or less joint ventures in China by the same foreign company to produce similar vehicle products in automobile manufacturing.
- **In February 2020**, the National Development and Reform Commission (NDRC) and 11 national ministries and commissions jointly issued the “Strategy of Smart Car Innovation and Development.” **The strategy outlines the vision of realizing conditional large-scale production of smart cars in 2025 and fully building China’s standard smart car system in 2035.** It also indicates the main tasks of smart car development, such as developing core technologies, improving infrastructure construction, and perfecting relevant laws and regulations. Moreover, the document announces safeguard measures such as strengthening organization and implementation and improving complementary policies. The strategy shows the determination and direction of developing smart cars at the national central level, which is conducive to the development of the

smart car industry chain. **In early 2022**, the NDRC researched the implementation of the strategy.

Driverless testing and deployment

As mentioned, according to Xinhua News Agency, China has set up 16 self-driving demonstration zones with more than 3,500 kilometers of testing roads. It is worth noting that, in the past two years, China’s autonomous vehicle industry has experienced explosive growth and the emergence of many start-ups with a focus on developing driverless vehicle technology. These entities hope to get support as soon as possible so that current technologies can be commercialized.

SEEKING INDUSTRIAL COMMERCIALIZATION

As Wu Gansha, Chairman and CEO of Chinese self-driving start-up UISEE said, “commercialization” is a hot topic in this industry, at present, and every enterprise is seeking to establish a firm foothold in the industry or related industries.

Since 2021, self-driving vehicles in China have been experimental. All L2-L4 self-driving vehicles, however, have been moving toward a closed road test site and the real urban road.

Among those self-driving vehicles, Robots and Robotaxi are the two directly open to the public.

Meanwhile, we can also find unmanned transportation aimed at serving the logistics industry to solve “last mile” challenges, as well as other industries with operations in closed process, such as ports and mines. Another type of vehicle under discussion is unmanned trucks with an emphasis on logistics and sanitation trucks with fixed routines in certain communities.³

- **RoboBUS:** Unmanned vehicle companies include Baidu, UISEE, Yizhou Zhihang, among others. Some traditional bus manufacturers such as

Yutong Bus and King long Bus are making multi-line layout as well.

- **Robotaxi:** Leading companies include Baidu, Pony.ai, DiDi, T3 Travel, WeRide, DEEPROUTE.ai and AutoX. In November 2021, Baidu and Pony.ai were authorized to launch the service of paid driverless taxis. Take Beijing as an example, within the 60 square kilometers of the Beijing Economic and Technological Development Zone, Baidu has set up more than 600 pick-up and drop-off points and invested 67 vehicles. This is the first commercial deployment of Baidu Apollo Go service on the open road.⁴
- **Unmanned vehicles in the park:** Unmanned vehicles from HUAWEI, Alibaba, Meituan and JD.COM have started large scale deployment in the park and business district, making short-distance automatic driving transportation possible.
- **Robotruck:** At present, the industry is developing from L2 and L3 to L4 and L5. Unmanned mainline logistics trucks including Faw Jiefang Automotive Company, DFCV (DONGFENG Commercial Vehicle Co., Ltd and CNHTC (China National Heavy-Duty Truck (Group Corp.)) are all exploring the commercial operation. In the L4 and L5 stages, some companies with expertise also started to collaborate with each other. For example, ALLRIDE.AI and Freetech Intelligent Systems Co., Ltd. have reached a strategic cooperation to develop high-level self-driving heavy trucks with the prerequisite of mass production, drawing synergies from each other.

Wu Gansha said that the company will further actively explore other sub-sectors suitable for the application of autonomous driving. Robot delivery, intelligent public transportation, industrial production, and other areas are all considered as effective ways to obtain more data for improving intelligent driving technology so as to ensure safety.

2 Guidance of the Ministry of transport on promoting the development and application of road traffic automatic driving technology 2020 124. http://www.gov.cn/zhengce/zhengceku/2020-12/30/content_5575422.htm

3 <https://baijiahao.baidu.com/s?id=1720641056032925939&wfr=spider&for=pc>
4 SAIC officially announced that its L4 autopilot operation platform, Xiangdao Robotaxi, started operation and was officially launched in Jiading, Shanghai. In 2022, Xiangdao Robotaxi plans to land in Shenzhen, realizing the overall fleet size of 200 units.

In terms of market scale:

- Data indicates the scale of China’s smart car market increased from 49 billion yuan in 2016 to 170.2 billion yuan in 2019, with a compound annual growth rate of 35.76%.
- The China Commercial Industry Research Institute predicts that the scale of China’s smart car market will reach 289.4 billion yuan in 2022.
- Since 2021, the orders of automobile brands such as UISEE have been rising as expected, showing great potential for China’s smart car industry.

As for technique aspect, V2X technology, which is closely related to unmanned driving, is also being developed further. V2X (Vehicle-to-Everything) is mainly used to enable the communication between vehicles and base stations, thereby obtaining a series of traffic information such as real-time road conditions, road information, pedestrian information and the alike, further improving driving safety, reducing congestion, improving traffic efficiency, providing in-vehicle entertainment information and so on.

- Data shows that the market size of China’s V2X industry increased from five billion yuan to 20 billion yuan in 2017-2019. It is predicted that in 2022, the market scale of V2X industry in China will reach 50 billion yuan.

Connected vehicles and logistics

DATA PRIVACY

In 2022, Zhu Huarong, deputy of National People’s Congress and chairman of Chang’an Automobile (000625), proposed that to promote the development of intelligent connected vehicles, it is necessary to pay attention to the safety of automobile data and privacy.

At present, the authorities have formulated the following policies and regulations on the important topics of user privacy protection involved in the industry:

- **In 2022**, the Ministry of Industry and Information Technology issued the “Guidelines for the Construction of Internet of Vehicles Network Security and Data Security Standard System,” proposing that by the end of 2023, the network security and data security standard system of Internet of Vehicles should be initially established. By 2025, it is necessary to form a relatively complete network security and data security standard system for the Internet of Vehicles. The release of this policy further clarified the importance of protecting the data and privacy of intelligent connected vehicles.
- **On August 20, 2021**, China issued a pilot guide for automobile data protection to protect drivers’ privacy and safeguard national security. One of the drafters of the guide, a senior official of China’s National Internet Information Office, said, “The guide pays equal attention to safety and development.” The purpose of the guide is to “reduce disorderly collection and illegal use but encourage its effective use to promote the healthy development of the industry.”
- On the same day, the Personal Information Protection Law was passed at the 30th meeting of the Standing Committee of the 13th National People’s Congress, which provided clear standards for the key data collection of driverless technology, such as legality, necessity, ensuring the security of data involving customers’ personal privacy, etc., and brought certain protection to consumers’ rights. According to this legislation, consumers have the full right to know and freely express their willingness to provide personal information.
- The Data Security Law, which was implemented on **September 1, 2021**, has pushed China into a stage of legitimizing the digital economy. The protection of national data security involved in this law is an important reason for Didi to delist from the US on December 3, 2021.

Meanwhile, Zhu pointed out that China still lacked specific regulations related to automobile data security and privacy protection, and the responsible parties are not clear. Under this circumstance, he suggested further improvement on relevant laws

and regulations to adapt to the development of new industries such as connected autonomous vehicles. At the same time, it is suggested that the government should strengthen guidance, formulate unified industry standards, speed up industry cooperation, and break data barriers. Some suggest the government should establish reliable automobile data circulation channels, so that the development of intelligent connected automobiles can comply with data security requirements.

5G

5G communication plays an essential role in the auto industry. At present, the standardization work of 5G-Advanced has officially started. 5G-A is considered as the middle stage of the evolution to 6G, while R18 is the first important version of 5G-A. Wang Dan, a reporter of China Mobile’s 3 GPP XRM, said that further maturity in 5G technology and mobile communication will achieve lower latency, contribute to artificial intelligence and build an effective network.

5G is undoubtedly great news for intelligent driving technology. Nokia Bertrop and other executives in the automotive and mobile industry confirmed the significance of 5G for this industry.

Imagine a road full of vehicles and pedestrians. The automatic traffic management system will collect the data transmitted by these objects and send all relevant information to self-driving cars. Each vehicle will combine these inputs with its own sensors to decide its next action. Proceeding information without delay is necessary considering the real, complicated traffic conditions. That explains the belief in 5G technology ⁵.

The automobile wireless communication module has been clearly applied and played an important role. With the vigorous development of intelligent networked cars, Chinese enterprises are looking for a foothold in the field of wireless communication modules to accelerate the layout of the international automobile market.

Chinese communication module manufacturers are developing rapidly in the market of automobile wireless, including Quectel, Fibocom, GosuncnWelink, Huawei, Neoway Technology, Sun Sea Aiot Technology (Sim com Wireless Solutions), Meg Smart Technology, etc. Chinese automobile wireless communication module suppliers are competitive to their foreign counterparts in technology, industrial chain, product competitiveness and capital attraction.⁶

- **Automotive-grade 5G module:** Quectel’s 5G module AG55xQ series empowered the implementation of more than thirty ‘5G+C-V2X’ projects from automotive clients. Additionally, Gosuncn Welink rolled out the world’s first commercial automotive-grade 5G+C-V2X module–GM860A in LGA package with the smallest size in the industry, as well as vehicle 5G modules–860A-CIAG and 860A-C1AX.
- 1 Quectel’s Hefei base has been operational, and its Changzhou base will be in full operation in 2022. The Guangzhou base of GosuncnWelink will also come into operation in 2022. The the Zhuhai base of Sunsea AIoT Technology commenced construction in June 2020 and has already been in partial production and will become fully operational in 2022.
- **Foreign tier 1 customers:** Quectel serves a total of over 60 tier 1 suppliers around the globe. Fibocom taps into the international market through the acquisition of Sierra Wireless automotive operations. GosuncnWelink has such clients as Bosch, Continental, Yanfeng Visteon, Pioneer, Hyundai Mobis, and cover the aftermarket OBD, etc.

China’s vehicle communication module is evolving towards the integration of 5G, C-V2X, GNSS and smart antenna. The Strategy of Intelligent Vehicle Development and Innovation (released by ten ministries and commissions including National

5 Zhiche Technique <https://www.zhihu.com/question/359947599/answer/965449668>
6 <https://www.globenewswire.com/news-release/2022/02/11/2383658/0/en/Global-and-China-Automotive-Wireless-Communication-Module-Market-Report-2022.html>

Development and Reform Commission in February 2020) emphasizes three aspects, which are the cooperation among infrastructures for vehicle intelligence; and cooperation with 5G construction.

ELECTRIC VEHICLES

- In January 2021, the International Clean Transportation Committee (ICCT) and China Electric Vehicle committee jointly released “Review and Future Prospect of China Electric Vehicle Development.”⁷

From the overall market performance, in just ten years, China has developed and cultivated the world’s largest electric vehicle consumer market.

Meanwhile, it has become the world’s largest electric vehicle producer.

- **In the past decade**, China’s cumulative sales of electric vehicles accounted for 47% of the global total. In terms of urban pilot projects, China has also achieved great success with the cumulative scale of the urban electric vehicle market leading the world.
- **In 2019**, most of the most advanced electric vehicle cities in the world were Chinese cities.
- **In the first half of 2020**, China was overtaken by Europe, in order to meet emissions standards for carbon dioxide (CO 2) in 2021 and avoid the “sky-high,” fine of hundreds of millions of euros. European automobile manufacturers introduced more than 30 new electric vehicles to the market in the second half of 2019.

At present, China has already formed a relatively perfect battery supply chain system. China leads the United States and Europe in the supply of key raw materials for product development and production. While there are still areas where China lags behind other countries in the technological development of advanced components, such as semiconductors, the gap is narrowing.

Secondly, China’s electric vehicles have shifted from public transportation to mainstream passenger cars and SUV market segments, but China’s commercial vehicles are still dominated by fuel vehicles, and electric commercial vehicles are still at the initial stage.

Finally, in terms of electric vehicle and battery technology, China is approaching international standards, though it has not been accepted by the global market yet. In 2019, less than one percent of the electric vehicles produced in China were sold to the rest of the world.

Driving forces

At present, fast-developing companies including AutoX, Baidu, Deeproute.ai, Didi, Momenta, Pony.ai and WeRide have completed many road tests and obtained many road-test licenses. These companies also act as agents of road test vehicles.⁸

For example, Baidu currently has a road test mileage of more than 21 million kilometers (the deadline was December 2021), more than 300 road test licenses and more than 500 road test vehicles. Its road tests were carried out in more than 30 cities including Beijing, Changsha, Shanghai, Dalian and Chongqing. In California, Beijing, Changsha and Cangzhou, Baidu did not have a license for road test but had a license for manned demonstration and obtained pilot licenses in commercial services.

Meanwhile, the road test mileage of WeRide exceeds eight million kilometers (the deadline was December 2021), with more than 24 road test licenses and more than 200 road test vehicles. The road tests were mainly in Guangzhou and Wuhan, with authorization from California and Guangzhou unmanned test licenses and manned demonstration operation licenses (data from official website).

AUTOX

- AutoX is headquartered in Shenzhen and its R&D center in California. It was founded by Xiao Jianxiong, a former Princeton University professor, in 2016. This company’s investors include Alibaba, MediaTek and SAIC, a Chinese state-owned automobile manufacturer.
- **In August 2020**, AutoX began to provide self-driving taxis to the public in Jiading, Shanghai. Users can book their itinerary through Alibaba’s Gaode navigation map, which AutoX said was the “first time” that the self-driving taxi service was launched on China’s major taxi-hailing platforms.
- **In January 2021**, AutoX launched the driverless taxi service in Pingshan, Shenzhen, which is an industrial zone that is reshaping itself into a “smart city.” In November 2021, AutoX said that the plan has covered the entire 168 square kilometers of Pingshan Mountain, which is almost three times the size of Manhattan. In December of the same year, AutoX announced that it would “test” a fleet of 25 driverless cars on public roads in Shenzhen.

BAIDU- APOLLO GO

- Apollo Go is the autonomous driving frontier of Baidu, the search engine giant. This Beijing-based Internet company was founded in 2000. Baidu launched the autopilot department at the end of 2015, and almost at the same time, most of its start-up competitors were born.
- **In November 2021**, Apollo Go was authorized in Beijing’s “China’s first commercial autopilot demonstration zone” to provide paid robo-taxi service. A fleet of 67 cars monitored by in-car safety drivers is Apollo Go’s “first commercial deployment” on open roads. This service can be accessed by Apollo Go’s application and runs from 7:00 am to 10:00 pm every day.



- Apollo Go participated in China’s “First Commercial Robot Taxi Demonstration Zone,” which is located in the suburb of Yizhuang, Beijing, and covers an area of 60 km². Industry giants including JD.COM and Meituan also conducted tests in this area in 2021.

PONY.AI

- **Pony was founded in 2016** by two senior officers from Baidu’s self-driving car department. The team has some of the most famous self-driving car experts in China. The company has offices in Guangzhou and California and, with the support of Toyota, has raised more than one billion USD.
- In addition to Baidu, **Pony was also approved in November 2021** to operate paid self-driving taxi service in Beijing Smart Car Demonstration Zone. This service is called PonyPilot+, which transports passengers in the same area for free.
- **In July of the same year**, PonyPilot+ made its debut in Jiading, Shanghai Auto Center. In June this year, Pony added completely driverless cars to Guangzhou’s self-driving taxi fleet.

7 Investment Analysis and Prospect Forecast Report of China’s Electric Vehicle Industry from 2022 to 2026 (Volume One and Volume Two) http://www.ocn.com.cn/reports/20091038diandongqiche.shtml?origin=baidu_so&bd_vid=9051735833140572335
8 <https://techcrunch.com/2022/01/14/2021-robotaxi-china/>

WERIDE

- WeRide and Pony.ai have many common roots. Both companies have bases in Guangzhou and California, and the founders are all from Baidu Autopilot Team. **WeRide was founded in 2017 and raised more than 600 million US dollars in 2021 alone.** Its investors include state-owned Guangzhou Automobile Group and Renault-Nissan-Mitsubishi.
- In November 2019, this company’s driverless taxi began to provide transport to the public within 144 square kilometers of Guangzhou. The service is in cooperation with the government owned Baiyun Taxi Group, which is the largest taxi company in South China.
- From the very beginning, the company was able to charge passengers at the same rate as Guangzhou taxi service. This attempt in paid service was much earlier than Baidu and Pony’s paid service in Beijing.

MEET THE AUTHOR



Germany

Regulatory developments and roadblocks

TRANSPORT AUTHORITIES

Germany, home to several leading automotive companies, is a leader in autonomous transportation. **The Federal Ministry for Digital and Transport** (BMDV)), a supreme federal authority of Germany is among the leading institutions on autonomous vehicles in the world. The Ministry, together with its subordinate authorities, carries out departmental tasks in the fields of mobility of persons, goods and data. This responsibility includes the federal transportation infrastructure (federal trunk roads, railway networks, waterways and air traffic routes).

The highest state authorities in the field of transport are the Ministry of the Interior, Sport and Integration and the Ministry of Housing, Construction and Transport. In addition, there are several road traffic authorities that are engaged in the Road Traffic Regulations (StVO), the Holiday Travel Ordinance and the Federal Emission Control Act. They are the:

- Municipalities belonging to the district (local road traffic authorities).
- District authorities and municipalities in their own right (lower road traffic authorities).
- Governments (higher road authorities).
- State Ministry of the Interior, for Sport and Integration (Supreme Road Administration).

By way of background, the Federal Motor Transport Authority (KBA) was established by law on August 4, 1951, as the federal authority for road traffic. It belongs to the division of the Federal Ministry of Transport and Digital Infrastructure and sees itself as a service provider for motor vehicles and their users. In Germany, the KBA is the only type approval

authority. Type approvals confirm that the legal safety and environmental standards as they relate to transportation are fulfilled. In addition, there are other type approvals required via the European Economic Area (EEA) and ECE regulations. The KBA informs other contracting states and national official monitoring organizations (sections 19 and 29 Road Traffic Licensing Regulations (StVZO)) of type approvals granted.

With the type approval, the authority confirms that the serially manufactured approved product meets legal standards. Type approvals stand for safe and environmentally friendly technology on the roads.

- Vehicle type approvals can be granted in accordance with national regulations (section 20 StVZO) or EC regulations (Directives 2002/24/EC, 2003/37/EC or 2007/46/EC).
- Component type approvals can be granted in accordance with national regulations (§§ 22 or 22a StVZO), EU regulations (EC directives and regulations, EU regulations) and UNECE regulations (ECE regulations).
- Type approvals for systems can be granted in accordance with EU regulations (EC directives and regulations, EU regulations) and UNECE regulations (ECE regulations).

In Germany, the Road Traffic Authority is the administrative authority, determined by state law in accordance with section 44 Road Traffic Regulations (StVO), responsible for monitoring and implementing the Road Traffic Regulations. The Road Transport Authority is not an independent organizational unit but is part of the local municipal administration (city administration or, in municipalities with a smaller population, the district administration).

Finally, in Germany, the motor vehicle registration office (and the driving license authority) may be assigned to the office that also assumes the task



of the road traffic authority, but this does not necessarily have to be the case.

Each of the aforementioned institutions plays a role in approving and regulating autonomous vehicle testing and deployment.

But how is Germany as a whole approaching this new age and the new prosperity that may come with it? On which path will the country in the heart of Europe move towards a new age? The principle that modern mobility is a key to future prosperity has motivated the federal government to place the task of promoting this prosperity at the center of political action. To that end, the Federal Ministry for Digital and Transport (BMDV)) has been given the important task of ensuring that key players from industry, research, associations, administration and politics work together to produce solutions that are viable Germany and the German society as a whole, a tech hub and leading automotive country.

The coalition agreement for the current legislative period already provides for various measures to create modern, barrier-free, sustainable and affordable mobility. It is expected that the BMVI will therefore continue to advocate for the creation of optimal framework conditions for the introduction of automated and connected driving systems (ACD) into the regular operation of road traffic in the new legislative period.

For years, the BMVI has been working to make Germany fit for the future in terms of modern mobility. For example, since 2013 the federal ministry has established the Automated Driving Round Table (RTAF) as an advisory body. It facilitates a close

exchange among actors from industry, science, associations and administration. The necessary know-how is bundled in such a way that a broad social consensus can be reached on all relevant aspects of ACD. The RTAF meets twice a year and has developed the necessary cornerstones for a successful introduction of ACD, which formed the basis for the federal government's "Strategy for automated and connected driving-remain the lead provider, become the lead market, initiate regular operation." (ACD strategy).

The ACD strategy was adopted by the German federal government in 2015. To ensure a fast and successful realization of the strategy, the objectives have been implemented with targeted measures in the fields of infrastructure, law, promotion of innovation, connectivity, cybersecurity and data protection, and social dialogue.

Unfortunately, however, it must be noted that the economy is still skeptical. Generally, German politicians, on all state levels, and the German auto industry do not think far enough ahead. They fail to recognize that the autonomous car is not only about driverless mobility, but also about an energy and traffic revolution. So far, the United States has understood this better than Germany and threatens to move ahead of Germany in this space. For example, to improve the safety of cars driving autonomously, chip manufacturer Qualcomm is calling for clear political guidelines for carmakers and suppliers. This involves the use of technologies so that vehicles from different manufacturers can communicate with each other. "The role of the regulatory authorities is central here," technology head Matthew Grob told the German Press Agency. "They have to announce by what date how many percent of autonomous cars must have this technology." In the same way, safety belts and airbags have also been made compulsory for all manufacturers.

Although Germany thus has a national strategy for AVs and plans for using them ethically, the country's federal structure may threaten consistency at the country level. **So far, the main results of the federal government's implementation strategy have been:**

- Adaptation of the national legal framework, in particular the amendment of the Road Transport Act.
- Adoption of an action plan to establish ethical rules for driving computers.
- Establishment and coordination of test fields for automated and connected driving in real traffic.
- Supporting the research and development of ACD solutions from basic to applied research.
- Active design of regulations and standards in committees at European and international level.

Through these measures, Germany has thus achieved an international pioneering role in creating the framework conditions for automated and connected driving (ACD), and these must be maintained and further expanded.

Automated driving is a cross-border issue, especially in Europe. On an international level, much has been done and actively led by Germany, most notably:

2015

A G7 declaration on automated and connected driving.

2016

National Development and Reform Commission launched the national innovative development strategy of intelligent vehicles.

A declaration of Amsterdam on self-driving and connected vehicles.

2017

A G7 declaration on cooperation for modern transport infrastructure and advanced technologies in transport.

2018

A Joint Declaration of Intent on the Cooperation in the Area of Automated and Connected Driving between Germany and the People's Republic of China

INTERNATIONAL LAW

In understanding the emergence of rules for autonomous vehicle deployment a brief overview is required. Road traffic makes it possible to get from one place to another quickly and comfortably. In principle, the road network is not limited to the national area, but enables cross-border traffic and, for this reason, naturally affects the interests of several sovereign states at the same time. Furthermore, vehicles are not only produced in the state in which they will later operate, rather the automotive industry is characterized by imports and exports on a global market. Therefore, it is not surprising that international agreements were concluded with the intention of creating uniform traffic and registration rules for motor vehicles to guarantee the safety of road traffic across national borders.

One of these agreements is the "Vienna Convention on Road Traffic" (WÜ) of 08.11.1968, which is an international treaty obliging the contracting parties to adopt uniform traffic and licensing rules. Compliance with these provisions is a prerequisite for admission to international traffic (cf. Art. 3 para. 3 WÜ).

But there are also numerous regulations at the European level that are intended to standardize the automotive sector in the individual member states of the European Union. For example, according to Art. 4 para. 2 of Directive 2007/46/EC, member states may only grant approval for vehicles, systems, components or separate technical units if they comply with the requirements of this directive. Regarding these approval requirements, Art. 35 (1) Directive 2007/46/ EC refers inter alia to the UNECE regulations listed in Annex IV, Part II and declares them to be equivalent components of secondary community law. The abbreviation "ECE" is derived from the United Nations Economic Commission for Europe (UNECE).

On the basis of the Vehicle Parts Convention (ECE Regulations) (FTÜ), the contracting parties crafted ECE regulations for wheeled vehicles, equipment and parts that can be fitted to wheeled vehicles (cf. Art.1 para. 1 p.1 FTÜ) by means of an administrative committee to which all contracting parties belong,

in accordance with the procedural rules set out in Annex 1. This includes, for example, brake systems, steering systems or headlights. The contracting parties involved are the EU and, in addition to Germany, 46 other states. These ECE regulations, agreed based on the FTÜ, constitute a set of instruments designed to harmonize the international technical requirements for motor vehicles in order to remove barriers to trade in motor vehicles and their accessories. All contracting parties to the FTÜ may accept the individual provisions but are not obligated to do so. Where a contracting party has accepted a regulation, it shall be bound by international law, and shall undertake to register vehicles or parts approved, in accordance with the regulation in its own country.

For Germany, this recognition is standardized in section 21a Abs. 1 StVZO. To make the ECE regulations binding at a national level, they must be transposed into national law. In the case of countries of the EU, this is regularly done by approving the regulation in accordance with the requirements of Directive 2007/46/EC, which can be viewed in Annex IV, Part II, p. 2.

The ECE regulations now comprise more than 130 technical regulations which, in addition to systems and components for active and passive safety, also deal with environmentally relevant regulations. Both the EU and Germany have accepted most of these regulations.

These technical regulations have yet to be developed for autonomous and automated driving beyond assistance systems. However, this does not mean that such modern driving systems cannot be approved. Rather, they are permitted by way of exemptions, also for series production, and can then be offered on the market.

ROAD TRAFFIC LAW

Background

As part of administrative law, traffic law is concerned with regulating traffic on public roads in Germany in such a way that no road user is harmed,

endangered, obstructed or exasperated. It is not summarized in a single set of laws, but consists of several laws and ordinances, which are passed at the federal level and thus apply throughout Germany. Road traffic law in Germany is composed of the following laws and ordinances:

The Road Traffic Act (StVG) is overarching. It contains rules on penalties and fines and lays down the basis for driving licenses and the registration of vehicles. Otherwise, it authorizes the Federal Ministry of Transport and Digital Infrastructure (BMVI) to implement these general provisions more precisely by means of ordinances.

The Road Traffic Ordinance (StVO) is probably the most familiar aspect of traffic law and made up the majority of driving lessons for German students. In short, it includes all the traffic rules that must be observed on German roads.

In addition to the StVO, The Road Traffic Licensing Regulations (StVZO) define the conditions under which motor vehicles and trailers can be registered for road traffic. It sets out in detail how these vehicles must be constructed and how they may be operated. The StVZO is to be gradually replaced by the Vehicle Registration Ordinance (FZV). Up until now, the FZV has regulated precisely how the approval procedure should look, under which circumstances license plates are awarded, and which insurance coverage vehicles must have.

Finally, the driving license regulation (FeV) prescribes the conditions an individual must fulfill in order to obtain a driving license, and the circumstances under which this license may be withdrawn.

As it relates to regulations that address autonomous vehicles specifically, Germany has different regulations just as there are currently different regulations in the individual US states and in the individual EU member states. At the international level, there are several agreements that provide the legal framework for national road transport legislation. One of the most important is the aforementioned Vienna Convention on Road Traffic of 1968. Automated systems were unknown in 1968 and therefore not regulated. Regulations at

that time were based on a vehicle controlled by a human driver. Since the last change of the treaty in March 2016, automated systems have been allowed. However, fully autonomous (level 5) driving is not yet possible, as the agreement still provides for a driver.

Looking at the German legal situation, it becomes apparent that according to section 1a of the Road Traffic Act, there are no legal restrictions against highly and fully automated driving at least for level 3 (highly automated driving) and 4 (fully automated driving). However, the experts cannot achieve an unequivocal result regarding the specific obligations, as laid out in section 1b StVG. This does not apply to fully autonomous driving (level 5), which is why the legal experts assume that it is “still fundamentally inadmissible.” The absence of the possibility that a person in the vehicle could, if necessary, take over the control of the vehicle is not provided for in the text of the law. As such, level 5 autonomous driving is therefore not yet possible under German law either and initially requires further legislative steps.

In fact, the latest implemented right to enable levels 3 and 4 (except driverless/level 5 vehicles) is already in force. Sections 1a and b StVG regulate the interaction between the vehicle with the highly or fully automated driving function and the driver. The new law provides for the use and concept of highly and fully automated driving functions.

But with all these legal provisions and legal foundations presented – how can autonomous driving now be implemented in Germany in concrete terms?

Summary

In Germany, vehicles with a highly automated or fully automated systems may be used in traffic in such a way that the driver can hand over the vehicle control to the system in certain situations. The system takes over the longitudinal and lateral guidance of the vehicle as well as acceleration and deceleration for defined applications, or for a limited time period. The driver no longer has to monitor the system permanently. Oftentimes, the system alerts the driver visually and acoustically when the vehicle needs to be checked again manually.



The operation of vehicles by means of highly and fully automated driving function systems is only permitted within the framework of normal use, whereby the intended purpose depends on the design. If an automated driving function is only intended for use on motorways, the system must not be used for traffic on other roads. The binding system description of the vehicle by the driver manufacturer must provide the driver with unmistakable information on the scope of the intended use.

