Changing driving laws to support automated vehicles

Policy paper

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NTC AUSTRALIA

National Transport Commission

Report outline

Title	Changing driving laws to support automated vehicles
Type of report	Policy paper
Purpose	Recommendations approved by the Transport and Infrastructure Council in May 2018
Abstract	This policy paper sets out recommendations for legislative reform to: provide clarity about the situations when an automated driving system (ADS), rather than a human driver, may drive a vehicle; ensure there is a legal entity that can be held responsible for the operation of the automated driving system; establish any new legal obligations that may be required for users of automated vehicles; and outline further work that needs to be done to transform agreed policy into legislation.
Key words	driver laws, Australian Road Rules, automated vehicles, driver duties
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Foreword

Australian transport and infrastructure ministers have recognised that automated vehicles offer the possibility of fundamentally changing how transport is provided and unlocking a range of benefits. They have agreed that Australia should aim to have end-to-end regulation in place by 2020 to support the safe commercial deployment and operation of automated vehicles at all levels of automation.

The National Transport Commission is working with state, territory and the Commonwealth governments on a program of regulatory reform to ensure the Australian community can gain the potential benefits of automated vehicles, including safety, productivity, environmental and mobility outcomes. Our aim is to develop a flexible and responsive regulatory environment for the commercial deployment of automated vehicles that supports innovation and safety.

This policy paper delivers a key aspect of this reform agenda. Ministers have agreed to a ground-breaking approach to driving laws in Australia. This will see the development of purpose-built national law to allow an automated driving system to drive in place of a human.

The agreement to a uniform, national approach is a significant step in preparing Australia for automated vehicles. It will give the Australian public and manufacturers clarity, certainty and consistency.

I would like to acknowledge the valuable input provided by stakeholders in informing this policy paper. I encourage government, industry and consumer groups to continue to work with us on the next steps in our automated vehicle regulatory reform agenda, to ensure Australians can gain the benefits of this technology.

Carolyn Walsh
Chair and Commissioner

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Executive summary

The purpose of this paper is to set out recommendations for legislative reform to:

- provide clarity about the situations when an automated driving system (ADS), rather than a human driver, may drive a vehicle
- ensure there is a legal entity that can be held responsible for the ADS when it is operating
- establish any new legal obligations that may be required for users of automated vehicles
- outline further work that needs to be done to transform agreed policy into legislation.

The 'changing driving laws to support automated vehicles' reform is part of a broader national reform program for the National Transport Commission (NTC). The reform program aims to put end-to-end regulation in place by 2020 to support the safe commercial deployment and operation of automated vehicles at all levels of automation. The Transport and Infrastructure Council agreed to this aim at its November 2017 meeting.

Any legislative reform should be implemented in parallel with the reforms to establish a safety assurance system, the purpose of which is to ensure automated vehicles are safe to use on our roads.

Context

In November 2016 the Transport and Infrastructure Council directed the NTC to develop legislative reform options to clarify the application of current driver and driving laws to automated vehicles, and to establish legal obligations for automated driving system entities (ADSEs).

What is the problem?

The key problem to be resolved through this reform is that Australian transport law assumes there is a human driver. It does not envisage a situation in which an ADS,[1] rather than a human driver, is in control of the dynamic driving task. Obligations relating to driving and road safety through complying with traffic laws are placed on a human driver, and the human driver is responsible for the consequences of noncompliance.

The Australian community cannot gain the benefits of automated vehicles, including safety, productivity, environmental and mobility benefits, unless barriers in transport legislation applying to automated vehicles are removed. But these legislative barriers should not be removed without ensuring the intent of the laws—to ensure the safe operation of vehicles on Australian roads—is maintained.

Introducing automated vehicles would mean that the assumption that there is a human driving the vehicle is no longer valid. An automated vehicle might be entirely driven by an ADS with no input from a human driver for parts or all of a trip.

The underlying assumption in transport law that there is a human driver gives rise to several related issues that must be considered if legislative change is made to allow an ADS to drive

[1] Automated driving system (ADS) means the hardware and software that are collectively capable of performing the entire dynamic driving task on a sustained basis. It is a type of driving automation system used in vehicles operating with conditional, high and full automation mode.

a vehicle. In particular, governments will need to consider who will be responsible for an ADS's failure to comply with the driver obligations.

Consultation

In October 2017 the NTC published a discussion paper outlining eight problems that need to be addressed by this reform and posing 14 questions.[2]

During October and November 2017, the NTC held consultations with a range of stakeholders. This included visits to all states and territories for consultation with representatives of various government agencies and bodies. In addition to road and transport agencies and police, who attended consultations in all jurisdictions, other government representatives who provided input included compulsory third-party insurers, treasuries, attorney-general departments and Parliamentary Counsel.

During this time, we also spoke with non-government stakeholders including the automotive industry and motoring clubs.

We received 41 submissions. Of these, 36 were public and are available on the NTC website. Five submissions were made on a confidential basis. Submissions were received from a wide range of stakeholders including state and territory governments, local governments, police, academics, legal firms and legal industry peak bodies, motoring clubs, insurers, manufacturers and industry.

The NTC has incorporated views expressed by stakeholders into our analysis. To provide maximum transparency about our reasoning while protecting the rights of stakeholders to make confidential submissions, we refer to these views in our analysis, identifying the sector from which they came.

Key themes

This paper sets out recommendations and policy directions for legislative reform to recognise an ADS as performing the dynamic driving task and to establish legal responsibility for complying with the dynamic driving task when the ADS is engaged.

The proposed reforms address the following key themes that arose repeatedly during consultation:

1. The need for a national approach to developing driving laws to regulate an ADS 'driver' and to clarify who is the responsible legal entity.
2. Concern that a failure to provide a national approach will be a barrier to the commercial deployment of automated vehicles.
3. A need to avoid forcing the radically new concepts and risks associated with automated vehicles into existing legislation that is designed for conventional vehicles and human drivers. This includes existing compliance and enforcement measures that focus on penalties and sanctions for individual human drivers.
4. A need for legal certainty and clarity about whether an ADS is legally permitted to perform the driving task.
5. A need for legal certainty and clarity about which entity is legally responsible for an ADS when it is performing the dynamic driving task, including responsibility for complying with road traffic laws.

[2] These problems are detailed in the *Changing driving laws to support automated vehicles* discussion paper, October 2017, NTC, pp. 15–17.

6. A need to ensure there are no safety gaps if an ADS performs the dynamic driving task. This may require that non-dynamic driving task obligations given to human drivers that an ADS cannot perform are reallocated to other parties. Stakeholders overwhelmingly supported a legislative analysis being performed to identify driving tasks that should apply to an ADS, and those that should not.
7. Automated vehicles are a revolutionary new technology. No country has a full end-to-end regulatory framework in place to accommodate automated vehicles. Regulatory decisions must be made within a context of uncertainty.

The chapters are grouped in themes to address the range of problems stemming from the fact that current Australian transport law assumes there is a human driver.

Chapter 2: The need for purpose-built law to regulate an ADS 'driver'

Chapter 3: Legal recognition of an ADS performing the dynamic driving task

Chapter 4: Control and responsibility for complying with the dynamic driving task at each level of automation

Chapter 5: Responsibility for non-dynamic driving task obligations

Chapter 6: Duties for users of an automated vehicle

Chapter 7: Alcohol and drug in-charge and in-control offences

Chapter 8: Compliance and enforcement

Recommendations

The NTC is making 11 policy recommendations to the Transport and Infrastructure Council at its May 2018 meeting:

1. That the Transport and Infrastructure Council agree that a uniform approach to driving laws for automated vehicles is taken through the development of purpose-built national law that:
   I. allows an automated driving system that has been approved under and continues to comply with the safety assurance system to perform the dynamic driving task when it is engaged
   II. ensures that there is always a legal entity responsible for the dynamic driving task when the automated driving system is engaged
   III. clarifies who the responsible entity is at various levels of automation when the automated driving system is engaged
   IV. sets out any obligations on relevant entities, including the automated driving system entity, and users of automated vehicles
   V. provides a regulatory framework with flexible compliance and enforcement options.
2. The purpose-built national law should:
   I. provide that an automated driving system that has been approved under and continues to comply with the safety assurance system may perform the dynamic driving task
   II. define the dynamic driving task in a way that aligns with SAE International Standard J3016
   III. provide the dynamic driving task obligations.
3. The purpose-built national law should provide that when the automated driving system is engaged the automated driving system is in control at conditional, high and full automation and the automated driving system entity is responsible for compliance with dynamic driving task obligations.

4. The purpose-built national law should identify any additional duties and obligations that an automated driving system entity is responsible for that do not form part of the dynamic driving task.
5. Legislative analysis of the model Australian Road Rules and the Heavy Vehicle National Law should be carried out by the National Transport Commission to:
    I. identify driver duties that form part of the dynamic driving task and would not be covered by another party if an automated driving system is in control
    II. assess which driver duties that do not form part of the dynamic driving task an automated driving system entity should be responsible for
    III. identify who the duty could be reassigned to if there are outstanding driver duties that are not fulfilled if an automated driving system is in control.
6. The National Transport Commission should coordinate a national working group with membership from the states, territories and the Commonwealth to:
    I. agree to a nationally consistent approach to analysis of state, territory and Commonwealth legislation on a similar basis to recommendation 5
    II. ensure that this legislative analysis is completed by states, territories and the Commonwealth by the end of November 2018 for the May 2019 council meeting.
7. The purpose-built national law should provide duties on a fallback-ready user to:
    I. remain sufficiently vigilant to respond to automated driving system requests, mechanical failure, or emergency vehicles and regain control of the vehicle without undue delay when required
    II. hold the appropriate licence for the vehicle type
    III. comply with drug, alcohol and fatigue driver obligations.
8. The purpose-built national law should clarify that no user in a dedicated automated vehicle has an obligation to be ready to drive or take control of the vehicle at any time.
9. State and territory legislation should clarify that a person who starts, or is a passenger in, a dedicated automated vehicle is not subject to drink- and drug-driving offences concerning starting a vehicle or being in charge of a vehicle.
10. State and territory legislation should clarify if necessary that all drink- and drug-driving offences, including those concerning starting or being in charge of a vehicle, apply to a person who starts or turns off an automated vehicle with manual controls. This position could be considered further as technology develops and international approaches evolve.
11. Further recommendations on compliance and enforcement options, including offences, penalties and sanctions for driving laws, should be made to the council in May 2019 after agreement on relevant elements of the safety assurance system at the November 2018 council meeting. These recommendations should consider interactions with the safety assurance system and duties or offences that system establishes—in particular, interactions with a potential primary safety duty.

Policy directions

The NTC also proposes the following three policy directions to the council. These will be further developed in the next phase of work:

1. Secondary activities should generally not be permitted for someone who is required to take over driving if requested by the automated driving system (a fallback-ready user at conditional level of automation) beyond what legislation currently permits for drivers, unless the activity is linked to an in-vehicle system that the automated driving system

can override. The NTC will monitor technological developments and international approaches to secondary activities.

2. Further work should be undertaken to consider how readiness-to-drive obligations could be applied to a human who may choose to take over driving when an automated vehicle with manual controls operating at high automation reaches the limits of its operational design domain. This includes consideration of how to distinguish the person who has readiness-to-drive obligations from passengers if there are multiple occupants of the vehicle.
3. Appropriate compliance and enforcement mechanisms, including offences, penalties and sanctions targeting automated driving system entities and other parties will be required in a new purpose-built national law to regulate an ADS 'driver'.

   The purpose-built national law will specify the dynamic driving task obligations the ADS must be able to perform (the proper control offence is not relevant to an automated driving system and will not be included).

   The law will make the ADSE responsible for the ADS's failure to correctly perform the dynamic driving task obligations and will include appropriate offences, sanctions and penalties.

Next steps in driving laws reform

For legal reform to introduce purpose-built national law to regulate an ADS 'driver', the NTC, states, territories and the Commonwealth will need to develop a consistent national approach to analysing relevant legislation.

States, territories and the Commonwealth will need to identify the dynamic and non-dynamic driving task obligations in their road safety and traffic laws. Jurisdictions will need to consider and agree:

- whether each obligation can apply to an ADS
- how obligations should be modified, if necessary, to enable an ADS to comply with the intent of the obligation on the human driver
- whether the obligation needs to be reassigned to another party if the ADS cannot perform it.

The next step in the driving laws reform is to form a national working group. This will be the mechanism for the NTC, states, territories and the Commonwealth to carry out the work required to complete recommendations 5 and 6 in this policy paper, which are set out above.

Matters the national working group needs to reach agreement on

The purpose of these recommendations and the national working group is to ensure there is sufficient analysis and discussion to reach agreement that will allow drafting instructions to be prepared to introduce purpose-built national law to regulate an ADS 'driver'. Drafting instructions are detailed written instructions to Parliamentary Counsel for drafting Bills. Agreement needs to be reached on:

- the dynamic driving task obligations (recommendation 2III)
- any additional duties and obligations that an ADSE is responsible for that do not form part of the dynamic driving task (recommendation 4)
- who the duty could be reassigned to if there are outstanding driver duties that are not fulfilled if an ADS is in control (this may require amendments to existing legislation such as the Heavy Vehicle National Law rather than being included in the new purpose-built law).

There are other matters that will need to be agreed to enable a Bill to be drafted to introduce purpose-built national law to regulate an ADS 'driver'. As outlined in section 9.3 of this paper, there are important linkages between the safety assurance system and the driving laws project. Some elements of legislation for the driving law reform should not be decided until the council makes a decision about elements of the safety assurance system in November 2018. In particular, any penalties and offences in the driving laws reform cannot usefully be considered until the council makes a decision about the policy options to address the safety risks associated with deploying vehicles with an ADS. This decision will include whether or not there will be specific safety assurance system sanctions and penalties and a primary safety duty.

Chapter 9:

- provides detail about the next steps in the driving law reform project to take us from where we are—high-level policy—to legislation to regulate an ADS driver
- clarifies the linkages with other NTC projects—in particular, the safety assurance system project—and the sequencing of these projects
- explains the opportunities for stakeholders to be involved in this process.

Table 2 (in chapter 9) provides detail on the sequencing and timing of automated vehicle reforms through to May 2019.

1 Context

Key points

- The Transport and Infrastructure Council directed the National Transport Commission (NTC) to develop legislative reform options to clarify the application of current driver and driving laws to automated vehicles, and to establish legal obligations for automated driving system entities (ADSEs).
- This policy paper sets out recommendations for legislative reform to provide clarity about the situations when an automated driving system (ADS), rather than a human driver, may drive a vehicle and to ensure there is a legal entity that can be held responsible for the operation of the ADS.
- Any amendments to legislation required to achieve this will need to be in place in time for vehicles with high or full automated functions to be commercially deployed. These amendments should also be implemented in parallel with the reforms to establish a safety assurance system, the purpose of which is to ensure automated vehicles are safe to use on our roads.

1.1 About the NTC

The NTC is an independent advisory body. We submit national land transport reform proposals to the Transport and Infrastructure Council. The council comprises Commonwealth, state and territory ministers who are responsible for transport and infrastructure.

The NTC contributes to achieving national reform priorities that are agreed by the council. Our reforms are assessed against the following policy objectives:

- improve transport productivity
- improve environmental outcomes
- support a safe transport system
- improve regulatory efficiency.

One of our key focus areas is removing regulatory barriers to innovative transport technologies that have significant safety, productivity and environmental benefits.

1.2 Objectives

The objective of the 'changing driving laws to support automated vehicles' reform is to develop options for legislative reform to ensure driving laws provide for automated vehicles to operate both legally and safely on Australian roads.

In November 2016 the Transport and Infrastructure Council approved the below NTC recommendation:

Recommendation 6*: That the NTC develops legislative reform options to clarify the application of current driver and driving laws to automated vehicles, and to establish legal obligations for automated driving system entities.*

Timeframe: Early 2017 to May 2018.

1.3 What is the problem?

The key problem to be resolved through this reform is that Australian transport law assumes there is a human driver. It does not envisage a situation in which an ADS, rather than a human driver, is in control of the dynamic driving task. Obligations relating to driving and road safety through compliance with traffic laws are placed on a human driver.

The Australian community cannot gain the benefits of automated vehicles, including safety, productivity, environmental and mobility benefits, unless barriers in transport legislation to the operation of automated vehicles are removed. But these legislative barriers should not be removed without ensuring the intent of the laws—to ensure the safe operation of vehicles on Australian roads—is maintained.

The introduction of automated vehicles would mean the assumption that there is a human driving the vehicle is no longer valid. An automated vehicle might be entirely driven by an ADS with no input from a human driver for parts or all of the trip.

The underlying assumption in transport law that there is a human driver gives rise to several related issues that must be considered if legislative change is made to allow an ADS to drive a vehicle.[3]

This paper sets out recommendations and policy directions for legislative reform to recognise an ADS as performing the dynamic driving task and to establish legal responsibility for complying with the dynamic driving task when the ADS is engaged.

The chapters are grouped in themes to address the range of problems stemming from the fact that current Australian transport law assumes there is a human driver.

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Chapter 6: Duties for users of an automated vehicle

Chapter 7: Alcohol and drug in-charge and in-control offences

Chapter 8: Offences, penalties and sanctions

1.4 Consultation

In October 2017 the NTC published *Changing driving laws to support automated vehicles: discussion paper* (the 'driving laws discussion paper'). The driving laws discussion paper outlined eight problems that need to be addressed by this reform and posed 14 questions.

During October and November, the NTC held consultations with a range of stakeholders. This included visits to all states and territories for consultation with representatives of a variety of government agencies and bodies. In addition to road and transport agencies and police, who attended consultations in all jurisdictions, other government representatives who provided input at consultations with states and territories included compulsory third-party insurers, treasuries, attorney-generals' departments and parliamentary counsel.

[3] These problems are detailed in *Changing driving laws to support automated vehicles: discussion paper*, October 2017, NTC, pp. 15–17. Available at <http://www.ntc.gov.au/Media/Reports/(E5695ACE-993C-618F-46E1-A876391B8CD9).pdf>.

During this time, we also spoke with a variety of non-government stakeholders including the automotive industry and motoring clubs.

We received 41 submissions. Of these, 36 were public and are available on the NTC website.[5] Five submissions were made on a confidential basis. Submissions were received from a wide range of stakeholders including state and territory governments, local governments, police, academics, legal firms, legal industry peak bodies, motoring clubs, insurers, manufacturers and industry.

The NTC incorporates views expressed by stakeholders into our analysis. To provide maximum transparency about our reasoning while protecting the rights of stakeholders to make confidential submissions, we refer to these views in our analysis, identifying the sector from which they came.

1.5 Key terms

What do we mean by 'automated vehicle'?

The term 'automated vehicle' covers a variety of levels of automation. The box below describes levels of driving automation. These definitions are based on Society of Automotive Engineers (SAE) International Standard J3016, *Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles*. These SAE levels are currently being used to develop legislative and regulatory responses to automated vehicles in the United States and the European Union. Throughout this paper, unless otherwise specified, when we use the terms 'conditional', 'high' or 'full automation' we are using these terms in the same way they are used in the SAE International Standard J3016.

Conditional automation means the ADS undertakes the entire dynamic driving task for sustained periods in defined circumstances. The human driver does not have to monitor the driving environment or the ADS but must be receptive to ADS requests to intervene and any system failures.

High automation means that the ADS undertakes the entire dynamic driving task for sustained periods in some situations, or all of the time in defined places. When the system is driving the vehicle, a human driver is not required to monitor the driving environment and the driving task or to intervene and the ADS can bring the vehicle to a safe stop unassisted.

Full automation means all aspects of the dynamic driving task and monitoring of the driving environment are undertaken by the ADS. The ADS can operate on all roads at all times. No human driver is required.

Automated driving technology has created many new terms that are not always used consistently. The box below provides an explanation of key terms and the way the NTC uses these terms in this paper. These are derived from the SAE International Standard J3016.

Automated driving system (ADS) means the hardware and software that are collectively capable of performing the entire dynamic driving task on a sustained basis. It is a type of driving automation system used in vehicles operating with conditional, high and full automation mode.

Automated driving system entity (ADSE) means the legal entity responsible for the ADS. This could be the manufacturer, registered operator of the vehicle or another entity (this term is not derived from the SAE International Standard J3016).

Dedicated automated vehicle means a vehicle that has no manual controls enabling it to

[5] Available at <http://www.ntc.gov.au/submissions/history/?rid=156263&pid=10834>.

be driven by a human driver. In this type of vehicle, the dynamic driving task is always performed by the ADS. The vehicle could include very limited controls, such as an emergency stop control, that can be activated by a human but would not enable a human to take over the driving task (this term is not derived from the SAE International Standard J3016).

Dynamic driving task means the operational and tactical functions required to operate a vehicle in on-road traffic (a more expansive definition is provided in the glossary).

Dynamic driving task fallback means the response by the fallback-ready user or an ADS to either perform the dynamic driving task or achieve a minimal risk condition after a dynamic driving task performance-relevant system failure or when the vehicle exits the operational design domain. In a vehicle with conditional automation the fallback-ready user performs the dynamic driving task fallback. In vehicles with high or full automation the ADS performs the dynamic driving task fallback.

Fallback-ready user means a human in a vehicle with conditional automation who is able to operate the vehicle and who is receptive to requests from the ADS to intervene and is receptive to evident dynamic driving task performance-relevant system failures. The fallback-ready user is expected to respond by taking control of the vehicle.

Minimal risk condition means a condition to which a user or an ADS may bring a vehicle to reduce the risk of a crash when the ADS reaches the limit of its operational design domain, has requested the fallback-ready user to take control or there is a dynamic driving task performance-relevant system failure.

Operational design domain means the specific conditions under which an ADS is designed to function (for example, geographic, roadway, environmental, traffic, speed or temporal limitations) including, but not limited to, driving modes (for example, on fully access-controlled freeways).

Safety assurance system means a regulatory mechanism to provide oversight of the safety performance of an automated vehicle to assure it can operate safely on the network (this term is not derived from the SAE International Standard J3016).

Case study: Navya autonomous shuttle as a dedicated automated vehicle

The Royal Automotive Club of Western Australia (RAC WA) is currently trialling a ‘fully autonomous’, electric shuttle bus in WA. The vehicle being trialled is Navya’s Autonom Shuttle, which is being referred to as the ‘RAC Intellibus’ for the purposes of the trial in WA.

