



# Trialling Autonomous Vehicles in NSW

August 2017





## About the NRMA

Better road and transport infrastructure has been a core focus of the NRMA since 1920 when our founders lobbied for improvements to the condition of Parramatta Road in Sydney. Independent advocacy was our foundation activity, and it remains critical to who we are as we approach our first centenary.

We've grown to represent over 2.4 million Australians, principally from New South Wales and the Australian Capital Territory. We provide motoring, mobility and tourism services to our Members and the community.

Today, we work with policy makers and industry leaders, advocating for increased investment in road infrastructure and transport solutions to make mobility safer, provide access for all, and deliver sustainable communities. By working together with all levels of government to deliver integrated transport options, we give motorists real choice about how they get around.

We firmly believe that integrated transport networks, including efficient roads, high-quality public transport and improved facilities for cyclists and pedestrians, are essential in addressing the challenge of growing congestion and providing for the future growth of our communities.

## Comments and queries

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# The importance of autonomous vehicles and trials

The privately-owned motor vehicle has been part of the Australian family now for at least three generations.

But the world of automobility is changing, and Australia will change with it. Population growth and the greater densification of our urban environment is throwing up enormous challenges. This includes increasing urban congestion, constraints on housing affordability and cost of living pressures.

Car manufacturers are now locked in a great battle of creative disruption as they attempt to respond to these challenges using new forms of technology. Revolutions in autonomous vehicles, electric vehicles, car sharing, ride sharing and connected vehicle technology will radically alter the concept of how we move around.

The shift towards a new form of mobility will usher in enormous benefits that are likely to be broadly spread throughout the community.

Increased choice and convenience will allow consumers to transition away from owning their own vehicles if they feel the traditional model of ownership does not offer value for money or peace of mind.

The arrival of autonomous vehicles will potentially improve safety, accessibility and productivity while reducing congestion and energy consumption.

While these benefits are clearly desirable, a considerable amount of information is still needed to further our understanding of what is ultimately required for a fully autonomous vehicle future. With many of our congested cities and precincts struggling with transport demands, it is vital for industry, in partnership with government, to play a leading role in shaping an autonomous future.

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The best way to introduce new technology while simultaneously gaining important insights into consumer perception is through trials. Some manufacturers are seeking opportunities to trial innovative technologies, while others are prepared for the full scale deployment of level 3 and level 4 autonomous vehicles. Through the provision of trials, Australian governments can expedite the introduction and adoption of autonomous vehicle technology without favouring certain manufacturers or technological approaches.

In order to build consumer confidence in autonomous technology and facilitate the introduction of level 5 fully autonomous vehicles, it is necessary for Australian governments to support and facilitate trials.



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Technology leader Volvo publicly highlighted one unique challenge faced by autonomous vehicle technology in the unique Australian environment – the interaction with kangaroos caused unforeseen issues when their bounding action was not accurately recognised by on-board detection and surveillance systems.

Autonomous vehicle trials are necessary to examine interactions between autonomous technology, road users, roadside infrastructure and other vehicles. Trials can accumulate data and information to improve knowledge and understanding, and should be facilitated in a range of driving environments, including in rural, regional and urban settings.

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**Greatly improved safety**

94% of accidents are caused by human error



**Improved transport interconnectivity**



**Reduced congestion**

Congestion will cost NSW \$6.9 billion in 2017



**Reduced pollution and emissions**

Reducing transport energy consumption by up to 90%



**Greater mobility options**

For elderly, young and disabled users



**Greater convenience, efficiency and reliability**



**Reduced costs and maintenance requirements**

# The regulatory environment

The regulatory environment that manufacturers and users of autonomous vehicles must navigate is complex:

## Road rules

Each state and territory maintains a set of road rules that define the rules for driving on shared roads. In NSW, the rules are known as the *Road Rules 2014*. To ensure the road rules are mostly uniform with those applicable in other states and territories, the rules are based on the *Australian Road Rules*, which were developed by the National Road Transport Commission (now the National Transport Commission or NTC) and first published in 1999.