During operation of a highly or fully automated driving system, the driver is allowed to turn away from the traffic situation. Within the scope of the mandatory system description, the driver may take his hands off the steering wheel, look away from the road and carry out other activities, such as processing e-mails in the infotainment system. As mentioned above, the driver no longer has to monitor the system permanently. However, he must remain vigilant. The driver is obliged to resume the vehicle control immediately if he recognizes or should recognize due to obvious circumstances that the conditions for an intended use of the highly or fully automated driving functions no longer exist. The driver must remain so perceptive that he can grasp the situations regulated by law and then resume control of the vehicle.

However, this shows once again that the new law does not regulate fully autonomous driving where there are only passengers (i.e., level 5). There is still a legal need for regulatory action at national and international levels, and a possible need for technological development, as it relates to level 5 autonomy.

Overall, the German federal government welcomes further developments in the field of autonomous driving. Its aim is to strengthen the German economic position in this sector. In its “Strategy for Automated and Connected Driving,” which was formulated in 2015, Germany has set the goal of ensuring that Germany remains the “lead supplier for automated and connected vehicles” and becomes the “lead market” for this new technology. The introduction of autonomous vehicles into public road traffic is to be facilitated in particular, by adapting the legal situation.

In 2016, the federal government set up an ethics committee to be able to find answers to the full range of questions related to autonomous driving, especially to deal with legal and ethical issues. The panel consisted of 14 scientists and experts. In June 2017, the Ethics Committee adopted a final report with a total of 20 ethical rules. Among other things, it was stated that the protection of humans always has priority. The Ethics Committee has also rightly made high standards when it comes to data protection. These are being used today in the development of automated and autonomous systems. In total, three clear principles apply: transparency, self-determination and data security.

At present, as previously mentioned, high and fully automated level 3 and 4 driving are largely permissible in Germany. And although the COVID-19 pandemic and a change of government are currently pushing many political issues to the background, autonomous driving is being driven forward in Germany:

Summary of bill enabling level 4 autonomous driving in defined areas

Following a bill proposed by then Transport Minister Andreas Scheuer, the Autonomous Driving Act came into force in Germany in July 2021, enabling Level 4 autonomous driving in defined operating areas, such as traffic between logistics terminals. This legal framework puts Germany at the global forefront of the race among countries to create the best possible conditions for autonomous driving.

Among other things, the law regulates the following issues:

- Technical requirements for the construction, condition and equipment of motor vehicles with autonomous driving functions;
- Testing and procedures for the granting of an operating permit for motor vehicles with autonomous driving functions by the Federal Motor Transport Authority;
- Regulations relating to the obligations of persons involved in the operation of motor vehicles with autonomous driving functions;
- Regulations relating to data processing during the operation of motor vehicles with autonomous driving functions;
- Enabling the (subsequent) activation of automated and autonomous driving functions of already type-approved motor vehicles (“dormant functions”); and
- Furthermore, adapting and creating uniform regulations to enable the testing of automated and autonomous motor vehicles.

In **February 2022**, the German government took note of the ordinance submitted by the Federal Minister of Digital Affairs and Transport to regulate the operation of motor vehicles with automated and autonomous driving functions and to amend road traffic regulations, which completes the national legal framework for autonomous driving.

In addition to the technical regulations, such as the technical requirements for the construction, condition, equipment for motor vehicles with autonomous driving function, the core of the legal ordinance is the regulation of the procedure for the admission of motor vehicles with autonomous driving function to road traffic. In order to enable the regular operation of these vehicles in public road traffic in defined operating areas, no singular technical exemptions of the respective federal state are to be required.

The approval of the Bundesrat, the parliamentary chamber with representatives of the individual federal states, which is required for the ordinance to come into force, is considered certain.

With the newly created law on autonomous driving, Germany is underlining its intention to remain a global leader in the field of transport in the future. If the country manages to maintain this speed and openness to technology even after the change of government, the signs are good. The importance that politicians now generally attach to this topic for the future viability of Germany as a business location can be seen clearly in the following statements by the responsible representatives of the newly elected government:

Olaf Scholz

Chancellor of Germany

“Policymakers must be tougher, clearer and more demanding than before when it comes to digitization. I want a gigabit society. To achieve the climate targets, we need more innovative developments in transport, a modern electricity infrastructure and rapid digitization.”

Volker Wissing

Federal Minister of Transport

Germany must have the ambition to play in the “Champions League” digitally, Wissing said - and when it comes to autonomous driving, he even sees the Republic soon as “Number One in the World.” “I believe that we will be faster than China in this respect.”

Christian Lindner

Federal Minister of Finance

“Autonomous driving is a “gamechanger” that will change business models and pose new challenges for German automakers.

However, I am optimistic that German automakers will be leaders in autonomous driving.”

Driverless vehicle testing and deployment

With its strong automotive industry, Germany is naturally also a sought-after testing ground for autonomous vehicles. With the speed limit-free autobahn, high-speed driving can also be tested here without any problems.

As it relates specifically to the legal framework for the testing of autonomous vehicles in Germany, vehicles may only be operated on public roads according to section 3 Abs.1 S.1 FZV (Fahrzeugzulassungsverordnung) and only if they are registered. According to the Vienna Convention (WÜ), every vehicle must have a driver (Art. 8 para. 1 (WÜ) who must be able to intervene on request. From a liability perspective, the use of a so-called safety driver in testing vehicles and vehicle systems makes sense and is common practice. Test drivers must possess a valid driving license otherwise, no additional training is necessary, but possible and useful.

The approval of prototypes for testing on public roads by means of a special permit is governed by sections 19 ff. of the German Road Traffic Act. StVZO. The granting of permits must be obtained from the responsible Landratsamt and is based on section 20 StVZO for type approval and section 21 StVZO for individual approval. Until now, up to level 3 autonomous test vehicles can be approved.

The vehicle is tested for its suitability and safety for public road traffic within the framework of the approval procedure (i.e., it is checked whether the vehicle, its design or its equipment meets the construction and operating requirements of section 30 StVZO). With regard to safety, the focus is on whether, based on general life experience or scientific findings, it is sufficiently likely that public road traffic and other road users may be endangered.

If the requirements of sections 30-62 StVZO are fulfilled, the administrative authority grants approval and the vehicle is registered as a test vehicle. If the vehicle does not correspond to the regulations, an exception permission can be given over section 70 StVZO by the highest national authority under certain conditions. The companies may test these on the intended test tracks during a possible limited time-period. In general, all test vehicles must be tested on the designated test tracks (e.g., A9 Munich-Nuremberg).

Permission is also required for testing on the private premises, provided that these are accessible to everyone.

There are no special insurance requirements for autonomous vehicles which go beyond the motor vehicle liability insurance prescribed in section 4 PflVG (Pflichtversicherungsgesetz). However, it might be useful for the manufacturer to insure the test vehicle comprehensively in order to avoid possible liability issues, since the strong connectivity can also lead to completely new risks (e.g., cyber-attacks).

There are a few safety requirements that are important to note. As a minimum, requirement for functional safety, hardware, and software systems must separate vehicle functions from infotainment, telematics, and navigation applications. The control systems must contain sufficient redundancy. For example, safe holding must be ensured even in the event of a failure of the main control system. Suitable protection against external (cyber) attacks must be provided, as well as against manipulation of security-relevant elements.

At every stage of development, the vehicle must navigate at least as safely as if a human being controlled it. However, the possibilities of automated and autonomous driving must not be used to limit the autonomy of the road user elsewhere. An example could be a general speed limit that is “enforced” by the vehicle driving in strict compliance with the regulations. Data collection must not be used to

establish new restrictions and controls throughout the country (e.g., for recording driving times). Technological development as such will make traffic safer and reduce risks such as those posed by overtired drivers.

Finally, in regard of autonomous trucking, MAN Trucking and Hamburger Hafen und Logistik AG (HHLA) successfully completed the three-year practical test Hamburg TruckPilot in June 2021. This test and other possibilities, such as the testing of connected truck columns on the A7 highway, proved that the use of self-driving trucks is technologically feasible and can be efficiently integrated into logistics processes. The company is working to bring self-driving trucks to series production readiness from 2030 and emphasizes that the law on autonomous driving in Germany, which was passed in July 2021, provides optimal conditions for testing driverless trucks under real operating conditions.¹ As it relates to AV deployment, in principle, there are no provisions that restrict consumers from riding in autonomous vehicles. The operators, however, must observe a few points. Experience with automated shuttles was gathered in a series of pilot tests over the last few years. The experiments have so far taken place in “protected areas” both in large cities and in small towns.

All pilot projects must be applied for on a case-by-case basis. As soon as the automated vehicle (shuttle) is to be driven on public roads, it needs, in addition to the obligatory liability insurance, an “approval on the basis of an exemption permit” in accordance with section 70 of the Road Traffic Licensing Regulations (StVZO).

As soon as revenues are generated from the trial operation, an operating permit in accordance with the Passenger Transport Act is required.

Finally, in regard to autonomous robotaxis, an operating permit in accordance with the Passenger Transport Act is required, just as it is for a normal bus or taxi company.

LIABILITY

A significant question facing automated and autonomous driving is that of liability in the event of an accident. In Germany and in some other countries, the legal situation is clear because there is a three-pillar model consisting of driver, owner and manufacturer liability. The driver is responsible for the driving task and must always monitor the vehicle and intervene in the event of an emergency, for example in the case of semiautomated driving functions. If he fails to comply with his duties of care and thereby causes an accident, he shall be liable, in addition to the owner, for the damage thereby incurred. Additionally, the manufacturer may be liable under product and producer liability for damage caused by a product defect. This combination of driver, owner and manufacturer liability offers a balanced distribution of risk, ensures victim protection, and has proven itself in practice. The liability model is also a good basis for new systems and the next steps in automated driving.

Politicians were also concerned with the issue of liability in connection with autonomous driving from the outset:

Alexander Dobrindt

German politician of the Christian Social Union of Bavaria. Former Federal Minister of Transport and Digital Infrastructure in the government of Chancellor Angela Merkel.

When CSU politician Alexander Dobrindt was still Transport Minister, he had a simple solution to this complex problem: In the event of an accident with autonomous cars, he said, “the moment the computer takes over, liability passes to the manufacturer.”

Given that car manufacturers could be held responsible, the car industry would do well to defend itself against accidents. In sum, are the driver, the owner, the car manufacturer and the producers of the individual vehicle parts are potentially liable.

The insurance industry, which has been dealing with liability issues for robotic cars for months, has a different view. According to insurers, the owner would have to be liable even if he did not make a mistake. This corresponds to the current legal regulation. However, the insurance company may seek recourse from the manufacturer if the latter is liable for a failure of the driving system.

In the case of semi-autonomous vehicles, the driver is in any event an integral part of the liability regime. According to German law, he must be guilty of intent, negligence, or any other misconduct for liability.

As of late, discussions have taken place about updating the liability regime to cover autonomous vehicles more specifically, however, the previous liability regime of German civil law is regarded as sufficient.

Connected vehicles and logistics

DATA PRIVACY AND SECURITY

We live in a time in which more and more citizens are concerned about the data collection frenzy of companies. Some have even described data as the “oil of modern times.” It is important that the data generated during autonomous driving is secure.

The data collected by autonomous vehicles (location data, sensor data, etc.) is considered “personal data” as defined by the EU and Federal Data Protection Act (now BDSG) and as of May 2018, the EU Data Protection Regulation (GDPR). Such data can be traced back to the owner, driver or passenger, and identified as information about personal or actual circumstances of a person. Most of the data collected by modern cars is assigned to the vehicle identification number (VIN).

The collection, storage and use of personal data is permitted under data protection law if there is a justification for doing so or if the data subject has given his effective consent. Limiting requirements (data economy, scoring in accordance with section 31 BDSG 2018) must be observed for both mass collection and automated processing of personal data. Further

¹ <https://www.mantruckandbus.com/en/innovation/mans-full-commitment-to-autonomous-trucks.html>



restrictions apply to particularly sensitive data (e.g., information on health or ethnic origin, cf. Art. 9 EU-DSGVO). More than four decades ago, the Federal Constitutional Court put a stop to the creation of total personality profiles (profiling).

The DSGVO proposes two major documentation concepts, which must be presented at all costs, if only to prove legal conformity in the event of possible complaints:

- **The list of processing activities for customer data (formerly: procedure directory).** This list should be the central document in the company. It covers all typical processing steps (e.g., e-mail marketing, CRM, customer analysis, etc.) but also your payroll accounting or merchandise management system and the like and helps you to comply with your obligations.
- **Documentation of processing security (technical and organizational measures).** Customer and user data can be sensitive, which is why the legislature stipulates here that they must be well secured. It must document extensively which measures are in place to ensure that the data is safe in the enterprise and remain there.

Before collecting the data, the organization should make sure that all data is necessary and proportionate to the purpose for which it was collected.

The passing on or even the sale of user and customer data is not possible without further consideration of the following scenarios:

- Transfer/sale in the context of a complete company sale (since the responsible person does not change, there are no issues here).
- Disclosure/sale within the framework of an asset deal (consent of the affected parties may be necessary, further information can be found).
- Transfer of data within the scope of order processing (AV contract is necessary).
- Passing on data in third countries (e.g., Google Analytics, guarantees must be available).
- Transfer/sale for the purpose of address trading (as a rule, new consent necessary, insofar as not done in the collection of data).

Excluded from this are already publicly available data.

As is already the case under previous legislation, there is a right to information on the processing of personal data. Upon request, companies must provide information on data processing in a precise, transparent, comprehensible and easily accessible form in clear and simple language. This includes, for example, the storage period, the purpose for which the data are processed, which categories of personal data are processed, information on the origin of the data and possible recipients of the data.

A new feature is the right to a copy of the data. You can specifically request information about which personal data are processed by the responsible person (e.g., surname, first name, address, date of birth, profession, medical findings) and receive this in the form of a copy provided by the company.

Under certain circumstances, companies must delete data. This is the case, for example, when the data are processed unlawfully or are no longer needed for the original purpose for which they were collected.

Individuals may also request, under certain circumstances, that your data not be further processed. The data is therefore not deleted, but the data processor must block the data and cannot continue to use it as usual.

In an effort to address data security, the Act to Increase the Security of Information Technology Systems (IT Security Act), came into force in July 2015. Through this Act, the federal government intends to make Germany's IT systems and digital infrastructures the most secure in the world.

In addition, The Federal Office for Information Security (BSI), which is responsible for security in information technology in Germany, has numerous references to the correct protection of data on its homepage.

The IT Security Act requires that operators of critical infrastructures in certain areas will have to comply with a minimum standard of IT security and report significant IT security incidents to the BSI. For the information technology and telecommunications sector, which is also highly relevant for automated and autonomous driving, the Ordinance on the Determination of Critical Infrastructures under the BSI Act (BSI-KritisV) already defines the scope of application.

The transport and traffic sectors also fall within the scope of the IT Security Act. The first regulation amending the KRITIS Regulation of 21.6.2017 (BGBl. I, p. 1903) determines exactly which annexes are included. Part 3, plant categories and threshold values, point 1.4, lists the traffic control and guidance system for the federal motorway network,

as well as the traffic control and guidance system for municipal road traffic for cities with more than 500,000 inhabitants.

Even if this regulation is not yet directly aimed at (highly) automated or autonomous driving, it is already clear that a corresponding IT infrastructure will fall under the increased requirements of the IT Security Act.

TELECOMMUNICATIONS AND 5G

One of the most important basic requirements for automated and connected driving is telecommunications connectivity. Germany still has a way to go before it has a nationwide 5G network. Meanwhile, the rollout of 5G is progressing faster than expected. Last year, Telekom said it had upgraded around 45,000 antennas for 5G across Germany. More than 4,700 cities and communities are benefiting from the network rollout. The upgrade will continue in 2021. In January and February 2021, Telekom switched on 5G at 892 additional locations. At the end of 2021, the German Federal Network Agency, which is responsible for network expansion, reported that the rollout of 5G is making progress: more than 53 percent of Germany's surface area is already covered by the latest mobile communications standard. The expansion is expected to be completed to around 99% in 2025.

The auction of the 5G frequencies in the 3.6 gigahertz range by the Federal Network Agency began on March 19, 2019 and ended with 6.55 billion EUR offered in total by the four bidders. The coverage obligations for the licence winners include a requirement to supply speeds of a minimum of 100Mbps to at least 98% of households in each state by the end of 2022, as well as all federal highways, and the major roads and railways. Furthermore, each operator will have to set up 1,000 5G base stations by the end of 2022, in addition to 500 base stations in "white spot" unserved rural areas.

Some 2 GHz frequencies are also earmarked for 5G use but will only be available between 2020 and 2025. Right from the start, 60 5G antennas have been transmitting in more than 20 cities and communities.

It is unknown if the newly elected government has taken a position between using 5G networks for cellular vehicle-to-everything communication or dedicated short-range communication. DSRC technology is already being used in Germany for the digital truck tolling system. From a technical point of view, this communication is desirable, but not necessary for the current sensor acquisition of the data by operating level 3 vehicles.

Notably, spectrum is unregulated in Germany, unlike in Great Britain or France.

Driving forces

Several of Germany's powerful states are also working on AVs. Some examples are:

- **North Rhine Westphalia**, which includes Cologne and Düsseldorf, has established a Zukunftsnetz Mobilität (future of mobility) network to support municipalities, many with the promotion of AVs among its tasks.
- **Berlin** and **Brandenburg** (the state surrounding the capital) are both analyzing the market for research and development work on AVs.
- **Public transport providers in Berlin, Hamburg and Frankfurt**, as well as the national railway company **Deutsche Bahn AG**, are testing autonomous buses in a range of settings, and there are more than 20 AV test sites nationwide. Some say that the highly devolved nature of government with more than 11,000 municipalities makes it difficult to set national standards and strategy.
- A 9-kilometer test track for testing automated and connected vehicles (TAVF) is currently being built in downtown Hamburg. Funded by the BMVI, the city's infrastructure is being upgraded to enable I2V (Infrastructure to Vehicle) and V2I (Vehicle to Infrastructure). This will enable tests to be carried out in real public road traffic.
- Car manufacturer **Mercedes Benz** becomes the first manufacturer in the world to receive UN approval for a level 3 Autopilot in the new model S-Class. In Germany, the system can be

used on 13,191 kilometers of highway in traffic jam situations and up to a speed of 60km/h after the Road Traffic Act was opened up to level 3 systems.

- Car rental company **Sixt** and Intel subsidiary **Mobileye** plan to launch 25 robot cabs in Munich from 2022.
- **Volkswagen** is also testing self-driving prototypes in Bavaria. Volkswagen, for example, presented prototypes of an autonomously driving "Bulli" bus with electric drive at the last IAA. Initially, Volkswagen plans to test the technology with five upgraded ID.Buzz prototypes; series operation with such self-driving cab shuttles should then be possible from 2025.

COVID-19 IMPACT

COVID-19 related matters, a federal election held in the fall of 2021, and the formation of a new federal government under the leadership of the former Finance Minister Olaf Scholz have dominated politics and pushed other topics, such as autonomous driving, to the background. Consequently, there were no changes or significant progress in relation to transportation. However, Germany has already set an important course for the future of autonomous driving during the last legislative period.

Since the beginning of the pandemic, AV companies in Germany were able to survive the pandemic and the related economic tumult. However, many struggled with the decrease in sales and had to adjust production due to COVID-19 regulations such as the reduced number of employees in factories and employees on short time/reduced working hours during the past year. This ultimately led to a reduction in production as well as a slowdown in research and development regarding autonomous driving. However, after the last lockdowns and restrictions, the progressive vaccination status of the population, and the decline in the threat of overburdening the German healthcare system made it possible that production and sales quickly recovered. Projections are positive and despite the negative effects of COVID-19 during the last two years, autonomous driving efforts continued. Despite

the pandemic, the legal framework in Germany for autonomous driving has been renewed and numerous test opportunities have been continued or expanded. In addition, numerous initiatives from industry and on the part of car manufacturers, such as Robotaxis in Munich, have also been initiated.

A LOOK AT AUSTRIA

Germany is a country in the heart of Europe with correspondingly numerous and everyday border crossings. Austria in particular, as a vacation destination for many Germans and a transit country, plays a decisive role here. It is therefore worth taking a brief look at where the alpine republic currently stands in terms of autonomous mobility.

Austria is not tackling the issue as decisively as German policymakers. In particular, the insufficient legal framework is clearly criticized, especially by the business community. In March 2019, the Automated Driving Ordinance came into force, allowing cars to park themselves and engage assistance systems on the highway. The current legal situation also allows for the establishment of test regions for autonomous driving.

The ALP.Lab test region in Styria is one example. The road sections equipped with special sensor infrastructure are used by, among others, the Virtual Vehicle research center in Graz. This center has its own test vehicles (Autonomous Driving Demonstrators), which companies from all over the world can use to try out new vehicle technologies.

However, work is underway on an amendment to the Automated Driving Ordinance (AutomatFahrV). In the future, this should make it possible to test automated passenger vehicles (such as minibuses), freight transporters and automated machines. All tests will require a male or female driver to be in the driver's seat and should be possible up to a speed of 50km/h for safety purposes. In closed-off areas, such as a test site. It will also be possible to drive without a safety driver on board. Fully driverless vehicles in regular operation - as planned in Munich and mentioned above - will not be part of the amendment process.

This shows that the imminent change in the law will not be a great technological success and that Austria will not be able to close the gap to other European countries such as Germany or the Netherlands. If one follows statements by Austrian politicians, however, safety and technical maturity are more important to the country than a leading role in autonomous mobility.

MEET THE AUTHORS



Hungary

Regulatory developments and roadblocks

The key regulatory instruments remained unchanged in Hungary in the past few years. Testing of autonomous vehicles (AVs) on public roads is permitted; however a test driver with special qualifications must always be present to monitor the system and must be able to intervene if necessary. The implementation of modern technologies, such as 5G and electric vehicles, and the development of autonomous vehicles has the support of most Hungarian policymakers and key business figures.

The Minister of Technology and Innovation introduced the Artificial Intelligence Strategy of Hungary in 2020 for the next 10 years¹. The Strategy mostly contains general aims for developments in the field of artificial intelligence. The Strategy includes the aim to form a supporting research and development environment for the symbiotic development of all professions necessary for the creation of the self-driving ecosystem. The Strategy aims to further develop testing facilities of autonomous vehicles and integrate them into the European testing environment.

The lack of specific regulatory regimes for autonomous vehicles often dissuades further testing. In certain areas, like liability rules, in case of liability rules, the same regulations apply to all vehicles in testing phase, irrespective of the specific needs of autonomous vehicles. Fortunately, the COVID-19 pandemic did not affect the ongoing autonomous vehicles projects

Driverless testing and deployment

The primary testing location for driverless vehicles in Hungary is the 250 ha (617acre) ZalaZone test park in Zalaegerszeg, West-Hungary². The test park and its construction is highly supported by the Hungarian Government. The test park offers a wide range of test facilities, including a high-speed handling course, smart city zone, motorway section and a special zone for testing advanced driver-assistance systems. The test park is supported by Ericsson's 5G technology installed on the communication towers of Magyar Telekom. The ZalaZONE Automotive Proving Ground facility was recently awarded with an Excellent Research Infrastructure Certificate by the National Research, Development and Innovation Office of Hungary³.

The Hungarian Road Management Company (Magyar Közút Nonprofit Zrt.) has signed a collaboration agreement in 2019 with its Austrian and Slovenian counterparties to help each other's work of preparing for the appearance of collaborative, networked and autonomous vehicles.

The Hungarian-founded autonomous vehicle technology company, Almotive, has started road testing in Hungary with Toyota vehicles equipped with Almotive hardware and software⁴.

Connected vehicles and logistics

5G

In July 2019 – to fulfil the obligation stipulated in Directive (EU) 2018/1972 regarding 5G -, The National Media and Infocommunications Authority of Hungary organized an auction for 5G frequencies in the 700 MHz, 2100 MHz, 2600 MHz and 3600 MHz frequency bands. The bidding companies purchased frequency usage rights for 15 years in 3 frequency bands for a more than HUF 125 billion (approximately USD 350 million). The final results were published in 2020.

5G penetration in Hungary is still relatively low, not all providers offer the frequencies and the infrastructure is generally only available in bigger cities.

The use of 5G is highly promoted in the tests of autonomous solutions, however – with view to the relatively low availability – wide ranging tests could not yet be started. Apart from Budapest, the ZalaZone test park was the first location in the country to receive the infrastructure to allow for 5G testing.

DATA PRIVACY

With respect to data privacy in Hungary, the provisions of the General Data Protection Regulation (Regulation (EU) 2016/679) (GDPR) are directly applicable in Hungary. However, there are a number of areas where the GDPR permits Member States to enact national legislation. In the course of implementing the provisions of the GDPR, the Hungarian Parliament adopted an amendment to the Right of Informational Self-Determination and on Freedom of Information Act ("Hungarian Information Act"). Both of the provisions of GDPR and the Hungarian Information Act shall be taken into account in case there is a data processing activity in connection with autonomous vehicles. All data collected by autonomous vehicles is considered "personal data" as these data are information relating to an identified or identifiable natural person (e.g. location data).

According to the rules pertaining to autonomous vehicles for development purposes, such vehicles must be equipped with a data recording device, which shall collect the following data: (i) name of the test driver; (ii) information on whether the vehicle operates in a manual or in an automatic mode; (iii) speed of the vehicle; (iv) GPS coordinates; (v) operation of the lighting and light signaling devices; and (vi) usage of the audible warning device.

¹ <https://ai-hungary.com/files/e8/dd/e8dd79bd380a40c9890dd2fb01dd771b.pdf>

² <https://zalazone.hu/>

³ <https://research-and-innovation.zalazone.hu/2021/12/16/zalazone-automotive-proving-ground-received-excellent-research-infrastructure-certificate/>

⁴ <https://aimotive.com/test-schedule>

Additionally, under the GDPR, personal data shall be stored no longer than it is necessary for the purposes for which such personal data are processed. The rules pertaining to autonomous vehicles for development purposes specify that after the end of the test, the data specified above have to be stored securely for 72 hours. Upon request, the data (including video and audio recordings) shall be sent to the competent authorities. In the case of a traffic accident, the data collected one hour before and one minute after the accident must be stored for three years.

ELECTRIC VEHICLES

Electric vehicles are becoming a daily sight on the roads of Hungary. According to the data of Jövő Mobilitása Szövetség (Mobility of the Future Alliance), the number of electric vehicles in Hungary rose by 71% in 2021. There are more than 21 thousand electric vehicles registered in Hungary. The number of charging stations is also on the rise with a 45% increase in the first half of 2021⁵.

The Hungarian Government already launched several rounds of state subsidized EV purchase programs; applicants were granted with subsidies of up to HUF 2.5 million (approximately USD 7,500). Companies are also encouraged to purchase EVs for the company fleets with certain corporate income tax rebates and reductions made available.

The production of EVs began in the Kecskemét plant of Mercedes-Benz; the EQB model is the first mass-produced EV manufactured in Hungary⁶.

The biggest vehicle engine manufacturing plant in the world, the Audi plant in Győr, is also ramping up the production numbers of electric engines, which surpassed 250,000 units in 2021⁷.

Driving forces

- The **Eötvös Loránd Research Network** created a new, neural-net based model using big data for the control systems of autonomous vehicles that could allow for the introduction of level 5 autonomy⁸.
- **Almotive**, the Hungarian-founded AV company began its road test in Hungary⁹ and announced further expansions and new solutions in 2021¹⁰.
- A collaboration started between the **Technical University of Budapest, Ericsson and Magyar Telekom**. The parties established a 5G test network in the vicinity of the university's buildings and intend to carry out the testing of 5G based data communication solutions allowing communication of autonomous vehicles and smart roads.¹¹
- The state-supported **ZalaZone autonomous vehicles test park** received further upgrades and is ready for complex high-capacity testing, including a high-speed handling course, smart city zone, motorway section and a special zone for testing advanced driver-assistance systems.
- **The Future Mobility Association** was established with the aim to further spread information and facilitate research initiatives in the fields of electromobility and traffic management. The Association includes a number of high-profile Hungarian and international companies ranging from the energy sector, through automotive manufacturers and IT solutions companies and also local municipalities and state-owned companies take part .

- The R&D center of **Knorr-Bremse** is working on the development of autonomous trucks. The company already produced prototypes that are able to autonomously maneuver in closed sites and have equipment allowing level 4 autonomy driving on highways .
- **The Autonomous Systems National Laboratory** was established under the initiative of the Hungarian State, aiming to facilitate research cooperation between research institutes, universities and companies. The laboratory focuses on research, development, patent, publications and workforce training in the fields of autonomous systems .
- Parts manufacturer active in AV development, **Continental** invested further HUF 4 billion (approximately USD 12 million) to increase the capacity of its Artificial Intelligence Development Center, which aims to create next-generation automotive software solutions making automated driving safe and affordable.