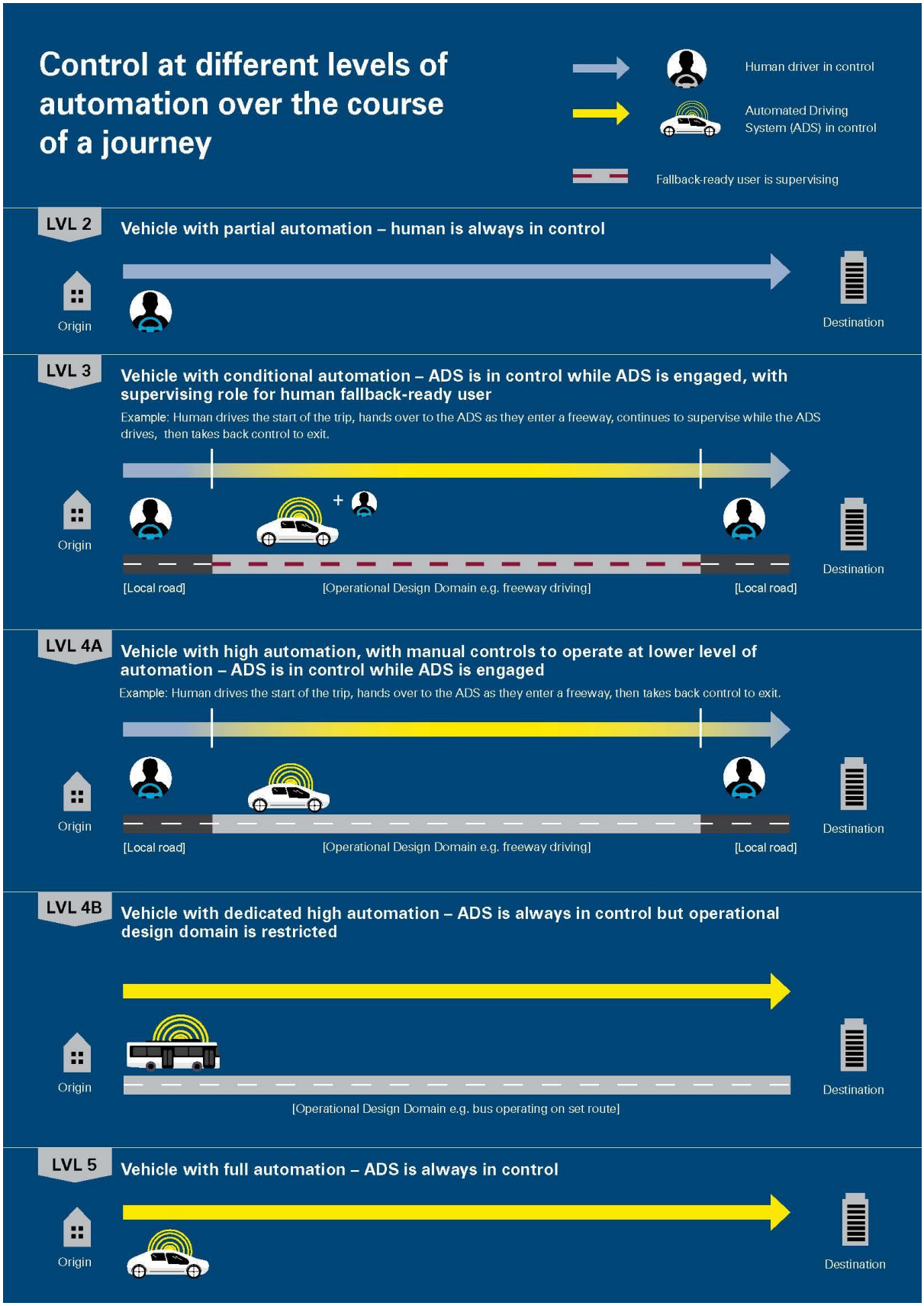
Navya describes its autonomous shuttle as ‘100% autonomous’ and ‘driverless’, with driverless technology ‘dedicated to first and last mile transportation’ (Navya, 2017, p. 16). The NTC considers it is a dedicated automated vehicle as it has no manual controls enabling it to be driven by a human driver such as a steering wheel or driver’s seat (although game console controls have been plugged in for the purposes of the RAC Intellibus trial in WA). The shuttle has two emergency stop buttons (Navya, 2017, p. 23). The NTC considers that the presence of emergency stop buttons would not enable the human to take over the driving task, and therefore does not detract from the Navya autonomous shuttle being a dedicated automated vehicle.

Figure 1 shows how a dedicated automated vehicle might look. There is no steering wheel or ‘driver’s seat’. It illustrates the type of vehicle the NTC is describing when it refers to a dedicated automated vehicle.

Figure 1. Image of a dedicated automated vehicle

Figure 2 illustrates the ways in which control of the dynamic driving task may transition between an ADS and a human driver during a journey.

Figure 2. Driving at different levels of automation over the course of a journey



1.6 Background to the reform

The 'changing driving laws to support automated vehicles' project is part of a broader national reform program for the NTC that aims to put end-to-end regulation in place by 2020 to support the safe, commercial deployment and operation of automated vehicles at all levels of automation. The Transport and Infrastructure Council agreed to this aim at its November 2017 meeting.

The NTC is collaborating closely with the Commonwealth, Austroads and state and territory governments to ensure an integrated regulatory system can be delivered for deploying vehicles with automated functions.

Other NTC projects to prepare Australia for the safe and routine commercial use of automated vehicles are:

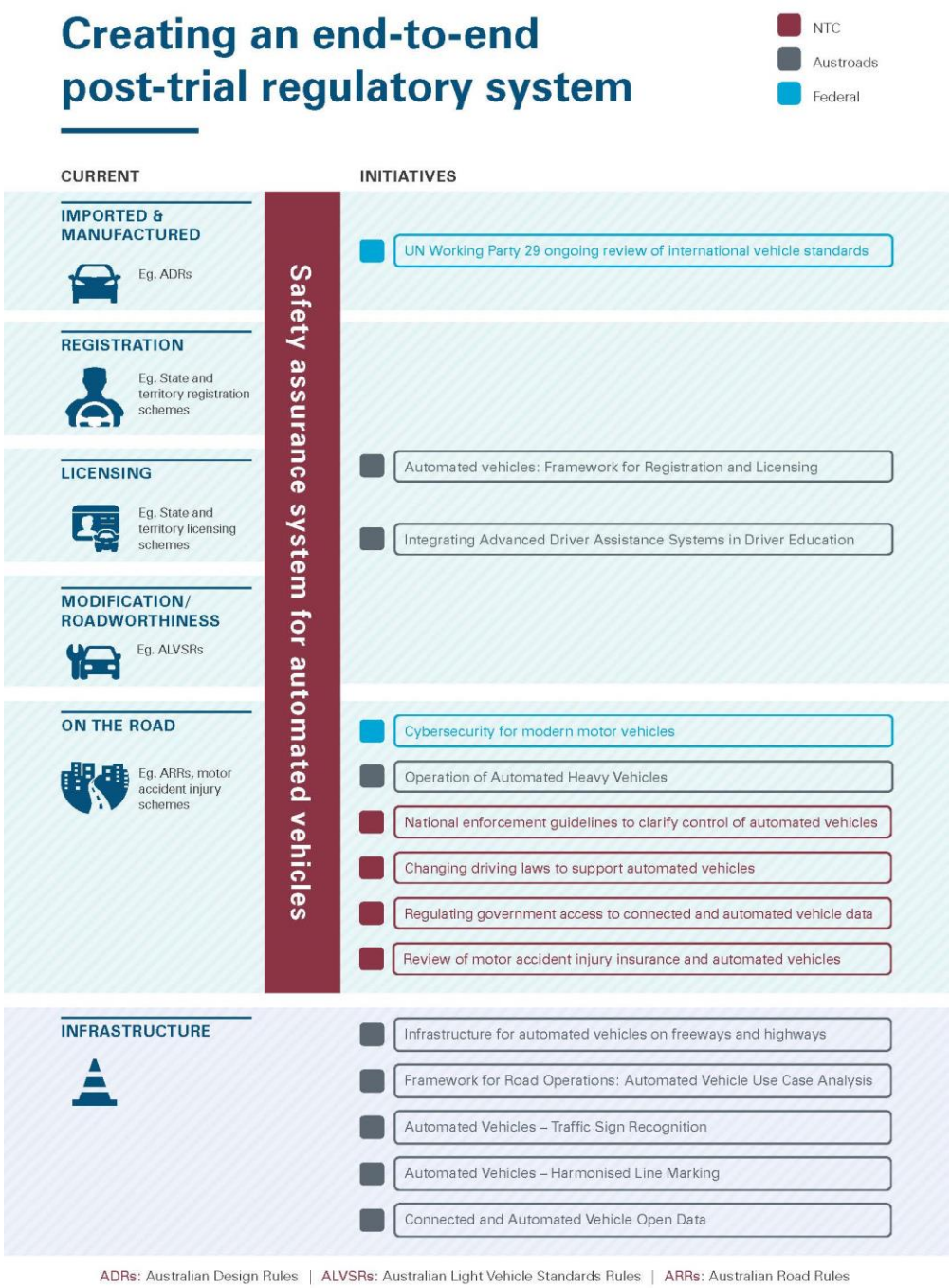
- **Automated vehicle trial guidelines**: national guidelines governing conditions for trials of automated vehicles. We delivered the automated vehicle trial guidelines in May 2017.
- **Clarifying control of automated vehicles**: national enforcement guidelines that clarify the application of current law on control and proper control to levels of driving automation available at the current time. The changing driving laws reform is looking ahead at how laws should change to support automated vehicles. We delivered the national enforcement guidelines in November 2017 but note that changes made through the driving laws reform may require that the national enforcement guidelines are updated.
- **Safety assurance system for automated vehicles**: the system that will set out how governments regulate the safety of automated vehicles. In November 2017 the Transport and Infrastructure Council approved the development of a safety assurance system for automated vehicles based on mandatory self-certification in the interim until international standards are developed. A regulation impact statement (RIS) is being prepared for public consultation to seek the views of interested parties on policy options to address the safety risks associated with deploying vehicles with ADSs. We will submit the RIS to the council for a decision in November 2018.
- **Compulsory third-party insurance review**: we are supporting states and territories to review compulsory third-party and national injury insurance schemes to identify any eligibility barriers for occupants of an automated vehicle, or those involved in a crash with an automated vehicle. Subject to the involvement of national and state treasury and finance portfolios, we will submit reform options to the council in November 2018.
- **Clarifying regulatory access to data**: a project to scope the circumstances in which government agencies should be able to access and use data generated by automated vehicles. We will submit reform options to the council in May 2019.

The safety assurance system and the ‘changing driving laws’ project are closely linked. The safety assurance system will identify the ADSE, which is the company or person that has certified that the ADS can safely perform the dynamic driving task. In this policy paper we propose that the ADSE should be responsible for complying with dynamic driving task obligations at conditional, high and full automation. We consider that changes to driving laws to provide for an ADS ‘driver’ should not be implemented until a safety assurance system is

in place to regulate the safety of these vehicles, including in-service risks such as software updates.[6]

Figure 3 illustrates the existing end-to-end regulatory process and the projects underway at each stage by each agency or entity to prepare for automated vehicles.

Figure 3. Creating an end-to-end regulatory processes and projects



[6] In section 9.3 we explain linkages and sequencing between the driving laws and the safety assurance system. Table 2 (Chapter 9) provides detail on the sequencing and timing of automated vehicle reforms through to May 2019.

1.7 Issues identified by stakeholders that are covered in other NTC projects

The scope for this reform is to identify high-level approaches and options for legislative reform to ensure:

- an ADS can legally perform the dynamic driving task when it is engaged
- a legal entity is responsible for the actions of the ADS when it is engaged
- the intent of existing driver obligations is maintained—in particular, for road safety.

Submissions identified a range of issues that are outside of the scope of the driving laws reform. A number of the issues identified are critical to successfully deploying automated vehicles.

Many of these issues are covered in other NTC projects or projects by other agencies such as Austroads or the Department of Infrastructure, Regional Development and Cities. Appendix A outlines these issues and our response, noting which NTC project covers this or where it is covered by another agency.

2 Purpose-built national law to regulate an ADS 'driver'

Key points

- Legislative reform is needed to allow an ADS to perform the dynamic driving task when it is engaged and to ensure a legal entity is responsible.
- A national approach should be taken to developing driving laws to regulate an ADS 'driver' and clarify who the responsible legal entity is.
- A uniform national approach to driving laws for automated vehicles should be achieved through developing purpose-built national law by the NTC working closely with states, territories and the Commonwealth.

2.1 Purpose of this chapter

The purpose of this chapter is to:

- set out the need for reform to existing driving laws to allow an ADS to perform the dynamic driving task when it is engaged
- explain why the NTC recommends a purpose-built national law to regulate an ADS 'driver', rather than allowing for an ADS 'driver' solely through making amendments to the Australian Road Rules and road traffic Acts.

2.2 Need for legislative reform

The driving laws discussion paper outlined the NTC's view that legislative reform is needed to clarify that the ADS is permitted to perform the driving task for an automated vehicle and ensure a legal entity is responsible for the actions of an ADS when it is engaged.

We reviewed definitions of 'drive' and 'driver' in international conventions, the model Australian Road Rules, state and territory legislation and case law to conclude that:

- When the ADS is engaged it is performing the tasks that courts and legislation have considered relevant to determining who is driving. It is in control of the movement and direction of the vehicle and of the propulsive force that causes the vehicle to move.
- The definition of driver or driving in a variety of legislation refers to a 'person' (noting that not all legislation provides a definition of 'driver').
- An ADS is a system, not a person. It is not covered by extended definitions of 'person' that recognise a body corporate. This means that an ADS is not covered by a range of legislation aimed at a 'driver'.
- There is no alternative legislative provision for an ADS to perform the dynamic driving task in place of a human driver.
- The fact that an ADS is not a person means that it is not covered by a range of legislation that uses the terminology 'driver' or refers to a 'person' who drives. However, when an ADS is engaged it is in control of the dynamic driving task. It, rather than a human occupant of the vehicle, is 'driving'. The lack of legislative provision for an ADS to perform the dynamic driving task in place of a human driver creates uncertainty about the duties and responsibilities of a human occupant of a

vehicle being driven by an ADS. Because an ADS is not a legal entity, it is also unclear who is responsible for breaches of driver duties by the ADS.

2.2.1 Feedback from the discussion paper

In the driving laws discussion paper, the NTC identified the need to provide certainty for automated vehicle manufacturers and consumers. We suggested that reform to existing driving laws is required to:

- allow the ADS to perform the dynamic driving task when it is engaged
- ensure that a legal entity ('ADSE') is responsible for the actions of an ADS when it is engaged, including compliance with road rules.

There was almost universal support from stakeholders for these proposals.

The Truck Industry Council (TIC) did not support reform to driving laws to allow an ADS to perform the dynamic driving task when it is engaged and ensure that a legal entity is responsible for the actions of an ADS when it is engaged. It submitted that:

> *Australia should adopt/align with, the current version of the Vienna Convention on Road Traffic. Article 8 of this Convention was recently modified to clarify the responsibility of "the driver". In both cases above, the latest version of the Vienna Convention requires that a human driver is in control and responsible, even if the vehicle is fitted with an [ADS] of any Level.*

2.2.2 Need for legal certainty and clarity

The key reason given in support of reform was a need for clarity and legal certainty. This legal certainty and clarity is twofold. First, to clearly allow an ADS to perform the dynamic driving task.

Second, submissions identified a need for legal reform to ensure that a legal entity is responsible for the actions of the ADS when it is engaged and to clearly identify this entity. Both insurers and police emphasised this need for enforcement and insurance purposes. For example, QBE stated that:

> *As an insurer, QBE strongly supports the view that there must always be a legal entity responsible for a vehicle operating where the road rules apply, and there can only be one legal entity at any one time.*

The New South Wales Police Force echoed this view stating that 'this is essential for law enforcement when determining criminal liability for offences' (Australia New Zealand Policing Advisory Agency (ANZPAA) submission).

While submissions generally agreed that there is a need for a legal entity to be responsible for the actions of the ADS when it is engaged, there were differing views on who the legal entity should be. In section 4.3 we discuss submissions on the relevant legal entity in detail and recommend that when the ADS is engaged the ADSE should be responsible for complying with dynamic driving task obligations and any other specified obligations (recommendation 3).

2.2.3 NTC conclusions

There was strong stakeholder support for reform to driving laws to allow an ADS to perform the dynamic driving task when it is engaged and to ensure there is always a legal entity responsible for the actions of the ADS when it is engaged.

The NTC considers that legal reform is necessary to provide legal certainty and clarity to consumers, manufacturers, enforcement agencies and insurers that an ADS is permitted to perform the driving task and to ensure there is a legal entity responsible for the actions of the ADS when it is engaged. Without such reform, consumers would not be able to take full

advantage of the benefits of automated vehicles. They would also effectively be held responsible for actions by automated vehicles that they do not control.

The next section and recommendation 1 propose that this, along with a range of other legislative reforms recommended in this report, should be achieved through purpose-built national law.

2.3 Purpose-built national law to regulate an ADS 'driver'

The driving laws discussion paper asked for views on how legislation should recognise an ADS and an ADSE.

The three proposed approaches were:

- **Approach 1**: Expand the definition of driver in Acts that deal with the dynamic driving task to include the ADS when it is engaged and make the ADSE responsible for the actions of the ADS.
- **Approach 2**: Exclude the ADS from the definition of driver. Make the ADSE responsible for the safe operation of the vehicle, including compliance with dynamic driving task obligations when the ADS is engaged.
- **Approach 3**: Create a new Act for automated vehicles that establishes the dynamic driving task obligations. Make the ADSE responsible for noncompliance with those obligations by the ADS when it is engaged.

The discussion paper identified that all three approaches have the following benefits:

- It is clear that an ADS is legally permitted to undertake the dynamic driving task.
- They all provide for an ADS to undertake the dynamic driving task in a dedicated automated vehicle, whether or not a human is present.
- The ADSE is only made responsible for offences related to tasks the ADS is designed to undertake.
- The ADSE's responsibilities are clearly defined. This will benefit manufacturers, enforcement officers and automated vehicle users.

2.3.1 Feedback from the discussion paper

There was strong support for a national approach to new driving laws. Submissions also emphasised the need for any legislation that governs an ADS and ADSE to be compatible with existing legislation.

There were mixed views from stakeholders on how legislation should recognise an ADS and an ADSE with relatively equal levels of support for approaches 1 and 3. Some submissions expressed no view on this question.

Approach 1

A significant number of submissions supported expanding the definition of driver in Acts that deal with the dynamic driving task to include the ADS when it is engaged and make the ADSE responsible for the actions of the ADS (approach 1).

The key reasons provided in support of this approach were:

- efficiency, timeliness and clarity gained through using existing legislative frameworks (Brisbane City Council, SA Freight Council, Insurance Australia Group (IAG), Maurice Blackburn Lawyers, QBE)
- it provides clear legal accountability at all times (QBE).

The specific needs of the insurance industry were raised by IAG and QBE. IAG submitted that 'in the short term this is the easiest transition for injured people and current liability frameworks'.

QBE's submission also focused on timeliness and ease of transition. It noted that 'the industry will need to adapt existing products to meet the risks posed by vehicles operating at conditional, high and full levels of automation' and that QBE is 'also very aware that autonomous vehicles may arrive in Australia as early as 2020'. It considered that '[s]imply expanding the definition of driver in Acts that deal with the dynamic driving task provides clear accountability, without unnecessary change which could add time and create confusion'. QBE submitted that this legislative approach would:

- provide clear legal accountability at all times
- enable national consistency, particularly across compulsory third-party (CTP) insurance schemes
- minimise flow-on changes for insurance contracts and supporting policy documentation.

RAC WA supported this only as a short-term approach. It considered that, in the long term, 'a new Act for automated vehicles should remain the ultimate goal with a view to incorporate a nationally consistent no-fault compulsory third party insurance scheme, or a suitably designed replacement scheme'.

Similarly, IAG considered that 'this is only a good starting point and should be reviewed for its effectiveness every few years, and will likely need to change with any change in liability framework changes'.

Approach 1: Variation proposed by Price Waterhouse Coopers' (PwC) submission

PwC's submission supported a variant of approach 1 'because it will force individual consideration and amendment of each specific legislative requirement, and therefore lead to greater certainty for all relevant parties'. It submitted that the other two approaches 'involve a new overlay, which is likely to give rise to uncertainty and/or unintended consequences'.

PwC submitted that changes should be implemented through amendments to the model road rules. Its submission provided detail of how this could occur including a marked-up copy of the South Australian Road Rules with suggested amendments.[7]

National Roads and Motorists' Association's (NRMA) submission, which took the form of a paper released by NRMA, Keolis Downer and PWC entitled *Transforming mobility: A regulatory roadmap for connected and automated vehicles*, supported this approach.

The NTC appreciates this thoughtful submission and has responded to it in some detail to clarify our thinking.

As an overarching approach, the NTC does not consider that the PwC proposal is the best solution. The reasons are twofold. First, there is a range of legislation that relates to drivers and driving and amendments to road rules alone, without consideration of and amendments to other legislation, risks safety gaps and unintended consequences. Second, there is a substantive policy distinction between the approach proposed by PwC and that recommended by the NTC in this paper. This relates to the legal entity responsible for the performance of the dynamic driving task when the ADS is engaged.

[7] The PwC submission including the marked-up version of the South Australian Road Rules is available at: <http://www.ntc.gov.au/media/1659/ntc-discussion-paper-changing-driving-laws-to-support-automated-vehicles-october-2017-anonymous-nov-2017-1.pdf>.

PwC's approach assigns responsibility for complying with the road rules to the registered operator of the vehicle when the ADS is engaged and performing the entire dynamic driving task.

Following analysis of submissions, the NTC's policy position is that, if the ADS is engaged, the ADSE should be responsible for its performance of the dynamic driving task at all levels of automation. Our reasons for this policy position are detailed in chapter 4. In essence, the reasons are fairness and the potential power imbalances between parties.[8]

The NTC's view is that if the ADSE has certified (through the safety assurance system) that the ADS can safely perform the dynamic driving task, including compliance with road rules when it is engaged, then the fairest approach is for it to be responsible for the dynamic driving task when it is engaged. It is unfair to make another party, such as the registered operator of the vehicle, responsible for the performance of the dynamic driving task unless there is evidence that they have done or failed to do something that affects the operation of the ADS.[9]

The NTC agrees with PwC's point that it would be unfair to make the ADSE legally responsible for matters outside that entity's control such as maintenance or modification work undertaken by third parties. However, we consider that the starting point should be that the ADSE who has certified that the ADS can perform the dynamic driving task should be responsible for this. The ADSE can then shift responsibility to another party if that party has done or failed to do something that affects the performance of the dynamic driving task by the ADS. We discuss this in section 4.3.2.