## Road transport and safety legislation

Each state and territory maintains its own road transport and safety legislation. In NSW:

- The *Road Transport Act 2013* contains statutory provisions concerning road users, road transport and road safety. In addition, the Act sets out a system for licensing, vehicle registration, road safety and transport efficiency.
- The *Roads Act 1993* regulates activities on public roads and sets out the rights of members of the public and adjoining land owners pertaining to the use of public roads.
- The *Passenger Transport Regulation 2007* outlines the obligations that drivers of public transport vehicles must adhere to. Buses, taxi-cabs and private hire vehicles are all captured in the Act.
- The *Crimes Act 1900* outlines offences and associated penalties relating to dangerous driving. Offences that intimidate, threaten or cause harm to an individual or object contravene safe driving practices and are punishable by law.

## Liability for injury, death and property damage

Negligence, contract, product liability and consumer protection laws that govern liability for injury, death and property damage are applicable to incidents arising out of the use of automated vehicles. There are also laws governing compulsory third party (CTP) insurance and other insurances in respect of this liability. In NSW, the CTP insurance scheme is designed to cover personal injury liability.

## Privacy and data

Laws concerning privacy and access to data could apply to information and data generated by autonomous vehicles. With advanced detection and communication technologies potentially generating a significant amount of data about persons traveling in autonomous vehicles, the *Privacy Act 1988* may be applicable should data be classified as personal or sensitive.

## Consumer law and design rules

Australian Consumer Law and Australian Design Rules (ADRs) prescribe safety standards for road vehicles. Australian Consumer Law, designed to ensure fair trading practices and consumer protection, came into effect in 2011. ADRs set national standards for vehicle safety and are administered under the *Motor Vehicle Standards Act 1989*.

# Legislative approaches to autonomous vehicle trials

## South Australia

In June 2016, the South Australian Parliament enacted the *Motor Vehicles (Trials of Automotive Technologies) Amendment Bill 2016*.

This new legislation provides a framework to facilitate on-road trials, testing and development of driverless vehicles and other advanced automotive technology on South Australian roads.<sup>1</sup>

South Australia's legislation has been referenced by Google as a benchmark for other countries to follow due to its design and support of innovative technologies.<sup>2</sup>

As an alternative to introducing an entirely new motor vehicles Act to facilitate autonomous vehicle trials, the South Australian legislation is based on a framework of exemption (to remove barriers within the current *Motor Vehicles Act 1959*). If autonomous vehicle trials prove successful, it is likely that South Australia will put in place significant and permanent amendments to the current *Motor Vehicles Act 1959*, or otherwise introduce an entirely new Act to the South Australian Parliament.

Since the *Motor Vehicles (Trials of Automotive Technologies) Amendment Bill 2016* was assented, around 20 autonomous vehicle trial proposals have been presented for consideration. The proposals, which include on-road trials, off-road trials and heavy vehicle trials, will provide key learnings to assist the progression of autonomous vehicles on Australian roads.

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## New Zealand

In May 2014, the New Zealand Government released an action plan setting out its proposed program on intelligent transport systems. The *Intelligent Transport Systems Technology Action Plan 2014–18* positioned New Zealand as a supportive test-bed for innovative transport technologies and concepts, including autonomous vehicles.

Surprisingly, little was required of the government to support autonomous vehicle testing and trialling as existing transport legislation did not explicitly require a vehicle to have a driver present for it to be used on the road. So long as safety standards and requirements are adhered to, no obvious barriers to introducing autonomous vehicles on roads in New Zealand exist.

Due to this scenario, the testing of autonomous vehicles is not limited to any specific or designated area – testing is able to take place on any part of the New Zealand road network.

Following the release of the *Intelligent Transport Systems Technology Action Plan 2014-18*, the New Zealand Government actively promoted and publicised its desire to host autonomous vehicle trials in New Zealand.

In January 2017, the first autonomous vehicle trial was conducted at Christchurch International Airport.

While no legislative barriers exist for testing and trialling purposes, manufacturers and technology companies wishing to utilise New Zealand's welcoming environment must hold appropriate public liability and professional indemnity insurance and adhere to New Zealand's road rules and safety provisions under the *Land Transport Act 1988*.