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Italy

Regulatory developments and roadblocks

Unlike other European countries, Italy has been slow to introduce a specific legislation dedicated to autonomous vehicles.

On **February 28, 2018** the Italian Ministry of Infrastructure and Transport adopted a Decree (No.90, the so-renamed **“Smart Road Decree”**) which underlies an ambitious project, aimed at:

- transforming the national road network so as to make it capable of communicating with “next generation connected” vehicles;
- preparing the ground for self-driving cars;

In relation to the **first aspect**, the Decree has divided the process of **“roads digital transformations”** into **two timelines**:

- until 2025, the works will be carried out **on the infrastructures belonging to the TEN-T** (Trans European Network - Transport) network and on over the six thousand kilometers of Italian freeways;
- from 2025 to 2030, the transformation will be extended to the entire network of the National Integrated Transport System, by **activating different digital services** (such as, flow deviation, intervention on the average speed of vehicles, suggestion of trajectories and lanes, and dynamic management of accesses).

Regarding **the aspect related to driverless cars**, the Smart Road Decree has – for the first time:

- provided brand new rules for testing autonomous vehicles on public roads;
- given a proper definition of **“driverless cars”**, by identifying those vehicles as ones “equipped with technologies capable of adopting and

implementing driving behaviors without the active intervention of the driver”;

- established a specific technical Observatory (**“Smart Road Observatory”**) aimed at:
- coordinating experimental initiatives;**
- supporting researches and studies, in particular with reference to the “road safety” theme.**
- Although the Smart Road Decree has made a big step forward in regard with the possibility to test autonomous cars, for what concern circulation, **Italian rules are still quite restrictive.**
- Indeed, presently it is not permitted to circulate in Italian roads with cars that have a level of automation higher than “partial assistance” (level 2 of SAE’s classification for autonomous vehicles).

With reference to the above, the **biggest obstacle** is represented by the **Italian Highway Code**, which

- predates the “digital era”;
- is designed for “man-driven” vehicles on the road.

Indeed, **Article 46** of Italian Highway Code clearly states that are meant to be vehicles *“all machines of any kind, circulating on the roads **driven by man.**”*

However, the current legislative framework **may change in July 2022.**

In this light, the **Vienna Convention on Road Traffic** – the treaty signed in 1968, governing international circulation of most world-wide countries and to which national traffic regulations are inspired – is in the **process to be amended to allow more openings in the circulation of autonomous vehicles.**

Pursuant to expected new **Article 34-bis** of the Convention, the requirement according to which all vehicles must have a driver, will be satisfied even if the vehicle uses an “automated driving system.”

In this regard, since Italy has ratified previously recalled Convention, our country will probably be called up to **adapt its internal regulation to the latest conventional provision.**

Therefore, it is hoped that soon the first self-driving cars will enter the market and will be freely driven on Italian roads as well.

However, **the change will come gradually.**

Indeed, what is believed it will be possible in Italy starting from July 2022 is the use of **Level 3 Adas** (“Advanced Driver Assistance System”) i.e. a driver assistance system that allows the driver to not keep his hands on the wheel all the time because the system itself will have the control of the speed and the trajectory of the vehicle.

Driverless testing and deployment

As previously said, Smart Road Decree has given the **“green light”** to **testing autonomous vehicles on public roads.**

The new rules provided by the **Italian Ministry of Transport (“MIT”)** pave the way for experimentation also in our territory of driverless cars.

As stated by the MIT itself: *“The beginning of experimentation is a very important first step in assessing the impacts of scenarios that see an increasing percentage of automated vehicles, capable of mitigating human mistakes with the aim of drastically reducing the number of deaths and injuries on the roads.”*

Indeed, in light of experimental research we have understood how, just after the approval of the Smart Road Decree, **a first “government-organized” show of a driverless car** circulating has taken place in Turin on October 2018, followed by several private experimentations in different Italian Regions.

However, the possibility to test driverless cars is not granted to anyone: pursuant to **Article 9**, the only subjects allowed to perform in Italy AV test-driving activities are:

- manufacturers;**
- universities;**
- public and private research institutes.**

In addition, the test-driving activity by previously mentioned parties is **subject to**:

- clearance of the road owner** (and if the subject performing the test-driving activity is not the manufacturer, it’s also required the clearance of the vehicle constructor);
- proper authorization**, issued by the Italian Ministry of Transport.

In this regard, Smart Road Decree states that the request for authorization must mandatorily indicate:

- the owner of the vehicle for the purposes of civil liability,
- the road areas subject to experimentation,
- the documentation to prove the authorization from the road owner, and
- the external, meteorological and visibility conditions of the roads and traffic where the experimentation can be carried out.

In order to guarantee the full safety of the experimental activities, the Decree **also requires** the **documentary evidence of certain vehicles features**, such as:

- the vehicle suitability to manage typical driving situations and interaction with other road users,
- the descriptions of the risks connected to the use of the vehicle and the relatives countermeasures foreseen,
- the safety protections to prevent unauthorized access to the internal computer system,
- conclusion of an insurance contract for the driverless vehicle.

The authorization can be released only to vehicles that have already been type – approved in an “ordinary” version, is valid for a year (but renewal is allowed) and once granted, can always be suspended or withdrawn for “circulation safety” reasons.

In addition, once the required permissions have been obtained, Italian legislation provides that the AV test-driving activity can be performed under **specific conditions**, like:

- **enlistment in a specific registry and assignment of a marker number;**
- circulation with a **test plate;**
- appointment of a **qualified vehicle supervisor**, who – in case of need – can quickly switch from automatic to manual mode;
- **vehicle fulfillment of special features;**
- **insurance policy for damage** by four times the amount of insurance ceiling provided for experimental vehicles without automated driving features.

As seen, the Italian legislation authorizing experimentation of self-driving cars is not without limitations.

However, an important step towards implementation AV testing activities in Italy has been taken recently thanks to the Government’s program **“Sperimentazione Italia”**, which allows start-ups, companies, universities and research institutes to experiment innovative projects notwithstanding current legislations.

Declaration of Italian Minister Giovannini:

“Experimenting innovative technologies in the mobility sector lays the foundations to promote sustainable development in urban centers and thus improve the quality of people life and the business activities. In order to redesign our cities through innovative urban regeneration projects, to which

we are also committed with the PNRR, it’s essential to have more sustainable mobility solutions, which allow to make travel more efficient while reducing the impact on the environment. I therefore hope that ‘Sperimentazione Italia’ is only the first step of this path, to be extended to other areas and other territories.”

In light of the recalled program, the Italian Ministry of Transport **has authorized for the first time in our territory the experimentation of a fleet of self-driving shuttles on the road of Turin.**

The permit has been issued **to the Italian “Gruppo Torinese trasporti”** (“GTT”). The experimental activity is part of the so-called “SHOW project”, funded by the European financing instrument “Horizon2020” and aimed at supporting the transition towards a safe and sustainable automated transport system.

According to latest news, the testing activity will consist of two phases:

- a. the first – scheduled between March and April 2022 – will be with no passengers on board in order to testify safety of the vehicles;
- b. the second will be hopefully performed from May 2022 and will allow citizens to benefit of the automated shuttle service.

Connected vehicles and logistics

SMART ROADS AND 5G

Autonomous vehicles require Smart roads.

Smart roads are intelligent roads that allow cars and vehicles traveling to constantly communicate and connect with each other.

Additionally, such roads enable road users to take advantage of several digital services such as indications of parking and fuel areas, provisions of alternative routes, ...

Smart roads require an ultra-fast connection to enable the constant data flow coming from cars and various systems installed.

In this regard, it is essential to strengthen in our country an implementation of the 5G network.

Indeed, according to **recent estimates** made by the **5Gaa** (5G Automotive Association) – the global organization bringing together more than 130 companies active in the automotive and ICT industries which is aimed to develop innovative solutions for future mobility and transportation services – starting from 2026, **5G technology will radically change the way we are used to drive.**

To keep up with these recent changes and to respond to the growing needs for connectivity, also linked to the transport sector, the Italian government **has approved the “5G Plan”**, an investment program of around two million euros to be implemented between now and 2026.

Autonomous and electric vehicles

The idea of self-driving cars is closely related to the idea of electric vehicles.

Indeed, it’s predicted that future vehicles will be:

- **driverless,**
- **constantly connected, and**
- **full electric.**

In this regard, **Fabio Gadda** - Marketing Program Manager of Teoresi (an engineering company born in Turin, which is now an international Group operating in Italy and in the USA), has affirmed:

“As Teoresi we historically work in the field of transportation: we develop embedded software for vehicles, on road or rail. What we see is an increasing cross-fertilization between

sectors: for example, the technologies we have been working on in the automotive field, such as electric and autonomous driving, can be applied to a field that will revolutionize urban mobility, namely urban air mobility.”

However, considering our country **the Italian market of electric cars, has recorded in 2022 a drop in sales.**

Indeed, based on the latest information provided by ANSA (the Italian “Agenzia Nazionale Stampa Associata”) compared to January 2021 there has been a decrease of 19.7”%, with only 107.814 sold units in 2022.

The reasons are surely to be found in the diffidence of Italian customers towards this type of technologies and, in general, are connected to the effects of the pandemic situation that we still drag along.

In this regard, it’s important for **the Italian government to keep encouraging this kind of purchases** in order to adapt our reality to the overall change that the vehicle industry is experiencing in this historical period.

Driving forces

EFFICIENT COOPERATION BETWEEN INSTITUTIONAL ACTORS, UNIVERSITIES AND “AUTOMOTIVE SECTORS” COMPANIES

In relation to AV space, it’s interesting to note that in our country **the most successful experimental projects has seen both public and private parties collaborating together.**

As an example, the city of Modena – heart of Italian Motor Valley – “gave birth” to the **first urban area** featured with appropriate facilities to consent the experimentation of vehicles equipped for autonomous driving.

The experimentation was defined as the first “*living lab for automated driving*” and is part of the **MASA** (Modena Automotive Smart Area) **project** which involves the participation of three main actors: the Municipality of Modena, the University of Modena and Italian Maserati.

MASA - a living lab for automated driving
(automotivesmartarea.it)

Another innovative experiment was the one conducted by the Italian University “Politecnico di Milano”, which – thanks to funds from Lombardy Region – has developed an advanced autonomous driving simulator (called **DiM400**) that will help increasing in the future projects dedicated to autonomous driving and driving assistance.

The DiM400 consists in a sort of **mobile passenger compartment**, which:

- is equipped with a virtual environment, projected on a panoramic screen, and
- works thanks to a complex set of mathematical algorithms, which allow to replicate the real operation of a “normal vehicle.”

Al Politecnico il simulatore di guida più innovativo al mondo – Alumni (polimi.it)

In relation with the above, the University’s Rector **Ferruccio Resta** has said: “*Experimental infrastructures and state-of-the-art laboratories are essential elements*

for international research and development with companies. Through the installation of the simulator Politecnico di Milano is competing on an international scale and turns the Bovisa area into an ecosystem of innovation. This is the objective of the University: to face the great challenges of the coming years, first of all that of mobility.”

ANAS S.P.A. AND THE “SMART ROADS PROJECT”

With reference to Smart roads, one of the most important projects is the one started **by ANAS S.p.A.**, the Italian government-owned company, responsible of managing and maintaining the network of roads and freeways of national interest.

Indeed, the company **has launched a total investment around one billion euros, aimed at creating more than 3,0000 km of smart roads by 2030.**

[Anas-smart-road-ENG.pdf \(stradeanas.it\)](#)

[Anas Smart Road \(English version\) - YouTube](#)

The Smart Mobility program is:

- functional at improving road safety and implementing the efficiency of traffic flows,

- supported by innovative technologies such as IoT (Internet of Things), AI (Artificial Intelligence), big data and advanced sensors.

Regarding Smart Roads, ANAS’ Managing Director has stated how: “*We are witnessing a radical change, a new understanding of the industry, where the user is placed at the center of a multi-modal, integrated, digital system. The volume and speed with which data is now being generated, processed and stored is unprecedented.*”

Based on empirical researches conducted on websites, **a first phase of the project** – with an overall investment of 250 million of euros – **is currently underway** and involves some of most important routes in our country, such as the Roman “Grande Raccordo Anulare” and the “Mediterranean Highway” in Calabria.

In this regard, ANAS deserves the credit of having created the **first Smart Road in Cortina**, which was opened on the occasion of the World Winter Ski Championships held in 2021 between Alpine territories.

The Smart Roads developed by ANAS **will also be sustainable**, thanks to the so-called “Green Islands” – specific spaces located along routes, designed to distribute clean energy with the aim of powering the entire road system.

In addition, another the goal of the Smart Road project is to equip the Green Islands with **drone charging systems**, that will be used in the future for monitoring roads safety and for checking the status of eventual works carried out along the roadways.

Unfortunately the use of drones is not yet possible. In this regard, it will be necessary to wait for a specific legislation governing this particular type of technologies.

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Poland

Regulatory developments and roadblocks

The Act on Electromobility and Alternative Fuels, effective January 2018, marked an important step towards the development of the autonomous vehicle market in Poland. The act **amended the Road Traffic Act to allow autonomous vehicle testing. It introduced to the Polish legal system a definition of “autonomous vehicle” as a motor vehicle equipped with systems controlling the vehicle’s movement and enabling movement without interference by the driver, who can take control of the vehicle at any time.**

In September 2019, the government adopted the **“Strategy for Sustainable Development in Transport until 2030”** emphasizing the need to strive to have autonomous vehicles on the roads “in the foreseeable future.” The strategy underlines the need to provide support for the effective functioning and competitiveness of the domestic automotive market and the IT market, through setting up the National CAD Contact Point and defining the rules for testing and introducing autonomous vehicles for use in a way that ensures safety and social acceptance for such technology¹.

The most important works at the government level aimed at preparing for autonomous road transport have been conducted by the Ministry of Infrastructure. This includes the project **“Poland’s road to transport automation” (AV-PL-ROAD)**, the goal of which was to set up a green book of autonomous vehicles, create a CAD contact point and a road map for the introduction of autonomous vehicles in Poland.

One of the results of the AV-PL-ROAD project was the establishment of the **Autonomous and Connected Vehicles Competence Center (CK: PAP)** within the structure of the Motor Transport Institute in June 2021. The overriding goal of the Center is to support the government administration in the efficient and safe implementation of autonomous vehicles in Poland.

Recent years have also seen initiatives at the local level.

- **In July 2019**, the Mayor of Rzeszów signed a letter of intent with companies responsible for network infrastructure, telecommunications and cybersecurity regarding a partnership aimed at research and implementation of 5G technology. It will support the introduction of autonomous buses in the city, which will initially run on a line connecting two railway stations, and ultimately on the route from the city center to the airport.
- **In September 2019**, tests of automated electric minibuses were carried out in Gdańsk with a view to public passenger transport, in particular “first and last mile” connections, all under the aegis of the Sohjoa Baltic project.
- Other groundwork preparations for autonomous vehicles have taken place in the city of Jaworzno. The city has mapped streets and their surroundings to create a 3D map to support navigation for autonomous vehicles. The city also intends to develop legal, technical, and organizational guidelines to ensure safety on the roads where autonomous vehicles will drive.
- **In January 2020**, autonomous trams were tested in Cracow. The test was conducted in cooperation with Cracow University of Technology - Institute of

Rail Vehicles, MPK Kraków and companies Newag, Cybid and Medcom. The aim of the project is to introduce autonomous trams to Cracow².

- **In February 2020**, the Autonomous Vehicles Working Group was established in Gdańsk. The inaugural meeting was attended by representatives of the Governor of the region, businesses interested in autonomous vehicles, clusters, and scientists. The task force is seeking to create the conditions for the development and sale of services and products related to autonomous vehicles.

According to experts, one of the roadblocks to faster implementation of autonomous vehicles in Poland are relatively strict regulations governing the testing of such vehicles. Under current laws, such tests cannot take place if local residents raise objections. The government is aware of the problem and is working on liberalization of the current regulations.

“Before autonomization comes to us for good, there are many legal, infrastructural and technological challenges to be solved that require a systemic and coordinated approach. One barrier is, for example, the law, which in many cases does not keep pace with technical development. The technology is not good enough to deal with every potential road scenario. There is also the issue of building an expensive infrastructure that will be in a kind of symbiosis with the cars of tomorrow.”³

- Marcin Ślęzak – Head of the Motor Transport Institute’s Connected and Autonomous Vehicles Competence Center

“There are many necessary changes. For example, there are problems with organizing testing. However, changes to the infrastructure seem to be more urgent. In both Poland and Europe, it is not always in a good condition - and sometimes it does not meet the requirements of autonomous vehicles. Beginning with road markings, not all roads have lanes marked with white lines that the software must ‘see’ to keep the vehicle on course.”⁴

- Michał Sikora – President of the Polish Automobile and Motorcycle Federation

Driverless testing and deployment

Following the amendment of the Road Traffic Act in 2018, companies can test autonomous vehicles on public roads in Poland if safety requirements are met and they have a permit from the relevant traffic management authority.

(I) APPLICATION – FORMAL REQUIREMENTS

The organizer of autonomous vehicle testing must submit a written application to the traffic authority responsible for management of the road on which the testing is going to take place. The application should state at least:

- full name and address / company name;
- registered office of the test organizer;
- place and date of start / end of the testing;
- planned route;
- a list of people responsible for securing the route of the autonomous vehicle; and

1 The strategy is available at: <https://www.gov.pl/web/infrastruktura/projekt-strategii-zrownowazonego-rozwoju-transportu-do-2030-roku2> (only in Polish).

2 Please see the report “Autonomiczny Transport Przyszłości”, Polski Instytut Ekonomiczny, Ministerstwo Infrastruktury, kwiecień 2020 r. (available at <https://www.gov.pl/web/infrastruktura/autonomiczny-transport-przyszlosci>).

3 Please see <https://www.its.waw.pl/download,5063,edd8247b261064fe2071c7c3a0232551,pl.html>.

4 Please see <https://www.transport-publiczny.pl/mobile/pojazdy-autonomiczne-przyszlosc-obiecujaca-ale-daleka-72572.html>.

- signature of the organizer / representative.

Mandatory attachments:

- proof of compulsory civil liability insurance for damage arising in connection with such testing, which should take effect upon obtaining a permit for autonomous vehicle testing;
- proof of payment of the premium for this insurance; and
- a copy of the decision on professional vehicle registration.

(II) CONSULTATIONS WITH RESIDENTS

When the full application is submitted, the traffic management authority conducts local consultations with residents of the municipality (Polish: gmina) where the autonomous vehicle testing is to be conducted, by placing the application on its website and setting a window of at least seven days for comments. Property owners along the planned route of the autonomous vehicle may voice objections.

(III) PERMIT FROM THE TRAFFIC MANAGEMENT AUTHORITY

The traffic management authority may issue a permit after obtaining **the consent of the road administrator and the opinion of the relevant regional police officer** regarding the impact of testing on traffic flow on the planned route of the vehicle. If such consent and opinion are not obtained, the permit will not be granted. In addition, the traffic management authority will not issue a permit where there is a risk that the autonomous vehicle testing will pose a threat to human life or health or to property of great value, or an objection is raised by an owner of real estate located along the planned route of the autonomous vehicle.

(IV) OBLIGATIONS OF THE TEST ORGANIZER

Once a permit is issued, the test organizer is obliged to:

- enable the police to perform activities to ensure road safety and protect human life and health and property during the testing;
- ensure that during the testing, in a place intended for the driver, there is a person with a driving license who can take control of the vehicle at any time, in particular in the event of a road safety hazard;
- publicly disclose information about the testing and the route of the autonomous vehicle; and
- provide the Director of the Transport Technical Supervision with a report on the testing of autonomous vehicles and their equipment, in accordance with the form set out in the regulations, within three months of completing the tests.

As the presence of a backup driver during testing is compulsory, all autonomous vehicles must be equipped with a steering system and other elements the driver requires to physically take control of the vehicle. As a result, it is currently impossible to conduct testing of fully autonomous vehicles without a human at the wheel (Level 5 AVs as defined by SAE).

The current legal framework does not permit consumers to use Level 3 through 5 AVs on public roads in Poland.

Wider deployment of autonomous vehicles should be stimulated by the **UN Regulation on uniform provisions concerning the approval of vehicles with regard to Automated Lane Keeping System (ALKS)**, adopted in June 2020, which is the first binding international regulation on Level 3 AVs. It took effect in January 2021 and is applicable in EU Member States.

The UN Regulation allows for the introduction of automated vehicles equipped with the Automated Lane Keeping System on roads where pedestrians and cyclists are prohibited and which, by design, are equipped with a **physical separation** that divides the traffic moving in opposite directions. In a first step, the regulation limits the operational speed to **60 km/h maximum** and to **passenger cars**. Moreover, the driver should always have an option to override the system at any time.

Connected vehicles and logistics

DATA PRIVACY

Much of the data generated by autonomous vehicles will **relate directly or indirectly to identified or identifiable individuals** and thus may be classified as **“personal data”** within the meaning of Article 4(1) GDPR. Such personal data may include vehicle data insofar as it can be associated with a natural person.

According to the GDPR (a principal data protection regulation in Poland), the processing of personal data is lawful if processed with the consent of the data subject concerned or on some other **legitimate basis** laid down by law. Special rules apply to processing **sensitive data** (e.g. biometric data or health-related data). Processing of such data is prohibited unless the data subject has granted explicit consent (a law may rule out this option), personal data is manifestly made public by the data subject, or processing is necessary for specific reasons listed in the GDPR.

Under the GDPR, the **data controller** (e.g. a vehicle manufacturer gathering data on the wear and tear affecting the vehicle's parts to improve its quality) is obliged, inter alia, to:

- have appropriate legal grounds for the processing of personal data;
- implement appropriate technical and organizational measures to be able to demonstrate that processing is performed in accordance with data protection laws and ensure a level of security appropriate to the risk;
- fulfil the information obligations and respect the rights of **data subjects** (e.g. car owners) (the right to be informed, the right of access, the right to rectification, the right to erasure, the right to restriction of processing, the right to data portability, the right to object to processing, the right not to be subject to automated individual decision-making, including profiling);
- follow the principles of data protection by design and default;
- maintain records of processing activities (there is a limited exemption from this obligation);
- notify a personal data breach to supervisory authorities;
- carry out a data protection impact assessment (DPIA), if required; and
- designate a data protection officer (DPO), if required.

The data controller may use a third party to collect and process personal data on its behalf (e.g. an equipment manufacturer or automotive supplier). In such case, the data controller should ensure that it has a written contract with the **data processor** setting out the subject-matter and duration of the processing, the nature and purpose of the processing, the type of personal data and categories of data subjects and the obligations and rights of the controller.

EDPB Guidelines 1/2020 on processing personal data in the context of connected vehicles and mobility related applications adopted on 9 March 2021, are available [here](#).

5G

On 6 March 2020 the President of the Office of Electronic Communications (UKE) announced a highly anticipated 5G auction. The auction was supposed to cover four nationwide frequency licenses in the 3.6 GHz band, and each booking included an 80 MHz block valid until 30 June 2035. The reserve price for each block had been set at PLN 450 million (approx. USD 120 million). Following the outbreak of COVID-19, the auction was suspended and not resumed. Instead, the government decided to launch a new auction.

According to official plans of the President of UKE, allocation of frequencies in the 3.6 GHz band for the purpose of implementation of 5G technology should be carried out in 2022. The allocation of frequencies should be preceded by the selection procedure, which is supposed to be announced shortly after the adoption of the draft act on the national cybersecurity system by the Standing Committee of the government.

In the meantime, operators are using already possessed spectrum to offer commercial 5G networks for their subscribers. However, such commercial networks face some limitations on data speeds and territorial coverage.

ELECTRIC VEHICLES

The key piece of legislation regulating the electric vehicle market in Poland is the Act of 11 January 2018 on Electromobility and Alternative Fuels, which transposes Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure. It sets out a list of **incentives for owners of electric vehicles**, including:

- exemption from excise duty;
- more favorable depreciation write-offs;
- possibility of using bus lanes; and
- free parking in paid parking zones.

The act also aims to establish **the legal framework for the development of the infrastructure required for electric vehicles**. One of the recent amendments to the act introduced a requirement to design and construct residential and non-residential buildings so that they can host EV charging stations.

In July 2021, the Ministry of Climate and Environment announced a new support scheme named “My Electric Vehicle.” The goal of the program is the reduction of air pollutant emissions, e.g. by co-financing purchase or lease of zero-emission vehicles.

Electromobility Poland SA, a state-controlled joint venture established in 2016 by four Polish energy companies (Tauron, Enea, Energa and PGE), is working on a Polish electric car under the Izera brand name. Prototypes of Izera were presented in July 2020.

For more information, please visit <https://izera.com/> and <https://electromobilitypoland.pl/en/home-2/>.

According to publicly available data, at the end of February 2022, there were:

- 40,904 electric passenger cars registered in Poland (compared to 20,504 in February 2021). Fully electric vehicles (BEVs) accounted for 49% (20,167 units) of this part of the vehicle fleet, and the remainder (51%) were plug-in hybrids (PHEVs). The number of hybrid passenger cars and vans increased to 346,324 units (compared to 212,211 in February 2021).
- 2,034 charging stations for electric vehicles in Poland (compared to 1,410 in February 2021). 30% of them were fast DC charging stations and 70% were AC chargers with a power less than or equal to 22 kW.

Up-to-date statistics can be found [here](#).

Driving forces

MOTOR TRANSPORT INSTITUTE’S CONNECTED AND AUTONOMOUS VEHICLES COMPETENCE CENTER (CK:PAP)

The Connected and Autonomous Vehicles Competence Center was established as part of the “Polish Road to Automation of Road Transport” (AV-PL-ROAD) project, an initiative of the Motor Transport Institute, the Ministry of Infrastructure, and the Faculty of Transport of Warsaw University of Technology.

The center serves as an expert institution and supports the government administration, among others, in the implementation of EU law. It also serves as a national contact point in the field of connected and autonomous vehicles. Additionally, it aims to coordinate and monitor research and development works. Plans of the center include the expansion of advanced technical facilities of the Motor Transport Institute and the development of infrastructure enabling in-depth research of technologies supporting the development of road transport automation.

The employees of the center include experts in the field of road transport automation, intelligent transport systems (ITS), road safety, transport psychology, national and international vehicle type-approvals.

For more information, please visit: <https://ckpap.its.waw.pl/en/about-us/>

- Marcin Ślęzak – Head of CK:PAP, Director of the Motor Transport Institute

MINISTRY OF INFRASTRUCTURE

The Ministry of Infrastructure is a central government body responsible for formulating transport policy. In recent years the Ministry of Infrastructure has conducted works intending to enable the development of the unmanned aerial vehicle industry and preparation for the autonomous transport system. The Ministry has been supervising e.g. the AV-PL-ROAD project, which was the most important initiative devoted to autonomous transport at government level, serving to create a green book of autonomous vehicles, conduct social research on the subject and prepare a roadmap for the implementation of autonomous vehicles in Poland.

Andrzej Adamczyk – Minister of Infrastructure

ROBOTEC.AI

Robotec.ai is a software company that develops high-tech solutions for automated and connected vehicles. Its multidisciplinary team consisting of experts in robotics, electrical engineering, software development, machine-learning and human factors supports car manufacturers in the field of software monitoring drivers and passengers. The company also implements machine learning technologies in vehicles.

For more information, please visit:
<https://robotec.ai/services/>

Michał Niezgoda – CEO at Robotec.ai

In Poland, there are several thriving centers dealing with autonomous driving. The works are carried out, among others, by Aptiv and Intel.

APTIV

Aptiv's center in Cracow has been operating since 2000 and is considered one of the most innovative and developing research centers in Aptiv's portfolio. Currently, its local staff numbers almost 3,000 people, including 2,000 engineers. Offices are located closer to the center of Cracow, while in the suburbs there is a machine park and a special test track (SmarTrack), which is the first test track for autonomous vehicles in Poland⁵.

The engineers from Aptiv's technical center in Cracow are developing a range of technologies for autonomous vehicles, including software, autonomous driving and multimedia audio systems, navigation, entertainment and communication systems, e.g. innovative gesture recognition systems. While some solutions are already available on the market, the company's local team is also working on technologies of the future for the automotive industry⁶.

Tomasz Miśniakiewicz – Country Director at Aptiv

INTEL

Intel has recently announced the opening of a new competence center in Gdańsk. In its new laboratories employees will work on projects related to autonomous vehicles, artificial intelligence, machine learning and data storage security.

It is worth noting that the campus in Gdańsk is already Intel's largest research and development center in the European Union⁷.

On 7 June 2021 the Polish Motor Transport Institute organized an international conference "AV-POLAND 2021." It was the biggest event of the year related to autonomous vehicles in Poland. A recording is available in English [here](#).

The next edition of the conference will be held on 7 June 2022. For more information, please visit <https://avpoland.com/en/>.

On 8-9 December 2021 the Polish Association of Automotive Parts Distributors and Manufacturers (SDCM) organized "XVI Congress of Automotive Industry and Market". One of the panels was devoted to current issues on the Polish market of autonomous vehicles.