Approach 2

Two submissions supported the approach of excluding the ADS from the definition of driver and making the ADSE responsible for the safe operation of the vehicle, including compliance with dynamic driving task obligations when the ADS is engaged.

National Road Transport Association (NatRoad) preferred this approach because it considered that it would 'require fewer consequential amendments to other laws, delineate more clearly what the human driver and the ADS are responsible for and therefore be less confusing'.

Australia and New Zealand Driverless Vehicle Initiative (ADVI) submitted that 'this model best provides for the expected diversity of ADS without the additional complexity of creating a new Act that would also risk creating confusion of different legislation while also maximising the focus on safety'.

ADVI submitted that '[d]efining the ADS separately … to the definition of driver is more compatible with the general operation of existing CTP law', stating that:

> *The general operation of many CTP laws in Australia is drawn by the negligent driving of a motor vehicle, not just the driving of a motor vehicle ... While an ADS may be in control of the dynamic driving task, it is not capable of being 'negligent' in the same way that human drivers are. Although an ADSE may be liable for negligent manufacture, service or supply, an ADSE cannot be regarded as a negligent 'driver'.*

[8] The NTC acknowledges that this power imbalance would be less likely to exist in a situation where there is a move away from private ownership as automated vehicles are introduced. A large company, with equivalent resources to a manufacturer that operates a fleet of automated vehicles, would not suffer this power imbalance in pursuing legal remedies such as an action in negligence or damages through Australian Consumer Law.

[9] The NTC notes that in some cases the registered operator may be the ADSE. This depends on future ownership models for automated vehicles, which could see a move away from individual vehicle ownership.

Approach 3:

A significant number of submissions supported creating a new Act for automated vehicles that establishes the dynamic driving task obligations and makes the ADSE responsible for noncompliance with those obligations by the ADS when it is engaged.

Key reasons provided in support of this approach were:

- Automated vehicles and the concepts and risks associated with them are a significant departure from the concepts and risks associated with a human driver. A new Act designed around these new concepts and risks and the new principles developed to regulate them would provide a more efficient, effective, comprehensive and future-proof approach (Northern Territory Department of Infrastructure, Planning and Logistics (DIPL), Patricia Cantos and a state government).
- It provides the opportunity to start afresh and create nationally consistent, purpose-built legislation that would minimise confusion (DIPL, Flinders University, Leiman and McKendrick and a state government).
- A standalone Act would provide greater certainty and make it easier for the public, manufacturers and enforcement agencies to understand compliance requirements (Victoria Police (ANZPAA submission) and a state government).
- It provides the opportunity to address a range of issues as a package—for example, updates, data collection and privacy. It would also allow the 'smart fleet' (automated vehicles) to be regulated separately, allowing introduction issues to be coordinated efficiently (a state transport department).
- In some cases, existing driving legislation is already complex and lengthy and requires modernisation and updating. Attempting to accommodate automated vehicles within this existing legislation may lead to creating an unnecessarily complex legislative model, could be costly and could produce unintended outcomes (DIPL, Patricia Cantos and a state transport agency).
- Existing legislation is aimed at modifying the behaviour of human drivers to address risks associated with human drivers. This is not appropriate for automated vehicles because the risks associated with an ADS are likely to be different—for example, software errors of malfunctioning hardware (DIPL, Patricia Cantos and a state government).

Other approaches

No responsibility for ADSE when ADS performing dynamic driving task

Two submissions, from peak bodies for manufacturers and importers of light and heavy vehicles—Federal Chamber of Automotive Industries (FCAI) and the TIC—considered that Australian legislation should not recognise an ADS and an ADSE. Both submissions emphasised the importance of the Vienna Convention and that Australia should align with it.[10] For this reason, they submitted that there needs to be a human driver in control at all levels of automation. Under this approach there would not be a need to modify driver laws to assign responsibility to an ADSE when an ADS is performing the dynamic driving task.

FCAI considered that some legislative amendment is required, submitting that 'it is essential to clarify in legislation that the ADS is legally permitted to perform the dynamic driving task, when it is engaged, for a vehicle with conditional, high and full levels of automation … a legal

[10] *Convention on Road* Traffic, opened for signature 8 November 1968, 1042 UNTS 17 (entered into force 21 May 1977) art 8.5 ('Vienna Convention'). See Appendix B for a description of international law developments relating to the Vienna Convention.

entity needs to be identified to be legally responsible for the actions of an ADS when it is engaged, including compliance with road rules'.

Division of responsibilities

The Western Australia Police Force (ANZPAA submission) and the Western Australian Government submitted that:

> *… the legislative mechanism must recognise that the person in charge of the vehicle has a responsibility to the extent that he/she could reasonably be expected to intervene to prevent an offence or crash. As such, the apportioning of liability between the ADSE and the person in charge will depend on both the vehicle (level of automation and emergency controls provided for the driver), as well as the situation (whether the person in charge had sufficient opportunity to intervene).*

2.3.2 NTC conclusions

The NTC considers that the best legislative approach to recognise an ADS and an ADSE is through developing purpose-built national law.

In the discussion paper we did not express a definitive view on which approach is preferable. We suggested that approach 1 ('Expand the definition of driver in Acts that deal with the dynamic driving task to include the ADS when it is engaged and make the ADSE responsible for the actions of the ADS') may be the most efficient because:

- it has the advantages of using existing concepts and an existing legislative framework
- it could be implemented through amendments to the model Australian Road Rules, which would help guide a nationally consistent approach and may lead to a timelier outcome
- the expansion of an existing concept of 'driver' has the advantage of being easily understood by the public, government and enforcement.

The responses to the discussion paper have persuaded us that, while this approach may have the advantage of being more quickly implemented, it would only provide a short-term fix. Reliance on amendments to existing Acts is too narrow in scope, will not provide adequately for the new concepts and risks associated with automated vehicles, and risks producing overly complex legislation.

In some states and territories the legislation already needs updating, and increasing the burden on this already strained legislation is not desirable.

The NTC's view is that purpose-built national law to recognise an ADS and an ADSE should be developed by the NTC working closely with states, territories and the Commonwealth. This has the following advantages:

- It provides for national consistency—a key concern for an ADSE and consumers using automated vehicles will be that they understand their respective duties and obligations; any radical differences between states and territories in Australia may act as a disincentive for using automated vehicles.
- It avoids the risks of forcing the radically new concepts and risks associated with automated vehicles into already over-burdened legislation.
- It enables Parliamentary Counsel to make a fresh start structuring a new Act in accordance with contemporary drafting practice to ensure that the Act is clear and accessible.

Given the significant support for a national approach, the NTC considers that there is a need to create nationally uniform legislation. We strongly agree with the point raised in some

submissions that agreement on core policy principles is essential. The majority of the recommendations in this policy paper are recommendations on core policy principles or for additional work to achieve agreement on these policy principles. However, reaching agreement to policy principles alone and requiring jurisdictions to implement the policy in local legislation without producing nationally uniform legislation creates a significant risk of national inconsistency. This is undesirable because it would result in uncertainty for consumers, manufacturers, enforcement agencies and insurers.

Creating national uniform legislation could occur through developing national model legislation[11] that is maintained by the NTC. This would be similar to the model Australian Road Rules. A second option would be applied laws legislation,[12] enacted by a host jurisdiction and then via an application Act in other jurisdictions, similar to the Heavy Vehicle National Law. A third option would be for the states to refer power to the Commonwealth.

The NTC does not have a view on a preferred approach at this stage. The NTC intends to analyse legislative implementation methods in the next stage of work on the safety assurance system and driving laws. We will consult with states, territories and the Commonwealth, as well as the Parliamentary Counsel's Committee, on the best approach. We note that uniform national legislation may require an intergovernmental agreement.

The recommendation for uniform national legislation does not mean that there will be no need to amend existing legislation. For example, there may be a need to clarify that a natural person who is driving the vehicle when the ADS is not engaged is not the driver when the ADS is engaged. This would be necessary to ensure that the human driver is not responsible for offences related to the dynamic driving task when the ADS is engaged.

The NTC has identified the need for it to undertake further legislative analysis, as well as states, territories and the Commonwealth to reach agreement on a nationally consistent approach to legislative analysis of their own laws and agree how to modify or reassign existing driver duties that an ADS cannot perform. We make two recommendations on how to achieve this and timelines to do this work in chapter 5 (recommendations 5 and 6).

The NTC recommends that a uniform approach to driving laws for automated vehicles is taken through the development of purpose-built national law that:

1. allows an ADS that has been approved under and continues to comply with the safety assurance system to perform the dynamic driving task when it is engaged—**chapter 3**.
2. ensures there is always a legal entity responsible for the dynamic driving task when the ADS is engaged—**chapter 4**.
3. clarifies who the responsible entity is at various levels of automation when the ADS is engaged—**chapter 4**.
4. sets out any obligations on relevant entities, including the ADSE, and users of automated vehicles—**chapters 5**, **6** and **7**.

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[11] Model law similar to the Australian Road Rules, which is maintained by the NTC, would have no legal effect without implementation by states and territories. The Australian Road Rules provide that 'the objects of the Australian Road Rules are to provide uniform rules across Australia for all road users and specify behaviour for all road users that supports the safe and efficient use of roads in Australia' (Australian Road Rules pt 1 div 1 rule 3). For the most part, each state and territory has incorporated the model Australian Road Rules into their own laws. However, not every provision has been copied exactly in each state and territory. Additionally, there are a number of provisions in the model Australian Road Rules that specifically leave certain matters to state and territory governments to determine.

[12] Applied law may take a variety of forms. See, generally, Edwards (2014). The NTC uses the terminology 'model law' and 'applied law'. The distinction we are making is between legislation that has no legal force of itself but is used by jurisdictions as a model to make into their own law (model law) and legislation that is passed by one jurisdiction's parliament and then other jurisdictions make that Act their law (applied law).

5. provides appropriate offences and penalties—**chapter 8**.

We provide more detail on each of these elements and detailed recommendations in the specified chapters.

Recommendation

1. That the Transport and Infrastructure Council agree that a uniform approach to driving laws for automated vehicles is taken through the development of purpose-built national law that:
   - I. allows an automated driving system that has been approved under and continues to comply with the safety assurance system to perform the dynamic driving task when it is engaged
   - II. ensures that there is always a legal entity responsible for the dynamic driving task when the automated driving system is engaged
   - III. clarifies who the responsible entity is at various levels of automation when the automated driving system is engaged
   - IV. sets out any obligations on relevant entities, including the automated driving system entity, and users of automated vehicles
   - V. provides a regulatory framework with flexible compliance and enforcement options.

3 Legal recognition of an automated driving system performing the dynamic driving task

Key points

- Legislative reform should recognise that only an ADS that has been approved under and continues to comply with the safety assurance system may perform the dynamic driving task on Australian roads.
- The safety assurance system is the primary mechanism to oversee the safe deployment of ADSs. It will provide assurance that an ADS can safely perform the dynamic driving task.
- To achieve a national law to regulate an ADS 'driver', the NTC, states, territories and the Commonwealth will need to work together to identify any existing dynamic driving task obligations in legislation that need to be included in the purpose-built national law (and may need to be modified to enable the ADS to achieve the same outcome as the obligation placed on a human driver).

3.1 Purpose of this chapter

The purpose of this chapter is to:

- clarify what the 'dynamic driving task' is and explain why legislative definitions of it should align with the SAE International Standard J3016
- explain why the purpose-built national law should provide that an ADS that has been approved under and continues to comply with the safety assurance may undertake the driving task
- outline the work that has already been undertaken to analyse legislation that deals with the 'dynamic driving task' and identify additional legislative analysis that needs to be undertaken by the NTC as well as states, territories and the Commonwealth to ensure that legislation is expressed in a way that provides for an ADS to perform relevant aspects of the dynamic driving task.

3.2 What is the dynamic driving task?

The act of 'driving' can be broken into 'strategic' and 'dynamic' tasks. Strategic driving tasks include trip planning (where and when to travel, and route selection). Dynamic driving tasks include the operational and tactical actions required to operate a vehicle (steering, speed). When examining what driver laws should apply to an automated vehicle, it is more useful to consider the vehicle's operation in terms of the 'dynamic driving task' because an ADS is designed to perform the 'dynamic driving task' when it is engaged.

SAE International Standard J3016 defines the dynamic driving task as:

> *All of the real-time operational and tactical functions required to operate a vehicle in on-road traffic, excluding the strategic functions such as trip scheduling and selection of destinations and waypoints, and including without limitation:*
>
> *1. lateral vehicle motion control via steering (operational)*

2. longitudinal vehicle motion control via acceleration and deceleration (operational)

3. monitoring the driving environment via object and event detection, recognition, classification and response preparation (operational and tactical)

4. object and event response execution (operational and tactical)

5. manoeuvre planning (tactical)

6. enhancing conspicuity via lighting, signalling and gesturing, etc. (tactical).

In this paper and in undertaking legislative analysis, the NTC uses the term and concept of 'dynamic driving task' rather than just 'driving'. We use it in a way that is consistent with SAE International Standard J3016 described above.

Use of the term 'dynamic driving task' assists in clarifying the role of a human driver in an automated vehicle. Strategic driving tasks such as route selection will be undertaken by a human, and the ADS will perform the entire dynamic driving task when it is engaged.

The approach of using the term 'dynamic driving task' and providing legislative provision for an ADS to perform it is consistent with both domestic and international legislative and regulatory developments. In its submission to the inquiry by the House of Representatives Standing Committee on Industry, Innovation, Science and Resources into *Social issues relating to land-based automated vehicles in Australia,* the (then) Department of Infrastructure and Regional Development stated:

> *Authorities in Europe, the United States and Australia have adopted the Society of Automotive Engineers' (SAE) International Standard J3016 as a common language for describing the capabilities of an automated vehicle.* (Department of Infrastructure and Regional Development, 2017, p. 7)

The committee's inquiry report recommended that:

> *… the Commonwealth adopt as standard terminology the use of 'automated vehicles' and formally accept that the standard definition for the automation level of vehicles is that used by the Society of Automotive Engineers' (SAE) International Standard J3016.* (Parliament of the Commonwealth of Australia, House of Representatives Standing Committee on Industry, Innovation, Science and Resources, 2017, p. iii)

The United States National Highway Traffic Safety Administration has noted the importance of using internationally supported terminology and adopted applicable SAE terminology (United States National Highway Traffic Safety Administration, 2017, p. 1)

Within the United Nations system, the Global Forum for Road Traffic Safety (WP.1), which aims to harmonise traffic rules, and the World Forum for Harmonisation of Vehicle Regulations (WP.29), which develops United Nations vehicle regulations, both either use SAE definitions or have developed definitions based on the SAE taxonomy. Transport ministers within the European Union have agreed that 'common definitions of connected and automated driving should be developed and updated, based on … SAE levels as a starting point' (European Council, 2016, p 5). SAE International and the International Organisation for Standardization (ISO) are working on developing SAE J3016 into an ISO Standard. It is expected that this work will enable universal recognition and acceptance of definitions related to automated vehicles, avoid standards duplication, and reduce costs for businesses working to develop automated vehicles (ISO, 2016).

3.3 Safety assurance system

The Transport and Infrastructure Council agreed in November 2017 that a national safety assurance system for automated vehicles would be based on mandatory self-certification. Under this approach, an ADSE would submit its ADS for approval by completing a statement of compliance. An ADSE will be required to demonstrate how it will manage safety against a number of criteria, including compliance with relevant road traffic laws. Only once government approval is given will the ADS be able to operate in Australia.

The safety assurance system will also approve significant modifications to an ADS that occur once it is deployed (for example, over-the-air software updates affecting the safety performance of the ADS or updates that materially affect the original safety assurance system approval of the ADS). In effect, the ADSE will be required to guarantee that the ADS can operate safely.

The safety assurance system is designed to provide a single national approach to regulating the safety of an ADS and will provide assurance that an ADS can safely perform the dynamic driving task. The NTC proposes that only an ADS that has been approved under and continues to comply with the safety assurance system should be legally permitted to perform the dynamic driving task. We note that while mandatory self-certification will initially cover first-supply, the safety assurance model can also ensure in-service safety performance, which is a key element of the safety assurance system.[13]

The safety assurance system plays a key role in identifying the ADSE, who is the company or person who has had their ADS approved by the safety assurance system.

If legislation recognises an ADS that is approved under and continues to comply with the safety assurance system as performing the dynamic driving task, there will need to be a legal entity responsible for its actions. This is discussed in Chapter 4.

3.4 Duties that an ADS cannot perform as currently expressed

In the discussion paper the NTC proposed that an ADSE should not be responsible for some of the dynamic driving task duties that are assigned to 'human' drivers. We suggested that the dynamic driving task duties that should be excluded are those that cannot be performed by a system. Duties that cannot be performed by an ADS are outside the control of the ADSE.

The model Australian Road Rules provide uniform rules for road users—including drivers, riders, passengers and pedestrians.[14] They contain many of the dynamic driving task obligations that drivers are required to carry out, including giving way, keeping left and obeying speed limits.

We have conducted a legislative analysis of dynamic driving task obligations in the model Australian Road Rules and considered whether the obligations can be performed by an ADS. The aim of this legislative review was to:

- identify any obligations that an ADS may not be able to perform and therefore may require that the ADS is exempted from the obligation

[13] The NTC is currently consulting on a RIS that includes options for ensuring that the safety assurance system will support the safe operation of an ADS, not just at first-supply but through the lifetime of the automated vehicle. This could include requiring the ADSE to maintain ongoing compliance with its Statement of Compliance and the introduction of a primary safety duty.

[14] *Australian Road Rules* rule 14

- identify any obligations that an ADS can perform but may require modification in the way they are expressed to enable an ADS 'driver' to comply with the intent of the obligation.

The NTC identified a limited number of duties in the model Australian Road Rules that are part of the dynamic driving task and, as currently expressed, cannot be performed by an ADS.[15] Some examples from the model Australian Road Rules that assume a human driver or may create difficulty for an ADS are listed in Table 1.

Table 1. Australian Road Rules that pose a difficulty for an ADS to perform as currently expressed

Rule	Description
Rule 54: How to give a stop signal	Where the brake lights are not in working order or not clearly visible the driver must give the stop signal by giving a hand signal or using a mechanical signalling device fitted to the vehicle.
Rule 219: Lights not to be used to dazzle other road users	A driver must not use, or allow to be used, any light fitted to or in the driver's vehicle to dazzle, or in a way that is likely to dazzle, another road user.
Rule 103: Load limit signs	A driver must not drive past a bridge load limit (gross mass) sign or gross load limit sign if the total of the gross mass (in tonnes) of the driver's vehicle, and any vehicle connected to it, is more than the gross mass indicated by the sign.
Rule 294: Keeping control of a vehicle being towed	The driver of a motor vehicle must not tow a trailer unless the driver can control the movement of the trailer, and it is safe to tow the trailer.

These rules may need to be modified to enable the ADS to achieve the same outcome. For example, for rule 54 (how to give a stop signal), the ADS could be designed not to operate if all brake lights and indicators are not functioning at the beginning of the trip. For rule 219 (lights not to be used to dazzle other road users), the controls could be designed not to be manually overridden when the ADS is engaged. In other cases, the ADS could be exempted from the obligation. These issues will be identified through the states, the territories, the Commonwealth and the NTC analysing relevant legislation.

3.4.1 Feedback from the discussion paper

Need for legislative reform to provide legislative recognition that the ADS can safely perform the dynamic driving task

In the driving laws discussion paper, the NTC sought views on whether existing driving laws needed to be reformed to provide legislative recognition that an ADS is permitted to perform the dynamic driving task.

Feedback from government, including enforcement bodies, reiterated that current laws do not clearly provide for an ADS to perform the dynamic driving task and endorsed the need for reform to provide legal certainty.

[15] Generally, there may need to be a clarification to the effect that the road rules expressed as applying to a 'driver' apply to an ADS performing the dynamic driving task unless a specific exclusion is made. The discussion above refers to road rules that may provide a substantive problem for ADS compliance, rather than this type of drafting issue.

The Western Australian Government suggested that, in addition to recognising the ADS as performing the dynamic driving task, it will also be important to have an ability to prohibit an ADS that does not meet prescribed standards. This comment highlights the important link between any reform of existing road traffic laws and establishing the safety assurance system. It is intended that the safety assurance system will act as a safeguard to prevent an unsafe ADS being deployed by requiring an ADSE to submit a statement of compliance against safety criteria before an ADS can be introduced into the market.

Some non-government stakeholders (QBE and an automobile manufacturer) supported legal recognition of an ADS but emphasised the need to clearly define:

- the respective duties of human drivers or users and the ADS and clearly allocate legal obligations among relevant parties
- how performance of the dynamic driving task shifts between parties.

These issues are discussed in section 4.2.3.

Flinders University, Leiman and McKendrick suggested that reform could specify that an ADS should only be able to legally perform those dynamic driving tasks within its operational design domain.

Obligations that are part of the dynamic driving task that the ADS cannot perform should be modified where appropriate, or the ADS exempted

In the driving laws discussion paper, the NTC sought feedback on whether the dynamic driving task obligations that an ADS cannot perform should be modified where appropriate, or the ADS exempted from the obligation.

There was general support from stakeholders for modifying or exempting dynamic driving task obligations that an ADS cannot perform. This is succinctly expressed by the TMR comment that 'there is a need to make changes to ensure that the ADSE does not have responsibility for driving tasks that cannot be performed by the ADS'. Victoria Police (ANZPAA submission) suggested that listing the responsibilities that an ADSE has may be prescriptive but would provide certainty.

Other stakeholders suggested that:

- Laws should be flexible to accommodate the ADS being able to perform more functions as technology develops (Western Australia (WA) Port Operations Task Force and an Australian government).
- Laws should provide for an ADS to perform to the manufacturer's specifications and as certified under the safety assurance system. Rather than modify an obligation or exempt an ADS from an obligation, a defence should be available to an ADSE where an ADS is not capable of performing a specific dynamic driving task (ADVI).

A number of stakeholders commented that where an ADS is exempt from a dynamic driving task obligation, there will need to be clear communication to, and understanding by, the party who will have responsibility for the obligation.

Definitions in legislation should align with the SAE International Standard J3016

Some stakeholders emphasised the importance of using internationally recognised terminology. GM Holden noted that terms in SAE International Standard J3016 are in general use throughout the automotive industry. FCAI also expressed support for the use of SAE International Standard J3016 terms.

3.4.2 NTC conclusions

Legislation to provide that only a safety assurance system compliant ADS is legally permitted to perform the dynamic driving task

The NTC is of the view that legislative reform is required to provide express legal recognition that an ADS may perform the dynamic driving task. There was strong support from stakeholders indicating that legal reform will provide clarity to industry, government and road users.