1. <http://dpti.sa.gov.au/driverlessvehicles>

2. <https://www.premier.sa.gov.au/index.php/stephen-mullighan-news-releases/337-sa-becomes-first-australian-jurisdiction-to-allow-on-road-driverless-car-trials>

## Singapore

In January 2015, the Singapore Land Transport Authority put in place a regulatory sandbox at the one-north business park in Queenstown to attract trials and keep pace with autonomous vehicle technology developments. Interested applicants can test autonomous technologies and navigational instruments on public roads with prior approval.

The Singaporean Minister for Transport is able to create rules that can place time and space limits on trials, set standards for the design of equipment, and impose requirements to share trial data.

The regulatory framework exempts autonomous vehicles, operators and those conducting or participating in trials from existing provisions of the Road Traffic Act, which makes the human driver responsible for the safe use of a motor vehicle while on a public road.

The regulatory sandbox is limited to five years – at the end of this period, the Ministry will consider enacting more permanent legislation or extending the period of the trial.

In June 2017, the Singapore Land Transport Authority announced it would expand the one-north test-bed into neighbouring areas to allow trial participants to experience a greater number of on-road scenarios.

The Singaporean legislation will potentially be the *Road Traffic (Amendment) Bill*.

## United States

In July 2017, the United States House of Representatives progressed a proposal to allow manufacturers and technology companies to deploy up to 100,000 autonomous vehicles on public roads across the United States.

The aim of the proposal, which currently appears to have bipartisan support, is to nationalise and harmonise the approach to allowing autonomous vehicles on public roads. In an effort to stop a patchwork of inconsistent rules and regulations across individual states, the Federal Bill overrides any applicable legislation introduced at the state level.

In terms of safety, the Federal Bill exempts autonomous vehicles from existing safety standards, provided that participants can show the vehicles function as intended and contain fail-safe features. Safety assessment reports will be required by regulators prior to the commencement of any trial.

While the proposed federal bill overrides state legislative efforts pertaining to the trialling of autonomous vehicles, registration, liability, insurance and licensing rules will remain the responsibility of the states.

The Federal Bill recognises the urgency of bringing forward the promised safety benefits that autonomous vehicles afford. US road deaths rose to 35,200 in 2015, a 7.7 per cent increase on the previous year – the biggest annual increase since 1966.<sup>3</sup>

The US House of Representatives will consider the bill in September 2017.

3. <https://futurism.com/first-ever-us-legislation-on-self-driving-cars-comes-to-the-house/>



# The case for trial legislation

The National Transport Commission recently identified 716 provisions in state and Federal legislation and regulations that relate to autonomous vehicles. Whether any of these provisions actually prevent the use of autonomous vehicles in Australia is debatable. In state and territory road rules, terms such as *control*, *proper control*, *driver* and *driving* raise many questions.

Numerous laws in Australia implicitly assume that vehicles can only be driven by a human driver. This implicit assumption creates considerable uncertainty as to how these laws would apply when a vehicle is being driven by an automated driving system.

*Who is the driver of a fully automated vehicle that is operating on a public road without any passengers?*

*Who is responsible for ensuring that a fully automated vehicle does not speed?*

Questions such as these create uncertainty and doubt. While autonomous vehicle trials could have potentially progressed under current law, the introduction of legislation was seen by South Australia as paramount to removing uncertainty. With a clear and predictable regulatory framework in place, trial participants are provided with clarity around issues such as insurance, liability, and the interpretation of implicit road rules.

## CTP and public liability insurance

CTP insurance schemes provide cover for 'at fault' drivers in respect of their liability to third parties that suffer injury. CTP is funded by premiums paid by vehicle owners, which is appropriate given that vehicle owners are generally the 'at fault' drivers whose liability is being insured.

However, as alluded to previously, terms within current road rules create uncertainty when autonomous vehicles are introduced. With this in mind, trial applicants in South Australia are required to hold appropriate public liability insurance.

The Department of Planning, Transport and Infrastructure clearly elucidates the requirement for public liability insurance:

*Trial applicants should note that they will NOT be covered by the Compulsory Third Party Insurance Scheme administered by the Motor Accident Commission of South Australia for the costs of the death of or bodily injury to third parties in the event of a trial vehicle collision with a third party's vehicle or person.<sup>4</sup>*



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4. <http://dpti.sa.gov.au/driverlessvehicles>

# New South Wales

In our 2017-18 NSW State Budget Submission, the NRMA called on the NSW Government to establish an autonomous vehicle trial fund in anticipation of autonomous vehicle trials.