A recording is available in Polish [here](#). A short summary in Polish can also be found [here](#).

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⁵ Please see <https://www.youtube.com/watch?v=iG9QTuRjON0>. Please also check: <https://motofocus.pl/produkcji-czesci-i-dystrybutorzy/96473/wizyta-w-centrum-badawczo-rozwojowym-aptiv-w-krakowie> (in Polish).
⁶ Please also check <https://www.aptiv.com/pl/aptiv-w-polsce>.

⁷ For more, check <https://constructionmarketexperts.com/en/news/intel-to-invest-in-artificial-intelligence-in-gdansk/>

South Korea

Regulatory developments and roadblocks

KEY KOREAN GOVERNMENT AGENCIES AND THEIR ROLES

Government agencies	Role	Governing/Relevant Laws
<i>Ministry of Land, Infrastructure and Transport (MOLIT)</i> <i>(n.b. KATRI (Korea Automobile Testing & Research Institute) is an institution under MOLIT)</i>	<ul style="list-style-type: none">Provides ITS (Intelligent Transport Systems) services and platforms.¹Makes Laws & Regulations (e.g., Announces safety standards for Level 3 AVs).	Motor Vehicle Management Act This is a law governing the management, performance quality and safety of automobiles. It serves as the basis for operating AVs, e.g., provides the definition of AV, allows test driving, etc. The Enforcement Decree of this Act stipulates the requirements for safe driving and test driving of autonomous vehicles. Guarantee of Automobile Accident Compensation Act This is a law that governs compensation for damage caused by the operation of automobiles. The Act specifies the obligations of the car owners, e.g., to subscribe to an insurance policy. (A requirement for insurance, even for the operation of test-driving, is stated in this law as well.)
<i>Ministry of Science and ICT (MSIT)</i>	<ul style="list-style-type: none">Information and Communication Technology InfrastructureICT Service/PlatformFrequency Distribution	Transport for New South Wales
<i>Korean National Police Agency (KNPA)</i>	<ul style="list-style-type: none">Governs/regulates matters occurring on the roads (e.g., accidents). Issues driving licenses / Verifies authenticity of the licenses.Builds high-tech infrastructure in response to development of AVs (Currently in the process).	Road Traffic Act This is a law that aims to resolve traffic problems on the road and regulate safe driving. The act assumes that a ‘driver’ is a ‘human’ and thus ‘driving’ requires operation of a steering wheel and brake by a human being. (There are some parts of the current RTA that contradict/do not cover the operation of AVs.)

¹ Major ITS services and platforms designed and provided by MOLIT include AFC (Automatic Fare Collection), ETCS (Electronic Toll Collection System), and ATEs (Automatic Traffic Enforcement System). The government provides national ITS data collected as such to the private sector to help the private sector with enhancing and expanding their ITS services. (See ITS brochure for further details; <https://www.molit.go.kr/upload/cyberJccr/pdf%20file/ITS>)

Government agencies	Role	Governing/Relevant Laws
<i>Ministry of Trade, Industry, and Energy (MOTIE)</i>	<ul style="list-style-type: none">Advancement of Autonomous TechnologyCommercialization of TechnologySME Globalization & Trading SupportConducts research before the government makes laws.Involved in drafting and publishing transportation-related policies.	

Rules, regulations, laws and guidance at the federal level

AUTONOMOUS VEHICLE ACT

- Effective from May 1, 2020**
- Objectives:** Provides necessary support/ infrastructure for introduction, spread, and safe operation of AVs. Regulates necessary requirements in relation to AVs. Ultimately, the Act aims to contribute to the improvement of the public’s living conditions and the development of the national economy by promoting and supporting the commercialization of AVs.
- Key parts of the act**
 - Designation of autonomous driving safety zones: The act offers a basis for the Minister of Land, Infrastructure and Transport’s authority to designate “autonomous driving safety zones” and certain places on public roads where people can operate their vehicles autonomously. In designating the zones, the Minister can consider whether the infrastructure has been created to support safe operation of AVs (Article 6 of the Act). In line with this provision, the Enforcement Decree of this Act provides the regulations on the standards and procedures for designating autonomous driving safety zones. More specifically, the Enforcement Decree requires that road structures, autonomous driving cooperation systems and the construction status of detailed road maps be considered when designating such safety zones. When designating or changing such safety zones, the authority shall notify autonomous vehicle manufacturers, etc. (Article 5 of the Enforcement Decree of the Act).
 - The Autonomous Vehicle Act enables the designation of AV pilot zones in which paid passenger ride and delivery services using AVs are allowed.
 - Unconventional vehicles not complying with the Korea Motor Vehicle Safety Standards (KMVSS),² such as delivery robots, will be allowed if safety measures are provided by the operating entity.

² K MVSS refers to the corresponding standards of the Automobile Management Act of Korea. (a.k.a. Motor Vehicle Management Act) – See Chapter III of the Act for further details.

- Pilot tests of the new V2X technology will also be allowed in the AV pilot zones.
- **Designation procedure:** Application by municipal & provincial governors Committee Review (chaired by MOLIT minister) Designation of AV pilot zone.

THREE GUIDELINES WERE ANNOUNCED ON DECEMBER 15, 2020

“Guidelines’ currently, and thus, do not have binding effect – persuasive/ recommendation only. Published as government publications with the statement “considering the complex nature of the matter [AVs], it is hard to institutionalize in a short period of time” (press release by MOLIT on December 15).

1. THE ETHICS GUIDELINE FOR AVS AND STAKEHOLDERS

- “The principal rule is that AVs shall be designed and manufactured in a manner such that protection of human life can be prioritized. Accordingly, rules such as ‘human lives shall be prioritized over property’ and ‘if avoiding accidents completely is impossible, [devise a method to] minimize the loss of life’ are included in the Guideline. Also, there are some ethics guidelines in relation to the user of the AV, such as ‘one’s operating an AV should not infringe others’ freedom and rights’ and ‘the user is required to take safety education to operate an AV properly.’” *Press release*

2. THE GUIDELINE FOR CYBER SECURITY

- Based on the UNR No.155 introduced in June 2020, MOLIT has written the Guideline for Cyber Security focusing mainly on a recommendation for automobile manufacturers. The guideline was announced on December 15, 2020.

- According to the guideline, a manufacturer should “preserve security by utilizing cybersecurity management procedures, for example, by “detecting and notifying users of risks, based on a ‘risk evaluation process’; reducing the level of risk by utilizing a ‘security measures process’; carrying out a ‘verification process’ to confirm the adequacy of the security measures.” (*press release*)
- MOLIT is planning to revise the relevant law to incorporate the guidelines and obligate the relevant parties to take actions to preserve cybersecurity. (According to a press release dated December 15, 2020, the government plans to implement a law incorporating this guideline in July 2022)

3. THE GUIDELINE FOR THE MANUFACTURE/ SAFETY OF LEVEL 4 AVS

- The government has provided a system for commercialization of Level 3 AVs this year (July 2020) and is currently in the process of introducing one for Level 4 AVs. The guideline was announced on December 15 to promote technology development for AVs by providing recommendations on necessary requirements for the safe operation/design/manufacture of AVs before the government’s official enactment of the law.
- **The guideline is composed of three parts**
 - (i) System security area;
 - (ii) Safe operation area;
 - and (iii) Safety education and ethical considerations.

Part (i) provides guidelines to minimize design defects and malfunctions of the AV and to protect the AV from cyber threats. **Part (ii)** aims to minimize the risk of accidents in the operation stage by providing guidelines for safe interaction among the users of the road (e.g., pedestrians, other cars, etc.) under diverse road conditions. **Part (iii)** concerns proper design and operation of AVs.

KEY GOVERNMENTAL POLICIES ON AVS

‘ICT Regulatory Sandbox’³

- The aim of this scheme is to help the market entry of new technologies and services that are acknowledged to be innovative and safe. The scheme allows technology and service developers to conduct demonstration tests (albeit with restrictions as to time, place, and scale).
- **Key contents/system**
 1. **Prompt Confirmation:** When a company is starting a new technology/industry, it can inquire whether any relevant regulations exist and whether a permit is required. The government agency will reply within 30 days. (If it receives no reply from the government within 30 days, then the company making the inquiry may assume there is no regulation that applies to its case).
 2. **Temporary License:** Where companies providing new products/services are having difficulties in releasing their products/ services in the market be-cause of the ambiguous or unreasonable regulations, notwithstanding the safety and innovation of such products/services having been proven, a temporary license may be granted. Once the temporary license is granted the products/services are not subject to the existing regulations upon satisfying certain conditions. Licenses can be granted to cover a maximum of 2+2 years, with the approval of the “Public-Private Regulatory Special Case De-liberation Committee” (allowed for a two-year term, which may be extended for another two years, subject to an obligation to improve the relevant laws and regulations within the period of the license).
 3. **Demonstration Exception:** When testing and verification of new products/new services are required at a time when relevant

laws and regulations are ambiguous and unreasonable or when there are some prohibitive regulations, etc., testing of new technologies or services is permitted, despite the existing regulations, under certain conditions (e.g., within a limited area/scale/period). This exception can be allowed for a maximum of 2+2 years with the approval of the “Public-Private Regulatory Special Case Deliberation Committee” (allowed for a two-year term, which may be extended for another two years, subject to an obligation to improve the relevant laws and regulations during that period. When delayed, a temporary license may be used.)

- A case that benefited from the system is the Siheung Bae-got New Town Life Park and its Autonomous patrol vehicle “Goalie.” While the release was delayed, the project received permission for test-operating through the ICT sandbox system.

‘Land Transportation Innovation Fund’

- Operation began in 2020 with an investment of approximately KRW 17 billion but has since expanded. According to the Minister of Land, Infrastructure and Transport, it created KRW 340 billion of general and specialized sub-funds, recruiting private management companies for the No. 4 and No. 5 sub-funds of the “Land Transportation Innovation Fund” to support the innovative growth of small and medium-sized enterprises and ventures with promising technologies in the field of land transportation. The sub-funds are earmarked as follows:
 1. **General (No. 4):** Invest more than 70 percent in small and medium-sized venture companies that possess, develop, or commercialize land transport technology in the land transport industry and related industries.

³ This Regulatory Sandbox scheme is being governed by the Ministry of Science and ICT of Korea, thus often referred to as ICT Regulatory Sandbox in a short form. (<https://www.korea.kr/special/policyCurationView.do?newsId=148857563>)

2. **Specialization (No.5):** (i) Drone, (ii) Smart logistics, (iii) Autonomous vehicle (including ITS), (iv) Smart city, (v) Smart construction (including digital engineering, architectural BIM, etc.), (vi) Invest more than 60 percent in small and medium-sized venture companies in the field of green remodeling.

Establishment of an ‘Innovative Growth Support Center’

- The government invested KRW six billion to start the establishment of an Innovation Growth Support Center which is slated to be completed in early 2022. This two-story center will be as large as 2000m2 and will be equipped with self-driving R&D facilities, such as a vehicle maintenance garage, security garage and a data analysis facility. This is a policy that enables small and medium-sized enterprises, for whom it has been difficult to equip their own vehicle storage facilities and research facilities, to develop and secure technologies without incurring large costs.

Cross-ministry R&D plan for Commercialization of Level 4 AVs (investing approximately KRW1.1 trillion) commenced in 2021

GOVERNMENT STANCE/GOVERNMENT REPRESENTATIVES’ STATEMENTS

Overall attitude: Supportive and willing to cooperate

- Many regulatory obstacles remain, but government/relevant authorities are making efforts to alleviate them by implementing policies such as regulatory sandboxes.
- The Ministry of Land, Infrastructure and Transport has collaborated with the Korea Transportation Safety Authority (KOTSA) to upgrade facilities of K-City, an autonomous vehicle testbed in Hwaseong some 40 kilometers (24.8 miles) southwest of Seoul, to provide various

environments that can simulate low-visibility weather conditions such as heavy rain and thick fog, The new testbed will be usable in the first half of 2022.The establishment of the next-generation intelligent transportation system (C-ITS) as well will be initiated soon, so that it can be built on major highways and national highways by 2022.”⁴

- In June 2021, the Korea Transportation Safety Authority established the AV Transportation and Logistics Master Plan 2025 to commercialize autonomous driving-based transportation and logistics systems through the commercialization and proliferation of autonomous vehicles.

AV MASTER PLAN 2025

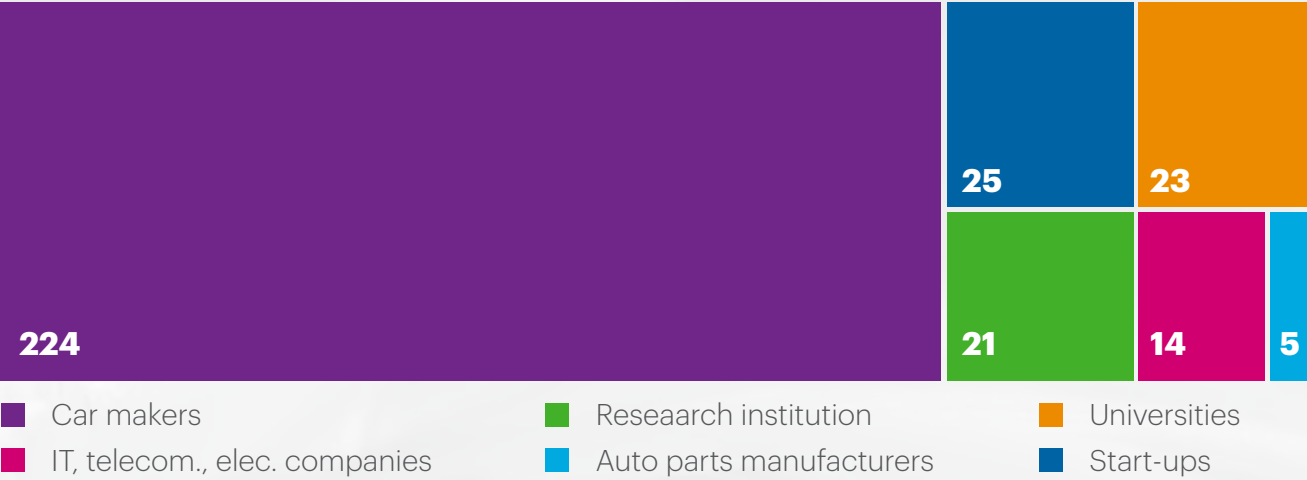
- **Vision:** The era of autonomous driving commercialization begins in 2025.
- **Goal:**
 1. Provision of autonomous driving commercial service on highways and major branches;
 2. Development of technology based on autonomous driving service (BRT, on demand); and
 3. Regulation improvement and infrastructure establishment for AV service.
- **Strategy:**
 1. Advancement of autonomous driving service technology;
 2. Expansion of an autonomous service demonstration;
 3. Creating the autonomous driving service business;
 4. Reinforcement of autonomous driving safety; and
 5. International cooperation related to autonomous driving job expansion.

Driverless vehicle testing and deployment

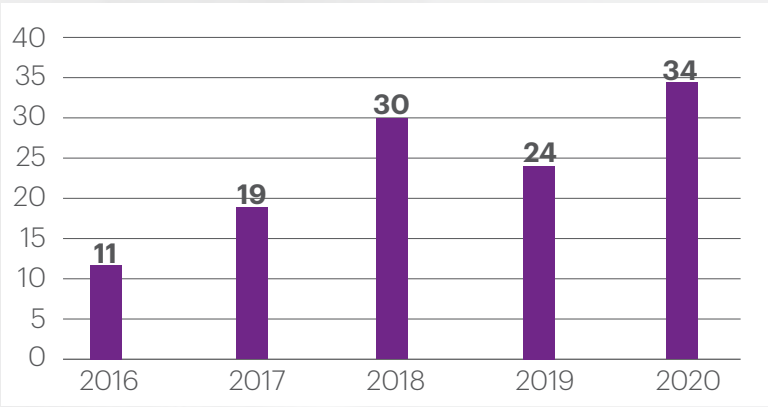
The Korean government (MOLIT) has been operating a “temporary permit scheme” since 2016 to support the development of autonomous-driving technology. The scheme allows test-operation/test-driving of qualified AVs on public roads.

- In 2020, 119 AVs from 41 entities received permits and the distance driven in Korea has exceeded 1,170,000 km. As of February 2022, the Ministry of Land, Infrastructure and Transport gave temporary permits to 193 self-driving taxis. There are seven pilot zones where paid self-driving is allowed. The pilot zones are areas where various commercial autonomous vehicle-related services such as car-hailing services are demonstrated.

BREAKDOWN OF PERMITS ISSUED ACROSS VARIOUS ENTITIES



NUMBER OF PERMITS ISSUED ACROSS VARIOUS ENTITIES



Source: Number of permits granted in past five years, Korea Transportation Safety Authority

- The current policy, however, requires AVs to have a driver on board (the form of the AV must be the same as that of traditional cars). Thus, any new types of cars must take a special route, with additional reviewing procedures, to obtain a permit.

⁴ Resource: Article titled “Government will speed up to support the AV-developing companies ... ‘Innovative Growth Support Center’ construction commenced” (dated June.19, 2020) published on the website, “Republic of Korea Policy Briefing(www.korea.kr)”; (<https://www.korea.kr/special/policyCurationView.do?newsId=148857563>)

- On November 19, 2020, the government (MOLIT) published an administrative notice to revise the procedures for granting temporary permits.

KEY REVISIONS TO NOTE

- Breakdown the category of AVs into three types; (A) the traditional type of AV; (B) AV without a driver's seat; and (C) Unmanned AV.
 - Under the current procedures, type (B) and (C) AVs are not eligible to obtain a temporary permit. (In the case of type (B), a permit is obtainable only when an exception in the law applies.) After the revision occurs, both type (B) and (C) will be eligible to receive a permit.
- Tailored permitting requirements will apply for each type of AV. For example, for type (B) AVs, a temporary permit may be granted only if the AV has incorporated certain functions – e.g. an emergency stop button for passengers, emergency controls, automatic stop function in case of breakdown, etc. For type (C) AVs, emergency control buttons on the left and right side of the AV.

TEMPORARY PERMITS AND OTHER REQUIREMENTS FOR TEST DRIVING

Currently, only autonomous vehicles that have received a temporary driving permit (upon the condition that a driver is on board) are allowed to operate on the roads across the country.

- At least a “temporary driving permit” from the Minister of Land, Infrastructure and Transport is required for test driving of autonomous vehicles. Also, a preliminary test drive of 5000 km in accordance with the “Regulations on the Safe Driving Requirements and Test Driving of Autonomous Vehicles” is required.
- Since February 2016**, permits have been granted only to vehicles that meet the “minimum safe driving requirements.”

“MINIMUM SAFE DRIVING REQUIREMENTS”

[See “Regulations on the Safe Driving Requirements and Test Driving of Autonomous Vehicles” (Chapter 2, para 1)]

- Vehicle must be certified to meet minimum safe driving requirements through a self-certification process by eligible manufacturers, or by the government (Article 30(3) of the VMA; and Article 34 of the Enforcement Decree of VMA).
- Any car owner or party who has the right to use the car, who wishes to obtain a temporary driving permit for the purpose of testing/researching AVs (“applicant for autonomous vehicle temporary driving permit”), is liable for damages for personal injuries arising from the operation of such vehicle. In addition, he/she must subscribe to adequate insurance to ensure payment of damages.

- The applicant for an AV temporary driving permit must conduct sufficient pre-driving (5000 km) at a test facility to confirm the operation of the autonomous vehicle functions.
- The applicant for an AV temporary driving permit must submit a list of test products and related data to the performance test agent. The test products and related data which must be submitted include: the vehicle subject to the permit application, descriptions of technical stages, structures and functions of such vehicle, insurance and other subscription certificates, pre-test driving report, etc.
- To obtain a temporary driving permit to operate an AV, an “AV test drive” notice must be posted on the rear of the vehicle. The size of the letters must be at least 70 mm in length and width, respectively, and such notice must be attached to a position of an appropriate height that can be easily seen by a driver behind such vehicle and must be identifiable at night.
- Permitted zones/areas for operation:** Since November 2016, it has been possible to operate on all roads in the country except for protected areas for the transportation of vulnerable people (e.g., children protected areas). (Article 26-2(1)3 of the Enforcement Rules of the Vehicle Management Act).
- For any vehicles that have difficulty meeting the safety driving requirements and safety standards (“Vehicle Rules”) due to their technical features (e.g., autonomous shuttle bus has no available driver's seats – thus, particular regulations such as the safety driving requirements and safety standards based on the existence of a driver's seat cannot be fulfilled), temporary operation thereof is permitted by applying special regulations.⁵

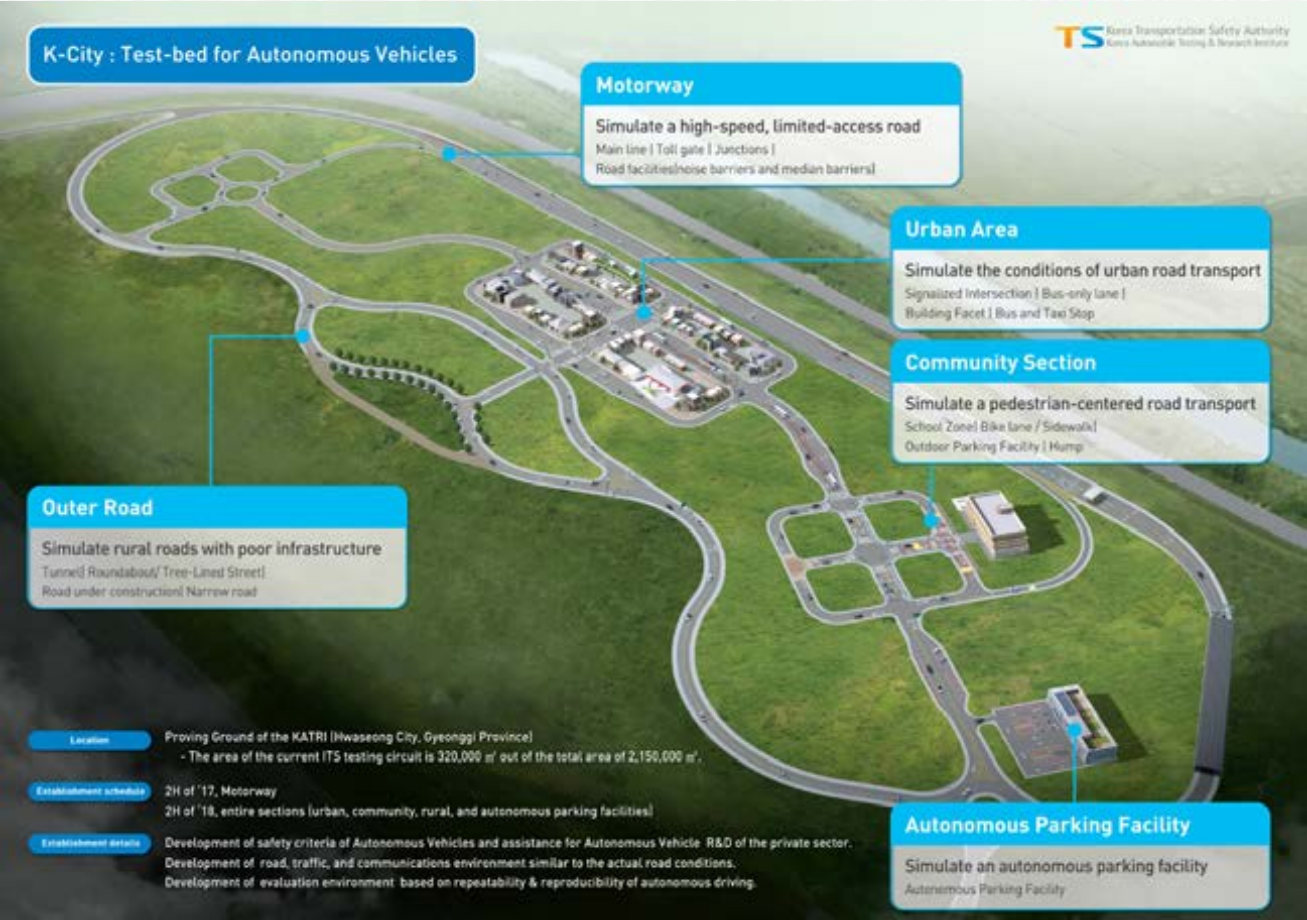
Test driving of autonomous vehicles on the condition that the driver will be on board was permitted by Ordinance of the Ministry of Land, Infrastructure and Transport (the Vehicle Management Act and the Enforcement Decree of the Vehicle Management Act).

- The test driver is responsible for any accidents that occur during temporary operation.
 - Scope of liability:** If a driver causes injury to another person, the driver is liable to compensate for the damage (injury) caused by the accident (Guarantee of Automobile Accident Compensation Act). However, in terms of criminal liability, AVs are not subject to punishment as an AV does not fall within the scope of ‘vehicle’ under the Act on the Aggravated Punishment, etc.

AV TESTING AT THE ‘TEST-BED’ (K-CITY)

- AV proving ground, K-City, officially opened in December 2018. K-City provides a real-world environment, including highways, urban and suburban roads, parking lots with 35 experimental facilities such as tollgates, crosswalks, BRT lanes, intersections, WAVE and 5G stations.
- Workspaces for participating companies and new facilities to simulate extreme weather and GPS shadowing will be added by 2022.
- Pedestrians and traffic will simulate a busy city road using robots. Self-driving cars will be evaluated based on their ability to avoid traffic and counteract unexpected situations.

⁵ See Article 114 of the Regulation on the Performance and Standards of Automobiles and Automobile Parts; and Article 22 of the Regulation on Safe driving Requirements of AVs and Test-driving.



AUTONOMOUS VEHICLE REGULATION INNOVATION ROADMAP 2.0

- On December 23, 2021, the Ministry of Land, Infrastructure and Transport (MOLIT) released its “Autonomous Vehicle Regulation Innovation Roadmap 2.0.”
- With the launch of Level 3 autonomous driving vehicles in 2022, the era of fully autonomous driving will begin, and it is expected that Level 4 autonomous vehicles will be commercialized in 2027. Based on this future scenario, by 2030, a total of 40 regulatory innovation tasks will be prepared, including 20 new tasks in three areas: vehicle, infrastructure, and service.
- Short-term (2022–2023) major tasks:** (1) Allowing autonomous driving software over-the-air update (OTA); (2) Providing pseudonymization standards to promote the use of autonomous driving image data; (3) Establishing an authentication management system to strengthen the security of the autonomous driving cooperation system; (4) Expanding special cases for autonomous mobility service.
- Mid-term (2024–2026) major tasks:** (1) Complementing safety standards for Level 4 autonomous vehicles and Level 3 commercial vehicles (buses, trucks); (2) Establishing an administrative sanctions system for traffic violations; (3) Revising driver concepts and deregulation of mandatory requirements; (4) Supplementing Level 4 autonomous vehicle insurance regulations; (5) Deregulating autonomous driving vehicle classifications to respond to the new mobility.

- Long-term (2027–2030) major tasks:** (1) Establishing a Level 4 autonomous vehicle inspection/maintenance system; (2) Allowing new autonomous vehicles a simple license; (3) Deregulating the classification system for a passenger transportation business to introduce new services.

Connected vehicles and logistics

LIABILITY

Responsibilities of the actors

- The Monthly KOTI Magazine on Transport (2020.10) summarizes responsibilities of the relevant actors, set out in the Ethics Guideline for AVs and Stakeholders, as follows:

Relevant actors	Role	Governing/Relevant Laws
Design Authorities - who design the AV utilizing relevant soft-ware and hardware technologies.	<ul style="list-style-type: none">Design authorities must design AVs in a manner such that the vehicles can store driving records, etc.Design authorities must design AVs in a manner such that the vehicles may prevent accidents as much as possible. In the event of an unavoidable accident, AVs should be designed to minimize damage to the passengers and other parties.	
Manufacturers - who develop the AV technologies or manufacturers who assemble the cars	<ul style="list-style-type: none">Manufacturers must produce AVs in a manner such that the vehicle can record and store any driving-related data.Manufacturers must produce and sell AVs in compliance with certification standards, bioethics, information & communication ethics and engineering ethics.Manufacturers are responsible for any damage caused by manufacturing defects of AVs.Manufacturers are obligated to provide AV owners and users with instructions (e.g. cautions in using certain functions of AVs and guidelines on safe driving) - they must provide the relevant information in writing and faithfully respond to any inquiries from the drivers and users.Manufacturers must be equipped with a cyber security system and must always provide drivers and users with information on any changing matters.	Product Liability Act (by FTC): This law governs the liability of manufacturers for any damages caused by defects in products. AVs correspond to a product under the Product Liability Act, but the software (system/program used in AVs) therein cannot be considered as a product and therefore cannot be held responsible for the product. However, liability may be imposed if such software can be interpreted as embedded software.