Recognising only an ADS that is approved under the safety assurance system and continues to comply with it as legally permitted to perform the dynamic driving task is an efficient and effective way to ensure the safe operation of an ADS, including compliance with road traffic laws.

The NTC agrees with the view expressed by Flinders University, Leiman and McKendrick that an ADS should only be able to legally perform those dynamic driving tasks within its operational design domain. Under the proposed safety assurance system, an ADS must have an operational design domain under which it is intended to function and safely operate. These elements will be assessed through the statement of compliance process in the safety assurance system. The NTC considers that this will provide a sufficient mechanism to identify and address safety risks.

Legislative definition of the dynamic driving task should align with the SAE International Standard J3016

The NTC considers that, where possible, legislative definitions, including the definition of 'the dynamic driving task' should align with those in SAE International Standard J3016. This has the advantages of:

- ensuring consistency with approaches taken in legislation allowing for trials of automated vehicles in Australia[16]
- consistency with the approach taken in overseas jurisdictions, which appear to be basing their definitions on the SAE International Standard J3016[17]
- allowing legislation to be more easily understood by industry, which is familiar with these definitions.

The NTC's research and supportive stakeholder feedback provided to a number of automated vehicle projects indicates that SAE International Standard J3016 provides a comprehensive set of functional definitions for industry, regulators and consumers, and has not been superseded by other international guidance. The work being done to develop it into an ISO Standard as mentioned in section 3.2 is further indication of its international support.

We do not consider it desirable to tie definitions in Australian legislation directly to the SAE International Standard J3016.[18] The NTC considers that this approach is risky because it ties legislative definitions to technical descriptions that are currently under review and that are not under the control of Australian legislatures. The NTC is of the view that even words to the effect of 'as amended, or replaced from time to time' would be insufficient because it would inappropriately tie Australian legislation to definitions that it does not control. For this

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[16] *Road Safety Amendment (Automated Vehicles) Act 2018* (Vic) s 3; *Road Transport Act 2013* (NSW), pt 5.6

[17] See, eg, definition of 'dynamic driving task' Tenn. Code Ann §55-8-101 (2017), and also the United States Federal Bills, American Vision for Safer Transportation through Advancement of Revolutionary Technologies Bill, ss 2, 4 and 8, Safely Ensuring Lives Future Deployment and Research In Vehicle Revolution Bill, s13.

[18] This approach has been taken in the draft California Regulation §228.02, which defines an autonomous vehicle as '… meets the definition of levels 3, 4, or 5 of the SAE International's *Taxonomy and Definitions for Terms Related to On-Road Motor Vehicle Automated Driving Automation Systems for On-Road Motor Vehicles, Standard J3016*, which is hereby incorporated by reference'.

reason, we recommend aligning with the SAE International Standard J3016, rather than directly referencing it.

The need for a variety of other definitions will be identified, working with Parliamentary Counsel, as the reform moves from the stage of policy development to legislative drafting.

The NTC's views our role as to clearly capture the required legislative policy. The precise wording of definitions to achieve the legislative policy aim would be the task of Parliamentary Counsel working with the instructing officer. All jurisdictions will need to agree on the definitions if they are going to adopt them in their own laws, including principal legislation.

The purpose-built national law should provide the dynamic driving task obligations

The NTC considers that the purpose-built national law should provide the dynamic driving task obligations. This could be achieved by reference to the model Australian Road Rules and other road traffic laws if necessary, or by creating rules specifically for the ADS based on the relevant rules and road traffic provisions.

The NTC considers that the dynamic driving task obligations that an ADS cannot perform should be modified where appropriate, or the ADS exempted from the obligation and have it reassigned to another party if necessary.

Further legislative analysis required by the NTC, states, territories and the Commonwealth

For legal reform to achieve the aim of enabling the legal operation of an ADS while assuring their safe performance, the NTC, states, territories and the Commonwealth will need to develop a consistent national approach to analysing relevant legislation.

States, territories and the Commonwealth will need to identify the dynamic and non-dynamic driving task obligations in their road safety and traffic laws. Jurisdictions will need to consider and agree:

- whether the obligation can apply to an ADS
- how obligations should be modified, if necessary, to enable an ADS to comply with the intent of the obligation on the human driver
- whether the obligation needs to be reassigned to another party if the ADS cannot perform it.

Provisions containing these obligations will need to be analysed with a consistent approach by all jurisdictions.

The dynamic driving task obligations that should be modified and those that the ADS should be exempt from will become more apparent through consultation with industry on the functionality of ADSs.

Additional work is also needed to examine any non-dynamic driving task obligations that should be performed by an ADS given their safety risk profile—for example, providing particulars at a crash or obeying authorised officer directions. This is discussed in more detail in chapter 5.

In chapter 5 we recommend that the NTC should coordinate a national working group with membership from the states, territories and the Commonwealth to agree to a nationally consistent approach to analysis of state, territory and Commonwealth legislation and ensure that the legislative analysis is completed by the end of November 2018 for the May 2019 council meeting (recommendation 6).

Recommendation

2. The purpose-built national law should:
    I. provide that an automated driving system that has been approved under and continues to comply with the safety assurance system may perform the dynamic driving task
    II. define the dynamic driving task in a way that aligns with SAE International Standard J3016
    III. provide the dynamic driving task obligations.

4 Control and responsibility for complying with the dynamic driving task obligations at each level of automation

Key points

- The ADS is in control of the vehicle when it is engaged at conditional, high and full automation.
- The ADSE identified under the safety assurance system should be responsible for the actions of an ADS when it is engaged because an ADSE has the most control over the ADS.
- The ADSE should only be responsible for the things it can control.

4.1 Purpose of this chapter

The purpose of this chapter is to:

- clarify who is in control and responsible for complying with dynamic driving task obligations when the ADS is engaged at conditional, high and full automation (see key terms in section 1.5 for an explanation of the levels of automation)
- set out the reasons why the ADS is in control and why the ADSE identified through the safety assurance system is responsible for complying with dynamic driving task obligations when the ADS is engaged
- identify linkages with the national enforcement guidelines and any revisions to the guidelines that may be required.

4.2 The ADS is in control when it is engaged at conditional, high and full automation

Current driving laws implicitly require a human driver and are based on the principle that a driver is in control of the vehicle. As such, current driving laws do not contemplate an ADS being in control of the vehicle and undertaking the dynamic driving task.

Who or what is in control of a vehicle generally determines who is responsible for the actions of the vehicle, including for breaches of traffic laws and potentially for damage resulting from crashes.

The discussion paper asked for views on whether the ADS or the human driver is in control of an automated vehicle at each level of automation, and outlined three options.

- **Option 1**: The human driver is always in control of a vehicle with all levels of automation even if the ADS is engaged.
- **Option 2**: The ADS is in control of a vehicle with high or full automation only; a human driver is in control of a vehicle with conditional automation even if the ADS is engaged.
- **Option 3**: The ADS is in control of a vehicle with conditional, high or full automation when it is engaged.

The NTC identified option 3 as its preferred approach. It has a number of advantages, including allowing automated design features to be used as intended and placing responsibility on the party actually undertaking the dynamic driving task.

We suggested that if a human engages the ADS to perform the driving task it is designed to undertake, the human would not expect to be held responsible for contraventions of road traffic laws while the ADS was engaged. Requiring the human to be in control in such circumstances could act as a barrier to the take-up of automated vehicles in Australia.

4.2.1 National enforcement guidelines and control at conditional automation

In November 2017 the Transport and Infrastructure Council agreed to adopt national enforcement guidelines that gave effect to the existing policy position that the human driver remains in control and responsible for complying with road traffic laws for a vehicle operating at conditional automation.

The NTC's policy paper accompanying the national enforcement guidelines, *Clarifying control of automated vehicles*, noted that the majority of stakeholders supported the human driver being in control of a vehicle operating at conditional automation. However, because the ADS is not currently recognised in legislation it cannot be in control.

The NTC noted that the national enforcement guidelines, including the policy position that the human driver remains responsible for a vehicle operating at conditional automation, will be reviewed and updated once legislation is amended to recognise an ADS and the entities responsible for them.

4.2.2 Feedback from the discussion paper

The majority of stakeholders agreed that the ADS is in control when it is engaged at high and full automation.

FCAI and the TIC disagreed that the ADS is in control when it is engaged. They consider that the human driver is in control of a vehicle at all levels of automation, noting that the Vienna Convention requires a human driver to be in control and responsible irrespective of the level at which the ADS is engaged.

A number of stakeholders also agreed that the ADS is in control at conditional automation, with some suggesting that specific obligations should still apply to human drivers when the ADS is in control.

- TMR suggested an ADS approved under the proposed safety assurance system is in control while operating within its operational design domain.
- Victoria Police (ANZPAA submission) stated that allowing the ADS to be in control when it is engaged would allow for vehicle functions to be used as designed. Although the ADS is in control, there should still be clear obligations on human drivers at conditional automation. ADVI, Transurban and Maurice Blackburn Lawyers similarly noted the need for specific accountabilities to apply to the human driver.
- GM Holden stated it is consistent with the United States National Highway Traffic Safety Administration's automated vehicle policy for the ADS to be in control at conditional, high and full automation.
- DIPL agreed that the ADS is in control at high and full automation. In relation to conditional automation, DIPL suggested it is not reasonable for a human driver to be accountable when the ADS is engaged; however, more clarity around the human driver's responsibilities at conditional automation needs to be provided before responsibility is assigned to the ADS.
- QBE stated that a position where the ADS is in control while undertaking the dynamic driving task provides the most certainty and consistency. Clear and consistent

guidance on when control shifts between parties needs to be provided to ensure clarity around legal responsibility and accountability.

- Flinders University, Leiman and McKendrick suggested that if legislation provides that the ADS is in control, this should be a rebuttable presumption to cover circumstances where the human driver does not respond appropriately to a handover request. The Queensland Police Service (ANZPAA submission) and PwC similarly raised the need for the human driver to take control when required to do so.
- IAG and the SA Freight Council noted the importance of appropriate handover time from the ADS to the human driver at conditional automation.

While agreeing that the ADS is in control at high and full automation, some stakeholders suggested that the human should still be in control when the ADS is engaged at conditional automation, or that there is a shared responsibility between the human driver and the ADS (Western Australia Police Force (ANZPAA submission), Western Australian Government, ACT Policing, Brisbane City Council, Australian Automobile Association (AAA), Australasian New Car Assessment Program (ANCAP), NatRoad and DiDi Chuxing).

The Brisbane City Council, the AAA and ANCAP raised concerns about the driving task switching between the ADS and the human driver and the unpredictable handover process. They suggested that the human driver should be in control at conditional automation.

4.2.3 NTC conclusions

The ADS is in control when the ADS is engaged at conditional, high and full automation

The NTC considers that the ADS is in control when it is engaged at conditional, high and full automation. This provides the most certainty and consistency and allows automated functionality to be used by consumers as it was designed to be used. We consider that this approach aligns with reasonable community expectations about fairness. It will mean that the risk lies with the party best able to manage it.

The NTC's view, which was reflected in stakeholder feedback, is that if a human engages the ADS to perform the driving task it is designed to undertake, the human would not expect to be held responsible for contraventions of road traffic laws while the ADS was engaged. Requiring the human driver to be in control in circumstances when the human is not undertaking the driving task may act as a barrier to the take-up of automated vehicles in Australia. It would not allow for the possibility of dedicated automated vehicles.[19]

Legal recognition that an ADS is in control of a vehicle when it is engaged should not occur unless there are mechanisms to ensure an ADS can operate safely, including in compliance with relevant road traffic laws. As outlined in section 3.3, in November 2017 the Transport and Infrastructure Council approved the development of a safety assurance system for automated road vehicles based on mandatory self-certification in the interim until international standards are developed. The safety assurance system is designed to provide a single national approach to regulating the safety of an ADS and will provide assurance that an ADS can safely perform the dynamic driving task.

Mandatory self-certification will require the ADSE to submit a statement of compliance for approval against principles-based safety criteria before an ADS or automated function, or

[19] The NTC defines 'dedicated automated vehicle' as a vehicle that has no manual controls enabling it to be driven by a human driver. In this type of vehicle, the dynamic driving task is always performed by the ADS. The vehicle could include very limited controls, such as an emergency stop control, that can be activated by a human but would not enable a human to take over the driving task.

significant modification, can be introduced into the market.[20] This may include developing criteria relating to compliance with relevant road traffic laws, interaction with enforcement and other emergency services and on-road behavioural competency. We propose that only an ADS that is approved under and continues to comply with the safety assurance system should be legally permitted to perform the dynamic driving task. As previously outlined, mandatory self-certification will initially cover first-supply. However, the safety assurance model can also ensure in-service safety performance.[21]

The NTC agrees with stakeholder feedback that at conditional automation the human driver would need to be receptive to system failures and requests by the ADS to intervene. Therefore, a cautious approach needs to be taken. This is particularly important because the safety of vehicles operating at conditional automation remains to be validated. The NTC considers that specific obligations may need to apply to human drivers when they are not undertaking the driving task. These are discussed in detail in chapter 6.

The NTC also agrees that it is important for handover requests from the ADS to be reasonable and with sufficient time to allow the human driver to take back control. The proposed safety criteria being developed as part of the NTC's safety assurance system project include a criterion relating to the human–machine interface (HMI). These may require the ADSE to explain how the HMI would:

- request the human driver to take back control of the vehicle/driving task with sufficient time for the human driver to respond
- draw attention to potential safety risks related to human monitoring and having to be ready to re-engage with the driving task.

The NTC recognises the views of some stakeholders that the ADS being in control may create a temporary inconsistency with the Geneva and Vienna Conventions. However, the NTC considers that a temporary tension with the Conventions on the issue of human driver control is acceptable in light of the acknowledged shortcomings of the Conventions regarding automated vehicles and the likely changes to treaty obligations in the future to provide more recognition for advances in technology.[22]

The NTC notes that the United States, like Australia, is a party to the Geneva Convention. In spite of this, the United States' National Highway Traffic Safety Administration (NHTSA) suggested that, for the purposes of state traffic laws, the ADS be deemed the driver of a vehicle operating at conditional, high or full automation (United States Department of Transportation, 2016, p. 39).[23] The discussion paper also outlined the approach taken in several American states, including California, Tennessee, Nevada and Georgia, at the time of publication (National Transport Commission, 2017, pp. 37-41). The approaches adopted by these states follow NHTSA's suggestions to varying degrees.[24]

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[20] The NTC is currently consulting on a Regulation Impact Statement (RIS) on the Safety Assurance System, including proposed safety criteria.

[21] The NTC RIS includes options for ensuring that the safety assurance system will support the safe operation of an ADS not just at first-supply but through the lifetime of the automated vehicle. This could include requiring the ADSE to maintain ongoing compliance with its statement of compliance and the introduction of a primary safety duty.

[22] Appendix B provides a description of the Geneva and Vienna Conventions on Road Traffic and recent work to provide for automated vehicles.

[23] In September 2017 the NHTSA released *Automated driving systems 2.0: a vision for safety*. While this document revises the *Federal Automated Vehicles Policy*, it does not retract the suggestion that states may wish to deem the ADS as the 'driver'.

[24] The approaches adopted are outlined in detail in the discussion paper at section 4.3.3. Noting that the approaches may be subject to change (as evidenced by the number of revisions made to California's approach to automated vehicle policy last year), the NTC has not revisited the approaches of the American states for the purposes of this policy paper.

4.3 The ADSE is responsible for complying with dynamic driving task obligations when the ADS is engaged

The NTC's driving laws discussion paper outlined that an ADS is not a legal entity and, therefore, if an ADS is legally recognised as being in control when it is engaged, a natural person or corporation must be identified to accept responsibility for the consequences of the ADS' actions. If there is no entity responsible for the actions of the ADS, there may be no-one to hold to account for breaches of road traffic laws and it would be difficult to locate an entity to take action against for damages resulting from a crash.

The discussion paper asked for views on who should be the legal entity responsible for the actions of the ADS when it is engaged, outlining five options:

- **Option 1**: The entity responsible for the ADS is the fallback-ready user.
- **Option 2**: The entity responsible for the ADS is the operator.
- **Option 3**: The entity responsible for the ADS is the registered operator.
- **Option 4**: The entity responsible for the ADS is the manufacturer of the vehicle.
- **Option 5**: The entity responsible for the ADS is the ADSE identified through the safety assurance system (if the approved safety assurance system requires an ADSE to identify itself).

The NTC identified option 5 as our preferred approach because the ADSE identified under the safety assurance system has the most control over the ADS. The ADSE would provide a statement against criteria to explain why the ADS can operate safely on Australian roads. Therefore, it would be appropriate for the ADSE to bear the responsibility if the ADS does not operate safely.

At the time the discussion paper was published in October 2017, the Transport and Infrastructure Council had not yet agreed to a regulatory option for the safety assurance system. The discussion paper therefore asked for views on how the ADSE should be identified in legislation if it is not identified through the safety assurance system. In November 2017 the council approved the development of a safety assurance system based on mandatory self-certification. This means that the ADSE will be identified through the safety assurance system.[25]

In the discussion paper the NTC suggested that an ADSE should only be responsible for the things it can control. An ADS is designed to perform the dynamic driving task within its operational design domain. Therefore, we proposed that an ADSE should be responsible for complying with dynamic driving task obligations and asked for views on this issue. As discussed in section 3.4, there are certain obligations that form part of the dynamic driving task that the ADS cannot perform (as currently expressed), and these may need to be modified or the ADS exempted from the obligation.

4.3.1 Feedback from the discussion paper

Entity responsible for the ADS

The majority of stakeholders agreed that the ADSE identified under the safety assurance system should be the entity responsible for the actions of the vehicle while the ADS is engaged.

- Government stakeholders agreed that the ADSE responsible for the actions of the vehicle while the ADS is engaged must be clearly identified in all cases and the

[25] This is subject to the outcome of the NTC's RIS, which will be submitted to the council for a decision in November 2018.

safety assurance system is the appropriate mechanism through which the ADSE can identify itself. IAG similarly noted the importance of clearly identifying and agreeing who the ADSE is.

- TMR noted that while the ADSE would be largely responsible for the actions of the vehicle while the ADS is engaged, the proposed primary safety duty may mean other parties also carry liability. The Western Australian Government and Western Australia Police Force (ANZPAA submission) similarly noted that 'the "driver" or "person in charge" may still be responsible for an act or omission if they had reasonable opportunity to prevent a crash or breach but failed to do so'.
- Victoria Police (ANZPAA submission) stated that holding the ADSE identified through the safety assurance system responsible for the actions of the ADS would provide the most stability and clarity for the public, manufacturers and enforcement agencies.
- QBE stated that the ADSE is the entity with the most control over the ADS. Therefore, the ADSE should bear the responsibility (without exception) if the ADS does not comply with relevant road safety and traffic laws.
- Maurice Blackburn Lawyers suggested the ADSE would 'likely be a corporation with the means to pay fines, compensation or other financial penalties and to remedy any defect'. Queensland Police Service (ANZPAA submission) similarly noted that 'a corporate ADSE will endeavour to insure against the risk'.

Stakeholders who disagreed that the ADSE identified under the safety assurance system should be responsible for the actions of the vehicle while the ADS is engaged suggested a range of options about who should be responsible and why.

- PwC and the NRMA submitted that the registered operator should be the entity responsible for the ADS because they are in a better position to ensure that the ADS is properly maintained, updated and operating correctly. They suggested that making the registered operator responsible would be fairer and remove complications. The registered operator could also use existing legal remedies to shift responsibility to another party if necessary.
- Ron Finemore Transport suggested that manufacturers should be solely responsible for the safe operation of automated vehicle systems because manufacturers will be making performance claims about ADS. Ron Finemore Transport considered that any attempt to shift responsibility to the registered operator or the ADSE through mandatory self-certification will introduce greater complexities.[26]
- The AAA stated that a range of liability models are under development internationally and there is uncertainty with current technology. The AAA therefore did not support a particular option at this stage, stating that a human driver should remain responsible at lower levels of automation (up to conditional automation), with a further review in the future to determine who should be responsible at higher levels of automation. GM Holden also suggested that it is too early to determine who is responsible when the ADS is engaged because this could limit innovative solutions and business models.
- Both the FCAI and the TIC submitted that the human driver should be responsible for the actions of the vehicle while the ADS is engaged. This is because the FCAI and the TIC consider that the human driver is in control of a vehicle when the ADS is engaged, irrespective of the level of automation.

[26] The NTC notes that an ADSE approved under the safety assurance system may be the manufacturer or registered operator.

Obligations applying to the ADSE

Most stakeholders supported the position that an ADSE should be responsible for complying with dynamic driving task obligations when the ADS is engaged.

- TMR clarified that the ADSE should only be made responsible for things it can control, which includes undertaking the dynamic driving task within its operational design domain. To complement this, TMR noted that the safety assurance system should include requirements relating to communicating the limitations of the ADS and the operational design domain to the fallback-ready user and ensuring the ADS does not operate outside its operational design domain.[27] The Western Australian Government and the Western Australia Police Force (ANZPAA submission) similarly commented on the importance of the operational design domain to the ADSE's responsibility for complying with dynamic driving task obligations.
- The Australian Trucking Association (ATA) noted that making the ADSE responsible for complying with dynamic driving task obligations would strengthen the requirements on ADSEs to ensure ADSs are able to operate safely and comply with Australian Road Rules.

Some stakeholders, including Transurban, DiDi Chuxing, Maurice Blackburn Lawyers and Victoria Police (ANZPAA submission), noted the importance of clearly defining the responsibilities on the ADSE, including the distinction between dynamic and non-dynamic driving task obligations.

4.3.2 NTC conclusions

The ADSE is responsible for complying with dynamic driving task obligations when the ADS is engaged

The NTC is of the view that responsibility should sit with the party best able to manage risk. We consider that this is the ADSE identified through the safety assurance system because it will be certifying that the ADS can safely perform the dynamic driving task. Therefore, the ADSE should be responsible for complying with dynamic driving task obligations when the ADS is engaged.[28]

The NTC notes that the majority of stakeholders supported this approach, emphasising the need to clearly identify the responsible entity. There was broad agreement that the safety assurance system is an appropriate mechanism through which this identification can occur.

The NTC considered other options such as making the registered operator or manufacturer responsible in all cases. We consider that making the ADSE identified through the safety assurance system responsible will result in fairer outcomes because:

- The registered operator is not in fact performing the dynamic driving task when the ADS is engaged.[29] It appears unfair to assign them responsibility and impose penalties that would create significant disadvantage (for example, demerit points).
- Where a registered operator is an individual, the registered operator may be at a significant disadvantage in pursuing remedies against an ADSE because of a likely power imbalance and disproportionate resources.

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[27] The proposed safety criteria being developed as part of the NTC's safety assurance system project include requirements relevant to the operational design domain that were suggested by TMR.