In *The Future of Car Ownership*, a major research paper from the NRMA to be released in August, we propose that Australian governments support and promote autonomous vehicle trials to demonstrate the benefits and increase collaboration and knowledge:

*Broad acceptance of autonomous vehicles will only happen if consumers deem them to be safe and useful to their everyday needs. This has been realised by companies such as Volvo, who are planning on trialling autonomous vehicles on commuter routes using members of the public.*

*Original equipment manufacturers should be invited to conduct trials in specifically defined areas (sandboxing) to demonstrate the benefits of autonomous vehicles, and to increase collaboration and knowledge.*

*State governments should also promote autonomous vehicle trials focused on citizens that at present have high mobility inequalities such as the elderly, those with a disability, and those living in remote areas.*

The NRMA is supportive of both sandboxing (trials conducted in specifically defined areas) and road network testing.

## Sandboxing

- Operating capability and limitations assessment
- Consistent interactions with infrastructure and signalling
- Autonomous vehicle operator learning and training
- Rapid data collection to inform insurance and liability matters
- Safe environment for ultra-innovative concepts

## Road network testing

- Cross-border and long-distance trialling and testing
- Altering environmental conditions and road surfaces
- Varying road infrastructure and signalling
- Interactions with human-driven road vehicles
- Road hazard and roadworks awareness testing
- Moving hazard and unforeseen scenario perception testing

A combination of sandboxing and road network testing supported by appropriate trial legislation creates a welcoming and highly desirable environment for manufacturers and technology companies to test and trial autonomous technologies and concepts.

To bring forward the many benefits of autonomy, including improved safety and increased productivity, NSW and other Australian states and territories should be focusing on creating the least restrictive testing model possible.

Making up less than 1.5 per cent of the world's vehicle demand,<sup>5</sup> it is important for Australia to allow and support testing and trialling under a variety of conditions to attract leading manufacturers and technology companies. Although our demand for vehicles is relatively small compared with many overseas markets, our cities and regions will derive enormous benefits from autonomous vehicle technology.

*88 million vehicles were sold globally last year - around 1.2 million were sold in Australia*

3. <https://www.treasury.gov.au/~media/Treasury/Consultations%20and%20Reviews/Consultations/2016/2017%20PreBudget%20submissions/Submissions/PDF/Australian%20Automotive%20Dealer%20Association.ashx>



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Given the enormous challenges we face with congestion, cost of living pressures, population growth and the densification of our urban environment, the NRMA contends that the privately owned model of car ownership will decline significantly as we progress through the coming decades.

In its place, the NRMA contends that connected and autonomous vehicles will be an important part of an all-encompassing mobility solution known as Mobility-as-a-Service, a door-to-door transport system which, in all likelihood, would be accessed through a subscription service.

*Autonomous vehicles are already being trialled on Australian roads - expanding and adding further trials will provide key learnings*

The NRMA believes this is the future, as it is simply not feasible for us to continue adding private motor vehicles to the road.

In addition to the safety, congestion, environmental and productivity benefits, autonomous vehicles and door-to-door transport could significantly improve access for users that are presently unable to drive. The young, the elderly, and people with disability will be big winners in an autonomous transport world.

*The average vehicle on Australian roads is 12 years old, so widespread take-up will occur over more than a decade*



## What autonomous vehicle trialling model is appropriate?

It is anticipated the National Transport Commission will prepare a nationally consistent legislative model to allow autonomous vehicles on Australian roads over the next two to three years. This legislative model, which would support the presence of autonomous vehicles over the longer term, is critical – the NRMA anticipates that high automation (driver no longer needed) will be commercially available to Australians in the 2020s.



In the interim, the NRMA supports trial legislation to provide certainty and promote investment.

To remain fundamentally consistent, NSW should pursue a framework of exemption based on South Australia’s model. By adopting fundamentally consistent legislation, states and territories remain open to cross-border trials. This scenario provides incentives for investment, particularly from overseas manufacturers and technology companies who wish to trial advanced concepts in varying environments and conditions.