Relevant actors	Role	Governing/Relevant Laws
Service Authorities - who provide services in response to the demand in the market, utilizing the AVs made by the manufacturers. (e.g. Siheungsi (City) provides patrol services with the 'Goalie' manufactured by Mando; Incheon Airport provides transport services with the autonomous trains and carts manufactured by Incheon Airport Corporation and domestic SMEs.)	<ul style="list-style-type: none">Service authorities must protect the safety of users and shall not infringe or harm the interests of others or public interests.Service authorities must keep the software of AVs current to the most recent version available.Service authorities must protect the personal information produced in the course of providing services.Service authorities should make efforts to minimize any illegal use and abuse.	
Drivers	<ul style="list-style-type: none">Drivers must drive AVs according to the vehicle's intended purpose and functions.Drivers must not make any arbitrary or illegal modifications that could cause safety problems in AVs.Drivers must complete a sufficient amount of training for safety before driving.	

- At least for now, the statutes/laws of Korea are silent on issues concerning allocation of liability in case of accidents (the AVA only going so far as to stipulate a narrow insurance requirement).

Additional liability imposed on the manufacturers under the UN regulation

- A new UN regulation will soon require vehicle makers in South Korea (together with those in Japan and EU) to secure connected vehicles from cyber security threats.
- Concern on cyber security threats: Hackers remotely accessing autonomous vehicles, posing a risk to public health and security.

UN regulation

- Aim:** Ensure manufacturers take adequate steps (e.g., take action and respond when consumers' cars get hacked) to protect their vehicles and customers from these types of threats.
- Manufacturers must address specific threats, such as potential malware infiltration of servers, which could give hackers access to troves of connected vehicle data.
- Manufacturers must document ways they will protect vehicles from specific threats, how they will up-date authorities on the success of their efforts at least once annually, and how they will report pertinent data on cyberattacks.
- While the date of implementation varies by region, in South Korea the regulation was incorporated into the "Guidelines for Cyber Security," which was announced by MOLIT on December 15, 2020.

DATA PRIVACY AND SECURITY

Exemption from general data privacy rules in the context of AV operation, subject to anonymization under the AVA

Generally, under the data protection laws of Korea, activities/businesses that collect and use personal information are subject to strict restrictions, such as consent requirements, use for consented/

specified purposes only, etc. Traffic information of pedestrians, other drivers, and drivers of AVs, fall within the scope of 'restricted' information as those are personal information as well.

However, the Autonomous Vehicle Act (AVA) provides an exemption from data restrictions in the Korean data protection laws. More specifically, Article 20 of the AVA provides that the three Korean data protection⁶ laws are not applicable to the use of personal information⁷ collected during the operation of AVs, provided that the information is anonymized. *

- Implications of the AVA: Collecting and using personal data may not necessarily trigger general data protection requirements under the relevant laws.
 - Note*: Providing an exemption for the data protection laws as such does not mean that use of the data is unconstrained throughout the interval between the collection of data and the anonymization of such data.
 - The AVA does not, by itself, clarify (to) what scope/extent the handling of such data is exempted from the restrictions before anonymization is done.
 - Where personal data is collected outside Korea and anonymization is done outside, whether you need 'con-sent' to use such data or are permitted to use it without consent remains unclear.

The Guidelines for Cyber Security (announced by MOLIT on December 15, 2020)

- Legal status of the guidelines:** 'Recommendations' (i.e., not yet a 'law' and thus, persuasive only and not binding).
- However, the government stated in the Guidelines published on December 15, 2020, that this is just

6 Personal Information Protection Act, Act on the Protection, Use, etc of Location Information, and Act on Promotion of Information and Communications Network Utilization and Information Protection, ETC.

7 Personal information' here means (i) personal information within the meaning of Article 2-1 of the Personal Information Protection Act, (ii) location information of individuals within the meaning of Article 2-2 of the Act on the Protection, Use, etc. of Location Information, and (iii) other information designated as personal information by Presidential decree.

a first step. The government is planning to enact laws/legal standards regarding cybersecurity, with the goal of implementing such laws beginning in July 2022.

- The guidelines have been made based on the UN Regulation on Cybersecurity (UNR No.155).

Key contents:

- Manufacturers are recommended to adopt a CSMS (Cyber Security Management System).
- To preserve cyber security, manufacturers are recommended, *inter alla*, to:
 - set a deadline within which the risk can be managed and respond as soon as possible to cyber threats to prevent/minimize the damages; and
 - continue monitoring the system after initial registration of the car and be equipped to detect cyber threats/attacks from the information collected (e.g., information collected from the data storage system of the car) and analyze the system's weakness.

TELECOMMUNICATIONS AND 5G

“5G+Strategy”

In April 2019, the Korean government announced a “5G+ Strategy” to realize innovative growth based on 5G technology, through cooperation among related departments and agencies. The government selected 10 “core industries” and 5 “core services” as strategic 5G industries and introduced support plans customized to each industry, based on market maturity and demand.

‘5G vehicles-to-everything(V2X)’ was selected as one of the ten “core industries,” while ‘autonomous vehicles’ was selected as one of the five “core services.”

For the selected “industries” and “services,” the government is supporting the development of the technology and under such support some major

Korean companies are devoting significant resources to its development.⁸

Development/progress currently

February 2018: SK Telecom and the Korean Transportation Safety Authority (TS) successfully ran “cooperative driving” on multiple 5G self-driving cars in K-City, pilot city for self-driving in Hwaseong on February 5, 2018. [Learn more.](#)

- Two self-driving cars equipped with 5G technology successfully ran trial driving while sharing traffic information with each other.

Testing confirmed:

- A self-driving car automatically stops when 5G and HD map alerted the driver of a child appearing in the vehicle's blind spot.
 - 5G network alerts drivers for jaywalking passengers and accidents on the road and facilitated communication at the crossroads with no traffic sign.
 - HD Map provides detailed traffic information, including reports of accidents in real-time.
- Two self-driving cars at the crossroads communicating via 5G network decide which vehicle to first pass through the congested area.
- A CCTV spotted a jaywalking child in a school zone area and alerted a nearby vehicle through a 5G network, allowing two self-driving cars to stop all at once.

November 2019: Hyundai Mobis and its partners, Korea Telecom (KT) and Hyundai MnSOFT successfully demonstrated 5G Cellular Vehicle-to-Everything (C-V2X) communications between autonomous test vehicles (AVs) at the company's Seosan Proving Ground in South Korea. (Nov 2019)

- Hyundai Mobis and KT have been cooperating closely with each other since they formed a technical alliance for connected cars in 2018. The two companies entered into an MOU for jointly developing ‘5G-based connected car technology’ in August 2018, and KT built the 5G infrastructure for the technology's development at the Seosan Proving Ground by the end of 2018. Hyundai Mobis began to work in earnest with the Hyundai MnSOFT software development division on the first project in January 2019, which included development of real-time navigation update technology and mobile communication-based C-V2X technology. Since that time, it has been creating related technologies. [Learn more.](#)

Driving forces

COVID-19 IMPACT

Largely two types of support have been provided by the Korean government:

1. Production Support

- Simplifying the import procedures for auto parts
- Special extension of work hours by allowing more than 52 hour per week

2. Liquidity Support

- Employment Retention Subsidies
- R&D Support for localization of auto parts
- Loan and credit guarantee program for SMEs
- Extension of debt maturity periods

In Korea, it appears that COVID-19 has sped up AV legislation and adoption.

FURTHER DEVELOPMENTS

- SK Telecom Announces its 5G Achievements and Plans on the First Anniversary of 5G Launch:

“Furthermore, the company will continue to work closely with Seoul Metropolitan Government to accelerate the C-ITS (Cooperative Intelligent Transportation System) project by applying Road Learner, which consists of 5G ADAS (Advanced Driver Assistance System) and Live HD Map Update solution. 5G ADAS and Live HD Map Update solution are key technologies for autonomous driving as 5G ADAS improves driving safety through features including lane departure warning and forward collision avoidance, and Live HD Map Update solution reflects road situations to HD maps in real time.” - SKT News Release

In June 2021, SKT wrapped up its testing of a next-generation traffic system in Seoul. SKT has been building autonomous driving testbeds with 5G sensors, IoT-built city buses, and taxis for use on major roads in Seoul, including attaching 1,735 5G sensors to major roads and traffic lights that are 151km long. SKT announced that the information obtained through the IoT sensors is sent by the average daily, 43 million related to walking signals and pedestrian access, 5.8 million related to pot-holes, and 520,000 related to congestion at platforms, helping drivers to drive safely.⁹

⁸ Further details available at <http://www.businesskorea.co.kr/news/articleView.html?idxno=30733#:::text=The%2015%20industries%20consist%20of,%2C%20information%20security%2C%20edge%20computing%2C>

⁹ Further details available at <https://www.smartcitytoday.co.kr/news/articleView.html?idxno=20955>.



- **Incheon International Airport:** Introduced autonomous trains (and cart robots) - In operation since October 14, 2020; implemented without delay.
 - **On October 14, 2020**, Incheon International Airport Corporation introduced and is operating the world’s first indoor autonomous trains and cart robots. Each of the two autonomous trains are in operation in the duty-free area of the arrivals hall at Terminal 1 and the duty-free area in the Departures hall at Terminal 2 respectively. The trains assist vulnerable users (e.g. the elderly, pregnant women, disabled, etc.), while the six cart robots are supplied to transport passengers’ luggage and/or certain cargos.
 - Both autonomous trains and cart robots were developed by Incheon International Airport Corporation in cooperation with domestic SMEs.
- **Siheung Baegot New Town Life Park:** Autonomous patrol car “Goalie” will be in operation soon.
 - An autonomous patrol car “Goalie” was developed by Mando, the second largest auto parts maker in Korea. The Goalies will be deployed in Siheung Baegot New Town Life Park to patrol the area at nighttime and video-record CCTV blind spots, sending the recordings to the control center.
 - The project was partially necessitated by relevant regulations rather than COVID-19 concerns. However, the ICT Board for regulatory sandboxes has allowed the test operation of Goalies to proceed and the project was given a temporary respite from regulatory regimes until March 2022.
- **“AV Pilot Zone” scheme:** A new system introduced under the Autonomous Vehicle Act (Effective from May 2020).
 - **AV Pilot Zone:** A special regulatory district to support the demonstration of autonomous driving services. If a district is selected as an AV pilot zone, self-driving manufacturers can carry out the simulation of a real-life situations (and actually receive fares/consideration). Moreover, a diverse range of (special) exemptions from regulations are available for private manufacturers who are willing to test-operate in the AV pilot zone (e.g., they can obtain a permit for test-operating without meeting the vehicle safety standards). This provides an opportunity for a manufacturer to gauge market reaction and the government can collect relevant data and ideas that may be useful in making further policies/institutional improvements.
 - Pursuant to the new law, **“AV Pilot Zones”** were designated¹⁰ for the first time in November 2020. The regions that were selected and some key services that were allowed are as follows:

No.	City/Province	Area designated as ‘AV Pilot Zone’	Autonomous driving Services to be provided include
1	Seoul	Area of 6.2km2 range in San-gam-dong area.	Shuttle service between DMC station and commercial/residential/park areas.
2	Chungbuk/Saejong (Jointly applied)	About 22.4km of Osong-Saejong Terminal route of BRT. ¹¹	BRT service between Osong Station and Sejong Terminal.
3	Sejong	22.9km of BRT circular route; and Area of approx. 25km2 in living zones 1-4.	Demand-responsive shuttle bus service circulating within Sejong Government Complex.
4	Gwangju	Area of approx. 3.76km2 in 2 zones in Gwangsangu.	Road cleaning cars, Waste collecting cars.
5	Daegu	Area of approx. 2.2km2 in Suseong Al-pha City; Area of approx. 19.7km2 of Technopolis and Daegu National Industrial Complex; and Approx. 7.8km route of the road connected to industrial complex.	Shuttle service within Suseong Al-pha City (Samsung Lions Park-Daegu Museum of Art route). Demand-responsive taxi service in Technopolis and the National Industrial Complex.
6	Jeju	Certain parts of the route between Jeju International Airport and Jungmun Tourist Complex (38.7km); and Area of approx. 3km2 within Jungmun Tourist Complex.	Airport pickup shuttle services (Jeju International Airport-Jungmun Tourist Complex route)

Based on an announcement of the Ministry of Land, Infrastructure and Transport made on November 22, 2020

¹⁰ Under the supervision of the Ministry of Land, Infrastructure and Transport, the “Autonomous Vehicle Demonstration District Committee” was created to designate AV pilot zones. (The committee consists of six commissioners from public sectors (vice-ministers of the Min-istry of Land, Infrastructure, and Energy/ Ministry of Economy and Finance/Ministry of Science and Technology/ Ministry of SMEs and Startups / National Police Agency, as well as the Minister of Land, Infrastructure, and Energy) and 12 commissioners from private sectors (experts in automotive/transportation/communication/ city)

¹¹ BRT, which stands for Bus Rapid Transit, is a transportation system in Korea, offering ex-press buses-only lanes, convenient transit services, etc.

Summary

Since the outbreak of the pandemic, the need and demand for so-called ‘untact’ services has increased greatly in Korea, as in other countries around the world. Accordingly, the government has been supporting (and cooperating), more actively than ever, in relevant projects/businesses of AV manufacturers.

Many Korean companies developing AV systems had been forced to stay at a demonstration stage, even after sufficient technology development, due to regulatory obstacles. However, it seems that the situation has improved for those manufacturers because the government is being more supportive and relaxing certain regulations to meet the increased demand for untact services (e.g. taxis without drivers) within Korea.

The government intends to take a phased approach by adding and upgrading regulations and laws related to technology, communications and insurance in steps in order to satisfy the standards and structure associated with operating autonomous vehicles. Between 2024 and 2026, it seems that the government will focus on devising a legal framework for Level 4 self-driving vehicles in terms of insurance policies and traffic systems to provide clear standards for legal responsibilities. The detailed action plans for regulation improvements will be announced in the first half of 2022.

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Turkey

Regulatory developments and roadblocks

Turkey recognizes the international efforts for development of driverless and automated vehicles. Although the regulatory background for autonomous vehicles is not ready for commercialization, this issue has been on the agenda of legislators in recent years. Accordingly, support for automated vehicles has been the topic of policy documents and action plans. By the same vision, Turkey has been breaking ground to implement regulations for electric vehicles and charging infrastructure.

Below is a summary of recent legislative efforts relating to smart transportation and connected urban planning:

- **2014 – 2016:** The first strategy document and action plan for intelligent transportation systems was prepared by the Ministry of Transport and Infrastructure. This document took effect in 2014 and provided guidance for the period between 2014-2016.
- **2016 – 2019:** The Ministry of Industry and Technology also prepared a strategy document and action plan (2016-2019) for Turkey’s automotive industry. This document focused on the implementation of international standards in developing intelligent systems such as driver assistance systems, emergency brake systems, active cruise-control systems, lane-keeping systems, e-Call, and testing of driverless cars.
- The Ministry of Environment and Urbanization has the responsibility to prepare a smart city strategy and smart city program. This program includes action plans to develop cities’ infrastructural capabilities suitable for autonomous vehicles and other intelligent transportation systems.

- **2016 – 2020:** The National E-Government Strategy and Action Plan (2016-2019), Information Society Strategy and Action Plan (2015-2018) and National Broadband Strategy and Action Plan (2017-2020) also aim to ensure collective development, encouraging and facilitating the use of intelligent transportation systems.
- **2020:** The Ministry of Transport and Infrastructure published the National Intelligent Transportation (ITS) Strategy Document and 2020-2023 Action Plan on May 8, 2020. The Action Plan explicitly states that all groundwork in terms of development and expansion of autonomous and connected vehicles are planned to be completed by 2023. Furthermore, certain regulations and legislative amendments governing the data protection, telecommunication and liability regimes are expected to be enacted.
- **2022:** Most recently, the Ministry of Industry and Technology adopted the Regulation on Type-Approval Requirements for Motor Vehicles and Their Trailers, Systems, Components and Separate Technical Units (EU/2019/2144) (known as “Type Approval Regulation”). The newly introduced Type Approval Regulation sets forth certain type approval requirements for autonomous vehicles as well. The regulation will effectively enter into force by June 7, 2022. The Type Approval Regulation mainly aims to harmonize the Turkish legislation with EU rules. Therefore, the regulation directly refers to European Commission and recognition of type approvals for vehicles granted within EU territory.

As the Turkish government has recently demonstrated a significant interest in developing the automotive industry by introducing the production of the first domestic car (namely, TOGG), relevant public authorities and municipalities have started to prioritize investing

in development of connected vehicles and smart city solutions. Turkey explicitly announced its belief that the transportation sector has been transforming because of the studies conducted on autonomous vehicles, connected vehicles, and intelligent road systems. The 2020-2023 Action Plan states that the driverless vehicle sector has been rapidly advancing due to applications such as traffic forecasts, smart decision-making via machine learning, deep learning technologies, and big data. With all these technologies, it is officially foreseen that traffic accidents, which constitute a major problem in transportation security in Turkey, can be prevented by early detection of potential dangers via pre-analysis of traffic scenarios. Therefore, the Turkish government believes that legislative and regulatory background for autonomous and connected vehicles should be ready to enforce not only for the vehicles but also in terms of artificial intelligence regulations, big data solutions, and deep learning techniques.

Therefore, Turkey is working closely with stakeholders, academics and non-governmental organizations to determine the legislative agenda.

Currently, Turkey has set forth a long-term goal for conducting preparatory studies to make the existing infrastructure suitable for autonomous driving and to develop fully autonomous vehicles and spread their use in all modes of transport.

The regulatory agencies conducting studies to develop the infrastructure and legal background for driverless vehicles could be counted as follows. Although these regulatory authorities regarding autonomous and connected vehicles have not yet been recognized by legislation, potential issues and disputes could be resolved in consultancy with the following public bodies:

- **Ministry of Transport and Infrastructure (General Directorate of Transport Services Regulation)**
- **Ministry of Environment and Urbanization**
- **Ministry of Information and Technology**
- **Turkish Data Protection Authority**

- **Municipalities (particularly in terms of use of autonomous vehicles for public transportation purposes)**
- **Information Technologies and Communication Authority**

Driverless vehicle testing and deployment

Under Turkish law, there is no specific regulation or a competent body to deploy and expand driverless vehicle testing. However, the Ministry of Transport and Infrastructure's Action Plan for 2020-2023 plans to complete the establishment of Autonomous Driving Test and Certification Centers where functional and operational tests of autonomous vehicles are performed, and certification services are provided.

Having said that, the Type Approval Regulation permits the testing of autonomous vehicles by manufacturing companies in accordance with the requirements specified in the Annex-2 beginning July 6, 2022.

Furthermore, test corridor deployments in EU countries and the development of driverless/connected vehicles brought cooperative intelligent transportation systems (C-ITS) to Turkey's agenda. Test phase studies are being conducted. In this respect, the Turkish government aims to complete the preparations for the test phase and create a C-ITS test and application corridor by 2023.



REGULATORY REQUIREMENTS

There is no other specific regulation or standard under current Turkish legislation governing autonomous vehicle testing or approval process for driverless vehicles. That said, the Type Approval Regulation stipulates the following requirements for automated vehicles:

- systems to replace the driver's control of the vehicle, including signaling, steering, accelerating and braking;
- systems to provide the vehicle with real-time information on the state of the vehicle and the surrounding area;
- driver availability monitoring systems;
- event data recorders for automated vehicles;
- harmonized format for the exchange of data, for instance, for multi-brand vehicle platooning; and
- systems to provide safety information to other road users.

It should be noted that the technical specifications relating to driver availability monitoring systems do not apply to fully autonomous/driverless vehicles.

Moreover, by entry into force of the Type Approval Regulation in 2022, autonomous vehicles will be required to comply with the technical and type approval requirements of e-Call Regulation. In this respect, manufacturers will be under obligation to ensure that autonomous vehicles to be utilized in Turkey are equipped with a permanently installed 112-based e-Call in-vehicle system.

In terms of license requirements, there is no specific regulation or exception for autonomous vehicles in Turkey. In this respect, as Turkey is a party to the Vienna Convention (WÜ), every vehicle must have a driver (Art. 8 para.1WÜ) who must be able to intervene on request. Test drivers must possess a valid driving license; otherwise, no additional training is required. The General Directorate of Security is the body responsible for issuing driver licenses. However, it should be noted that specific legislation and regulation is expected in terms of license requirements in conjunction with amendment

requirement for liability rules under Turkish Law of Obligations and Criminal Law.

Further, product liability laws and product safety regulations require certain safety standards and currently does not provide any exception for autonomous products.

In terms of insurance requirements, there are no specific requirements for autonomous vehicle testing. However, under the Law No. 2918 on Highway Traffic, the person who owns the vehicle or who is registered in the registry as a buyer when sold with retention of title or lessee, borrower or pledgee in cases of long-term lease, loan or pledging, is obliged to have a liability insurance.

In terms of autonomous platooning, the Type Approval Regulation requires a harmonized format for the data exchange (e.g. multi-brand vehicle platooning).

DRIVERLESS VEHICLE DEPLOYMENT

The Type Approval Regulation permits the use of driverless vehicles for personal use on public roads by laying down the procedures and technical specifications for the systems and the type-approval of autonomous vehicles to ensure the safe operation of automated and fully automated vehicles on public roads. The regulation will effectively enter into force in 2022.

NAVIGATING INTERNATIONAL AND LOCAL REGULATIONS

The legal and regulatory requirements regarding autonomous and connected vehicles are not governed by any one government entity and the legislative background has not been adapted to specific requirements for autonomous vehicles. Therefore, requests to run trials and/or test certifications require market entrants to receive consultancy services from legal professionals who can conduct research to navigate regulations at international and domestic levels and effectively communicate with different public authorities as well as non-governmental organizations. Moreover, despite harmonization requirements for Turkish

legislation with relevant EU law, due to customs union and accession process, national regulations still address potential deficiencies under Turkish law. Therefore, the need for a specialized legal counsel goes beyond doubt for potential market entrants.

While Turkish government is still constructing its policy and strategy framework, neither testing nor deployment of autonomous vehicles has been initiated in Turkey. Therefore, although there is no legislation explicitly prohibiting the use of driverless vehicles, Law No. 2918 on Highway Traffic and other traffic regulations are totally constructed upon driver-based vehicles. Therefore, all approvals and license requirement for personal use of vehicles are based on the existence of a driver. Accordingly, consumers have not been permitted to use driverless vehicles for personal use.

LIABILITY

Under Turkish law, there is no specific regulation on liability in terms of autonomous vehicle accidents. It should be primarily noted that there is currently a hot debate in doctrine regarding liability issues under Turkish tort criminal law. Therefore, due to the lack of actual use and testing/deployment of autonomous cars in Turkey, there is high legal uncertainty regarding liability issues. The primary legislative piece currently regulating liability is Law No. 2918 on Highway Traffic providing tort provisions for the “operator” of vehicles within the meaning of the law. As the tort law principles based on “defect liability” in terms of vehicle use, the liability of “manufacturer” is considered as significantly rare under Law on Highway Traffic. However, it is still open to discussion whether manufacturers could be held liable for defects stemming from autopilot.

Regarding civil responsibility, the operator, manufacturer, and driver may be held responsible under Turkish Code of Obligations according to related provisions for each. In this regard, operators may be held liable under danger liability provisions, while manufacturers may be held responsible under the product safety regulations. However, the meaning of the term “driver” within this framework is considered as uncertain to assess.

On the other side, criminal responsibility may arise, pursuant to Turkish criminal law, if discussions on free will are concluded at a uniform acceptance. Furthermore, natural persons, either being a manufacturer or programmer, can be held liable under criminal law. However, as legal persons do not directly have criminal responsibility, manufacturers’ position is also controversial from a criminal law perspective.

Connected vehicles and logistics

DATA PRIVACY AND SECURITY

The General Data Protection Regulation and Data Protection Act 2018

According to the Type Approval Regulation, any processing of personal data, such as information about the driver processed in event data recorders or information about the driver’s drowsiness and attention or the driver’s distraction within the scope of the autonomous vehicles, should be carried out in accordance with Law No. 6698 on the Protection of Personal Data. (“PDP”)

Furthermore, although Turkish e-Call Regulation does not contain any article on the personal data protection, it refers to the EU Regulation numbered 2017/79 to be taken into consideration in case of doubt. Therefore, we assume that the processing of personal data collected through the 112-based e-Call in-vehicle system is subject to Law No. 6698 on the Personal Data Protection (“PDP law”) like the EU reference to the GDPR.

As in all developing industries with disruptive innovation and a data-driven characteristic, it is expected that connected autonomous vehicles will collect and process a vast amount of data, which has significant value for manufacturers and developers. Therefore, it would be crucial to define which data is deemed as “personal” and will benefit from the protective cloak of PDP law in Turkey.

Personal data is any information that can identify a natural person such as a name, an identification number, location data, an online identifier or one or

more factors specific to the physical, physiological, genetic, mental, economic, cultural, or social identity of that natural person.

Personal data relating to race, ethnic origin, political opinion, philosophical belief, religion, religious sect or other belief, appearance, membership to associations, foundations or trade-unions, data concerning health, sexual life, criminal convictions and security measures, and the biometric and genetic data are deemed to be special categories of personal data.

Special categories of personal data, if obtained by others, can leave the data subject open to discrimination or unfair treatment. For this reason, sensitive personal data merits stricter protections than other personal data.

Notably, only data relating to natural persons is protected under the PDP law. Therefore, the term “data subject” is used in the law to refer to natural person whose personal data is being processed.

The procedures and principles for processing personal data in the law are regulated in accordance with the Convention for the Protection of Individuals regarding Automatic Processing of Personal Data No.108 and the European Union Data Protection Directive 95/46/EC.

The following general principles set out in the law shall be complied within the processing of personal data:

- lawfulness and fairness;
- being accurate and kept up to date where necessary;
- being processed for specified, explicit and legitimate purposes;
- being relevant, limited and proportionate to the purposes for which they are processed; and
- being stored for the period laid down by relevant legislation or the period required for the purpose for which the personal data are processed.

According to Article12 on data security of PDP law, the data controller is obliged to take all necessary

technical and organizational measures to provide an appropriate level of security for the purposes of:

- preventing unlawful processing of personal data;
- preventing unlawful access to personal data; and
- ensuring protection of personal data.

The Turkish Personal Data Protection Board has the power to take regulatory action to determine security requirements. In case the processing of personal data is carried out by another natural person or legal person on behalf of the data controller, the controller shall jointly be responsible with these persons for taking the necessary measures. Therefore, data processors are also obliged to take measures to ensure data security.

The controller is also obliged to carry out the necessary audits, or have them conducted, to ensure the implementation of the provisions of the law. The controller can conduct this audit by itself or have them conducted through a third party.

The data controllers and the data processors shall not disclose the personal data that they have obtained to anyone contrary to the provisions of the law and they shall not use such data for purposes other than that for which the personal data has been processed.

In the event processed data is obtained by others by unlawful means, the data controller shall communicate the breach to the data subject and notify the board within the shortest time. Where necessary, the board may announce such breach at its official website or through other methods it deems appropriate.

The principles regarding the processing of personal data should be at the core of all personal data processing activities. In this respect, the first question to be asked is whether the data collected by autonomous vehicle is considered as “personal data” under PDP law. It is generally understood that all these principles and requirements under PDP law could principally be applied to autonomous vehicles, given there are no specific regulations or exemptions for the data collected, processed, and transferred by autonomous vehicles.

In conclusion, any manufacturer or business who aims to collect or exploit personal data collected and processed by autonomous vehicles could be characterized as a data controller and would need to meet the requirements set forth under PDP law. In this respect, discussions regarding “legitimate interests,” “performance of a contract,” or “requirement for explicit consent” will inevitably be on the table for autonomous vehicles.

TELECOMMUNICATIONS AND 5G

In the National Broadband Strategy and Action Plan (2017-2020), development of 5G technologies in Turkey is considered a national policy priority. The primary objectives include supporting local production, creating testing and R&D networks, and incentivizing sector participants. Moreover, the action plan introduces the goal of inclusion of intelligent transportation systems in the annual funding programs by the Ministry of Industry and Technology and Ministry of Transport and Infrastructure until 2023.

While there have been no tenders for spectrum yet nor any licenses granted for 5G networks in Turkey, the Information and Communication Technologies Authority (“BTK”) granted permits to three leading companies to conduct 5G tests in Istanbul, Izmir and Ankara.

SPECTRUM MANAGEMENT

Spectrum management is regulated under Law No. 5809 on Electronic Communications and Regulation No. 27276 on Spectrum Management; however, there is no specific regulation regarding transportation and autonomous vehicles. Within this scope, the regulatory body is the Information and Communication Technologies Authority.

Notably, the National Broadband Strategy and Action Plan (2017-2020) aims for expansion of M2M, IoT and IoE and broadband services that will eventually increase the efficiency in ITS. The government aims to complete fiber and broadband infrastructures in all state roads and highways by 2023.

COVID-19 IMPACT

The COVID-19 outbreak changed the priorities in transportation industry in Turkey. Most companies investing in innovative solutions for transportation sector shifted their efforts to develop self-disinfection systems and tracking technologies for actual or potential patients in public transportation vehicles. Therefore, due to the COVID-19 outbreak, the attention for autonomous and connected vehicles has drastically shifted toward safe and clean vehicles, particularly in terms of public transportation.