[28] Other than certain obligations forming part of the dynamic driving task that the ADS cannot perform. These are discussed in section 3.4.

[29] Although in some circumstances the ADSE could also be the registered operator.

- The ADSE, rather than the registered operator, is likely to have the relevant data to shift liability to another party.
- If an ADSE is given responsibility, it could use existing legal remedies to shift responsibility to entities that perform activities that affect the performance of the ADS.
- The entity making performance claims about the ADS should be responsible for the actions of the vehicle when the ADS is engaged. However, the vehicle manufacturer may not always be the entity developing the ADS and therefore will not necessarily be the entity making performance claims regarding the ADS both under the safety assurance system and to the public more broadly.

The NTC agrees with the point made by stakeholders that the ADSE should not be made responsible for matters outside its control. Some stakeholders suggested that, in certain circumstances, responsibility could be shared between the ADSE and other parties. The NTC is analysing this as part of the proposed primary safety duty, which is being consulted on as part of the NTC's safety assurance system project consultation RIS. Existing vehicle roadworthiness obligations on registered operators could also be relied on. Alternatively, or in addition, specific duties and associated offences for registered operators relating to automated vehicle or ADS roadworthiness could be considered.

The NTC agrees with submissions stating that there is a level of uncertainty internationally, including around responsibility, technology and business models. However, indications are that automated vehicles may be ready for commercial deployment in Australia as early as 2020. A decision about who is responsible cannot be delayed until there is greater certainty because. An entity needs to be legally responsible for dynamic driving task obligations when the ADS is engaged. Delaying such a decision is likely to be a barrier to automated vehicles being introduced in Australia.

Recommendation

3. The purpose-built national law should provide that when the automated driving system is engaged the automated driving system is in control at conditional, high and full automation and the automated driving system entity is responsible for compliance with dynamic driving task obligations.

5 Responsibility for non-dynamic driving task obligations

Key points

- The ADSE identified under the safety assurance system will be held responsible for:
  - dynamic driving task obligations that the ADS performs
  - some non-dynamic driving task obligations.
- A legislative analysis conducted by states, territories, the NTC and the Commonwealth is necessary to identify:
  - the dynamic and non-dynamic driving task obligations that an ADSE should be responsible for
  - the driver obligations that would need to be reassigned to other parties if the ADS is in control and cannot fulfil them.

5.1 Purpose of this chapter

The purpose of this chapter is to:

- explain why the ADSE should not be responsible for a range of non-dynamic driving task obligations placed on a 'driver'
- identify that there are some driver obligations that are not part of the dynamic driving task that the ADSE should be responsible for. An example of this type of obligation is the need to provide details to another driver involved in a crash.

The term 'non-dynamic driving task obligation' in this chapter includes those obligations on a driver to perform tasks not related to the driving task (for example, securing loads, use of seatbelts, carrying required documents).

5.2 The ADSE is only responsible for tasks within its control

In the driving laws discussion paper, the NTC suggested that the intent of existing driver obligations needs to be maintained both to ensure safety and to ensure a party who is capable of fulfilling the obligation has responsibility for it. We proposed that the ADSE should not be responsible for driver obligations that the ADSE cannot, or should not, control because they are not part of the dynamic driving task. We also suggested that if the non-dynamic driving task obligations are not appropriate for the ADS to undertake, consideration needs to be given to whether there is a safety gap and, if so, reallocating the obligation to another party.

In chapter 4 we recommended that legislation should provide that when the ADS is engaged, the ADS is in control at conditional, high and full automation and the ADSE is responsible for complying with dynamic driving task obligations (recommendation 3). Our view is that an ADSE should be responsible for dynamic driving task obligations because it will be certifying

that the ADS can safely perform the dynamic driving task under the safety assurance system.[30]

In the driving laws discussion paper, we identified that there are a range of existing driver obligations that:

- do not relate to the dynamic driving task
- cannot be, or may not be able to be, included in the design and programming of the ADS.

Examples include:

- requirements that involve a mental element such as knowledge—for example, a driver of dangerous goods must not drive if they know, or ought reasonably to know, that a situation applies that means transporting the goods is unsafe
- requirements for a driver to check something—for example, drivers of vehicles transporting a placard load (which are loads carrying over a certain amount of dangerous goods that are required to display placards) may not drive the load if it is not equipped with compliant fire extinguishers and portable warning devices that are correctly stowed
- various obligations on drivers of public passenger transport that require the driver to assess a situation or take an action—for example, ensuring the vehicle is clean, treatment of lost property, taking action about dangerous passenger conduct and accepting hiring for taxis
- requirements that a driver assists those injured and report in person to a police station if a person is injured and no police attend a crash
- requirements to pay parking fees and tolls
- obligations on a driver to ensure passengers under 16 years wear seatbelts
- obligations to remove fallen items from the road
- requirements that drivers carry documentation—for example, dangerous goods documentation and heavy vehicle mass and dimension exemption permits.

5.2.1 Feedback from the discussion paper

Almost all stakeholders agreed that the ADSE should not be responsible for non-dynamic driving task obligations.

- Some stakeholders suggested that if the ADS is capable of performing specific non-dynamic driving tasks, the ADSE should be responsible for those tasks (ADVI and WA Port Operations Task Force). Submissions indicated that existing technologies perform certain non-dynamic driving tasks automatically (for example, signage or documentation requirements), suggesting that these responsibilities could be assigned to an ADSE.
- Flinders University, Leiman and McKendrick suggested that it may be appropriate to assign responsibility for non-dynamic driving tasks to an ADSE in instances where a commercial vehicle is being used to carry or secure loads, similar to current heavy vehicle chain-of-responsibility obligations.
- Some stakeholders highlighted the need for clear assignment of responsibilities between various parties to provide clarity for road users and ensure there are no gaps (Law Institute of Victoria, NRMA and Maurice Blackburn Lawyers).

[30] This will be limited to the specified operational design domain.

- IAG emphasised the importance of analysing the tasks an ADS and a human occupant can perform. It suggested that new 'vehicle control' rules should be created to ensure the roles and responsibilities of the human driver or supervisor, passengers and the ADS/ADSE are clear and all parties are aware of their legal obligations. It provided the example of a crash, suggesting that the ADS could alert a road authority or emergency services while the human occupant may have the responsibility to check if anyone is hurt.
- Transurban suggested that in the early stages of automated vehicle deployment, responsibility for paying tolls remains with the vehicle owner. As technology develops and automated vehicles are programmed to choose the most efficient routes, which may incorporate the use of toll roads, the registered vehicle owners or providers of mobility services themselves may take on responsibility for the tolls as part of their service offering to passengers.
- Victoria Police (ANZPAA submission) suggested that there could be a number of entities that could be responsible for the non-dynamic driving tasks. Consideration should be given to allocating responsibilities to the 'responsible person', which would be broader than the ADSE.

5.2.2 NTC conclusions

The NTC considers that the ADSE should not be responsible for driver obligations that the ADSE cannot, or should not, control. There was clear support for this proposition.

The proposed safety assurance system will require that all ADSEs certify that the ADS can safely perform the dynamic driving task when the ADS is engaged. This means that the dynamic driving task is within the control of the ADSE and there is no situation in which an ADSE could 'opt out' of these obligations.

In chapter 3 we recommend that legislation should provide that an ADS that has been approved under and continues to comply with the safety assurance system may perform the dynamic driving task (recommendation 2l). In chapter 4 we recommend that legislation should provide that when the ADS is engaged, the ADS is in control at conditional, high and full automation and the ADSE is responsible for complying with dynamic driving task obligations (recommendation 3).

The basis for these recommendations is:

- Mandatory self-certification under the safety assurance system provides assurance that an ADS can safely perform the dynamic driving task.
- The purpose of an ADS is that it is able to safely perform the dynamic driving task when it is engaged, removing human error.
- An ADSE should be responsible for dynamic driving task obligations because it will be certifying that the ADS can safely perform the dynamic driving task under the safety assurance system.

Non-dynamic driving obligations that an ADSE should be responsible for

There are a range of other obligations assigned to human drivers that are not part of the dynamic driving task. The NTC considers there are a small number of these that an ADSE must be responsible for, at least in a dedicated automated vehicle, because they are essential for road safety and are very closely linked to the dynamic driving task.

Two key examples of this type of obligation are:

- obligations to comply with directions of a police officer or authorised person for the safe and efficient management of traffic[31]
- obligations to stop at the scene of a crash and provide details to another driver or police.[32] While stopping would be part of the dynamic driving task and an ADS must be able to safely stop after a crash, providing details would not be part of the dynamic driving task. An ADS may not be capable of identifying another driver involved in the crash or identifying a police officer.

The NTC's view that the ADS needs to be able to carry out these two obligations is reflected in two of the proposed safety criteria for the safety assurance system.[33] The safety assurance system will require an ADSE to submit a statement of compliance against specified criteria for approval before an ADS or function, or significant modification, can be introduced into the market. The NTC is currently consulting on a RIS for the safety assurance system, including safety criteria. If the safety criteria are accepted, then these matters will be within the control of the ADSE because it has certified that the ADS can perform them.

The specific details of these obligations may be modified for an ADS to allow it to satisfy the obligation if an equivalent set of tasks is performed to achieve the same safety outcome. Further work will be needed to determine what an ADSE should be required to do in each situation. Companies like Waymo are working with law enforcement agencies to develop collision protocols (citylab.com, 2017). The proposed safety assurance system includes a criterion that requires the ADSE to certify that the ADS can safely interact with enforcement and emergency agencies. Australia could consider adopting the approach of some American states. Legislation in those jurisdictions provide that various reporting obligations of a driver are satisfied if a vehicle with high or full automation remains at the scene of a crash and if the vehicle or its owner or operator contacts enforcement and emergency agencies.[34]

There may be other non-dynamic driving task obligations that an ADSE should be responsible for, at least in a dedicated automated vehicle. Recommendations 5 and 6 propose that the NTC (as well as states, territories and the Commonwealth) undertakes further legislative analysis of driver obligations to ensure there are no safety gaps. Assessment of any other non-dynamic driving tasks that an ADSE should be responsible for would be made as part of this work.

In a non-dedicated automated vehicle, it may be possible to assign obligations to:

- the fallback-ready user in vehicles with conditional automation
- an occupant in a vehicle with high or full automation.

Non-dynamic driving tasks that legislation could enable an automated vehicle to perform

There are some non-dynamic driving task obligations that an ADS manufacturer may design an automated vehicle to perform. In contrast with the obligations identified above, the NTC does not consider that an ADSE should always be required to provide these features.

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[31] See, eg, *Australian Road Rules* rule 304.

[32] See, eg, *Australian Road Rules* rule 287.

[33] Criterion 5, which relates to interactions with enforcement and other emergency services and proposes (among other things) that when the ADS is engaged it should be able to follow the directions of enforcement officers. Criterion 7, which relates to on-road behavioural competency, proposes (among other matters) that the ADS should also be able to respond to unusual events that occur within the operational design domain, changes to the external operating environment and new or changed hazards being introduced into the operational design domain. These could include temporary speed zones and traffic controls such as variable speed signs and police manually directing traffic.

[34] See, eg, Tenn. Code Ann. § 55-10-101-106 and NC Gen Stat §20-401(f)).

Therefore, the safety assurance system should not require the ADSE to certify that the ADS can perform them. If the ADSE is a manufacturer it may choose to include features to enable the vehicle to perform a range of non-dynamic driving task obligations currently placed on human drivers to gain a competitive advantage.

Examples include:

- requirements to pay parking fees and tolls
- requirements that drivers carry documentation—for example, dangerous goods documentation and heavy vehicle mass and dimension exemption permits.

The NTC considers that relevant legislation should enable the automated vehicle to perform these types of obligations in place of human drivers, but not require it. Industry and consumers would gain the benefits of these features without unnecessarily limiting ADS technology, which will provide for safer performance of the dynamic driving task on Australian roads.

Recommendation

4. The purpose-built national law should identify any additional duties and obligations that an automated driving system entity is responsible for that do not form part of the dynamic driving task.

5.3 National legislative assessment to ensure no safety gaps when an ADS is in control

In the driving laws discussion paper, the NTC suggested that legislation should be reviewed to assess whether there is an appropriate entity designated with responsibility for driver obligations when an ADS is in control of a vehicle. We suggested that if safety gaps are identified, the driver obligations should be reassigned to a party connected with the task or vehicle and capable of carrying them out. This could include parties that currently have the same or similar obligations, such as registered operators, or it may include new parties such as the fallback-ready user or the occupants or users of a vehicle with high or full automation.

5.3.1 Feedback from the discussion paper

Almost all stakeholders agreed that existing non-dynamic driving task obligations that an ADS cannot perform should be reallocated to other parties. Stakeholders overwhelmingly supported a legislative analysis being performed to identify driving tasks that should apply to an ADS, and those that should not. Many stakeholders reiterated that if safety gaps are identified it will be important to reallocate the obligation to other parties.

- A number of government submissions noted that further work will need to be undertaken by Australian governments to identify and clarify dynamic and non-dynamic driving tasks.
- Some submissions (QBE, Victoria Police (ANZPAA submission) and TMR) stated that examination of non-dynamic driving obligations will require assessment of the nature of the obligation, the situations in which the obligation is likely to arise and determination of the appropriate entity upon whom to rest responsibility. Victoria Police suggested that this could include a ‘responsible person’, which would be broader than an ADSE.
- As discussed in section 5.2.1, IAG emphasised the importance of analysing the tasks an ADS and a human occupant can perform. The Law Institute of Victoria, NRMA and Maurice Blackburn Lawyers also supported clear assignment of responsibilities

between various parties to provide clarity for road users and to ensure there are no gaps. These tasks will form part of a legislative analysis.

- Some stakeholders stated that current lack of knowledge about the specifics of automated vehicle technology will pose difficulties in legally assigning responsibility for non-dynamic driving tasks. NatRoad commented that it may be difficult to clarify what the human driver is and is not responsible for without knowing the functionality and limitations of the ADS within each level of automation. DiDi Chuxing submitted that it is not presently possible to evaluate whether an ADS can accomplish all the dynamic driving tasks.
- SA Freight Council emphasised the need for a mechanism by which occupants or fallback-ready users are made aware of any non-dynamic driving obligations they are responsible for, particularly as this may vary between different vehicles and different ADSs.
- Those stakeholders (TIC and FCAI) who support the human driver being in control of a vehicle at all levels of automation when the ADS is engaged, considered that the human driver should continue to fulfil all existing driver obligations (both dynamic and non-dynamic driving task obligations).
- GM Holden suggested that the model Australian Road Rules be reviewed to identify provisions that explicitly or implicitly require a human driver, and that any legislative review should include consultation with industry.

5.3.2 NTC conclusions

The NTC considers that there is a need for further legislative analysis to support the changing driving laws for automated vehicles reform. There was strong support for a coordinated approach to analysing relevant legislation across all Australian jurisdictions.

The analysis should identify the dynamic and non-dynamic driving task obligations and determine in each case whether the obligation should apply to an ADS. Where it is not appropriate or possible to assign an obligation to the ADS, there will need to be consideration as to which party should have the obligation so that there is no safety gap. The NTC considers that there are benefits to involving industry in a legislative review and will work with industry on a suitable approach to this consultation.

Recommendations

5. Legislative analysis of the model Australian Road Rules and the Heavy Vehicle National Law should be carried out by the National Transport Commission to:
    I. identify driver duties that form part of the dynamic driving task and would not be covered by another party if an automated driving system is in control
    II. assess which driver duties that do not form part of the dynamic driving task an automated driving system entity should be responsible for
    III. identify who the duty could be reassigned to if there are outstanding driver duties that are not fulfilled if an automated driving system is in control.
6. The National Transport Commission should coordinate a national working group with membership from the states, territories and the Commonwealth to:
    I. agree to a nationally consistent approach to analysis of state, territory and Commonwealth legislation on a similar basis to recommendation 5
    II. ensure that this legislative analysis is completed by states, territories and the Commonwealth by the end of November 2018 for the May 2019 council meeting.

6 Duties for users of an automated vehicle

Key points

- Where the ADS is operating at conditional automation, new readiness-to-drive obligations should be imposed on the fallback-ready user who must take over the driving task at the request of the ADS, or where there is a system failure.
- Readiness-to-drive obligations should not be imposed on passengers in dedicated automated vehicles because the person would have no ability to take control of the vehicle. The safety risks of dedicated automated vehicles need to be mitigated through obligations on the ADSE.

6.1 Purpose of this chapter

The purpose of this chapter is to:

- explain why there may be a need to place duties on occupants of a vehicle who may take over driving when an ADS is performing the dynamic driving task
- describe proposed new duties on users of automated vehicles, in particular the fallback-ready user,[35] who must take over driving at the request of the ADSE or where there is a system failure in a vehicle operating at conditional automation
- propose that secondary activities should generally not be permitted for a fallback-ready user beyond what legislation currently permits for drivers, unless the activity is linked to an in-vehicle system that the ADS can override
- propose that further work be undertaken to consider how readiness-to-drive obligations could be applied to a human who may choose to take over driving in an automated vehicle with manual controls operating at high automation.

In this chapter we refer to 'dedicated automated vehicles'. We use this term to describe a vehicle that has no manual controls enabling it to be driven by a human driver. In this type of vehicle, the dynamic driving task is always performed by the ADS. The vehicle could include very limited controls such as an emergency stop control that can be activated by a human but would not enable a human to take over the driving task.

6.2 Readiness-to-drive obligations on someone who must take over if requested by the ADS (the fallback-ready user)

When operating at conditional automation, an ADS is not designed to bring the vehicle to a safe stop when it encounters a system failure or reaches the limits of its operational design domain. At conditional automation a human (fallback-ready user) must take over driving in these circumstances. The requirement for a fallback-ready user distinguishes vehicles operating at conditional automation from vehicles operating at high or full automation, where the ADS can bring the vehicle to a safe stop.

In the discussion paper the NTC noted the risks of human distraction and error when transitioning control from the ADS to a fallback-ready user. We suggested that a combination of system design requirements through the safety assurance system and legal obligations on

[35] The 'fallback-ready user' is a term that comes from SAE J3016. A fallback-ready user means a human in a vehicle with conditional automation who is able to operate the vehicle and who is receptive to requests from the ADS to intervene and is receptive to evident dynamic driving task performance-relevant system failures. The fallback-ready user is expected to respond by taking control of the vehicle.

the fallback-ready user would provide the best assurance that automated vehicles can operate safely.

In the discussion paper we suggested that introducing new obligations in road traffic laws on the fallback-ready user could help ensure they are alert to system errors or requests to intervene. We proposed that a fallback-ready user of a vehicle with conditional automation:

- must remain sufficiently vigilant to acknowledge the transition demand and acknowledge vehicle warnings, mechanical failure or emergency vehicles (consistent with guidance under development by WP.29)
- may avert their attention from the dynamic driving task and perform secondary activities but must remain sufficiently vigilant to regain control of the vehicle without undue delay, when required
- must take control when it is apparent that the automation is no longer working in a proper manner
- must take control when requested by the ADS
- must hold the appropriate licence for the vehicle type
- must comply with drug, alcohol and fatigue driver obligations.

6.2.1 Feedback from the discussion paper

Readiness-to-drive obligations on the fallback-ready user

Most stakeholders agreed that readiness-to-drive obligations relating to sufficient vigilance, holding a driver's licence and complying with drug, alcohol and fatigue driver obligations should be imposed on fallback-ready users.

- DIPL, TMR, New South Wales Police Force, Victoria Police (ANZPAA submission) and a state government suggested that the term 'sufficient vigilance' may present interpretation and enforcement challenges, and may need to be clarified.
- The SA Freight Council submitted that further work needs to be undertaken to define 'undue delay'.

AAA and PwC submitted that it is not necessary to create new legal obligations for readiness-to-drive obligations to apply to fallback-ready users because existing laws are sufficient.

The TIC similarly submitted that there should be a human driver responsible at all levels of automation. Therefore, there is no need to consider a fallback-ready user because the human driver is responsible.

Several stakeholders agreed with the NTC suggestion that system design requirements through the safety assurance system are necessary.

- Transurban and ADVI submitted that the ADS should provide sufficient time for the fallback-ready user to take back control.
- The Western Australian Government, Western Australia Police Force (ANZPAA submission) and PwC submitted there should be obligations on the ADS to ensure the fallback-ready user is actually ready to take back control.

Secondary activities for a fallback-ready user

There was less agreement among stakeholders about allowing a fallback-ready user to perform secondary activities. Stakeholders who agreed that the fallback-ready user should be allowed to perform secondary activities outlined a number of caveats to this approach.

- Some stakeholders, including NatRoad, PwC, Brisbane City Council, Queensland Police Service, Western Australia Police Force (ANZPAA submission) and the Western Australian Government submitted that secondary activities should be allowed only if these activities do not affect the fallback-ready user's ability to take back control when necessary.
- The SA Freight Council submitted that if fallback-ready users are not allowed to perform some secondary tasks, there will be less take-up of vehicles with conditional automation because their value would be substantially lowered for users. For clarity, there needs to be a legal definition of what secondary tasks are acceptable.
- QBE suggested that a fallback-ready user should be allowed to perform secondary tasks if 'they are physically positioned to take control of the vehicle when required'.
- A vehicle manufacturer suggested fallback-ready users should be allowed to perform secondary activities, provided there are appropriate boundaries and controls including manufacturers providing effective training to users.
- The FCAI and an Australian government submitted that Australia should align with international approaches to secondary activity including WP.29.

Some stakeholders considered that the fallback-ready user should not be allowed to undertake secondary activities, or that only very limited secondary activities could be undertaken. Stakeholders generally focused on the safety risks of control switching between the ADS and the human driver.

- DIPL, the ATA, Maurice Blackburn Lawyers and Flinders University, Leiman and McKendrick submitted that fallback-ready users may find it difficult to respond in a timely way to requests from the ADS to intervene if they are engaged in secondary activities.
- Victoria Police (ANZPAA submission) stated that legislation should clearly outline that fallback-ready users are not allowed to perform secondary activities. Current laws precluding secondary activities, such as those relating to using a mobile phone and visual display units, should apply. Such a 'black and white' rule will ensure 'there is no room for individual interpretation'.
- ANCAP suggested that if secondary activities are allowed, users should be allowed to use in-vehicle systems only. Such systems 'would allow vehicle warnings to override a secondary activity in a similar fashion to in-flight announcements in an aircraft'.

6.2.2 NTC conclusions

New readiness-to-drive obligations should be imposed on fallback-ready users

The NTC considers that new readiness-to-drive obligations need to be imposed on fallback-ready users. Feedback from stakeholders expressed strong support for such obligations to include sufficient vigilance, holding a driver's licence and complying with drug, alcohol and fatigue driver obligations.