Sandboxing and road network testing complement each other and allow all facets and scenarios pertaining to autonomous vehicles to be thoroughly examined. Legislating for only one testing method ultimately puts in place restrictions and is inconsistent with creating an environment to thoroughly test a range of concepts in varying traffic conditions.

## Proposed additions to the South Australian model

While the South Australian legislative model provides one of the best frameworks for autonomous vehicle trials anywhere in the world, the NRMA believes the following amendments and/or additions would be appropriate in NSW:

- National autonomous vehicle trial guidelines should be used by default, with amendments and/or additions possible where deemed necessary or desirable.
- Exemptions enacted in other state and territory jurisdictions should be recognised.
- Zero alcohol level for autonomous vehicle stewards.
- Time-based autonomous vehicle trials should be open to the possibility of extension by authority of the Minister.
- Post-trial reporting should be a matter for the trial. Where commercial trials are undertaken without government funding, the nature and necessity of reports to the Parliament should be closely considered.



# What has occurred so far?

## Parliament of New South Wales – StaySafe Report

In February 2016, an Inquiry into Driverless Vehicles and Road Safety in NSW was referred to the Joint Standing Committee on Road Safety (StaySafe).

### Terms of Reference

That the Joint Standing Committee on Road Safety (Staysafe) inquire into and report on driverless vehicle technology in New South Wales with particular reference to:

1. The capacity of driverless vehicle technology to deliver improved road safety outcomes including a lower road toll, and fewer accidents and injuries to drivers, pedestrians and other road users.
2. The extent to which current road safety policies and regulations in NSW anticipate the introduction of driverless vehicle technology, including driverless heavy vehicles, and any regulatory and policy changes which will be required.
3. The preparedness of NSW road safety regulators to meet the challenges extended by driverless vehicle technology.
4. The experience of other jurisdictions in Australia and overseas in adopting and adapting to driverless vehicle technology.
5. Other related matters.<sup>6</sup>

In September 2016, StaySafe submitted its Driverless Vehicles and Road Safety in NSW report to the Parliament of New South Wales.

### Recommendations

The Committee recommends that a national regulatory framework for the development and deployment of automated vehicles be developed by the National Transport Commission, in consultation with New South Wales and other states, and implemented by an agreed date with the following components:

1. A robust national trialling and testing regime, including collaboration between regulators and manufacturers, and consultation with users.
2. The establishment of agreed benchmarks for setting safety and performance standards for both automated vehicles and users, and other road users, including vulnerable road users.
3. Incorporation of the benefits of international standardisation and/or an international framework;
4. A determination of the liabilities attaching to the manufacture, sale, and use of the technology, to be legislated if necessary.
5. An examination of the security of the data systems which underpin the technology, including the development of protocols to facilitate data sharing and address privacy issues.
6. A comprehensive public education campaign about the deployment of the technology, targeting amongst others, drivers of both automated and non-automated vehicles, cyclists, motorcyclists, and pedestrians.
7. The public identification of automated vehicles to make them visually distinctive to other road users, particularly during the trial and testing phase.
8. A program to determine the impacts of automated vehicle technology on the provision and maintenance of road infrastructure, including consideration of both current arrangements, and any new arrangements required to support vehicle connectivity.
9. Transition protocols for managing safe road use by a mixed fleet.<sup>7</sup>

6. <https://www.parliament.nsw.gov.au/committees/DBAssets/Inquiry/TOR/1972/Terms%20of%20Reference%20-%20Driverless%20Vehicles%20and%20Road%20Safety%20in%20NSW.pdf>

7. <https://www.parliament.nsw.gov.au/committees/DBAssets/InquiryReport/ReportAcrobat/6075/Report%20-%20Driverless%20Vehicles%20and%20Road%20Safety%20in%20NSW.pdf>

## Policy principles

In August 2016, the Transport and Infrastructure Council published policy principles for government action in relation to land transport technology.