With that said the official action plans for the development of autonomous vehicle sectors in Turkey have not been delayed or suspended due to COVID-19 outbreak.

ELECTRIC VEHICLES AND CHARGING STATIONS

There is a positive correlation between the number of electric vehicles (“EVs”) and the availability of charging infrastructure. As the number of EVs increases, it incentivizes infrastructure providers to increase their investments. In this mutually cultivating development cycle, the availability of charging infrastructure also motivates consumers’ purchase intention of EVs. As consumers wait for the technology and the system to mature, manufacturers abstain from investing until they see demand in the market. The recent amendment made in Electricity Market Act No. 6446 (“Electricity Market Act”) December 2021 will serve as a step closer to addressing the preceding problem.

Although total sales of EVs in the Turkish market was 2,849 between January 2021 and December 2021, it is believed that there is a compelling potential for EVs with the launch of domestic electric vehicle production (TOGG) soon. The rapid spread of EVs due to global developments aiming to prevent climate change inevitably requires radical changes, especially for the transportation sector. To meet the energy needs of this rapid spread, the infrastructure of electric charging stations must be developed. According to figures, more than 85% of EV charging occurs at home. However, it must be noted that to mitigate the range anxiety of the EV users, the availability of public charging infrastructure plays an essential role in extending EV adoption. Considering the complementary economic relationship and the causation between EVs and their charging stations, the foregoing radical changes in the transportation sector also led to quite a few legal changes.

WHAT DOES THE AMENDMENT BRING?


Although the Electricity Market Act is a long way from addressing the dynamics specific to the charging infrastructure, it constitutes a way towards it. Within the amendment’s scope the definitions of certain terms such as EV, charging network, charging network operator, charging station, charging station operator, and interoperability are provided. As the EV is defined as “a motor vehicle that uses an electric motor alone or as an ancillary and can be charged externally with electric energy,” the scope of the Electricity Market Act not only covers “all-electric vehicles” but also “plug-in hybrid vehicles.”

These developments in the electric vehicle field are expected to increase the interest in the autonomous vehicles.

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Regulatory developments

The UK government expects connected and autonomous vehicles to be a key area of growth over the coming decade, predicting that the technology will lead to the creation of 38,000 new high-skilled jobs, and that the industry could be worth £41.7 billion by 2035.

To ensure that the UK is able to benefit from these new technological developments, steps are now being taken to ensure that the necessary legislation is in place to attract investment and to enable self-driving vehicles to be used on public roads.

In July 2021, the UK government conducted a **consultation exercise** to inform strategic policy on connected and automated mobility (CAM) in the UK. This sought to identify areas of expected UK competitive advantage in the future global CAM supply chain. A key objective was to understand if and how investment in CAM can help future-proof the UK's existing automotive, logistics and wider mobility industries. The UK government has not yet published its findings.

EXISTING LAWS

Currently, the development and use of autonomous vehicles in the UK is governed by a number of different laws and guidelines, including:

- **The Automated and Electric Vehicles Act 2018 (AEVA 2018)**
This sets out the legal definition of a vehicle which is “self-driving” (a vehicle which is “operating in a mode in which it is not being controlled, and does not need to be monitored, by an individual”). It also overhauls the civil liability rules applicable to vehicles operating autonomously. These provide that the insurer is required to pay compensation to any person injured by an autonomous vehicle and afterwards seek to recover its losses from any person or body actually responsible for the incident.

- **The Road Traffic Act 1998**
This considers the licensing and insurance of all vehicles operating in the UK, as well as road regulation and traffic offences. Currently, all vehicles and motorists must comply with this Act when operated on UK roads.
- **The Road Vehicles (Construction and Use) Regulations 1986**
The regulations set out rules governing the design, manufacture, maintenance, construction and use of motor vehicles in the UK. Regulation 104 currently prohibits the use of any vehicle on the road where the driver does not have proper control of the vehicle. When testing autonomous vehicles in the UK, all applicable regulations in the Road Vehicles (Construction and Use) Regulations must still be complied with at all times (and in particular, Regulations 104 to 107).
- **The Highway Code**
In April 2022, the UK Department for Transport proposed a number of changes to the Highway Code, including a new section relating to the use of autonomous vehicles. In particular, the new section will clarify that the driver of the car is liable for all incidents and damage caused by the vehicle where they are in control but not where the vehicle is in self-driving mode. Where the vehicle is in self-driving mode, the individual is not required to pay attention to the road, but must be prepared to resume full control of the vehicle when prompted.
- These proposed changes are expected to take effect in the summer of 2022.

LAW COMMISSION – JOINT REPORT

The Centre for Connected and Autonomous Vehicles (CCAV) was created in 2015 as a new governmental body in the UK with specific expertise in the field. It was given a mandate to work together with academia and industry to promote autonomous technology in the UK and to guide the development of suitable regulations.

In 2018, CCAV instructed the Law Commission of England & Wales and the Scottish Law Commission (the Commissions) to undertake a review of the current laws relating to autonomous vehicles, and to make recommendations for a new regulatory framework to govern the introduction and safe deployment of connected and autonomous vehicles on UK roads.

The Commissions published their findings in January 2022 in the **Automated vehicles: Joint report**. The report sets out a number of recommendations which have now been put to the legislators for consideration. Some of the key recommendations are:

- **A new Automated Vehicles Act:** Given the significant legal consequences which will arise with the widespread adoption of autonomous vehicles, the Commissions have recommended that new, UK wide, primary legislation is required to deal with the regulation of autonomous vehicles on public roads.
 - **The test for self-driving:** A clear test should be developed to determine whether a vehicle is to be considered “self-driving” (rather than merely providing features which offer driving-assistance). The Commissions suggest that a self-driving vehicle is able to control the vehicle safely and legally, even when not being monitored by any individual.
 - **Safety standards:** The Secretary of State for Transport should publish a safety standard against which the safety of autonomous driving can be measured in practice and on a continuous basis. This should include a comparison against equivalent harm caused by human drivers, but
- the Commissions have not sought to define what level of safety would be acceptable.
 - **Civil liability:** The Commissions considered issues relating to the insurance of autonomous vehicles, product liability laws, and cases of contributory negligence. The key recommendations in this section are to: (i) expand the insurance provisions set out in AEVA 2018 so that they apply to all vehicles determined to be “self-driving”; (ii) review existing product liability laws to account for the additional challenges posed by emerging technologies; and (iii) ensure that there are provisions in place to provide compensation for injury or damage caused by uninsured usage of autonomous vehicles.
 - **Wrongful interference:** The existing laws under the Road Traffic Act 1988 should be updated to create new offences relating to the tampering, interference, or theft of autonomous vehicles.
 - **Passenger services:** Any new Automated Vehicles Act should grant powers to the Secretary of State to issue permits for the provision of passenger services by autonomous vehicles.
 - **Responsibilities of the “user-in-charge”:** The new Automated Vehicles Act should clearly define the responsibilities of the human “user-in-charge,” and clearly distinguish these responsibilities from when any self-driving functions have control of the vehicle.
 - **Marketing:** To avoid confusion, tighter controls should be introduced around what can and cannot be marketed to the public as an autonomous vehicle. It is envisaged by the Commission that it would be a criminal offence to use any terms (such as “autonomous” or “self-driving”) to suggest that a vehicle is an autonomous vehicle, where it is not recognised by the Secretary of State as meeting the applicable test for self-driving.

Driverless Testing and Deployment

In the UK, it is permitted to trial and test autonomous vehicles. There are already a number of well established companies operating in this space.

Any testing of autonomous vehicles must comply with the **Code of Practice: automated vehicle trialing**, which has been jointly published by CCAV, the Department for Transport, and the Department for Business, Energy & Industrial Strategy. This aims to facilitate the safe deployment of the technology in the UK.

Interested parties are entitled to test autonomous vehicle technology on any UK road without the need to obtain specific permits in advance. Some of the key legal requirements are considered below.

VEHICLE STANDARDS

In accordance with the Code of Practice, any vehicle used for testing on UK roads must be roadworthy meet the in-service requirements detailed in the Road Vehicles (Construction and Use) Regulations 1986.

ADEQUATE SUPERVISION

For autonomous vehicle trials on public roads, a suitably licensed and trained safety driver or safety operator should supervise the vehicle at all times. The safety driver/operator must ensure the vehicle is observing traffic laws, and should be ready and able to override automated operation if required. That person may be outside the vehicle as long as he or she has the ability to intervene and resume manual control if necessary.

If the testing of any autonomous vehicle is to be undertaken on a remote basis, such remote-controlled trials should have appropriate redundancies in place to handle any failures or disengagements. These include warning systems and the ability to allow the safety driver/operator to take control of the vehicle at all times.

Those looking to undertake remote-controlled trials of an autonomous vehicle on public roads or other public place will need to ensure that the remote-control system is able to deliver the same level of safety as having a driver inside of the vehicle.

INSURANCE

Under UK legislation, the use of non-autonomous motor vehicles must be insured (with the insurance attaching to an individual) so as to cover third-party risks. Failure to do so is an offence.

As detailed above, AEVA 2018 introduced a statutory insurance regime for autonomous vehicles which provides that, where an accident is caused by an insured autonomous vehicle, the insurer is liable for damage suffered by a person (covering death, personal injury and property, with limited exceptions). Where there is no insurance in place, the owner of the vehicle is liable for the damage.

AEVA 2018 prohibits the insurer from making any exclusions and limitations from the applicable insurance policy. This is subject to two exceptions: where an accident is caused directly by software alterations made by or with the knowledge of the insured person; or where the insured person failed to install safety-critical software updates he or she ought reasonably to have been aware of. In such situations, the insurer is entitled to recover any amounts it has paid out as a result from that person.

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Regulatory developments and roadblocks

For years, lawmakers, policymakers, and advocates have discussed what a framework could look like for autonomous vehicles.

Congress moved first, in 2017, with the House passing the SELF DRIVE Act ¹ by voice vote, and the AV START Act ² clearing the Senate Commerce Committee also by voice vote. But the momentum of 2017 was stalled over thorny issues of preemption and arbitration, and trucks were left out of both House and Senate bills, suggesting a failure to reach consensus on how to deal with automated trucks. No AV bill has moved out of committee since, leaving progress to the federal government and the states.

The Department of Transportation (DOT) under both President Obama³ and President Trump⁴ issued multiple plans and strategies for autonomous vehicle development and deployment. These reports and best practices were all voluntary and shared among manufacturers and states to help with autonomous vehicle safety and regulation. The Trump Administration published three advanced notices of proposed rulemaking (ANPRMs) but moved only one of these

rulemakings to a proposed rule: **the National Highway Traffic Safety Administration (NHTSA) Notice of Proposed Rulemaking (NPRM) on Occupant Protection for Automated Driving Systems.**⁵ Now the Biden Administration has moved this proceeding to a final rule published March 30, 2022, ⁶ the first DOT final rule on automated vehicles.

The Biden Administration took two initial steps last year to advance the development of a regulatory framework.

In June 2021, the Department of Transportation issued a call for public comment on “the development of a framework for Automated Driving System (ADS) Safety.”⁷

Later that month, NHTSA issued an unusual Standing General Order requiring the reporting of incidents involving vehicles equipped with an Automated Driving System (ADS) (Levels 3-5 Automation) or a Level 2 Advanced Driver Assistance System (ADAS)⁸.

The order requires motor vehicle manufacturers, motor vehicle equipment manufacturers, and operators to report all crashes involving a vehicle equipped with the specified systems that results in injury or property damage.

1 Congress.com, “SELF DRIVE Act” (July 2017): <https://www.congress.gov/bill/115th-congress/house-bill/3388/cosponsors>.
2 Congress.com, “AV START Act” (September 2017): <https://www.congress.gov/bill/115th-congress/senate-bill/1885/cosponsors>.
3 US Department of Transportation, “Federal Automated Vehicles Policy” (September 2016) online (pdf): <https://www.transportation.gov/sites/dot.gov/files/docs/AV%20policy%20guidance%20PDF.pdf>.
4 US Department of Transportation, “Automated Vehicles Comprehensive Plan” (January 11, 2021) online (pdf): <https://www.transportation.gov/sites/dot.gov/files/2021-01/USDOT_AVCP.pdf>. This most recent document is referred to as version 4.0, the third policy statement by the Trump DOT following the initial policy statement in the Obama Administration.
5 85 Fed. Reg. 17624 (Mar. 30, 2020)
6 87 Fed. Reg. 18560 (Mar. 30, 2022)
7 US Department of Transportation/National Highway Traffic Safety Administration, “Framework for Automated Driving Systems Safety” (Spring 2021): <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202104&RIN=2127-AM15>.
8 Eric Tanenblatt and Chan Creswell, “National Highway Traffic Safety Administration requires autonomous vehicles companies to disclose crashes” (June 30, 2021) DriverlessCommute.com: <https://www.thedriverlesscommute.com/national-highway-traffic-safety-administration-requires-autonomous-vehicles-companies-to-disclose-crashes/>.

If the wreck takes place while an ADAS or ADS system is either in operation or was in operation shortly before the incident, the wreck is on a publicly accessible road, or it involves “a hospital-treated injury, a fatality, a vehicle tow-away, an air bag deployment, or a vulnerable road user such as a pedestrian or bicyclist” the report must be made within **24 hours**, with any correction to this report submitted no later than **ten days** after the accident.

This order was likely prompted by a rash of highly publicized accidents in the last couple of years involving cars with ADAS Level 2 systems. NHTSA recognized that the autonomous vehicle industry is growing with vehicles driven by consumers without a full understanding of the limits of current automation. As the industry continues to grow, it will be incumbent on federal regulators to move safety rulemakings and standards to serve the industry and the public.

Published in March 2022, Occupant Protection Standards revise several Federal Motor Vehicle Safety Standards (FMVSS) to consider the lack of steering wheels and gas pedals on highly automated vehicles. The FMVSS amendments ensure that autonomous vehicles have the same level of protection as any other vehicle but clarify the standards for manufacturers who manufacture cars without traditional controls⁹.

While the operation of automated vehicles (other than commercial operations) remains a matter of state and local law, it is up to the federal government to promulgate standards for the safe design and manufacture of automated vehicles.

Driverless testing and deployment

In the United States, autonomous vehicle testing and deployment is typically governed by each state. Some early adopting states (California, Arizona) have made their legal frameworks clear to developers and invited the industry to operate in their state. Others have yet to establish any framework at all. This patchwork of regulatory and legislative guidance has steered most deployment to states and localities with defined processes and restrictions.

For instance, states like California, Texas, and Arizona have experienced much autonomous vehicle testing and deployment over the last year.

AUTONOMOUS TRUCKING

Texas has quickly gained prominence as the go-to state for testing and deploying autonomous trucking. The I-45 corridor from Houston to Dallas has become one of the nation’s prime destinations for autonomous truck testing and development¹⁰. Companies including FedEx and UPS have partnered with autonomous vehicle companies and began operations along I-45¹¹. Due to a historic driver shortage, autonomous trucking has the potential to revolutionize the logistics industry and increase shipping efficiency. Already, companies like Walmart and Ryder are investing in autonomous trucks and finding ways to work them into their current systems while preparing for future deployment¹².

AUTONOMOUS DELIVERY

In Houston, Nuro, an autonomous delivery robot company, launched a heralded partnership with Dominos to deliver pizzas across the city¹³ This initiative was promoted in national advertising and demonstrated the need and viability for autonomous delivery¹⁴. The COVID-19 pandemic has reiterated the benefits of autonomous delivery for businesses and consumers. In colleges across the country, Grubhub and other delivery services have begun using autonomous delivery bots to bring students a contactless food delivery experience¹⁵.

ROBOTAXI FLEETS

For years, robotaxi fleets have been seen as the primary early deployment strategy for autonomous technology. This year, Waymo, an autonomous vehicle spinoff from Alphabet, and Cruise, a GM-backed autonomous vehicle company, both received permits from California to open their robotaxi services to the public. Waymo and Cruise received the proper permits from the state to charge for rides with safety drivers. Cruise can operate without safety drivers in the car if no charge is made. While both companies have operated in Arizona in years past, California’s permit process is far more robust. By receiving permits from California regulatory agencies, these companies have demonstrated a significant level of consumer safety¹⁶.

Waymo and Cruise are not the only companies looking to get involved in the robotaxi space. Ford, Lyft, and Argo AI, an autonomous technology company based out of Pittsburgh, launched a

robotaxi service in Miami this year, with hopes to quickly expand across the country. This partnership is unique due to the inclusion of established players in all three areas of expertise needed for such a service to work efficiently¹⁷. In Las Vegas, Motional, the Hyundai joint venture with Aptiv, an autonomous vehicle company, is partnering with Via, an on-demand shuttle software company, to offer rides to the public to and from designated areas. Currently these vehicles have safety drivers and are free, although Nevada does not restrict a company from charging customers¹⁸.

Connected vehicles and logistics

5G

In the last year, consumers have been inundated with promises and claims about 5G networks offering split-second cellular service. Although the United States’ 5G infrastructure continues to fall behind other developed countries, the promise of highspeed consistent service has led many to believe that the eventual transition will lead to new technological breakthroughs that mimic the flurry of technological developments created due to the transition to a 4G network¹⁹. Many have theorized that autonomous vehicles will flourish and connected infrastructure will finally become possible due to the widespread deployment of a 5G network. While the infrastructure cannot yet support such ideas as remote driving over a 5G network, vehicle integration of 5G service will allow for connected

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Eric Tanenblatt and Chan Creswell, “Autonomous Vehicles are Here: Waymo and Cruise take the lead in the race toward Deployment” (March 3, 2022): <<https://www.thedriverlesscommute.com/autonomous-vehicles-are-here-waymo-and-cruise-take-the-lead-in-the-race-toward-deployment/>>.

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infrastructure to communicate with vehicles and vice-versa²⁰. Recently Verizon and Cisco announced that they had achieved proof of concept by utilizing Verizon’s network and Cisco’s routers. By doing so, they did not have to rely on roadside radios to meet latency thresholds for autonomous driving and communication between connected vehicles and connected infrastructure²¹.

DATA PRIVACY

Autonomous vehicles will involve the generation and use of personal data in a way that is not analogous to any operation of a conventional vehicle. Safety must guide autonomous vehicles and autonomous technology manufacturers, and yet, the personal privacy rights of drivers must also be considered. Currently, there is pending litigation in Illinois surrounding a vehicle manufacturer’s capture and preservation of biometric data under the state’s Biometric Privacy Act²². The car scans drivers’ faces as a safety measure of their ADS Level 2 system. In this way, vehicles ensure that drivers are paying attention to the road. Current legal proceedings challenge the storage and retention of these scans. California, Colorado, and Virginia have all passed state data privacy laws²³. As the autonomous vehicle sector continues to grow, state and federal lawmakers will need to address data privacy as it relates to autonomous vehicles and potential safety measures.

ELECTRIC VEHICLES

The electrification of automobiles and the deployment of autonomous vehicles have always been inextricably linked. In the future, most

autonomous vehicles will need to be electric vehicles. It is important for consumers, regulators, and manufacturers to adopt a more electrified automotive sector before the widespread deployment of AVs. Over the last year, stakeholders have embraced EVs and planning for the future.

General Motors has announced that it plans to stop selling gas and diesel vehicles by the year 2035. Mercedes-Benz announced that all new vehicle platforms by 2025 will be “EV-only.” Ford plans to spend \$22 billion on electric vehicles through 2025 and see a 76 percent carbon reduction by 2035.²⁴

Passing of the Infrastructure Investment and Jobs Act demonstrated the federal government’s willingness to join manufacturers and help prepare the country for the upcoming electric vehicle revolution. **The package included almost \$5 billion over five years for the launch of an electric vehicle charging network to combat range anxiety in consumers.**

Each state must submit an EV Infrastructure Deployment Plan to the Joint Office of Energy and Transportation that builds on already existing Alternative Fuel Corridors. The Zero Emission Transportation Association (ZETA), which represents many companies involved in EV manufacturing, commended the Act.

ZETA Executive Director **Joe Britton** said, *“The Infrastructure Investment and Jobs Act is the single largest investment to date in electrifying the United States’ transportation system...”*

In support of the program, Transportation Secretary **Buttigieg** said, *“A century ago, America ushered in the modern automotive era; now America must lead the electric vehicle revolution.”*²⁵

Driving Forces

SECRETARY PETE BUTTIGIEG AND THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION (NHTSA)

As Secretary of Transportation, Secretary Buttigieg will play a key role in guiding the United States’ policy surrounding autonomous vehicles and autonomous technology at-large. Secretary Buttigieg has repeatedly expressed his desire to make sure autonomous vehicles are safe for consumers above all else.

The Department of Transportation released six “Innovation Principles” to guide the department as it enters a new age of technological development:

- 1. Serve our policy priorities;
- 2. Help America win the 21st century;
- 3. Support workers;
- 4. Allow for experimentation and learn from failure;
- 5. Provide opportunities to collaborate; and
- 6. Be flexible and adapt as technology changes.

Along with NHTSA’s recent regulatory announcements, US regulators are taking serious interest in the

autonomous vehicle space as an industry instead of as a niche scientific specialty.

The development of a regulatory framework and a viable autonomous vehicle industry will also meet the four pillars of **safety, climate, equity, and jobs** announced by Secretary Buttigieg.

CALIFORNIA PUBLIC UTILITIES COMMISSION (CPUC) AND CALIFORNIA DEPARTMENT OF MOTOR VEHICLES (DMV)

With so many autonomous vehicle companies testing in California, the CPUC and California DMV hold significant power over the future of autonomous vehicles. As the primary autonomous vehicle regulatory agencies in the state, the CPUC and California DMV often control which companies can test in the state and how their tests can be carried out. As a state with a strict regulatory environment, approval from these agencies normally indicates a company’s technology is extremely safe and ready for operation on public roads.

CRUISE

Cruise is an autonomous vehicle company based out of San Francisco and supported by General Motors. After testing for years in its hometown, Cruise has received the proper permits to operate a robotaxi service in San Francisco with a safety driver in the car. Cruise has also received a permit to drive the public at

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no cost without a safety driver. Cruise is considered a national leader in the autonomous vehicles space.

FORD/ARGO/LYFT

Argo AI is an autonomous technology company based out of Pittsburgh with deep ties to Ford, Lyft, and Volkswagen. The Ford/Argo/Lyft team made headlines in 2021 by launching their own autonomous robotaxi service with a safety driver on the Lyft network in Miami.

The partnership hopes to expand their operations to 1,000 self-driving vehicles in several cities over the next five years. Walmart announced that they would be partnering with Ford and Argo to launch an autonomous delivery service in Austin, Miami, and Washington DC.

MOTIONAL

Motional is a joint venture between Hyundai and Aptiv, an automotive technology supplier. Motional is the successor to nuTonomy and Ottomatika, previously purchased by Aptiv.

In February 2022, Motional partnered with Via to launch a driverless robotaxi service in Las Vegas. The service uses BMW 5-series sedans and includes a safety driver with predetermined pick-up and drop-off locations. The service plans to go fully driverless in 2023.

In December 2021, Motional announced a partnership with Uber Eats for autonomous delivery in Santa Monica starting in 2022.

MOBILEYE AND INTEL

Mobileye is an Israeli company founded in 1999 by Hebrew University professor Amnon Shashua. The company was purchased by Intel in **2017**. Mobileye is focused on autonomous vehicles that drive using cameras alone and has tested such vehicles in Paris, Munich, and New York. Mobileye was the first AV company to test in New York City. Mobileye also offers the ability to retrofit fleets with their ADAS technology.

In 2021, Intel announced its intention to take Mobileye public in 2022.

PLUS AND TUSIMPLE

Plus and TuSimple are two autonomous trucking companies, both focused on Level 4 autonomy. With the trucking industry facing a historic driver shortage, many believe autonomous trucks may alleviate some of the logistics industries demands.

TESLA AND ELON MUSK

Since the early days of Tesla, Elon Musk has driven the company to the frontlines of the future. Now, Tesla remains on the cutting edge with their ADS Level 2 system, Autopilot and the Full-Self Driving package. Musk contends that autonomous vehicles should be possible with cameras only, instead of the various stacks of LiDAR, Radar, and other technologies present in some autonomous vehicles. True camera-only autonomous driving could break down significant barriers toward mass production of personal autonomous vehicles.

WAYMO

Waymo is an Alphabet company spun off from the Google self-driving car project in 2016. Now, Waymo operates self-driving robotaxis in San Francisco and Arizona and tests autonomous trucking in New Mexico and Texas. By all accounts, Waymo is among the US leaders in the autonomous industry.

50-state roundup

To help navigate the patchwork of state regulations surrounding autonomous vehicles, Dentons has outlined developments in each state – including relevant Bills introduced or passed from 2019 – 2022 (as of May 25, 2022).

If a year is not listed under a given state, it indicates that no bills were introduced or passed in that year or have not been introduced or passed as of this writing.

ALABAMA

Alabama has been active in regulating autonomous vehicles (AV) since it first formed a committee on the subject in 2016. The Alabama Department of Transportation has sole and exclusive jurisdiction over automated driving systems, autonomous vehicles, and tele-operations systems. At present, commercial vehicles may operate autonomously, either with or without a physical driver, so long as a remote driver can operate the vehicle.

Since 2017, there have been numerous bills considered in the legislature to regulate AVs (including multiple ones sponsored by State Senator Gerald Allen (R). In 2019, Senate Bill 47 was passed and signed into law, which created a framework and codified the rules for commercial AVs. The legislature also passed legislation in 2018 allowing for truck platoons.

Alabama is ripe for investment from the AV industry. Besides being home to many automotive manufacturing plants, [Auburn University recently announced its new AV research facility](#). The facility is a part of Auburn's National Center for Asphalt Technology test track and will assist researchers at

the Samuel Ginn College of Engineering's GPS and Vehicle Dynamics Laboratory.

- Bills passed in 2019: Senate Bill 47, Senate Joint Resolution 21
- Bills introduced in 2020: House Bill 229
- Bills introduced in 2021: Senate Bill 154

ARIZONA

Arizona has long been one of the nation's leaders in AV research, deployment, and acceptance. Due to a series of executive orders signed by Governor Doug Ducey, Arizona has been home to one of the most permissive AV frameworks in the country. However, in 2021, the state legislature passed its first major bill concerning AVs. House Bill 2813 was signed by Governor Ducey on March 24, 2021 and codifies the presence of AVs in the state. This law advises on what AVs should do after an accident, restricts counties, towns, and cities from instituting their own taxes, fees, or requirements, and outlines the process required to drive an AV in the state.

According to the new law, fully autonomous vehicles may drive with the system engaged on public roads if there is a licensed driver ready to take over the task where necessary. To operate a vehicle without a driver present, one must submit a "Law Enforcement Interaction Plan" to the Arizona Department of Transportation along with a written statement acknowledging certain features, including that: (1) the vehicle complies with all applicable federal laws and standards; (2) if a failure occurs, the vehicle will reach a minimal "risk condition," (3) the vehicle is designed to comply with all applicable traffic laws, and will have a person responsible designated to receive traffic citations; and (4) the vehicle meets all license, registration, title and insurance requirements.

The historic welcoming nature of Arizona's AV regulatory structure has long solidified the state's standing as a hotbed of AV innovation. Waymo now provides fully autonomous commercial rides in the state alongside Cruise, Nuro, and other AV operators. Waymo also served local communities in Arizona during the height of the COVID-19 pandemic.

Recently, autonomous trucking companies have increased their operations in Arizona. Due to Governor Ducey and Arizona's early support for the autonomous sector, the state remains on the cutting edge of AV development and deployment.

- Bills introduced in 2020: House Bill 2060, House Bill 2340
- Bills introduced in 2021: House Bill 2007, House Bill 2476, House Bill 2083, House Bill 2813
- Bills passed in 2021: House Bill 2813
- Bills introduced in 2022: Senate Bill 1333, House Bill 2014, House Bill 2187, House Bill 2263, House Bill 2273
- Bills passed in 2022: House Bill 2273

ARKANSAS

Arkansas first addressed the use of AVs in the state in 2019 when it created an AV pilot program overseen by the State Highway Commission. Two years later, in 2021, the state legislature unanimously passed House Bill 1562, which transitioned the pilot program into a more formal program. The law also introduced the concept of an On-Demand Driverless Vehicle Network. The State Highway Commission remains responsible for overseeing the implementation of the law. The state also allowed Driver Assistive Truck Platooning (DATP) under legislation that took effect in 2017.

While Arkansas does not boast the interconnected networks of Arizona or California, certain businesses are taking advantage of the state's AV framework. Walmart announced a partnership with Gatik and their multi-temperature Autonomous Box Trucks. Driverless technology will now transport goods along a short route to stock a Neighborhood Market in Bentonville. Walmart stated that they will soon expand this program to other locations.