Existing obligations on human drivers are not sufficient to cover readiness-to-drive obligations on fallback-ready users. As outlined in section 4.2.3, the NTC's view is that the ADS is in control when it is engaged at conditional automation and therefore the fallback-ready user is not the driver at the time the ADS is engaged. This means that driver

obligations in existing laws would not apply to a fallback-ready user when they are in the vehicle, but not yet driving. To ensure they are sufficiently alert to system failures or requests from the ADS to take back the driving task, new readiness-to-drive obligations need to be introduced on fallback-ready users.

We acknowledge that terms such as 'sufficient vigilance' and 'undue delay' may present interpretation and enforcement challenges and that more prescription around these terms may provide a greater level of certainty. However, the NTC considers that providing such prescription may not be helpful, particularly at this early stage, because it is likely to depend on the type of technology being used. Therefore, the less prescriptive approach, which is in line with WP.29 proposals, is more appropriate at this stage. ADSE instructions and ADS design are likely to be relevant considerations but not necessarily determinative.

Secondary activities for a fallback-ready user should generally not be permitted

Our policy direction is that secondary activities for fallback-ready users should not be permitted beyond what legislation currently permits for drivers, unless the activity forms part of an in-vehicle system that the ADS can override.[36] The NTC considers that this strikes an appropriate balance between not allowing secondary activities at all and allowing secondary activities that may be unsafe at this early stage of technological development.

Stakeholders expressed significant concern about secondary activities for a fallback-ready user because of the safety risks of control switching between the ADS and the human driver. At this stage in the development of ADS technology, the safe transition of the dynamic driving task from an ADS to a fallback-ready user remains to be tested.

Even stakeholders who agreed that the fallback-ready user should be allowed to perform secondary activities outlined a number of caveats to this approach.

The responses to the discussion paper have persuaded us that, given the significant safety concerns raised, a conservative approach to allowing secondary activities is warranted at this stage.

We have provided a policy direction rather than a recommendation on this matter. This approach to secondary activities will be considered further as technology and international approaches develop. To an extent, the approach may also depend on any education and training provided to fallback-ready users by ADSEs. The proposed safety criteria being developed as part of the NTC's safety assurance system project include requirements around ADSEs providing education and training, including informing users of the vehicle of any fallback-ready user obligations.

The policy direction picks up suggestions from ANCAP and a proposal being considered by WP.29 that the user '[m]ay turn his attention away from the complete dynamic driving task in the ODD [operational design domain] but can only perform secondary activities with appropriate reaction times. It would be beneficial if the vehicle displays were used for secondary activities' (Informal Working Group on Intelligent Transport Systems / Automated Driving, 2017, p. 6).

The NTC considers that system design requirements through the safety assurance system are also necessary. The proposed safety criteria currently being developed include obligations to ensure the fallback-ready user is ready to take back control and provide sufficient time for them to do so.

[36] This would allow images on the screen of the visual display unit to be visible to the fallback-ready user while the vehicle is moving, provided that it can be overridden by the ADS. Under Road Rule 299 this is currently not allowed for human drivers.

Recommendation

7. The purpose-built national law should provide duties on a fallback-ready user to:
   I. remain sufficiently vigilant to respond to automated driving system requests, mechanical failure, or emergency vehicles and regain control of the vehicle without undue delay when required
   II. hold the appropriate licence for the vehicle type
   III. comply with drug, alcohol and fatigue driver obligations.

Policy direction

1. Secondary activities should generally not be permitted for someone who is required to take over driving if requested by the automated driving system (a fallback-ready user at conditional level of automation) beyond what legislation currently permits for drivers, unless the activity is linked to an in-vehicle system that the automated driving system can override. The NTC will monitor technological developments and international approaches to secondary activities.

6.3 Readiness-to-drive obligations on someone who may take over driving

An ADS operating at high automation can bring a vehicle to a safe stop without human intervention. For this reason, we suggested that there may not be the same need to place readiness-to-drive obligations on a human occupant at high automation as there is for conditional automation. Imposing such obligations could limit access to consumer benefits of automated vehicles and, where there are multiple occupants in the vehicle, it would be unclear who the readiness-to-drive obligations would apply to. In circumstances where a human driver chooses to take over the driving task, existing driver obligations would apply from that point onwards.

The discussion paper acknowledged that there may be some road safety risks if readiness-to-drive obligations are not placed on human occupants. There is potential for road hazards and congestion if a vehicle operating at high automation brings itself to a safe stop at the end of its operational design domain.

In the discussion paper the NTC proposed that no additional obligations be placed on human occupants of vehicles when the ADS is engaged at high automation.

6.3.1 Feedback from the discussion paper

Readiness-to-drive obligations on users in a vehicle operating at high automation with manual controls

The majority of stakeholders submitted that it is necessary to impose readiness-to-drive obligations on users in a vehicle operating at high automation with manual controls, at least in certain circumstances.

- DIPL submitted that a possible approach is for readiness-to-drive obligations to apply to a human 'only if they are seated in a position where they have access to the vehicle's manual controls'. Any readiness-to-drive obligations should not be as stringent as for conditional automation but should include being licensed and sober.
- TMR submitted it would be 'counterintuitive and dangerous for an ADS to have to pull over on the side of the freeway at an exit ramp because the driver was asleep or in no fit condition to drive the vehicle'. TMR suggested this would not require the human

to monitor the driving task but be ready to take back control. The human should at least be awake and sober.

- The Western Australian Government and the Western Australia Police Force (ANZPAA submission) submitted that the human would need to have the skills to intervene in an emergency and to ensure the vehicle can operate safely. Transurban[37] and a state government similarly suggested that, depending on the design of the ADS, there may be situations where the driver will need to take back control, such as preventing a crash as a last resort.
- Victoria Police (ANZPAA submission), ADVI and IAG submitted that the presence of manual controls means that the human driver can take control of the driving task, and therefore readiness-to-drive obligations are required.

Victoria Police and the AAA acknowledged that a vehicle operating at high automation will come to a safe stop and the human occupant will not necessarily take over driving. However, Victoria Police, the AAA and Maurice Blackburn Lawyers submitted that until more is known about automated vehicle technology, readiness-to-drive obligations should be imposed.

Some stakeholders agreed with the NTC's proposal in the discussion paper that no additional obligations be placed on human occupants of vehicles when the ADS is engaged at high automation.

- The SA Freight Council, PwC, Transurban and GM Holden submitted that existing obligations on human drivers would come into effect as soon as human occupants take over the driving task.
- The SA Freight Council and PwC emphasised that human occupants are not required to, and may not actually, take over the driving task because a vehicle operating at high automation can come to a safe stop.

While not necessarily suggesting that no readiness-to-drive obligations be imposed, some stakeholders recognised such obligations could diminish the mobility benefits of automated vehicles for people with disabilities and older Australians. Some stakeholders also provided suggestions about how to mitigate the potential risks of having no, or limited, readiness-to-drive obligations on human occupants.

- An Australian government submitted that imposing readiness-to-drive obligations on human occupants may limit the mobility advantages for people with disabilities. This may be unreasonable if people from these groups would not require the vehicle to operate outside its operational design domain. Therefore, 'broad readiness-to-drive obligations may be overly restrictive'.
- Although supporting readiness-to-drive obligations in general, ADVI, Victoria Police (ANZPAA submission) and the ATA suggested that requirements should also be imposed on the ADSE. These should include the ADS detecting a human's readiness to drive (Victoria Police) and having an effective 'ADS fallback driver transition system' (ATA). ADVI suggested readiness-to-drive obligations should not be imposed where there is a negligible safety risk, or where the risk can be mitigated by other means such as obligations on the ADSE under the safety assurance system.

[37] Although Transurban explicitly agreed that no additional obligations should be placed on human occupants of vehicles operating at high automation.

6.3.2 NTC conclusions

Readiness-to-drive obligations for users of a vehicle operating at high automation need to be considered further

The NTC considers that further work is needed on how readiness-to-drive obligations could apply to a human who may take over driving in an automated vehicle operating at high automation. Stakeholders generally supported imposing readiness-to-drive obligations on users in a vehicle operating at high automation with manual controls. They suggested that these obligations should be less rigorous than those imposed on fallback-ready users. However, they considered that the presence of manual controls, and the fact that automated vehicle technology is largely untested, means that certain obligations should still apply.

The NTC considers that the presence of manual controls does not, in and of itself, mean that readiness-to-drive obligations are required. When the ADS is engaged at high automation, the ADS should be able to bring the vehicle to a safe stop unassisted and therefore human users are not required to take over the driving task. As was suggested by some stakeholders, existing obligations on human drivers would come into effect if users choose to take over the driving task.

Concerns about the ability of an ADS engaged at high automation to bring the vehicle to a safe stop in practice was a key reason provided for requiring readiness-to-drive obligations. We consider that if a user needs to intervene in an emergency situation or may face a situation where they will need to take back control, the vehicle may actually be operating at conditional automation rather than high automation. In this case, fallback-ready user obligations would apply. However, the NTC acknowledges that the safety of automated vehicle technology is largely untested. There may be safety risks regarding traffic congestion if several vehicles come to a safe stop in a particular part of the road network and the users of these vehicles are unable to take over the driving task. Further consideration needs to be given to how readiness-to-drive obligations could be applied where manual controls are present so that the user can take control of the vehicle.

Concerns raised by some stakeholders about decreases in mobility benefits of automated vehicles and difficulties with enforcement need further consideration. Automated vehicles have the potential to provide significant mobility benefits to people with a disability and older Australians. Any decreases in such benefits through imposing readiness-to-drive obligations need to be carefully assessed. Victoria Police (ANZPAA submission) raised a concern that readiness-to-drive obligations may be difficult to enforce where there are multiple passengers in dedicated automated vehicles because it is not clear ‘who is most in control’. This applies equally to vehicles operating at high automation with manual controls. There is no requirement for a user in a vehicle operating at high automation with manual controls to take over the driving task. Even if there is a driver’s seat,[38] it may not be occupied.

In a vehicle operating at high automation, risk mitigation strategies other than imposing obligations on users need to be appropriately utilised. Some of the risks are likely to be mitigated through the NTC’s safety assurance system project. The proposed safety criteria being developed as part of this project include requirements to ensure the ADS:

- has a defined operational design domain and is unable to operate in areas outside of its defined operational design domain
- can bring the vehicle to a minimal risk condition (such as a safe stop) in circumstances when the ADS cannot operate safely
- can detect a human’s readiness to drive and can safely transition the driving task.

[38] As discussed in section 6.4.1, Victoria Police submitted that readiness-to-drive obligations may be difficult to enforce where there are multiple passengers in a dedicated automated vehicle because there will not be a driver’s seat.

Policy direction

2. Further work should be undertaken to consider how readiness-to-drive obligations could be applied to a human who may choose to take over driving when an automated vehicle with manual controls operating at high automation reaches the limits of its operational design domain. This includes consideration of how to distinguish the person who has readiness-to-drive obligations from passengers if there are multiple occupants of the vehicle.

6.4 Readiness-to-drive obligations on passengers in dedicated automated vehicles

In a 'dedicated automated vehicle' the dynamic driving task is always performed by the ADS, and the ADS can bring the vehicle to a safe stop without human intervention.

In our discussion paper we proposed that readiness-to-drive obligations are not relevant for dedicated automated vehicles because they are not designed for a human to drive. Humans in dedicated automated vehicles should be regarded as passengers.

6.4.1 Feedback from the discussion paper

Readiness-to-drive obligations on passengers in dedicated automated vehicles

Stakeholders agreed that no readiness-to-drive obligations should be placed on passengers in dedicated automated vehicles. A number of stakeholders, including TMR, SA Freight Council, GM Holden, an Australian government and Victoria Police (ANZPAA submission) emphasised that someone travelling in a dedicated automated vehicle would have no capacity or ability to take control. Other stakeholders submitted that imposing readiness-to-drive obligations in these circumstances would:

- be contrary to the purpose of driverless vehicles and significantly reduce the anticipated benefits of these vehicles to society, such as alternate transport for the elderly, people with a disability and others who are unable to drive (DiDi Chuxing, an Australian government)
- 'place an unreasonable onus on any person utilising automated vehicles' (Law Institute of Victoria (LIV)).

Victoria Police submitted that any readiness-to-drive obligations may be difficult to enforce if there were multiple passengers because dedicated automated vehicles will not have a driver's seat. It would be necessary to determine who was 'the most in control', and therefore who the obligations should apply to.

While agreeing generally, the Western Australian Government and Western Australia Police Force (ANZPAA submission) submitted that a true dedicated automated vehicle is unlikely to exist. They suggested that automated vehicles would probably have emergency controls for a human to use. In these circumstances, occupants of the vehicle should be required to take reasonable steps to prevent a crash.

The FCAI and the TIC stated that dedicated automated vehicles will not exist in the foreseeable future. Therefore, this issue should be reconsidered at a later time when the technology is more advanced and better understood.

Some stakeholders, including ADVI, RAC WA and Queensland Police Service (ANZPAA submission), emphasised the importance of any safety risks of dedicated automated vehicles being mitigated through obligations on the ADSE.

6.4.2 NTC conclusions

No readiness-to-drive obligations should be imposed on passengers in dedicated automated vehicles

The NTC considers that readiness-to-drive obligations should not be imposed on passengers in dedicated automated vehicles. Feedback strongly supported this position. Stakeholders emphasised that a person would have no ability to take control of the vehicle, and imposing readiness-to-drive obligations in these circumstances would be unfair and reduce the benefits of automated vehicles.

We acknowledge submissions suggesting that true dedicated automated vehicles may not exist in the foreseeable future. However, the NTC considers that a policy position can be reached now because our definition of a dedicated automated vehicle explicitly excludes human driver controls being present in the vehicle. In response to submissions that vehicles operating at full automation would most likely have emergency controls implicitly requiring passengers to take reasonable steps to prevent a crash, we note that the need to take such steps implies passengers need to monitor the driving task. As suggested by the LIV, requiring passengers to monitor the driving task may place an unreasonable onus on users of vehicles with full automation.

The NTC agrees that the safety risks of dedicated automated vehicles need to be mitigated through obligations on the ADSE. Such obligations are being developed as part of the NTC's safety assurance system project.

Recommendation

8. The purpose-built national law should clarify that no user in a dedicated automated vehicle has an obligation to be ready to drive or take control of the vehicle at any time.

7 Alcohol and drug in-charge and in-control offences

Key points

- A person who starts, or is a passenger in, a dedicated automated vehicle should not be subject to drink and drug driving offences concerning starting a vehicle or being in charge of a vehicle.
- All drink and drug driving offences including those concerning starting or being in charge of a vehicle should apply to a person who starts or turns off an automated vehicle with manual controls. This position could be considered further as technology develops and international approaches evolve.

7.1 Purpose of this chapter

The purpose of this chapter is to clarify how drink and drug driving offences relating to starting a vehicle or being in charge of a vehicle should apply to:

- a person who starts, or is a passenger in, a dedicated automated vehicle
- a person who starts, or is in charge of, an automated vehicle with manual controls.

7.2 Alcohol and drug offences should not apply to passengers in a dedicated automated vehicle

Most state and territory road traffic laws prohibit someone driving or attempting to put a vehicle in motion while affected by alcohol or drugs.[39] The NTC's driving laws discussion paper outlined that these offences may apply to people who start a vehicle operating at high or full automation and set its route before the ADS is engaged or who are occupants of such a vehicle while it is driving.

Requiring occupants who are not driving to comply with drink and drug driving laws is a potential barrier to receiving the full benefits of automated vehicles. Legislative amendments to provide exemptions from these laws could be made for people who set a vehicle operating at high or full automation into motion. The NTC's discussion paper suggested that exemptions should be provided for occupants of dedicated automated vehicles because they will always be passengers.

In the discussion paper the NTC sought feedback on its proposal that exemptions from the drink- and drug-driving offences concerning starting a vehicle and being in charge of a vehicle should be provided to a person who starts, or is a passenger in, a dedicated automated vehicle.

7.2.1 Feedback from the discussion paper

Exemptions for passengers in a dedicated automated vehicle

Many submissions considered that exemptions from the drink- and drug-driving offences concerning starting a vehicle and being in charge of a vehicle should be provided to a person who is starting, or is a passenger in, a dedicated automated vehicle.

[39] See, eg, *Road Traffic Act 1974* (WA) s 63; *Road Traffic Act 1961* (SA) s 47; *Road Transport Act 2013* (NSW) s 112); *Traffic Act* (NT) s19(2); *Road Transport (Alcohol and Drugs) Act 1977* (ACT) ss 19A, 24(3).

- TMR submitted that a person should not be liable for instructing an automated vehicle to take them home where there is no ability for that person to take control.
- The AAA and the SA Freight Council submitted there are no safety risks if the person cannot take over the driving task.
- DiDi Chuxing stated that if such exemptions are not provided, the use and benefits of automated vehicles would be significantly diminished.

ADVI and Transurban submitted that any risks of providing such exemptions need to be established and mitigated, with ADVI suggesting any risks should be mitigated by the safety assurance system.

Stakeholders who submitted that such exemptions should not be provided were generally concerned about the possibility of a passenger interfering with the control of the vehicle.

- Flinders University, Leiman and McKendrick submitted it may only be appropriate to apply exemptions if developments in technology mean no-one can tamper with the operation of a dedicated automated vehicle. The ATA similarly submitted that a person affected by drugs and alcohol could interfere with the safe operation of the vehicle or vehicle systems. FCAI and South Australia Police (ANZPAA submission) submitted that such an exemption should be reconsidered at a later time when the technology is more advanced.
- The Western Australian Government and the Western Australia Police Force (ANZPAA submission) stated that there may still be emergency controls in a vehicle to allow passengers to intervene, and allowing a person who is affected by drugs or alcohol to access these controls may not be safe.
- The TIC and the ATA submitted that such exemptions should not be provided because the person starting the vehicle may be required to perform non-dynamic driving tasks.

Victoria Police (ANZPAA submission) submitted that such an exemption should not be provided in relation to drug driving offences because this would contradict existing laws relating to illegal drug use and possession.

7.2.2 NTC conclusions

Alcohol and drug in-charge and in-control offences should not apply to a person who starts, or is a passenger in, a dedicated automated vehicle

We consider that exemptions from drink- and drug-driving offences concerning starting a vehicle and being in charge of a vehicle should be provided to a person who is starting, or is a passenger in, a dedicated automated vehicle. This is consistent with feedback from a number of stakeholders that drink- and drug-driving offences should not apply when occupants cannot take over the driving task. As suggested by some stakeholders, requiring passengers to comply with drink- and drug-driving laws could significantly diminish the benefits of automated vehicles without necessarily reducing any safety risks.

The presence of emergency stop controls in a dedicated automated vehicle, or the possibility that someone may tamper with its operation, does not mean there should be no exemptions:

- Emergency stop controls are currently contained in other modes of transport such as trains. If a passenger presses the emergency stop control, the passenger would not be considered in control of the train. In addition, passengers who are under the influence of drugs or alcohol are able to travel on public trains even though they could access the train's emergency stop controls.
- A passenger in a conventional vehicle could tamper with it while it is being driven by a human driver.

The proposed safety criteria being developed as part of the NTC's safety assurance system project require the ADS to be capable of bringing the vehicle to a minimal risk condition (such as a safe stop) when the ADS cannot operate safely. Compliance with such a criterion is likely to be analogous to a human driver taking action if a passenger in a conventional vehicle interfered with the safe operation of the vehicle.

The NTC notes that offences relating to drug use and possession are separate to driving offences. We propose that passengers in dedicated automated vehicles are exempt from drink- and drug-driving offences because they are not driving so it is inappropriate that driving-related offences apply to them. They would continue be subject to drug use and possession offences.

Recommendation

9. State and territory legislation should clarify that a person who starts, or is a passenger in, a dedicated automated vehicle is not subject to drink- and drug-driving offences concerning starting a vehicle or being in charge of a vehicle.

7.3 Alcohol and drug in-charge and in-control offences will apply to a person who starts an automated vehicle with manual controls

In the discussion paper the NTC recognised that exemptions from alcohol and drug in-charge and in-control offences may not be as clear for occupants in a vehicle with manual controls because occupants could choose to take over the driving task. If an occupant chose to take over the driving task, he or she would become the driver, and drink- and drug-driving offences would apply. However, the NTC considered that the safety risk of someone who is drug or alcohol-affected taking over driving is too high.

We sought feedback on our proposal that exemptions from the drink- and drug-driving offences concerning starting a vehicle and being in charge of a vehicle should not be provided to someone who starts a vehicle operating at high and full automation that included manual controls (and therefore may take over driving).

7.3.1 Feedback from the discussion paper

Exemptions for a person who starts a vehicle operating at high and full automation with manual controls

Many stakeholders submitted that exemptions from the drink- and drug-driving offences concerning starting a vehicle and being in charge of a vehicle should not be provided to a person who is starting a vehicle with manual contols operating at high or full automation. A number of stakeholders—in particular, government—came to this view on the basis that the vehicle can still be driven by a human and that there is a safety risk if a person under the influence of alcohol or drugs chooses to take over the driving task.

- DIPL and Transurban submitted that the risk of a person under the influence of alcohol or drugs deciding to take over the driving task is too high to allow exemptions.
- ADVI submitted that such exemptions should not apply unless the risks could be mitigated in other ways, such as through the safety assurance system.

Of the stakeholders who submitted that such exemptions should apply, many stated this on the basis that drink- and drug-driving offences would apply if the person started driving.

- The AAA stated that while there is a risk that the human may choose to take over the driving task, this is separate from a person starting a vehicle with high or full automation.
- The SA Freight Council submitted it would be counterintuitive to assume a person affected by drugs or alcohol would choose to take over the driving task in contravention of drink- and drug-driving laws.
- QBE submitted that allowing such exemptions 'would preserve the benefit of being able to have the ADS safely drive the person home'.

The Motorcycle Council of New South Wales, DiDi Chuxing, WA Port Operations Task Force and Victoria Police (ANZPAA submission) suggested there could (or should) be a mechanism to prevent a human under the influence of drugs or alcohol from undertaking the driving task—for example, by way of an alcohol interlock or breathalyser.

7.3.2 NTC conclusions

Alcohol and drug in-charge and in-control offences should apply to a person who starts an automated vehicle with manual controls

Based on feedback from the discussion paper the NTC considers that exemptions should not be provided to a person who starts a vehicle operating at high and full automation that includes manual controls.