### National Policy Framework for Land Transport Technology – Policy Principles

1. Government decision-making on transport technologies will be based on capacity to improve transport safety, efficiency, sustainability and accessibility outcomes.
2. New technologies should be implemented in a way that is consumer centric (i.e. designed to meet the needs of those using the service). This includes consideration of:
  - a. options to deliver transport information and services in a way that is consistent and familiar, and
  - b. the diverse needs of travellers, in particular travellers with a disability, vulnerable road users such as cyclists and pedestrians, and users of multiple modes of transport.
3. Where government investment is required to support the deployment of new technologies, that investment will be evidence based, consistent with long-term strategic planning and will deliver value for money.
4. Where feasible, government agencies will avoid favouring particular technologies or applications, in order to encourage competition and innovation. New applications should support interoperability, backwards compatibility and data sharing, and should account for possible future transitions to other technology platforms.

5. Planning for transport technologies will build on existing infrastructure networks (including public transport) and seek to leverage existing consumer devices (such as smart phones) where appropriate.
6. When considering regulatory action, governments will consider low cost approaches such as collaborative agreements or self-regulation before pursuing formal regulation.
7. If required, best practice regulatory approaches will be adopted to ensure regulation is cost efficient, transparent, proportionate to the risk, fit for purpose and done in consultation with affected stakeholders. This includes adopting relevant international or regional standards, unless there is a compelling reason for a unique Australian requirement.<sup>8</sup>

### Proposed amendments

The NRMA's *The Future of Car Ownership* research paper proposes the following amendments to the *National Policy Framework for Land Transport Technology – Policy Principles* to improve choice, convenience, accessibility and productivity:

- 2a. options that support informed choice for transport consumers to optimise their journey;
- 2b. the diverse needs of travellers, in particular travellers with disability, non-English speakers, vulnerable road users such as cyclists and pedestrians, and users of multiple modes of transport; and
- 2c. access to, travel of and storage of autonomous vehicles and associated technology.

8. [https://www.ntc.gov.au/Media/Reports/\(32685218-7895-0E7C-ECF6-551177684E27\).pdf](https://www.ntc.gov.au/Media/Reports/(32685218-7895-0E7C-ECF6-551177684E27).pdf)

## Trial guidelines

In May 2017, the National Transport Commission and Austroads jointly released *Guidelines for Trials of Automated Vehicles in Australia*. The guidelines are intended to:

- support nationally consistent conditions for automated vehicle trials in Australia.
- provide certainty and clarity to industry regarding expectations when trialling in Australia.
- help road transport agencies manage trials in their own state or territory as well as across state borders.
- establish minimum standards of safety.
- help assure the public that roads are being used safely.
- help raise awareness and acceptance of automated vehicles in the community.<sup>9</sup>

The guidelines provide criteria covering the following areas:

### Management of trials

- Location.
- Technology description.
- Traffic management.
- Infrastructure and network requirements.
- Public engagement.
- Managing change.

### Insurance

- Appropriate cover.

### Safety management.

- Security.
- Risks to road users.
- Risks to infrastructure.
- System failure.
- Transition processes.
- Human driver requirement.
- Pre-trial testing.
- Training.
- Fitness-for-duty.
- Vehicle identifiers.

### Data and information

- Incident data.
- End-of-trial reporting.
- Sensitive information.

### Implementation

- Cross-border trials.
- Existing trials.
- Trials to commercial deployment.
- Commercial trials.
- Vehicle limits.
- Time limits.

The guidelines are an important step on the path to an autonomous vehicle future. Providing a certain degree of clarity to industry is crucial to attracting trial proposals.

A nationally and fundamentally consistent set of guidelines allows industry to view Australia as one holistic marketplace, encouraging investment, engagement and innovation.

9. [http://www.ntc.gov.au/Media/Reports/\(00F4B0A0-55E9-17E7-BF15-D70F4725A938\).pdf](http://www.ntc.gov.au/Media/Reports/(00F4B0A0-55E9-17E7-BF15-D70F4725A938).pdf)



# Longer term regulatory framework

Implementing trial legislation is a critical step on the path to an autonomous vehicle future and must be a priority. However, a longer term and more permanent regulatory framework is undoubtedly necessary – consideration should be given to progressing options as soon as possible.

With the NRMA anticipating highly autonomous vehicles in Australia in the 2020s, now is the time

to begin the process of determining what the most appropriate regulatory framework looks like.

The NRMA acknowledges the importance of an autonomous vehicle future and will continue to provide leadership on behalf of its Members, who rely on the NRMA to keep them moving.



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