Recently, Governor Hutchinson has made autonomous vehicle development a key emphasis during his last year in office. At the end of 2021, Hutchinson travelled to Israel where he spoke at the international Smart Mobility Summit in Tel Aviv and touted Walmart and Gatik's partnership. During his

State of the State Address, Governor Hutchinson expressed his desire to see the autonomous vehicle industry in Arkansas grow. To help achieve this goal, the governor launched the Arkansas Council for Future Mobility by executive order. The council will look for ways to position the state at the forefront of future mobility technologies including electric vehicles, autonomous vehicles, and advanced air mobility. The council includes representatives from Walmart, J.B.Hunt, the University of Arkansas, the director of the Arkansas Department of Transportation, and other interested stakeholders. Governor Hutchinson has requested a report from the council by the end of November 2022.

- Bills passed in 2019: House Bill 1822, House Bill 1561
- Bills introduced in 2021: House Bill 1562
- Bills passed in 2021: House Bill 1562

CALIFORNIA

Simply put, California leads the nation in AV development, deployment, and acceptance. With a comprehensive approach to regulating AVs and the participation of numerous AV operators, California is primed to be the home of our collective autonomous future.

Since 2017, California has enacted several laws that lay out procedures for the testing and deployment of AVs in the state. The state expanded its program from requiring backup drivers in all test vehicles to allowing self-driving car tests without backup drivers. To qualify for a driverless testing permit, companies must show proof of insurance or a bond equal to \$5 million, verify the vehicles are capable of driverless operation, and verify that the vehicles meet Federal Motor Vehicles Safety Standards. As of 2021, 54 companies hold permits to test with a driver in the car and 8 hold permits to test while completely driverless. In 2021, the state legislature also passed SB 500, which will ensure that new light-duty AVs starting in model year 2031 are zero-emission vehicles. The state legislature also passed SB 570, which exempts AVs from regulations that are irrelevant to their operation (i.e., windshield wipers and speedometers), and provides alternative standards.

Besides these legislative developments the last year saw several industry milestones. In late December 2020, California issued its first deployment permit to Nuro, which allowed them to provide commercial services to the public. Nuro, famous for its starring role in Dominos "Avoid the Noid" campaign, is a driverless delivery robot made solely to deliver goods and is not for public transportation, thus reducing the potential consequences of their vehicle's failure.

In June 2021, California issued a permit to Cruise, the GM-backed AV company, that allows the company to provide their services to the public without a safety driver on board. In September, Cruise and Waymo received deployment permits for a commercial robotaxi service, which represents the first time the California DMV has given the green light to an AV company to charge passengers for rides. Waymo must have a safety driver on board. In March 2022, the California Public Utilities Commission (CPUC) completed the process by issuing both companies "Drivered Deployment" certificates, allowing the companies to deploy their robotaxis with a safety driver in the car.

California is a barometer for the AV industry, showing that trends of consolidation are not necessarily negative. Instead, when combined with the leaps made in safety and deployment, the AV industry can demonstrate that innovation and regulation can co-exist to launch us forward into a bright autonomous future.

- Bills introduced in 2020: Assembly Bill 3116, Senate Bill 59, Senate Bill 336, Assembly Bill 516, Assembly Bill 1964
- Bills introduced in 2021: Senate Bill 66, Senate Bill 570, Senate Bill 500
- Bills passed in 2021: Senate Bill 500, Senate Bill 570

COLORADO

Companies seeking to test and operate autonomous vehicles in Colorado are greeted by a welcoming regulatory environment. Legislation enacted in 2017 allows driverless vehicles to be operated in the state

if they can comply with existing state and federal law. Additionally, legislation passed in 2019 requires the State Department of Transportation to convene a working group to examine the impact of technology, including autonomy, on transportation business models. The group made their recommendation to the legislature in November 2019.

In 2021, tech company EasyMile began testing a 15-passenger autonomous shuttle near the Denver Airport and initiated a two-week AV food delivery test in the city of Westminster last June. Building off that success, EasyMile partnered with the Colorado School of Mines to introduce "the nation's largest fleet of low-speed, autonomous electric shuttles." This fleet of nine autonomous shuttles will serve students on the Colorado School of Mines campus and around the City of Golden. The shuttles are 100 percent electric and will contribute to the city and state's environmental targets.

Senator **John Hickenlooper** (D-CO), who signed the bill providing for autonomous vehicles in Colorado during his time as governor, said regarding the project, *"We are proud to further support Colorado's position as a hub for advancing technology and innovation. Automation and electrification are promising opportunities to improve transportation safety, cost, and environmental impact."*

Learn more: [Nation's largest fleet of autonomous, electric shuttles launches in Colorado](#) | [Colorado School of Mines](#) | [Newsroom \(minesnewsroom.com\)](#)

- Bills passed in 2019: Senate Bill 239

CONNECTICUT

Of the states that have passed autonomous vehicle laws, Connecticut has one of the strictest regulatory structures. In the past legislative session, House Bill 6486 bill to modernize this regulatory system was introduced, but it gained no traction and failed. To comply with Connecticut’s regulations, operators must go through a multistage approval process, and testing is only allowed in select municipalities to be designated by the commissioner of the State Department of Transportation. Connecticut did loosen its restriction by allowing the operator to not be in the driver’s seat as long as they are physically inside the AV to engage the system. The state has also established a task force to study fully autonomous vehicles.

In 2021, the Connecticut Department of Transportation (CTDOT) released a “strategic plan” for the adoption of Connected Autonomous Vehicle (CAV) technology. CTDOT seems to believe that the true value in autonomous technology will start with its integration of connected vehicle technology. Additionally, they seem reluctant to fully invest in AV testing and deployment until firmer national standards have been set. In the meantime, however, the state is dutifully working to prepare their infrastructure and bureaucracy for the full introduction of CAV technology.

CTDOT will look to test autonomous technology along their CTfastrak BRT corridor in the coming years. They will test without passengers onboard but will expand to service the public after extensive testing. Additionally, CTDOT will test and deploy connected vehicle technology along the Berlin Turnpike.

While Connecticut might not be encouraging autonomous vehicle development and deployment like other states, their regulatory agencies are well-versed on the issue and ready to accept CAV technology once it becomes more mature.

- Bills passed in 2019: Senate Bill 924
- Bills introduced in 2021: House Bill 6486

DELAWARE

Governor John Carney signed an executive order to establish an Advisory Council on Connected and Autonomous Vehicles. The Advisory Council was tasked with developing recommendations for innovative tools and strategies that can prepare Delaware’s transportation network for connected and autonomous vehicles. The Advisory Council’s final report was submitted in September 2018. The report has spurred no successful legislation to this point.

In 2020, the state acquired two EasyMile Shuttles which now operate at the state campus in Dover. The vehicles operate on a fixed route and are equipped with LiDAR and GPS. The Delaware Department of Transportation has stated that they hope to expand the program to other areas of the state. Learn more here.

FLORIDA

For some time now, Florida has been considered a national leader in AV testing and deployment. Autonomous vehicle companies see Florida’s growing and aging population as an ideal place to test commercialization.

In 2019, Florida relaxed its laws to allow for AV testing on public roads without a human operator in the vehicle. Within days, a Starsky Robotics 18-wheeler was on the highway without a driver at the wheel in the midst of Sunday morning traffic. Notably, Florida has the third most truck drivers in the United States behind Texas and California. Automating truck driving will be an important turning point not just for Florida’s economy, but also for its labor force.

In 2021, Florida took another step towards the commercialization of autonomous technology with the passage of House Bill 1289, which legalized and developed a framework for autonomous delivery vehicles. Now, Florida can join other AV hubs like California and Texas in utilizing autonomous delivery robots to better serve its aging population and address its sprawling geography.

However, perhaps the biggest development in Florida’s autonomous industry this year came

from companies not yet operating in the state. First, Cruise acquired Voyage, an AV company whose work had centered on assisting elderly communities, including the Villages in Florida. In the announcement of the sale, former Voyage CEO, Oliver Cameron, now a vice president at Cruise, said that members of the Voyage team would assist Cruise in its development of the Cruise Origin.

Second, Ford, Argo AI, and Lyft announced last July that Lyft customers in Miami could ride in an autonomous vehicle by the end of the year. The partners plan to expand to Austin in 2022 and eventually operate about 1,000 autonomous vehicles in multiple markets over the next five years. After years of testing its vehicles in Miami, Argo and Ford are now poised to immediately integrate their transportation options with Lyft’s interface and customer base. This constitutes a much more sustainable venture into autonomous driving for Lyft, who recently sold its AV venture to Toyota. As a part of the partnership, Lyft will receive 2.5 percent common equity in Argo, a Ford and Volkswagen backed company. The initiative launched in late December 2021, bringing Ford’s autonomous vehicles to the streets of Miami.

Due to its early adoption and accepting environment, Florida stands to continue leading the nation into an autonomous future. With strong community support, like that of the Florida Chamber of Commerce’s “Autonomous Florida” project, the Florida AV industry is poised to thrive and grow.

- Bills passed in 2019: House Bill 311, Senate Bill 2500, Senate Bill 7068
- Bills introduced in 2020: House Bill 771, House Bill 4713
- Bills passed in 2020: House Bill 1303
- Bills introduced in 2021: Senate Bill 1620 (companion to HB 1289)
- Bills passed in 2021: House Bill 1289
- Bills introduced in 2022: Senate Bill 150, House Bill 1525

GEORGIA

Georgia allows the operation of both autonomous vehicles and trucks under legislation passed in 2017. Driverless vehicles may operate in the state if they are fully insured and lawfully registered. At present, no robotaxi services are operating in the state; however, there are autonomous shuttle projects, including an autonomous shuttle that traverses a 1.5-mile track in the Peachtree Corners Curiosity Lab.

With 2020 came the advent of “The Ray,” an 18-mile stretch of I-85 in southern Georgia that will help test highway technologies, including a network of six roadside units capable of communicating with AVs. The pilot uses “CIRRUS by Panasonic,” and is described as a “vehicle to everything” (V2X) system. This next-gen striping will assist autonomous and connected vehicle technology and serves as a unique place for testing CAV (Connected and Autonomous Vehicles) equipped vehicles. In 2022, T-Mobile, Applied Information and Temple, Inc. introduced 5G connected infrastructure to the Peachtree Corners Curiosity Lab. By downloading the TravelSafely smartphone app, drivers can receive warnings and alerts from infrastructure while sending information back such as a call for a green light. This installation will allow these companies to receive data and feedback from V2X technology tested out in the field.

With a history of automobile manufacturing and access to major shipping ports along the coast and Hartsfield Jackson Airport in Atlanta, Georgia is positioned to play a major role in electric and autonomous vehicle development and deployment. In fact, SK Innovation is currently building new electric battery plants in Commerce, Georgia that will provide batteries for Ford and Volkswagen’s new electric vehicles. Additionally, Apple has held discussion with Kia about bringing its autonomous vehicle production to their Georgia plant. In late 2021, Rivian, an electric vehicle company focused on trucks and SUVs, announced its intention to bring a major vehicle manufacturing and battery plant to the state. The move was hailed by Governor Kemp and Stacey Abrams as an important advancement in Georgia’s plan to anchor the national electric vehicle industry. The plant will be

a \$5 billion investment and will employ upwards of 7,500 workers. In recent months, the plant has faced pushback from local community members and some Republican candidates for state and federal office.

In 2021, the Georgia State Legislature passed Senate Bill 165 exempting autonomous vehicles from state regulations that do not make sense when considering driverless technology. In 2022, the legislature passed HB 1009 which codified and regulated robot delivery devices.

- Bills introduced in 2021: House Bill 249, Senate Bill 165
- Bills passed in 2021: Senate Bill 165
- Bills introduced in 2022: House Bill 1009
- Bills passed in 2022: House Bill 1009

HAWAII

In 2020, Governor David Ige signed House Bill 2590 into law, creating a pilot program within the Hawai'i Department of Transportation to allow for autonomous vehicle (AV) testing on Hawai'i public roads. The law requires that a conventional human driver be always physically present in the vehicle to supervise the vehicle and prevent collision if necessary. The passage of the law was due, in no small part, to the efforts of the Hawai'i Autonomous Vehicle Legal Task Force which included Dentons partner Bill Kaneko.

Hawai'i represents a unique environment for AV testing and deployment. The combination of an insulated traffic environment, relatively short commuting routes, a comparatively small population, and a limited number of weather and road variables make Hawai'i an attractive AV testing environment.

In 2021, the Naval Facilities Engineering Command, and Expeditionary Warfare Center announced a \$6 million award to the University of Hawai'i at Manoa's Hawai'i Natural Energy Institute. This award will support the institute's research into wave energy, including using wave energy converters (WEC) to recharge autonomous undersea vehicles.

Recently, professors and students from the University of Hawai'i participated in the Indy Autonomous Challenge. With help from local partners and industry, the team placed sixth overall and reached speeds of 115 miles per hour.

- Bills passed in 2019: House Concurrent Resolution 220
- Bills introduced in 2020: Senate Bill 620, Senate Bill 3060, House Bill 1183, House Bill 1725, House Bill 2590
- Bills passed in 2020: House Bill 2590
- Bills introduced in 2021: Senate Bill 1008

IDAHO

Idaho Governor C.L. "Butch" Otter signed Executive Order 2018-01 on January 2, 2018, to create the Autonomous and Connected Vehicle Testing and Deployment Committee to identify relevant state agencies to support the testing and deployment of autonomous and connected vehicles.

The Committee submitted its report in November 2018. The report has not yet spurred any successful legislation to this point.

In 2021, Yellowstone National Park, located in Idaho, Montana, and Wyoming, brought autonomous shuttles to serve the summer crowds. Through the end of August, two electric autonomous shuttles from Olli provided free rides to visitors around lodging and campsites. These projects demonstrate the versatility of autonomous technology and the seamless ways that AVs can solve transportation challenges in a variety of circumstances.

"This type of technology can really help us achieve some of our major sustainability goals that we've set here in the park." - **Cam Sholly**, Yellowstone National Park Superintendent

Learn more: [Yellowstone National Park unveils self-driving electric cars](#) - East Idaho News

ILLINOIS

Both Illinois and Chicago officials have been slower than other jurisdictions to adopt AV technology. While Illinois has no legislation directly regulating autonomous vehicles, an executive order signed by former Governor Bruce Rauner allows their operation in the state. The order establishes the Autonomous Illinois Testing Program, overseen by the state Department of Transportation. Vehicles can only be operated with an employee of the manufacturer behind the wheel. In recent legislative sessions, there has been a movement to pass the comprehensive "Autonomous Vehicles Act," but it has failed to gain traction.

"We want testing to happen here in Illinois, but we want to do it safely" - Illinois Transportation Secretary **Randy Blankenhorn** in 2018.

Since then, Illinois has maintained its relative hesitance towards AVs.

This, however, does not mean the local stakeholders are not pushing for autonomous technology development and deployment in Illinois. The Illinois Autonomous Vehicle Association (IAVA), is a group of stakeholders and interested parties seeking to "enable the continued transformation of mobility that connected and autonomous vehicle technology will provide People, Communities, Government & Business in Illinois." The IAVA partnered with the Smart Transportation Infrastructure Initiative at the University of Illinois Urbana-Champaign to announce plans to build the Illinois Autonomous and Connected Track (I-ACT). The I-ACT will cover 430 acres of the former Chanute Air Force Base in Rantoul, Illinois. The project has already received support from the city, the university community, and the Illinois Department of Transportation.

Rashid Bashir, Dean of the Grainger College of Engineering said, *"The new autonomous track will fill the important need of training the future leaders in smart mobility and creating even more economic growth in this vital sector."*

Learn more: [U of I autonomous vehicle track is building the future of mobility](#) | [Illinois Center for Transportation](#) | [UIUC](#)

- Bills introduced in 2020: House Bill 2575, House Bill 4758, Senate Bill 3204,
- Bills introduced in 2021: House Bill 2575, House Bill 4758, Senate Bill 3204,

INDIANA

Indiana currently has no laws or regulations about autonomous passenger vehicles; however, truck platooning is regulated under 2017 legislation. There have been efforts in the past to create an autonomous task force with the power to approve operation of fully driverless vehicles in the state, but all have failed to garner enough support to pass into law.

This lack of regulation, however, has not stopped the autonomous industry from breaking into the state. During the 2021 summer, May Mobility and the Toyota Mobility Foundation brought autonomous shuttles to the Indiana University-Purdue University Indianapolis campus and the surrounding areas. The shuttles are open to the public and assist the IndyGo Red Line in last mile transport.

Just down the road, the Indianapolis Motor Speedway, the Energy Systems Network, and multiple other partners are working together to introduce the Indy Autonomous Challenge. This challenge featured college and university teams from around the world in an autonomous race around the Indianapolis Motor Speedway on October 23. All teams will utilize the same Dallara-produced AV-21 retrofitted for automation. The teams were responsible for loading software able to put their car across the finish line first over 20 miles, averaging at least 120 miles per hour. The winners of the inaugural challenge, TUM Autonomous Motorsport, a team from Technische Universität München in Germany, launched "driveblocks," a company looking to bring autonomous driving to the European logistics sector after their win.

IOWA

Iowa allows driverless vehicles to operate on the public highways without a conventional human driver physically in the vehicle if it meets a set of conditions, including that the vehicle can achieve a minimal risk condition if a malfunction occurs and that the vehicle can operate in compliance with the applicable traffic and motor vehicle safety laws and regulations. In 2019, Iowa passed Senate File 302 that establishes more regulation for AV vehicles, including terms for insurance and liability and penalties. Iowa also authorizes on-demand driverless-capable vehicle networks to facilitate the transportation of persons or goods, including transportation for hire. In September 2021, the Iowa Transportation Department issued rules that guided the implementation of Senate File 302.

Iowa stands as an interesting test case for autonomous vehicles since the road and weather conditions can differ greatly from the environments in which most autonomous testing is done. The University of Iowa's National Advanced Driving Simulator received a \$7 million grant from the Department of Transportation to study autonomous vehicles on rural roads. Autonomous vehicles could be particularly beneficial to rural communities due to the outsized amount of traffic fatalities in rural areas.

- Bills passed in 2019: Senate File 302
- Bills introduced in 2020: Senate Bill 1128, House Bill 122

KANSAS

During the last legislative session, Kansas passed a bill establishing the state's comprehensive legal framework for autonomous vehicles. The bill built off of the state's strategic plan and statewide task force for connected and autonomous vehicles. By signing the bill into law, Governor Laura Kelly opened the state up for new autonomous vehicle initiatives.

The law allows "driverless-capable vehicles" to drive on public highways without a safety driver if they can reach a minimal safety condition, comply with state and federal laws and regulations, submit an interaction plan with Kansas Highway Patrol and meet other various requirements. Autonomous vehicles must have a human driver in the vehicle for the first 12 consecutive months it operates in the state unless it is not designed for human occupancy or lacks manual controls. The law gives the Kansas Highway Patrol full regulatory authority over autonomous vehicles and creates the Autonomous Vehicles Advisory Committee to publish yearly reports on AV adoption in Kansas.

Gatik, an autonomous delivery truck company, and Walmart have already announced they will be expanding their autonomous delivery program to Kansas after initial successful deployments in Louisiana and Arkansas.

- Bills Passed in 2022: SB 313

KENTUCKY

Kentucky has set forth rules for commercial vehicle platooning, including exempting any vehicles engaged in a platoon from "following too closely" laws. In 2018, Kentucky allowed commercial vehicles to operate in a platoon, but for each vehicle, there must be a licensed driver behind the wheel and a marking designating that it's part of a platoon. Former Governor Bevin, at the urging of the Kentucky Aerospace Industry Consortium, verbally supported the launch of "Elevate Kentucky," an initiative to establish Kentucky as an autonomous vehicle testing hotbed. However, no legislative efforts on autonomous passenger vehicles have passed.

The city of Louisville has developed a "playbook" for autonomous vehicles that outlines their general principles and next steps for AV adoption. For now, Louisville plans to develop a framework for AVs, prepare for a possible reduction in parking, and create a "data-platform" for AVs and CVs. Additionally, autonomous technology will soon be utilized at the Cincinnati Northern Kentucky Airport (CVG). ThorDrive, a local company, is assisting CVG as they adopt autonomous technology for their ground vehicles. Ottonomy, an autonomous robot company, is introducing autonomous delivery robots at CVG who can deliver food and products to customers throughout the airport.

LOUISIANA

Back in 2019, Louisiana passed legislation governing the operation of autonomous freight carriers and other autonomous commercial vehicles. Louisiana law allows for the operation of both autonomous vehicles and autonomous truck platoons. It also specifically authorizes autonomous commercial motor vehicles to operate without a conventional driver physically present in the vehicle if the autonomous commercial motor vehicle meets a set of criteria, including that the vehicle can operate in compliance with applicable law and can achieve a minimal risk condition if an emergency occurs.

In 2021, Louisiana passed a new law, Senate Bill 147, that codifies personal delivery devices and outlines the regulations for their use. In particular, the law limits such devices to 20 miles-per-hour at the most, mandates that an employee be able to monitor and control the device, and that businesses operating such a device maintain an insurance policy with coverage not less than \$100,000. The law does allow for local governments to restrict delivery devices in their constituencies.

Lastly, Walmart announced Louisiana would be the first state to be included in the expansion of their autonomous vehicle plans. By partnering with Gatik, Walmart has incorporated driverless Box Trucks into their Bentonville, AR stores and is expanding the program into Louisiana. These trucks will deliver goods from Walmart stores to set delivery points where customers can pick-up their goods.

- Bills passed in 2019: House Bill 455
- Bills introduced in 2021: Senate Bill 147
- Bills passed in 2021: Senate Bill 147

MAINE

Maine does not currently have any laws or regulations pertaining to autonomous vehicles. However, 2018 legislation authorized the creation of a Commission on Autonomous Vehicles to coordinate efforts among state agencies and knowledgeable stakeholders to develop a process for testing automated driving systems on public roads. The law requires that the Commission issue a final report containing findings and recommendations, including suggested legislation. Additionally, Governor Paul LePage signed an executive order creating the Maine Highly Automated Vehicles (HAV) Advisory Committee to oversee the introduction of highly automated vehicles.

While there have been pushes for autonomous vehicle legislation in recent years, none have succeeded. Maine still has no standards for the registration of AVs nor for the licensure of AV operators.

This does not mean, however, that the conversation in the state regarding autonomous vehicles has ceased. In early 2021, the University of Maine hosted a panel that discussed autonomous vehicles with multiple stakeholders. The University of Maine is home to the Autonomous Vehicle Research Group at the VEMI Lab which studies autonomous vehicles and the way they can expand accessibility.

- Bills passed in 2019: House Bill 455
- Bills introduced in 2020: House Bill 1222 (LD 1710)

MARYLAND

In 2015, the Maryland CAV (Connected Autonomous Vehicles) Working Group was formed as the central point for coordination on statewide CV and AV efforts. In 2017, the Maryland Department of Transportation adopted regulations for AV testing, including an approval process for all testing on public roads and required insurance coverage of \$5 million. These requirements stand as a "living document" and are modified to meet the state's need and national guidance.

Recently, Maryland has continued to move forward with autonomous technology acceptance. In December 2020, the state released its Connected and Autonomous Vehicles Strategic Framework, which laid out the state’s thinking about CAV, how partners could support the state’s goals, and overarching focus areas for resources. This framework invited public and private partners to consider CAV and evaluate how emerging technology could be integrated into and change their future objectives and plans.

Additionally, the state passed AV-adjacent legislation in 2021. Senate Bill 291 allows for truck platooning and empowers the state to make regulations to carry out the law.

- Bills passed in 2019: House Bill 455
- Bills introduced in 2020: House Bill 1464
- Bills introduced in 2021: Senate Bill 291
- Bills passed in 2021: Senate Bill 291

MASSACHUSETTS

While Massachusetts has yet to pass a comprehensive framework concerning autonomous vehicles, executive orders issued by Governor Charlie Baker outlined the process by which one might apply to test AVs and established the Massachusetts Department of Transportation as the overseeing agency. Additionally, an executive order established an Autonomous Vehicles Working Group.

The lack of codified requirements is not for a lack of proposed legislation. In the past two years, multiple bills have sought to regulate and restrict autonomous vehicles, but they have yet to gain any traction in the state legislature. The city of Boston, meanwhile, has created their own framework for testing and partnered with Motional and Optimus Ride with plans to expand.

- Bills introduced in 2020: Senate Bill 2056, Senate Bill 2115, House Bill 3013, House Bill 3089, House Bill 3143, House Bill 3672, House Bill 3099, House Bill 5028, HB 5080
- Bills introduced in 2021: House Bill 3595, House Bill 3475, House Bill 3434, Senate Bill 2351

MICHIGAN

An autonomous vehicle whizzes by a storefront as it merges onto a freeway communicating with each car and sign as it passes. A school bus looks on at the vehicle as its passengers, technicians, and engineers from around the world study the vehicle’s movements. While these environments are not always easily accessible to manufactures and developers, the University of Michigan’s Mcity Test Facility provides these testing opportunities in a safe and controlled environment that provides state-of-the-art monitoring and metrics to prepare AVs for the open road.

As the home of the nation’s auto manufacturing industry, it’s no surprise that Michigan is one of the nation’s leading AV testing hubs. In 2016, the state approved legislation allowing for pilot testing. The state is also home to several large testing facilities, including the University of Michigan-owned Mcity. These projects were funded in part by the \$60 million federal grant allocation for automated driving systems research for its Michigan Mobility Collaborative.

By investing in the autonomous future, Michigan is preparing itself for the coming transformation to autonomous vehicle manufacturing. In fact, Cruise, a GM-backed autonomous vehicle company, has announced that it will begin assembling its self-

driving shuttle, the Origin, at a Detroit-Hamtramck Assembly plant in 2023. In 2019, Waymo opened “the world’s first dedicated autonomous plant” in Detroit. In February 2022, Ford announced that it would be teaming up with Google to renovate Michigan Central Station and turn it into a center for electric vehicle and autonomous vehicle research.

Throughout the state, autonomous technology is being tested and integrated into the Michigan transportation infrastructure. In October 2021, May Mobility launched “A2GO,” an autonomous shuttle service in their hometown of Ann Arbor, with the support of a grant from the Michigan Economic Development Corporation. The state continues to encourage autonomous development, even going so far as to create the Office of Future Mobility and Electrification in July 2020. *In the announcement of the office, Governor Whitmer said, “Now more than ever, it is critical that Michigan strengthen opportunities for economic growth and job creation while securing our continued leadership in mobility and electrification through forward-thinking policies, innovative partnerships and smarter infrastructure.”*

MINNESOTA

Although Minnesota has no laws or regulations specifically addressing autonomous vehicles, the state’s Department of Transportation is actively promoting and preparing for widespread autonomous technology. In 2018, Governor Mark Dayton signed an executive order creating a Governor’s Advisory Council on Connected and Automated Vehicles to recommend a path forward. Its resulting 66-page report delivered a rosy outlook on automated cars and included draft legislation setting up a permit system and giving the state DOT wide latitude to decide whether to allow a business to test based on its history with self-driving technology. The Minnesota Legislature has yet to decide the issue, though they express safety concerns for public testing and deployment.

In 2021, both bills about autonomous vehicles stalled in the legislature. Senate Bill 214 sought to prohibit Level 4 or 5 automated driving systems from operating in the state. House Bill 230 encouraged the state to investigate using autonomous vehicles for mass transit through a microtransit rideshare pilot program.

Although House Bill 230 did not pass, the Minnesota Department of Transportation did launch a 12-month pilot program utilizing an autonomous shuttle in September. The shuttle, known as the “Med City Mover” will travel a 1.5-mile route in downtown Rochester along the Mayo Clinic and surrounding areas.

Minnesota has passed legislation regarding platooning on freeways and expressways. A platooning system may be used only if a plan has been approved by the Commissioner of Transportation, who must consult with the Commissioner of Public Safety before approving the plan.

- Bills passed in 2019: House Bill 6
- Bills introduced in 2021: Senate Bill 214, House Bill 230

MISSISSIPPI

Mississippi has yet to pass legislation concerning autonomous passenger vehicles. However, the state does permit platooning if the operator receives approval from the Department of Transportation and the Department of Public Safety.

Although there is no widespread adoption or deployment of autonomous vehicles in the state, the Mississippi State University Center for Advanced Vehicular Systems continues to support the development of autonomous technology. In contrast to more traditional autonomous research, MSU CAVS has spent time focusing on how autonomous technology might operate in an off-road setting. Besides their physical “proving grounds,” they are developing an open-source simulator that will allow autonomous software to be tested in a virtual environment before it hits the open road (or off-road).

Learn more:

- [We Ring True: MSU’s Autonomous Vehicle Simulator - YouTube](#)
- [Autonomous Vehicles | CAVS \(msstate.edu\)](#)

MISSOURI

In past legislative sessions, lawmakers have proposed legalization and prohibition of autonomous vehicles to no avail. In 2021, legislators introduced Senate Bill 452 which would have codified autonomous vehicles and laid ground rules for their operation. This bill did not generate momentum and failed. Senate Bill 176, which sets regulations for delivery robots, did pass the legislature in 2021 and became law.

Even in states without a legal framework, however, autonomous technology is gaining notoriety. Researchers at the University of Missouri and Missouri S&T are studying autonomous driving and technology. Missouri’s tucking community has expressed interest in autonomous driving and how it might benefit the future of transportation.