The NTC recognises submissions that suggested drink- and drug-offences would apply as soon as the person chooses to take over the driving task. However, a number of submissions, particularly from government stakeholders, suggested that even though these offences would apply, the safety risks of a human under the influence of alcohol or drugs choosing to take over the driving task are too high. We consider that the cautious approach suggested by government stakeholders should be applied initially, and reviewed over time. We recognise that the enforcement challenges discussed in section 6.2 could also arise in relation to alcohol and drug in-charge and in-control offences because it may not be clear who the obligations would apply to where there are multiple passengers in dedicated automated vehicles.

As noted in some submissions, a mechanism such as an alcohol interlock or a breathalyser could safeguard against a human taking over the driving task while under the influence of drugs or alcohol. This would require the ADSE to include such technology in each vehicle. The NTC's approach to automated vehicle safety is for it to be performance-based and technology-neutral so we do not support this as a compulsory requirement. Technology safeguarding against the human driver taking over the driving task while under the influence of drugs or alcohol could become widely adopted by ADSEs as a result of industry best practice. In this case, the risks of the human taking over the driving task while under the influence would be reduced. Therefore, the position that no exemptions from drink- and drug-driving offences should be provided where an automated vehicle has manual controls could be considered further as technology develops and international approaches evolve.

Recommendation

10. State and territory legislation should clarify if necessary that all drink- and drug-driving offences, including those concerning starting or being in charge of a vehicle, apply to a person who starts or turns off an automated vehicle with manual controls. This position could be considered further as technology develops and international approaches evolve.

8 Compliance and enforcement

Key points

- The ADSE will be responsible for the ADS's failure to correctly perform the dynamic driving task obligations with compliance and enforcement options including appropriate offences, sanctions and penalties.
- The purpose-built national law will specify the dynamic driving task obligations the ADS must be able to perform.
- Further recommendations on compliance and enforcement options including offences, penalties and sanctions for driving laws should be made to the Transport and Infrastructure Council in May 2019 after agreement on relevant elements of the safety assurance system at the November 2018 council meeting. These recommendations should consider interactions with the safety assurance system and duties or offences that system establishes—in particular, interactions with a potential primary safety duty.

8.1 Purpose of this chapter

This chapter will suggest that the purpose-built national law should provide compliance and enforcement options including appropriate offences, sanctions and penalties that:

- provide sufficient incentive for an ADSE to ensure that the automated vehicle operates safely, including complying with defined dynamic driving task obligations when the ADS is engaged
- are seen as suitably proportionate for an ADSE relative to existing offences and penalties for human drivers
- interact effectively with existing road traffic law to maintain existing offences and penalties for human drivers
- interact effectively with any compliance and enforcement options created by the safety assurance system.

8.2 Appropriate compliance and enforcement mechanisms

The purpose of penalties for failing to comply with road rules and traffic laws is to encourage safe driving behaviour and punish unsafe driving behaviour. Penalties are designed to adequately reflect the nature of the offence being committed and the seriousness of the risk posed and to be at a level that appropriately balances fairness and deterrence. Existing road traffic offences are intended to influence the behaviour of human drivers, with each state and territory deciding the applicable penalty for offences.[40]

While some driver offences are inapplicable to an ADS—because they require a mental element[41]—many offences, particularly those related to the dynamic driving task, could apply to the operation of the ADS, as they are actions within the control of the ADSE.

[40] *Australian Road Rules* rule 10(1).

[41] See eg *Model Subordinate Instrument on the Transport of Dangerous Goods by Road or Rail* cls 3.1.6, 4.4.6, 4.5.8.

We consider that if an ADSE is responsible for complying with relevant traffic laws when the ADS is engaged, there must be compliance and enforcement options for breaches of traffic laws by the ADS.

In the driving law discussion paper we suggested that individual penalties for each breach of a traffic law is not the most appropriate way of ensuring that an ADS complies with traffic laws. We sought stakeholder views on how road traffic penalties should apply to the ADSE, proposing that:

- existing road traffic penalties are clearly aimed at influencing the behaviour of human drivers—without change, they are unlikely to be appropriate or effective when applied to an ADSE
- if existing road traffic penalties apply to an ADSE, corporate multipliers are likely to increase the effectiveness of those penalties
- breaches of road traffic laws should be taken as evidence of a broader failure to provide safe automated vehicles and as a breach of the primary safety duty or other specific offences included in the safety assurance system
- a primary safety duty should be examined as part of the safety assurance system reforms.

8.2.1 Regulating the ADSE and the performance of the ADS through road traffic offences and the safety assurance system

An important issue for regulating automated vehicles is how compliance and enforcement options in the proposed safety assurance system will link with, or sit alongside, breaches of road traffic laws.

ADS breaches of traffic laws may be evidence of a wider failure by an ADSE to provide safe automated vehicles through a fault in the software or hardware of the ADS. There may be a need to reassess whether the ADS is safe. This indicates the importance of a feedback loop so that ADS breaches of traffic laws are fed back into the safety assurance system.

The safety assurance system could include a range of compliance and enforcement options including graduated sanctions and penalties. These could include improvement notices, infringement notices, enforceable undertakings, suspension and withdrawal of ADS approval.

The NTC is also considering a primary safety duty. This ongoing duty throughout the life cycle of the vehicle would aim to prevent unsafe behaviours by the parties that are not prescribed offences. It would do this by managing in-service safety risks and hazards. A primary safety duty would not be prescriptive and would therefore accommodate significant advances in safety technology.

A primary safety duty to ensure automated vehicle safety could be based on a number of existing models including work health and safety, rail safety law and the Heavy Vehicle National Law.

Responses to the NTC's discussion paper *Assuring the Safety of Automated Vehicles* (June 2017) indicated support for a primary safety duty in addition to sanctions and penalties directed at the ADSE.

At its November 2017 meeting the Transport and Infrastructure Council endorsed that the next phase of safety assurance implementation should further consider including a primary safety duty. We are seeking feedback on the possibility of including a primary safety duty as part of our consultation on the RIS for a safety assurance scheme.

8.2.2 Feedback from the discussion paper

Applying the proper control offence to an ADS

In the driving laws discussion paper the NTC sought views on whether the 'proper control offence' should apply to the ADS if there are sufficient ways to hold the ADSE to account for the proper operation of the ADS.[42] The proper control rule states that a driver must not drive a vehicle unless the driver has proper control of a vehicle. We suggested that the offence could either:

- be amended to be made relevant to an ADS by defining what proper control is for an ADS, or
- not apply to an ADS.

The majority of stakeholders supported the proposition that the proper control offence should not apply to the ADS if the ADSE is required to accept responsibility for the operation of the ADS.

Many stakeholders considered the proper control offence is not relevant to the operation of an ADS:

- QBE, GM Holden and another automobile manufacturer submitted that the proper control offence is designed to deal with 'human failings' such as distraction and inattention. The offence is irrelevant when the ADS is engaged.
- The Western Australia Police Force (ANZPAA submission) supported that the proper control offence should not apply to the ADS. It considered that it would be 'unusual to have a law in which a non-person' (the ADS) can commit an offence.
- Queensland Police Service (ANZPAA submission) suggested that, rather than extending the definition of proper control to an ADS, new offences could be created—for example, a 'failure to develop and maintain a proper operating ADS'.
- GM Holden suggested that amending road rules to account for the ADS, including amending the proper control offence, 'is unnecessary, as an overly prescriptive approach could hinder future development of the technology'.

The SA Freight Council stated that the proper control offence should be amended to define proper control for an ADS, with the ASDE responsible for any breach. This could include, for example, a requirement that sensors operate effectively, and for pre-ignition checks to be run before an ADS takes control of a vehicle.

PwC proposed that the proper control obligation apply to the registered operator when the ADS is engaged.

Victoria Police (ANZPAA submission) supported the ADS as being in control in a vehicle with conditional automation but emphasised that the proper control obligation should apply to a fallback-ready user at the point they take control from the ADS.

Offences, sanctions and penalties

In the driving laws discussion paper the NTC sought feedback on whether obligations and penalties on ADSEs in the safety assurance system should complement, or be an alternative to, road traffic offences. We also sought views on how, if at all, road traffic penalties should apply to ADSEs.

Stakeholders provided a mixture of responses, with some favouring road traffic penalties being complementary. Others favoured creating new safety duties and requirements on the ADSE outside of the road traffic offences framework.

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[42] *Australian Road Rules* rule 297(1)

Many stakeholders emphasised the importance of creating a mechanism to help enforcement authorities determine when the ADS is engaged. Under the safety assurance system, it is proposed that ADSEs be required to demonstrate data management (including interaction with enforcement agencies) as a safety criterion.

Applying road traffic penalties to ADSEs and use of corporate multipliers

- TMR expressed support for the proposition that the ADSE be held liable for road traffic breaches caused by the ADS.
- SA Freight Council observed that any ability for authorities to issue an infringement notice to an ADSE is likely to require legislative change.
- A number of submissions, including those from some enforcement agencies, supported applying a corporate multiplier to road traffic offences to ensure the penalty has a punitive effect on the ADSE (ACT Policing, Western Australia Police Force, Queensland Police Service, Victoria Police (ANZPAA submission) and PwC).
- Victoria Police suggested that a corporate multiplier may have little impact on an international corporation.
- The Western Australian Government considered that although corporate multipliers alone may not be a sufficient deterrent, they should be made available as part of a suite of compliance tools.

Offences in driving laws could complement offences in the safety assurance system:

- TMR and Queensland Police Service (ANZPAA submission) also stated that ADSE liability for road traffic breaches could be complementary to those ADSE obligations and penalties that will be administered through the safety assurance system.
- Victoria Police (ANZPAA submission) supported the safety assurance system and road traffic offence regimes being complementary and emphasised the importance of safety assurance system offences and penalties producing a suitable, safety-oriented systemic outcome. Similarly, Queensland Police Service (ANZPAA submission) emphasised that rectifying technical errors in the ADS should take priority over issuing road traffic infringements.
- Western Australia Police Force (ANZPAA submission) stated that when a road rule is breached, the ADSE should be compelled to fix an ADS fault.

Breach of road rule triggers—involvement of safety assurance system regulator

- Some stakeholders suggested that an ADS breaching a road traffic law should activate the scrutiny of the safety assurance system regulator. A number of submissions, including from government and enforcement authorities, suggested that a breach of the road rules be used as evidence to trigger an investigation into the safe operation of the ADS under the safety assurance system.
- Differing views were expressed as to which entity would conduct an investigation. New South Wales Police Force (ANZPAA submission) suggested the ADSE could be required to investigate the cause of the ADS failure as part of a primary safety duty and take action to address the breach. Other stakeholders supported the safety assurance system regulator performing an investigative role. The ATA suggested that the Australian Transport Safety Bureau could be empowered to conduct independent investigations into ADS failures.

Primary safety duty

There has been consistent, supportive feedback to the NTC for a primary safety duty to be part of the regulatory framework for automated vehicles. This was reflected in responses to questions in the driving laws discussion paper about offences, sanctions and penalties.

- TMR indicated its support for a primary safety duty where fault could be allocated if the ADS fails to comply with road traffic obligations.
- PwC suggested that a primary safety duty could apply to the entity that supplies an ADS.

Enforcement mechanisms in the safety assurance system could operate as an alternative to road traffic offences applying to an ADSE

Many stakeholders commented that there should be ways, other than amending the road traffic laws, to penalise the ADSE for a failure of an ADS to be safe. Patricia Cantos expressed the view that any new purpose-built Act could provide for tailored enforcement mechanisms that are suited to corporate offenders. The New South Wales Police Force (ANZPAA submission) stated that a new Act would:

> *Establish safety measures that are clear and separate to the current behavioural regulation imposed on drivers [that] … encourage compliance through the general application of monetary and demerit point penalties.*

A number of the sanctions suggested by stakeholders are likely to be considered as part of the measures to regulate the ADSE through the safety assurance system—for example, power to compel an ADSE to disable the ADS so that the vehicle reverts to a conventional vehicle.

Consequences of an ADS failure could include suspension or revocation of an approval under the safety assurance system. New South Wales Police Force and South Australia Police (ANZPAA submission) emphasised that more work needs to be done to consider the implications on enforcement, the impact on the community and community expectations.

Using existing product liability and corporate criminal liability provisions

A number of stakeholders noted that existing product liability protections under Australian Consumer Law could also play a role in ensuring the safe operation of an ADS (Western Australia Police Force (ANZPAA submission) and an automobile manufacturer).

Western Australia Police Force (ANZPAA submission) suggested that corporate criminal liability offences should be considered for circumstances where an ADSE acts recklessly, causing death or substantial damage.

While the applicability of criminal laws to an ADSE is outside the scope of this project, state and territory governments, the NTC and the Commonwealth will need to consider this issue. The NTC acknowledges that any amendment to offences found in criminal laws would require consultation with the Attorneys-General. Holding an ADSE to account through a primary safety duty (discussed above at 8.2.1) with tiered criminal offence provisions could be one way of achieving a similar punitive effect. It could provide liability for an ADSE—including imprisonment terms for duty holders—for breaching a safety duty that exposes an individual to risk of death, serious injury or harm.

8.2.3 NTC conclusions

Proper control is not relevant to an ADS

Almost all stakeholders thought that the proper control offence in the model Australian Road Rules (rule 297) should not apply to an ADS. We agree that the proper control offence should not apply to an ADS because the offence is designed to deal with unsafe driving behaviour by humans. Nor do we consider that amending the rule to impose a proper control obligation on an ADSE will provide any additional safety benefit for automated vehicles.

If an ADS fails to comply with a road rule or causes a crash, it is likely to be the result of a system, technical or mechanical failure. Such failures are better addressed under the

proposed safety assurance system in addition to existing product liability provisions in the Australian Consumer Law.

Compliance and enforcement mechanisms

Our view is that relying solely on offences, sanctions and penalties in existing law (road traffic and non-road traffic) will not sufficiently incentivise the ADSE to ensure that automated vehicles operate safely. For example, the consumer guarantees in the Australian Consumer Law provide a number of protections for consumers relating to goods being fit for purpose, free from defects, safe and matching their description. Consumers could rely on these protections to seek a remedy for a faulty ADS. Additionally, the Commonwealth's recall powers under the Australian Consumer Law could also be used. However, the NTC considers that there are limitations on the effectiveness of using the Australian Consumer Law for this purpose. These include:

- Consumer protections are retrospective.
- Vehicle recall may be a disproportionate response if the ADS fault can be rectified by other actions with less inconvenience to consumers.
- The onus of taking action would, at times, be placed on the consumer. A consumer may not have the financial resources or ADS data at their disposal to adequately prepare their complaint.

We are seeking feedback on compliance and enforcement mechanisms that could sit within the safety assurance system as part of our consultation RIS. Possible mechanisms include specific safety assurance system sanctions and penalties and a primary safety duty. The final RIS will be presented to the Transport and Infrastructure Council in November 2018. We consider that any policy recommendations concerning offences, sanctions and penalties for driving laws should occur after the council has agreed on elements of the safety assurance system. This includes whether there should be a primary safety duty and, if so, who it applies to.

Policy direction

3. Appropriate compliance and enforcement mechanisms, including offences, penalties and sanctions targeting automated driving system entities and other parties, will be required in a new purpose-built national law to regulate an ADS 'driver'.

   The purpose-built national law will specify the dynamic driving task obligations the automated driving system must be able to perform (the proper control offence is not relevant to an automated driving system and will not be included).

   The law will make the ADSE responsible for the ADS's failure to correctly perform the dynamic driving task obligations and will include appropriate offences, sanctions and penalties.

Recommendation

11. Further recommendations on compliance and enforcement options, including offences, penalties and sanctions for driving laws, should be made to the council in May 2019 after agreement on relevant elements of the safety assurance system at the November 2018 council meeting. These recommendations should consider interactions with the safety assurance system and duties or offences that system establishes—in particular, interactions with a potential primary safety duty.

9 Next steps

Key points

- This policy paper provides high-level policy recommendations aimed at enabling consensus from the Transport and Infrastructure Council on key features of driving laws for automated vehicles.
- For purpose-built national law to be developed, this high-level policy agreement will need to be translated into drafting instructions to develop legislation.
- The NTC's driving laws reform and safety assurance system reform projects are closely linked. Some decisions about the driving laws reform should not be made until elements of the safety assurance system are settled. The chapter explains these linkages and sequencing of the projects and the next steps in the driving law reform.

9.1 Purpose of this chapter

This policy paper aims for consensus from the Transport and Infrastructure Council on key features of driving laws for automated vehicles. Our key recommendation is that purpose-built national law should be developed. If council agrees to our recommendations, this high-level policy agreement will need to be translated into drafting instructions to develop legislation. Drafting instructions are detailed written instructions to Parliamentary Counsel for drafting Bills. The NTC will need to work closely with stakeholders to achieve this.

The NTC notes that the council has endorsed the ambitious aim of putting end-to-end regulation in place by 2020 to support the safe, commercial deployment and operation of automated vehicles at all levels of automation. This will require that government and industry work closely together to achieve an appropriate regulatory framework and that Australian governments dedicate appropriate resourcing to automated vehicle projects.

The purpose of this chapter is to:

- explain the next steps in the driving law reform project to take us from where we are—high-level policy—to legislation to regulate an ADS driver
- clarify the linkages with other NTC projects—in particular, the safety assurance system project—and the sequencing of these projects
- explain the opportunities for stakeholders to be involved in this process.

9.2 Next steps in driving laws reform

For legal reform to enable the legal and safe operation of an ADS, the NTC, states, territories and the Commonwealth will need to develop a consistent national approach to analysing relevant legislation.

States, territories and the Commonwealth will need to identify the dynamic and non-dynamic driving task obligations in their road safety and traffic laws. Jurisdictions will need to consider and agree:

- whether each obligation can apply to an ADS
- how obligations should be modified, if necessary, to enable an ADS to comply with the intent of the obligation on the human driver

- whether the obligation needs to be reassigned to another party if the ADS cannot perform it.

The next step in the driving laws reform is forming a national working group. This will be the mechanism for the NTC, states, territories and the Commonwealth to carry out the work required to complete recommendations 5 and 6 in this policy paper, which are set out below.

Recommendations

5. Legislative analysis of the model Australian Road Rules and the Heavy Vehicle National Law should be carried out by the National Transport Commission to:
    I. identify driver duties that form part of the dynamic driving task and would not be covered by another party if an automated driving system is in control
    II. assess which driver duties that do not form part of the dynamic driving task an automated driving system entity should be responsible for
    III. identify who the duty could be reassigned to if there are outstanding driver duties that are not fulfilled if an automated driving system is in control.
6. The National Transport Commission should coordinate a national working group with membership from the states, territories and the Commonwealth to:
    I. to agree to a nationally consistent approach to analysis of state, territory and Commonwealth legislation on a similar basis to recommendation 5
    II. ensure that this legislative analysis is completed by states, territories and the Commonwealth by the end of November 2018 for the May 2019 council meeting.

9.2.1 Matters on which the national working group needs to reach agreement

The purpose of these recommendations and the national working group is to ensure there is sufficient analysis and discussion to reach agreement that will allow drafting instructions to be prepared to introduce purpose-built national law to regulate an ADS 'driver'. Agreement needs to be reached on:

- the dynamic driving task obligations (recommendation 2III)
- any additional duties and obligations that an ADSE is responsible for that do not form part of the dynamic driving task (recommendation 4)
- who the duty could be reassigned to if there are outstanding driver duties that are not fulfilled if an automated driving system is in control (this may require amendments to existing legislation such as the Heavy Vehicle National Law rather than being included in the new purpose-built law).

The NTC will provide members of the working group with its analysis of the Australian Road Rules and Heavy Vehicle National Law and will seek agreement on how to approach the analysis. A template for analysis will be provided to working group members for them to analyse state, territory and Commonwealth legislation. It is anticipated that the working group will meet on a fortnightly basis. This is subject to discussion with jurisdictions on the appropriate frequency of meetings. During this time, the NTC will also consult with industry and peak bodies.

Once the working group has reached agreement on the key matters listed above, the NTC will consult formally on this with industry, peak bodies and other interested parties. We propose that this consultation will take the form of a series of roundtables.

The NTC also intends that the working group will analyse legislative implementation options for the driving law reform. The working group will be the key forum for government consultation on which legislative model should be used.

As described in chapter 2, national uniform legislation could be created through national model legislation maintained by the NTC, similar to the model Australian Road Rules, or by applied laws legislation enacted by a host jurisdiction and then enacted via an application Act in other jurisdictions, similar to the Heavy Vehicle National Law. A third option would be for the states to refer power to the Commonwealth. The NTC will also consult with the Parliamentary Counsel's Committee on the best approach. Uniform national legislation may require an intergovernmental agreement.

The first step in this work will be for the NTC to provide members of the working group with a paper setting out the risks and benefits of the legislative implementation options by 30 June 2018.

9.3 Linkages and sequencing between the driving laws and the safety assurance system

The NTC is currently consulting on a RIS. The NTC will put recommendations to the council at its November 2018 meeting. The RIS seeks the views of interested parties on the following policy options to address the safety risks associated with deploying vehicles with an ADS:

- **Option 1: Current approach (the baseline option)** – does not introduce a safety assurance system. It uses existing regulatory processes to manage the safety of automated vehicles.
- **Option 2: Administrative safety assurance system** – introduces a safety assurance system using administrative processes under existing regulation. It requires an ADSE to self-certify against principles-based safety criteria.
- **Option 3: Legislative safety assurance system** – introduces a safety assurance system with a dedicated national agency for automated vehicle safety. It requires an ADSE to self-certify against principles-based safety criteria. It includes sanctions and penalties that are specific to safety assurance.
- **Option 4: Legislative safety assurance system + primary safety duty** – introduces a safety assurance system with a dedicated national agency for automated vehicle safety. It requires an ADSE to self-certify against principles-based safety criteria. It includes sanctions and penalties that are specific to safety assurance and a general duty on ADSEs to ensure safety ('primary safety duty').

The RIS will also seek the views of interested parties on the proposed criteria against which the ADSE will be required to submit a statement of compliance.

There are important linkages between the safety assurance system and the driving laws project. Some elements of legislation for the driving law reform should not be decided until the council makes a decision about the RIS in November 2018. In particular, any penalties and offences in the driving laws reform cannot usefully be considered until the council makes a decision about the policy options to address the safety risks associated with deploying vehicles with an ADS. This decision will include whether or not there will be safety assurance system-specific sanctions and penalties and a primary safety duty.

Stakeholders told us that elements of the safety assurance system need to be clear and agreed before elements of the driving law reform can be agreed. In response to these comments, the NTC has moved consultation on the safety criteria for the safety assurance system forward to include this consultation as part of the RIS. This will cover elements that are essential before finalising driver law reforms to allow for an ADS 'driver'. The proposed

criteria have been outlined in two parts—principles-based safety criteria and other obligations on ADSEs.