- Bills introduced in 2020: HB 2059
- Bills introduced in 2021: Senate Bill 176, Senate Bill 452
- Bills passed in 2021: Senate Bill 176

MONTANA

Montana currently has no laws or executive orders governing AVs; however, the legislature did pass House Joint Resolution 10 establishing a study committee on autonomous vehicles in 2021. The committee will include people from the state’s Department of Transportation, Department of Justice, highway patrol, automobile, and insurance community, among others. Together the committee will study other statutory frameworks and make a presentation and recommendation to the state legislature by September 2022.

Additionally, Yellowstone National Park, partly found in Montana, utilized autonomous shuttles this summer. These 3D-printed Olli electric shuttles assisted visitors by offering free rides from the Canyon Village to nearby lodging and campsites.

- Bills introduced in 2021: House Joint Resolution 10
- Bills passed in 2021: House Joint Resolution 10

NEBRASKA

In April 2018, Nebraska lawmakers cleared the way for companies to test self-driving vehicles if the vehicle can operate in compliance with traffic and motor vehicle safety laws. The AV may or may not contain a human driver, but if a human driver is present, he or she must be a licensed driver and covered by insurance. The law also authorizes the operation of an on-demand AV network for the transport of persons or goods, including for-hire transportation or public transportation.

There has been limited deployment and testing across Nebraska. There has been no momentum for further legislation. This year, a proposal to study autonomous vehicles as they relate to a variety of unconsidered issues did not pass.

- Bills introduced in 2020: L 521, L 142
- Bills introduced in 2021: LR155

NEVADA

Ever since Nevada passed AV legislation in 2012, the state has led driverless vehicle innovation. In 2017, with the passage of Assembly Bill 69, Nevada permitted the testing and commercial public deployment of AVs—later that year, Las Vegas had its first completely autonomous electric shuttle deployed for public use. In 2019, the AV startup Zoox received permission from the Nevada Department of Motor Vehicles to deploy AVs on state roads.

In 2021, the Nevada State Legislature passed two new bills that updated the state’s code and kept it on the forefront of autonomous technology. Assembly Bill 412 codified requirements and exceptions for “neighborhood occupantless vehicle[s]” like the autonomous delivery vehicles beginning to rollout across the country. These vehicles, like Nuro, are introducing consumers to autonomous vehicles and commercializing the technology.

Senate Bill 288 allows for an autonomous technology company to contract with a transportation network in the state. This bill will clearly benefit rideshare companies looking to partner with autonomous vehicle companies. In November, Lyft announced that it will partner with Motional, an Aptiv-Hyundai joint venture, to launch a commercial fully driverless ride-hail service in Las Vegas in 2023. Lyft and Motional have worked together before and Motional has been testing in Nevada for some time. They hope to offer the public autonomous rides by the second half of next year. In February 2022, Motional launched an initially free robotaxi service alongside Via, an on-demand transit company.

- Bills passed in 2019: Assembly Bill 23
- Bills Enrolled in 2021: Assembly Bill 412, Senate Bill 288
- Bills passed in 2021: Assembly Bill 412, Senate Bill 288

NEW HAMPSHIRE

After previously vetoing a bill to permit autonomous vehicle testing in New Hampshire, in 2019, Governor Chris Sununu signed into law a bill that creates an automated vehicle testing pilot program in New Hampshire. The new law creates an autonomous vehicle advisory commission and testing pilot program and sets requirements for vehicle deployment. The new pilot program permits testing on public roads. While there has not been widespread testing in state, FedEx has indicated that they have tested their own delivery bot in the New Hampshire. House Bill 116, which did not pass the state legislature, would have codified delivery robots.

- Bills passed in 2019: Senate Bill 216
- Bills introduced in 2021: HB 116

NEW JERSEY

In 2019, New Jersey established an 11-member tasked force called the New Jersey Advanced Autonomous Vehicle Task Force to study autonomous vehicles and recommend laws, rules and regulations that New Jersey may enact to integrate autonomous transportation into the state’s transportation system. However, since then, New Jersey has not passed any major legislation around autonomous vehicles. Year after year, bills are introduced to create a legal framework for AVs, but they never come to fruition.

After years of inactivity, things are beginning to change. In December, Governor Phil Murphy announced that his office would partner with the New Jersey Department of Transportation, the city of Trenton, and Princeton University to launch Trenton MOVES. Trenton MOVES will be the first autonomous vehicle-based urban transit system in the US. Companies are invited to share their interest in building an on-demand transit system that features 100 autonomous vehicles and serves the 90,000 residents of New Jersey’s capital city. In February 2022, Trenton MOVES received a \$5 million grant from the state Department of Transportation to help support the project.

*“Since taking office, we have worked relentlessly towards making New Jersey the innovation center of America,” said **Governor Murphy**. “There is perhaps no initiative that embodies this goal more than the Trenton MOVES project, which will attract tech talent from around the country and the world with the mission of creating an autonomous vehicle-based transit system in our Capitol that will provide a new, affordable transportation solution for underserved areas of Trenton. This is an exciting project with immense potential and I look forward to the day that the first vehicle hits the road.”*

Learn more: [Office of the Governor | Murphy Administration Announces RFEI for Project to Create the First Autonomous Vehicle-Based Urban Transit System in America \(nj.gov\)](#)

- Bills passed in 2019: AJR 164
- Bills introduced in 2020: A 1187, A 1189, A 1607, A 2807, S 2129
- Bills introduced in 2021: Senate Joint Resolution 17, AJR 138, A 1187, A 1189, A 1607, Senate 2129, A 2807

NEW MEXICO

In the past, autonomous vehicle companies have conducted testing in New Mexico, particularly regarding autonomous trucks. However, until this year, the state had no formalized framework for autonomous vehicles or autonomous vehicle testing. House Bill 270 defines autonomous vehicles, regulates autonomous vehicles and autonomous vehicle testing, and allows for platooning.

Recently, Honda completed a month-long test of their autonomous work vehicle alongside a New Mexico construction company. The vehicle assisted Black & Veatch on a 1,000-acre site where they were building a solar farm.

- Bills introduced in 2021: House Bill 270
- Bills passed in 2021: House Bill 270

NEW YORK

New York has highly restrictive regulations on AV testing. Under legislation approved in 2017, any testing must be approved by the commissioner of the Department of Motor Vehicles, supervised by the New York State Police, and levied with significant hourly and per mile rates. Some autonomous companies have tested their technology in private areas away from New York’s regulations, but until this year, there has not been any sustained large scale testing efforts.

This year, Mobileye and Waymo, two leading autonomous vehicle companies, announced their plans to test in New York City. NYC provides a new and challenging testing environment for autonomous vehicles. Instead of long stretches of unencumbered highway, New York City is a fast and changing environment with a variety of stimuli that are hard to replicate. Although these experiences will help AVs grow and learn, the technology must be safe and secure to receive approval from the state and city and protect the public.

- Bills introduced in 2020: SB 65, A 301, SB 1159, A 1554, SB 1779, A 1808, A 2643, SB 6014, A 7980, A 8460
- Bills introduced in 2021: A 639, A 3743, A 4280, A 7744, S 3909, S 6993

NORTH CAROLINA

In 2020, Governor Cooper signed SB 739 into law, allowing autonomous delivery devices in pedestrian areas and on highways. This year, the state legislature followed by passing Senate Bill 814, which codified and regulated “neighborhood occupantless vehicles.” In contrast to SB 739, neighborhood occupantless vehicles are fully autonomous and do not require an operator.

Over the past year, TransLoc, a Durham-based company and subsidiary of Ford Mobility, launched a driverless shuttle at the Wright Brothers National Memorial. Perhaps fittingly, this shuttle was the first vehicle of its kind to be used at any US National Park.

*“This is a huge day for transportation,” said North Carolina Transportation Secretary **Eric Boyette**, in remarks delivered at the event launching the project. “We’ve come such a long way since the Wright Brothers made their first historic flight here more than a century ago. Just like that milestone, we think the CASSI (Connected Autonomous Shuttle Supporting Innovation) represents the start of another revolution for transportation.”*

Learn more: [NCDOT, National Park Service launch autonomous shuttle | Mass Transit \(masstransitmag.com\)](#)

- Bills passed in 2020: SB 739
- Bills introduced in 2021: HB 814
- Bills passed in 2021: HB 814

NORTH DAKOTA

North Dakota permits autonomous vehicle operation if the vehicle can operate in compliance with all applicable federal and state law. State law does not require a human driver to operate on the public highway if the autonomous vehicle can achieve a minimal risk condition if a system failure occurs. The law permits on-demand autonomous vehicle networks to transport persons or goods.

North Dakota also allows for truck platooning subject to the Department of Transportation in coordination with the state highway patrol superintendent, developing an operational plan that provides guidelines for operation. The plan must include operational information that must be provided by a platoon technology provider or commercial motor vehicle operator.

While North Dakota may not see as much testing as states like Arizona and California, autonomous technology still effects the state’s economy.

Airtonomy is a North Dakota-based software company that handles data for autonomous vehicle companies. This year, Airtonomy won the Genius NY business competition and received the million-dollar award. As the autonomous sector continues to grow, even states without large scale testing will benefit.

- Bills passed in 2019: House Bill 1199, House Bill 1418

OHIO

There are no laws in Ohio governing AVs, but there are relevant executive orders (EO) signed by former Governor John Kasich in 2018. The first EO created DriveOhio, a new division of the state DOT that allows any company to test AVs in the state if they register with DriveOhio and have a human operator behind the wheel. Four cities—Columbus, Dublin, Athens, and Marysville— have already signed agreements with DriveOhio to test AVs on their streets, and the state has designated a 35-mile stretch of US Route 33 a “Smart Mobility Corridor” for the deployment of connected vehicle technologies. A \$45 million SMART testing center opened in Logan County and funded by a partnership between Ohio State University and the State of Ohio, will include an indoor highway track capable of simulating ice and snow year-round. The second EO created regulations for testing self-driving vehicles in the state.

The city of Columbus’ partnership with DriveOhio has led to two separate autonomous shuttles being introduced in the city for a testing period. While the city’s second launch was interrupted by the pandemic, it allowed autonomous technology to prove its capabilities for societal improvement. From July 2020 to April 2021, the autonomous shuttle service distributed almost 130,000 meals in the community.

Additionally, Ohio State University is already researching autonomous vehicle cybersecurity through their Mobility Cyber Range (MCR) at the Center for Automotive Research (CAR). Partnering with NVIDIA, a leading autonomous vehicle company, this research will allow the sector to test their vehicle’s cybersecurity and identify potential safety and security issues.

Learn more: [Self-Driving Shuttles | SmartColumbus](#); [Developing a Safety Plan for Self-Driving Shuttles | SmartColumbus](#)

- Bills passed in 2019: EO26D

OKLAHOMA

In 2022, Oklahoma built off of earlier legislation and passed a comprehensive legal framework for autonomous vehicles. The law uses the term “Fully Autonomous Vehicle” for level 4 and 5 vehicles and permits drivers to operate vehicles equipped with “automated driving systems” as long as the vehicle issues a request to intervene when necessary. Autonomous vehicles can drive on public highways without a safety driver if they can meet a minimal safety condition and comply with other regulations including the submission of a law enforcement interaction plan. The Department of Public Safety and the Department of Transportation are given the power to create rules implementing the law.

By passing legislation on autonomous vehicles, Oklahoma will open itself up to benefits from autonomous trucking activities already taking place in the nation’s heartland. As the bill’s sponsor, Senator Paul Rosino, (R) noted, “Oklahoma is the only state on the I-40 corridor that isn’t already allowing AVs. That places our state at an economic and public safety disadvantage.” University of Oklahoma President Joseph Harroz Jr recently announced the school’s plan to launch OU Polytechnic Institute on the OU-Tulsa Campus. This new school would be focused on building Oklahoma’s Tech Workforce and would offer programs focused on innovative areas like electric vehicles and autonomous technology.

In 2021, Oklahoma passed a law approving autonomous delivery vehicles. Notably, the law does allow cities and towns to ban the operation of delivery vehicles in their boundaries.

- Bills Passed in 2021: SB 706
- Bills Passed in 2022: SB 1541

OREGON

Oregon has no current regulations in place concerning autonomous vehicles. However, House

Bill 4063, signed by Governor Kate Brown on April 10, 2018, named the Oregon Department of Transportation (ODOT) the state’s lead agency on automated vehicle policy and directed ODOT to facilitate a task force on automated vehicles. The Task Force submitted its first report to the legislature on September 10, 2018, and its second on September 9, 2019. The task force voted to continue meeting on an ad hoc basis in response to significant developments in automated vehicle technology and policy. The task force dissolved on January 2, 2021.

However, the state’s lack of regulation does not mean the autonomous sector is inactive in Oregon. In fact, Portland includes autonomous vehicles in their smart city initiative, “Smart City PDX.” Last year, Jay Boberg, co-founder of Nicolas-Jay Winery allowed Monarch Tractors to showcase their autonomous tractor on his property. Developments in autonomous farming technology could greatly assist Oregon’s agricultural sector.

PENNSYLVANIA

Pennsylvania law does not explicitly regulate autonomous vehicle testing, but the state Department of Transportation has created a voluntary registration process. Additionally, Pennsylvania has established regulations on truck platooning and created the Highly Automated Vehicle Advisory Committee within the Pennsylvania Department of Transportation. The Committee must submit a report annually. HB 1078 would have established general provisions for AVs and associated penalties.

The state, however, has become rather important in the autonomous sector. Due in part to Carnegie Mellon University’s long-time research on autonomous vehicle, Pittsburgh has become a hotbed for autonomous vehicle testing and development. Additionally, Pittsburgh has provided local incentives to autonomous vehicle companies. Toyota and Aurora, an autonomous tech company, are planning to test their robotaxis in Pittsburgh. They hope to launch their robotaxi fleet in partnership with Uber in 2024.

Argo AI, a leading autonomous vehicle company, is based in Pittsburgh. This year, Argo announced that it will partner with Ford and Lyft to debut an autonomous rideshare service in Austin and Miami. The company plans to expand to over 1,000 vehicles in multiple markets in the next five years. Walmart announced that they will also partner with Argo to use autonomous vehicles to assist in last-mile delivery on Austin, Miami, and Washington DC. Clearly, Argo is continuing to grow and lead the industry, thus helping elevate Pittsburgh and Pennsylvania’s standing in the autonomous industry.

- Bills introduced in 2020: HB 1078

RHODE ISLAND

Rhode Island has yet to pass legislation on autonomous vehicles. The Rhode Island Department of Transportation started the Rhode Island Transportation Innovation Partnership (TRIP) in 2017 to encourage autonomous vehicle testing and usage. Multiple autonomous shuttles have conducted limited runs in the state.

In 2021, Oceanographers from the University of Rhode Island partnered with an international group of researchers to gather valuable climate data from the Gulf Stream during the Winter. This mission would never be possible for a human crew, due to massive storms and safety issues. However, by using autonomous sailing drones, the scientific community can gather data that has never been gathered before.

- Bills introduced in 2020: HB 1078

SOUTH CAROLINA

South Carolina has yet to pass legislation on autonomous passenger vehicles, but it has exempted platoons from certain traffic laws.

As a major player in automotive manufacturing, South Carolina will likely play a large role in producing the next generation of automobiles. Already, Polestar has announced that they will build their first EV on US soil at their South Carolina plant.

- Bills introduced in 2020: HB 1078

SOUTH DAKOTA

South Dakota has directed the Transportation Commission to promulgate rules to authorize the testing and operation of platooning at electronically coordinated speed and distance intervals that are closer than otherwise allowed under the “following too closely” laws in the state.

Raven Industries, a South Dakota-based company, was purchased earlier this year by CNH Industrial, an international agriculture vehicle manufacturer. CNH Industrial said that the purchase will help them integrate autonomous technology into their services.

South Dakota State University has recently partnered with Starship Technologies to bring autonomous delivery robots to campus.

- Bills passed in 2019: House Bill 1068

TENNESSEE

Legislation passed in 2017 allows certified autonomous vehicles to operate in the state, provided they contain automatic crash recording and notification technology. The law also preempts local regulation of ADS-operated vehicles and specifies that the ADS shall be considered a driver for liability purposes when it is fully engaged and operated properly. The TennSmart consortium, made up of government agencies, universities, and companies with ties to the state, hopes to encourage collaboration and innovation in the AV area.



Vanderbilt University and the Tennessee Department of Transportation announced a partnership to conduct a road study on I-24 that examines how autonomous vehicles effect traffic. By recording traffic data and analyzing the videos, researchers can identify where “phantom traffic” originates. Phantom traffic are slowdowns created by human reactions to traffic conditions instead of wrecks or emergencies. Besides analyzing video tape, researchers will introduce 100 autonomous vehicles onto the road, to see if autonomous vehicles can help mitigate the causes of phantom traffic.

In March 2022, local reporters spotted two Argo AI/Ford vehicles driving around Nashville’s famous Gulch neighborhood. A spokesperson from Argo confirmed that two vehicles were being manually driven around Nashville on a “mapping mission,” although that did not mean Argo had plans to test or deploy in the area. Regardless, the news created some buzz in the Music City about the potential of driverless vehicle deployment.

TEXAS

Texas’ geography and friendly regulatory climate has made it a magnet for autonomous vehicle testing. The I-45 corridor has become a hotspot for autonomous truck testing. In fact, UPS and Waymo will now partner to collect data and deliver goods between Dallas and Houston. Waymo has expanded its presence in Texas by partnering with C.H. Robinson for multiple pilot projects along the same route.

In 2021, Dominos partnered with Nuro to launch a highly publicized autonomous delivery service in Houston. Austin has also emerged as a player in autonomous technology development. By next year, Argo AI, Ford, and Lyft hope to launch their driverless rideshare service in Austin and Miami, with plans to quickly expand. Last year, Tesla officially moved its headquarters to Austin. In March 2022, Toyota and Aurora announced the launch of their self-driving fleet of Sienna minivans in the Dallas-area, under the supervision of safety drivers. Texas Department of Transportation officials have expressed clear commitments to building on the momentum of AV development and investment in Texas.

State law allows an automated motor vehicle to operate in the state regardless of whether a human operator is present in the vehicle if certain requirements are met. Texas also preempts local regulation of automated motor vehicles and automated driving systems. This year, Texas passed two new autonomous vehicles laws. Senate Bill 1308 instructs the legislature to study autonomous and connected vehicles and House Bill 3026 exempts autonomous vehicles for irrelevant regulations.

- Bills introduced in 2021: House Bill 3026, Senate Bill 1308
- Bills passed in 2021: House Bill 3026, Senate Bill 1308

UTAH

Driverless vehicles are regulated on Utah roads under legislation approved in 2019. While any properly insured autonomous vehicles may operate, autonomous networks must be registered with the state. Vehicles must be operated in compliance with all applicable traffic and safety laws and must be able to achieve a minimal risk condition or make a request to intervene if a system failure occurs. Finally, Utah permits the Department of Transportation to obtain, collect and utilize anonymized location data of connected vehicles.

Unlike some other Southwestern states, Utah has not seen widespread autonomous vehicle testing and acceptance. Still, there have been limited runs of autonomous shuttles in the state. One Utah company, Autonomous Solutions, is bringing jobs and industry to rural Utah. Autonomous Solutions is an autonomous technology company that works to automate military and commercial vehicles using GPS. House Bill 31, introduced this year, would have created a study committee to investigate unaccompanied minors in autonomous vehicles, but the bill did not pass.

In 2022, the state legislature passed HB 137, which clarified that a “human driver” operating an autonomous vehicle was still subject to traffic laws, including a prohibition against driving under the influence.

- Bills passed in 2019: Senate Bill 72, House Bill 101
- Bills introduced in 2020: HB 414
- Bills introduced in 2021: House Bill 31
- Bills introduced in 2022: HB 137
- Bills passed in 2022: HB 137

VERMONT

Vermont has established an automated vehicle testing program and granted authority to the Agency of Transportation to adopt specific rules. State law requires that during a test an operator is seated in the driver’s seat of the automated vehicle monitoring the operation of the vehicle and can take immediate control if necessary.

This year, Vermont issued its first forays into the autonomous vehicle space. The Agency of Transportation to publish an Automated Vehicle Testing Guide at the end of 2020; however, no municipalities had approved autonomous vehicle testing within their boundaries. In January 2021, however, Springfield became the first town to permit autonomous vehicle testing. The Agency of Transportation also held their first forum on AVs and included May Mobility, TuSimple, and EasyMile, indicating their commitment to the autonomous space.

- Bills passed in 2019: Senate Bill 149

VIRGINIA

Although Virginia has no laws or regulations specifically pertaining to autonomous vehicles, the state has taken an active role in encouraging testing and deployment. Seventy miles of Virginia highways have been designated “automated corridors” and outfitted with high-definition mapping and data acquisition systems to support automated-vehicle testing. Virginia has become a hotbed of autonomous vehicle activity and shows that autonomous vehicles can operate in regulation-less states, as long as the operator adheres to state and federal law.

Virginia’s universities and institutions of higher learning are researching autonomous technology and continue to contribute to the autonomous sector. Virginia Tech has worked with Ford to research signals and communication systems for autonomous vehicles. Virginia Tech is home to the Virginia Tech Transportation Institute, who has partnered with the Governors Highway Safety Association (GHSA) to research how first responders can best interact with autonomous technology. The University of Virginia is also making a name for themselves in the autonomous space. UVA’s Autonomous Racing Team participated in the Indy Autonomous Challenge and earned a spot as the fastest American car in the race. In 2022, Virginia Tech launched a new open-access tool that allows autonomous vehicle companies to examine and compare different cities and their conditions for autonomous driving.

The Amazon HQ2 will soon transform Arlington County’s National Landing neighborhood. The headquarters’ developer JBG Smith, announced that it will partner with AT&T to build the country’s first “smart city at scale.” The plan includes utilization of autonomous vehicles and Virginia Tech plans to launch its own campus on-site.

- Bills introduced in 2020: Senate Bill 1100

WASHINGTON, DC

In 2012 the District of Columbia became one of the first jurisdictions to pass legislation regarding testing autonomous vehicles. On November 2, 2020, Mayor Bowser signed the Autonomous Vehicles Testing Program bill which was approved by Congress just a few days later. The act regulates testing autonomous vehicles on District roads through a testing program at the District Department of Transportation. To test an autonomous vehicle on public roads, an autonomous vehicle testing entity must submit certain information to DDOT for approval, including vehicle information for each vehicle tested; a safety and risk mitigation plan; and a description of the area and conditions under which an autonomous vehicle can function while being tested autonomously. Among other things, the bill requires crash and data reporting, including any crash of its vehicles while under autonomous operation that results in property damage, bodily injury, or death.

An Autonomous Vehicle Working Group, established by Mayor Bowser in February 2018, (Mayor’s Order 2018-018), has been exploring the implications of autonomous vehicles, including workforce and employment, urban planning, parking, and a range of other issues. This year, the AV Working Group released their recommendations to Mayor Bowser. The comprehensive document laid out principles and next steps to encourage autonomous vehicle development including making sure a working group continues to meet.

Companies continue to recognize DC’s potential and are moving to introduce autonomous technology to the district. Walmart announced this year that they will be partnering with Argo AI to use autonomous vehicles in their last mile delivery. Optimus Ride is

now offering autonomous rides throughout Barracks Row and Capitol Hill.

- Bills introduced in 2020: B 248
- Bills passed in 2020: Bill 23-232 (Autonomous Vehicles Testing Program Bill)
- Bills introduced in 2021: B 134
- Bills passed in 2021: B 285

WASHINGTON

While Washington State does have a legal framework for autonomous vehicle, its regulations are not overbearing. Governor Jay Inslee signed an executive order in June 2017 to require that state agencies with pertinent regulatory jurisdiction “support the safe testing and operation of autonomous vehicles on Washington’s public roads.” The executive order establishes an interagency workgroup and enables pilot programs throughout the state. The order specifies certain requirements both for vehicles operated with human operators present in the vehicle and for vehicles operated without human operators in the vehicle. In 2020, Washington passed House Bill 2676 that established minimum requirements for testing AVs, necessitating the reporting of planned local testing and any collision accidents. In 2021, Senate Bill 5460 defined autonomous vehicles as Levels 4 through 5, clarifying that Level 3 was not considered autonomous in Washington. The bill also provided the Department of Licensing additional rulemaking authority. In 2022, the state legislature considered multiple bills to change the reporting requirements for autonomous vehicles and autonomous vehicle testing. None of these bills were passed.

So far, BMW, NVIDIA, Waymo, and Zoox, are all self-certified to operate autonomous vehicles in Washington. Zoox, the autonomous vehicle unit backed by Amazon, will launch an office in Seattle and bring a fleet of Toyota Highlanders to the city for testing. This fleet will allow Zoox to test in a wet climate unlike its current testing in San Francisco and Las Vegas.

- Bills introduced in 2020: SB 6659, HB 2470
- Bills passed in 2020: HB 2676
- Bills passed in 2021: Senate Bill 5460
- Bills introduced in 2022: House Bill 1731, House Bill 2070, Senate Bill 5828

WEST VIRGINIA

Until recently, West Virginia had yet to pass any laws concerning autonomous vehicles. In 2021, West Virginia passed legislation offering tax credits for autonomous vehicle companies. In 2022, the state legislature passed House Bill 4675 to codify, regulate, and define autonomous and semi-autonomous delivery robots and House Bill 4787 which created a comprehensive framework for autonomous vehicles in West Virginia.

House Bill 4787 permits Level 3, 4, and 5 autonomous vehicles to drive in West Virginia with or without a driver, as long as they meet minimum safety standards and can reach a minimal risk condition. The West Virginia Department of Transportation is given the authority to create rules around the testing, deployment, and annual safety inspection of autonomous vehicles. The bill permits platooning and creates the Highly Automated Vehicle Advisory Committee. Additionally, the bill requires AVs be equipped with a recording device and automatic crash notification technology. The owner of the AV must show proof they are covered by insurance for at least \$1 million before operating on the highway. House Bill 4787 will open West Virginia up to the autonomous vehicles industry.

West Virginia University’s BrickStreet Development Center for Innovation and Entrepreneurship and the Marion Regional Development Corporation are in talks with the Fairmont City Council to develop the Fairmont Transportation Research Campus at the old Fairmont Coke Works site. This development would include an academic research center, automobile testing, performance and training facilities, an almost two-mile-long road course, acceleration and deceleration course and a skid pad with an emphasis on autonomous vehicle research.

“This project is a way for North Central West Virginia to begin to be a leader in a new technology,” - Marion Regional Development Corporation President **Nick Fantasia**

Learn more: [Fairmont City Council hears plan to develop autonomous vehicle testing facility | Local News | timeswv.com](#))

- Bills introduced in 2021: HB 2760
- Bills passed in 2021: HB 2760
- Bills introduced in 2022: HB 4675, HB 4787
- Bills passed in 2022: HB 4675, HB 4787

WISCONSIN

Former Governor Scott Walker signed an executive order in May 2017 creating the Governor’s Steering Committee on Autonomous and Connected Vehicle Testing and Deployment within the state Department of Transportation. The committee was tasked with advising the governor “on how best to advance the testing and operation of autonomous and connected vehicles in the State of Wisconsin.” The Committee submitted their report in 2018 and made several recommendations, including requiring municipal oversight, an application process and backup drivers. While these have yet to be enacted, the committee also noted that it believes current state law “does not prohibit the operation of autonomous vehicles.”

Despite the lack of any legal framework, Wisconsin regularly sees autonomous vehicle activity in the state. In 2017, the US Department of Transportation named University of Wisconsin – Madison one of ten “proving ground pilot sites” for autonomous vehicles. Since then, UW – Madison has helped create the Wisconsin Connected and Automated Transportation Consortium alongside multiple partners including engineering firms, the city of Madison, and even the Road American racecourse. Together these partners provide support and designated testing facilities for autonomous vehicles.

This year, the city of Racine announced the launch of its own driverless shuttle, the “Badger.” Painted to resemble the University of Wisconsin mascot, this driverless shuttle is built in partnership with Perrone Robotics in Virginia and help’s the city of Racine live up to its “smart city” moniker.

WYOMING

In 2018, the Wyoming DOT director argued for the need to prepare for driverless vehicles. Wyoming is one of three states that received a grant from the USDOT in 2015 to participate in a connected vehicle pilot program tested along I-80. There are no laws or executive orders governing AV use in Wyoming, though self-driving vehicles are not specifically prohibited by law. In 2021, Yellowstone National Park launched autonomous shuttles named TEDDY (The Electric Driverless Demonstration in Yellowstone). These shuttles, provided by Beep, helped alleviate the summer crowds.

In 2022, Senate File 16 sought to institute a comprehensive regulatory framework for autonomous vehicles in Wyoming but failed in committee. The bill would have created markings requirements, insurance requirements, reporting requirements, and given authority to Wyoming Department of Transportation to create any further rules or regulations.

- Bills introduced in 2021: Senate 7
- Bills introduced in 2022: Senate 16

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