The NTC is proposing 11 safety criteria against which ADSEs will be required to submit a statement of compliance:

1. safe system design and validation processes
2. operational design domain
3. human–machine interface
4. compliance with relevant road traffic laws
5. interaction with enforcement and other emergency services
6. minimal risk condition
7. on-road behavioural competency
8. installation of system upgrades
9. testing for the Australian road environment
10. cybersecurity
11. education and training.

The NTC is also proposing three other obligations on ADSEs to assist relevant parties to appropriately assign criminal and civil liability for events such as road traffic law breaches and crashes:

1. data recording and sharing
2. corporate presence in Australia
3. minimum financial requirements.

A key concern for stakeholders in finalising any driving law reforms is access to data. The NTC's proposed criteria include a criterion relating to data recording and sharing. Such a criterion would likely place requirements on ADSEs to record and provide certain data to relevant parties. This could include crash data, data relating to who is in control of a vehicle, and data to individuals to dispute liability.

The NTC will be consulting on the safety criteria as part of the consultation on the RIS. The decision RIS will go to the council in November 2018. The NTC recognises that government, industry and the community need certainty about these aspects of the safety assurance system before any driving law reform can be made to implement changes to driving laws to allow for an ADS driver. The sequencing of our reform provides for this.

Table 2 sets out the sequencing and timing of automated vehicle reforms through to May 2019.

Table 2. Sequencing and timing of automated vehicle reforms

Project	Action	Timing	Outcome sought
Changing driving laws	High-level policy recommendations to the council based on feedback and analysis of issues raised in the discussion paper[43]	To the council in May 2018	High-level policy recommendations approved by the council in May 2018
Safety assurance system	Consultation RIS	Published May 2018 Consultation until early July 2018	Seeks the views of interested parties on: ▪ four policy options to address the safety risks associated with deploying vehicles with an ADS ▪ proposed criteria against which the ADSE will be required to submit a statement of compliance
Changing driving laws	Formation of a national legislative policy working group (coordinated by the NTC)	Formed by May 2018 NTC documents fulfilling recommendation 5 in this policy paper completed and circulated by 31 May 2018 Fortnightly meetings (subject to discussion with jurisdictions on frequency of meetings) to discuss and agree to analysis – June to November 2018 States, territories, Commonwealth analysis (rec 6) and nationally consistent approach agreed by 30 November 2018	Carry out recommendations 5 and 6 in this policy paper to allow for drafting instructions to be prepared specifying: ▪ the dynamic driving task obligations (rec 2III) ▪ any additional duties and obligations that an ADSE is responsible for that do not form part of the dynamic driving task (rec 4) ▪ who the duty could be reassigned to if there are outstanding driver duties that are not fulfilled if an ADS is in control

[43] *Changing driving laws to support automated vehicles: discussion paper*, October 2017, NTC. Available at <http://www.ntc.gov.au/Media/Reports/(E5695ACE-993C-618F-46E1-A876391B8CD9).pdf>.

Compulsory third-party insurance review	Discussion paper	Discussion paper published June 2018 (subject to advice from treasuries) Consultation until August 2018	Public feedback on options for providing insurance coverage for accidents involving an automated vehicle
Regulating government access to C-ITS and automated vehicle data	Discussion paper	Discussion paper published September 2018 Consultation until November 2018	Public feedback on whether current legislation and regulation governing government access to, and use and disclosure of, personal information is sufficient given the information that will be generated by C-ITS and automated vehicle technology
Compulsory third-party insurance review	Recommendations to the council	To the council in November 2018	Recommendations approved by the council in November 2018 and referral to the Council of Federal Financial Relations (subject to advice from treasuries)
Safety assurance system	RIS to the council for decision	To the council in November 2018	Recommendations approved by the council including decisions about: ▪ whether there will new legislation providing specific sanctions and penalties and whether there will be a primary safety duty ▪ the criteria against which the ADSE will be required to submit a statement of compliance
Changing driving laws	Consultation with industry, peak bodies and other interested stakeholders on national working group proposed: ▪ dynamic driving task obligations (rec 2III) ▪ any additional duties and obligations that an ADSE is responsible for that do not form part of the dynamic driving task (rec 4) ▪ who the duty could be reassigned to if there are outstanding driver duties that are not fulfilled if an ADS is	Consultation – December 2018 to January 2019	Consult with industry and other interested stakeholders of proposed obligations on the ADSE and others in driving laws

	in control (this may require amendments to existing legislation such as the Heavy Vehicle National Law rather than being included in purpose-built law)		
Safety assurance system	Detailed legislative policy recommendations	To the council in May 2019	Detailed legislative policy recommendations approved by the council enabling drafting instructions to be developed
Changing driving laws	Detailed legislative policy recommendations	To the council in May 2019	Detailed legislative policy recommendations approved by the council enabling drafting instructions to be developed
Regulating government access to C-ITS and automated vehicle data	Recommendations to the council	To the council in May 2019	Recommendations approved by the council in May 2019
Changing driving laws	Legislation drafted	May 2019 onwards	Draft Bill(s) produced for the council's approval to introduce purpose-built national law to regulate an ADS 'driver'
Safety assurance system	Legislation drafted as required	May 2019 onwards	Draft Bill(s) produced for the council, as required, to provide for a safety assurance system

KEY
Consultation
Transport and Infrastructure Council decision
NTC action

Appendix A Additional issues raised by stakeholders

Issue	NTC response
Pace of regulatory change – too fast or too slow *Raised by*: ADVI, Geoffrey Taylor, IAG, NRMA Take a two-step approach to regulating automated vehicles laws *Raised by*: AAA, DiDI Chuxing, FCAI, WA Port Operations Task Force • Consider legislating for lower levels of automation in the short term, then graduate to legislating for more advanced levels of automation • Alternatively, the two-step approach could provide initially for testing of automated vehicles, then deployment (DiDi Chuxing)	The NTC appreciates the variety of comments by stakeholders that the pace of its program of work to create an end-to-end regulatory scheme for automated vehicles is either too fast or too slow. We do not consider that changes to relevant legislation, registration and licensing, road operations and enforcement processes relevant to states, territories and the Commonwealth to enable the commercial deployment of automated vehicles can be completed before 2020. Australia is maintaining engagement with work occurring in international forums on automated vehicles and is developing a technology-neutral approach to regulation. Ministerially agreed timeframes require a legislative solution that deals with all levels of automation by 2020. Based on advice from industry, the NTC expects that dedicated automated vehicles operating at high automation (for example, shuttle buses) could be deployed within five years. Any legislative change to enable the ADS to perform the dynamic driving task and to hold an entity responsible for the on-road operation of the ADS is interdependent on the project to establish a safety assurance system, which is designed to regulate vehicles with all levels of automation.
Congestion caused by private ownership of automated vehicles rather than shared-ownership and shared-use models Road pricing to manage congestion Prioritisation of walking/cycling and public transport rather than automated vehicles in dense urban areas to alleviate congestion *Raised by*: City of Melbourne	Road pricing and congestion charging are outside the scope of this project. The Commonwealth Government is leading work on potential reforms of current road funding and investment, including for heavy vehicles (see, for example, <https://infrastructure.gov.au/roads/heavy/>). Congestion charging is a matter for state, territory and local governments.
Regulatory reform should recognise the disruptive and unknown impacts of automated vehicles *Raised by*: City of Melbourne	The NTC's goal is to establish end-to-end regulation to support the safe, commercial deployment of automated vehicles at all levels of automation. This end-to-end regulation is intended to be neutral in relation to specific business cases to provide appropriately flexible regulation to respond to disruptive business models. To achieve this goal, there is a significant national reform program involving the Commonwealth, state and territory governments, and other agencies including Austroads. This project's focus is on identifying legislative reform to ensure the ADS can legally perform the dynamic

Issue	NTC response
	driving task and to ensure there is a legal entity responsible for the actions of an ADS. The NTC considers that there will be a range of laws outside the transport portfolio that the ADSE may be responsible for complying with. There will be opportunities for the issues raised by Melbourne City Council to be considered in other projects inside and outside the transport portfolio. The *National Policy Framework for Land Transport Technology Action Plan 2016–2019* encompasses disruptive technologies. See <http://transportinfrastructurecouncil.gov.au/publications/> for more information.
Consumer education on the functionality of ADS technology and driver/user responsibilities *Raised by*: ADVI, ANCAP	It is intended that education for relevant parties on the functionality of an ADS will be a safety criterion that an ADSE will be required to address under the safety assurance system. Further work will be done on this issue as part of the safety assurance system project. Whether driver/user education will be a requirement of the driver licensing system is an issue to be considered by Austroads and state and territory licensing authorities. Austroads will consider whether changes to driver education and training should be included within registration and licensing programs for vehicles with advanced driver assistance systems. Austroads will also consider any outputs from the safety assurance system requirements for driver education and training.
Data security *Raised by*: Law Council of Australia	Data security is being analysed by the Department of Infrastructure, Regional Development and Cities.
Data access and privacy *Raised by*: AAA, Geoffrey Taylor, IAG, LIV, National Farmers' Federation, NRMA, WA Port Operations Task Force	The NTC acknowledges that access to data for enforcement and liability purposes is an important facet of a regulatory system. Access to data is covered in the following projects: • The NTC's safety assurance system project. It is proposed that an ADSE be required to provide recorded data to relevant parties including enforcement, insurers and consumers. • The NTC's compulsory third-party insurance review project. This project will consider what data insurers will need to assess claims by injured parties when an automated vehicle is involved. • The NTC's clarifying regulatory access to data project. This project will consider whether current legislation and regulation governing government access to, and use and disclosure of, personal information is sufficient given the information that will be generated by C-ITS and automated vehicle technology. The focus of this project is on restricting government access if necessary, rather than providing access to government and other parties.
Insurance *Raised by*: AAA, Law Council of Australia, Law Institute of Victoria, NRMA	The NTC's compulsory third-party insurance review project will address this. We are supporting the states and territories to review compulsory third-party and national injury insurance schemes to identify any eligibility barriers for occupants of an automated vehicle, or those involved in a crash with an automated vehicle.

Issue	NTC response
Maintenance and repair *Raised by*: IAG	Maintenance and repair of automated vehicles and ADSs are included in the NTC's safety assurance system project.
Loss of driving skills *Raised by*: ATA, National Farmers' Federation	The impact of automated vehicles on the skill set of drivers and relevant licencing proficiencies is within the responsibility of Austroads. It is intended that education for relevant parties on the functionality of an ADS will be a safety criterion that an ADSE will be required to address under the safety assurance system. Further work will be done on this issue as part of the safety assurance system project.
Land use and planning Road network and infrastructure demands *Raised by*: MAV, NRMA	The impact of automated vehicles on land use and planning is not within the scope of this project. These are matters for consideration by state, territory and local governments. The impact of automated vehicles on road agency operations, including infrastructure standards and registration and licensing, is not within the scope of this project. Austroads and states and territories have responsibility for these issues (see <http://www.austroads.com.au/drivers-vehicles/connected-and-automated-vehicles>). Many state and territory trials are currently exploring technical infrastructure changes for vehicles with advanced driver assist systems and digital infrastructure for connected vehicles. Changing demands for infrastructure are also outside the scope of this project but are being examined by road agencies and infrastructure planning agencies.
Responsibility for parking infringements *Raised by*: City of Melbourne	This issue will be subject to further scrutiny as part of the safety assurance system and will be considered as part of the legislative analysis to be performed by states, territories, the Commonwealth and the NTC.
Heavy vehicle issues *Raised by*: WA Port Operations Task Force	The additional obligations placed on parties that are responsible for operating a heavy vehicle will be considered as part of NTC's legislative review in the next phase of this project. The impact of automation on heavy vehicle standards is likely to be considered further by the Commonwealth Government, the NTC, industry and the National Heavy Vehicle Regulator.
Responsibility for software updates *Raised by*: IAG, NatRoad, TMR	Imposing safety obligations on a range of parties is being considered as part of the current consultation on the safety assurance system RIS. In addition, the proposed safety criteria being developed as part of the NTC's safety assurance system project include a criterion requiring the ADSE to disengage the ADS if safety-critical system upgrades are not installed, including because of failures by registered owners/operators to install software updates provided by the ADSE.
Additional obligations on users/passengers in dedicated automated vehicles *Raised by*: QBE	Safety obligations are being considered as part of the current consultation on the safety assurance system RIS.

Issue	NTC response
Shared mobility *Raised by*: NRMA	While it is not an express objective of this project, removing barriers to the commercial deployment of automated vehicles is likely to facilitate a variety of new business models for consumers.
Technology issues • Importance of digital infrastructure to support automated vehicles • Impacts on rural and regional areas *Raised by*: ADVI, MAV, National Farmers' Federation, WA Port Operations Task Force	While outside the scope of this project, the physical and digital infrastructure required to support automated vehicles will be considered by a number of current and proposed projects being coordinated by the NTC and Austroads. At this stage, automated vehicles can achieve high levels of automation without connectivity to other vehicles or infrastructure. It is likely that, in time, connectivity and automation will merge to achieve a connected and automated vehicle, but it is unclear when this is likely to happen.
Incentivising use of automated vehicles *Raised by*: WA Port Operations Task Force	The purpose of the changing driving laws project is to remove regulatory barriers to enable automated vehicles to be used. Trials of automated vehicles are occurring across a number of jurisdictions, including surveys on levels of public acceptance of automated vehicles. Any additional measures to support automated vehicles would be subject to consultation by all levels of government in the future.

Appendix B Geneva and Vienna Conventions on Road Traffic

Both the 1949 Geneva Convention on Road Traffic (Geneva Convention) and the 1968 Vienna Convention on Road Traffic (Vienna Convention) cover road traffic safety regulations and establish principles to govern traffic laws. Australia is a contracting party to the Geneva Convention but not the Vienna Convention.

The Geneva and Vienna Conventions require each vehicle to have a driver and require drivers to be able to control their vehicle at all times.[44] The Conventions also define a 'driver' as a person who drives a vehicle.[45]

On 23 March 2016, an amendment to Article 8 of the Vienna Convention entered into force (United Nations Economic Commission for Europe Information Unit, 2016). The amendment provides that systems that influence the way vehicles are driven are allowed where they are in conformity with UN vehicle regulations or can be overridden or switched off by the driver (Economic Commission for Europe: Working Party on Road Traffic Safety, 2014, p. 9). While this amendment provides some recognition of automated functionality, it continues the common understanding that a vehicle requires a driver to control it, and that the driver is human.

As such, legislative change to recognise the ADS as being in control of the vehicle when it is engaged may create tensions with the Geneva and Vienna Convention requirements. However, the NTC notes that the current drafting of the Conventions is inconsistent with advances in technology and the introduction of automated vehicles, and this incompatibility has been recognised internationally (Economic Commission for Europe: World Forum for Harmonization of Vehicle Regulations, 2017). Recent papers at the Global Forum for Road Traffic Safety (WP.1)[46] suggest that treaty obligations are likely to change in the future to provide more recognition for advances in technology and the introduction of automated vehicles. For example, WP.1 has been discussing principles in circumstances where the vehicle is driven by vehicle systems that do not require the driver to perform the driving task, as well as the development of a 'non-binding advisory instrument dedicated to highly automated and/or driverless vehicles which would serve the Contracting Parties to 1949 and 1968 Conventions on Road Traffic' (Economic Commission for Europe: Working Party on Road Traffic Safety, 2017, pp. 5-6).

In addition, the work currently being undertaken by the World Forum for Harmonization of Vehicle Regulations (WP.29)[47] is suggesting a shift away from each vehicle requiring a human driver and the human driver being in control. For example, a recent proposal relating to the definitions of automated driving submitted to WP.29 suggested that a human driver is not needed at full automation and in certain vehicles with high automation. The proposal also distinguishes between vehicle tasks and driver tasks, requires the system to transfer the vehicle to a minimal risk condition at higher levels of automation and allows the system to delay deactivation of the ADS when immediate driver takeover could compromise safety at conditional, high and full automation (Informal Working Group on Intelligent Transport Systems / Automated Driving, 2017).

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[44] Geneva Convention, Article 8; Vienna Convention, Article 8.

[45] Geneva Convention, Article 4; Vienna Convention, Article 1.

[46] WP.1 is an intergovernmental body established under the United Nations Economic Commission for Europe. The primary function of WP.1 is to serve as guardian of the United Nations legal instruments aimed at harmonising traffic rules. WP.1 is responsible for the Vienna Convention.

[47] WP.29 is a permanent working party allowing open discussions on motor vehicle regulations. WP.29 offers a framework for globally harmonised regulations on vehicles.

WP.29 has noted it has engaged in discussions with WP.1 to address inconsistencies between the Vienna Convention and the WP.29 regulations (Economic Commission for Europe: World Forum for Harmonization of Vehicle Regulations, 2017, pp. 19-20).

Appendix C Submissions list

Name of organisation	Abbreviation	Description
Anonymous	–	Individual
Anonymous	–	Individual
Australia and New Zealand Driverless Vehicle Initiative	ADVI	National peak advisory body for autonomous vehicle technology led and coordinated by the Australian Road Research Board
Australian New Zealand Policing Advisory Agency	ANZPAA	Policing advisory agency to Australia and New Zealand
Australian Automobile Association	AAA	National peak body representing automobile clubs
Australasian New Car Assessment Program	ANCAP	Independent vehicle safety advocate
Australian Trucking Association	ATA	National peak body representing trucking operators
Brisbane City Council	–	Local council
Cantos, Patricia	–	Individual
DiDi Chuxing	–	Ride-sharing, AI and autonomous technology conglomerate
City of Melbourne	–	Local council
Northern Territory Department of Infrastructure, Planning and Logistics	DIPL	Department of the government of the Northern Territory
Department of Transport and Main Roads (Qld)	TMR	Department of the government of Queensland
Federal Chamber of Automotive Industries	FCAI	National peak body for manufacturers and importers of light vehicles and motorcycles
Finemore, Ronald	–	Individual
Flinders University, Leiman and McKendrick	–	Australian University
GM Holden	–	Automobile manufacturer
Insurance Australia Group	IAG	General insurance group
Law Council of Australia	–	Peak national representative body of the Australian legal profession

Name of organisation	Abbreviation	Description
Law Institute of Victoria	LIV	Professional association for Victorian solicitors and lawyers
Maurice Blackburn Lawyers	–	Compensation and social justice law firm
Motorcycle Council of New South Wales	–	Council for New South Wales motorcycle clubs, associations and ride groups
Municipal Association of Victoria	MAV	Peak body for councils in Victoria
National Farmers' Federation		Peak national body representing farmers and agriculture across Australia
National Road Transport Association	NatRoad	Association representing road freight transport operators
National Roads and Motorists' Association	NRMA	Motoring club and mutual organisation
Price Waterhouse Coopers	PwC	Professional services firm
QBE	–	General insurance group
Royal Automobile Club of Western Australia	RAC WA	Automobile club
South Australian Freight Council	SA Freight Council	Industry-based association
Taylor, Geoffrey	–	Individual
Transoptim	–	Consultancy firm
Transurban	–	Manager and developer of urban toll road networks in Australia and the United States
Truck Industry Council	TIC	Peak body for heavy vehicle manufacturers and distributors
Western Australian Port Operations Task Force	WA Port Operations Task Force	Taskforce of the Freight and Logistics Council of Western Australia
Western Australian Government	–	Department of Transport, Main Roads WA and the Public Transport Authority, WA Police and the Insurance Commission of WA

Public submissions are available on the NTC website at <http://www.ntc.gov.au/submissions/history/?rid=156263&pid=10834>.

Glossary

Term	Definition
Australian Road Rules	National model law intended to provide the basis for nationally consistent road rules in each jurisdiction. These rules do not, by themselves, have any legal effect.
automated driving system (ADS)	Hardware and software collectively capable of performing the entire dynamic driving task on a sustained basis. It is a type of driving automation system used in vehicles with conditional, high or full automation.
automated driving system entity (ADSE)	The legal entity responsible for the automated driving system. This could be the manufacturer, operator or legal owner of the vehicle or another entity.
conditional automation*	When an automated driving system performs the dynamic driving task for sustained periods of time limited by its operational design domain. The human driver does not have to monitor the driving environment or the ADS but must be receptive to any system failures and intervene if requested and be the fallback for the dynamic driving task.
dedicated automated vehicle	Vehicle that has no manual controls enabling it to be driven by a human driver. In this type of vehicle, the dynamic driving task is always performed by the ADS. The vehicle could include very limited controls, such as an emergency stop control, that can be activated by a human but would not enable a human to take over the driving task.
dynamic driving task*	All of the real-time operational and tactical functions required to operate a vehicle in on-road traffic, excluding the strategic functions such as trip scheduling and selection of destinations and waypoints, and including without limitation: ▪ lateral vehicle motion control via steering (operational) ▪ longitudinal vehicle motion control via acceleration and deceleration (operational) ▪ monitoring the driving environment via object and event detection, recognition, classification and response preparation (operational and tactical) ▪ object and event response execution (operational and tactical) ▪ manoeuvre planning (tactical) ▪ enhancing conspicuousness via lighting, signalling, gesturing and so on (tactical).
dynamic driving task fallback	The response by the fallback-ready user or an ADS to either perform the dynamic driving task or achieve a minimal risk condition after a dynamic driving task performance-relevant system failure or when the vehicle exits the operational design domain.
fallback-ready user	A human in a vehicle with conditional automation who is able to operate the vehicle and who is receptive to requests from the ADS to intervene and is receptive to evident dynamic driving task performance-relevant system

Term	Definition
	failures. The fallback-ready user is expected to respond by taking control of the vehicle.
full automation*	When all aspects of the dynamic driving task and monitoring of the driving environment are to be undertaken by the ADS. The vehicle can operate on all roads at all times with no expectation that a user will respond to a request to intervene.
Heavy Vehicle National Law	National laws related to the regulation of heavy vehicles over 4.5 tonnes. Operational in all Australian states and territories except Western Australia and the Northern Territory.
high automation*	When the system drives the vehicle for sustained periods in some situations, or all of the time in defined places, and no human driver is required to monitor the driving environment and the driving task, or to intervene, when the system is driving the vehicle.
human–machine interface (HMI)	A software application that presents information to the fallback-ready user to alert them of the need to reengage in the driving task.
minimal risk condition	A condition to which a user or an ADS may bring a vehicle to reduce the risk of crash when the ADS reaches the limit of its operational design domain, or has requested the fallback-ready user to take control or there is a dynamic driving task performance-relevant system failure.
non-dynamic driving task obligations	Obligations on a driver to perform tasks not related to the dynamic driving task (for example, securing loads, use of seatbelts, carrying required documents) and those actions related to the strategic driving task (for example, route selection and determining stops along a journey).
operational design domain*	The specific conditions under which a given driving automation system or feature of that system is designed to function, including, but not limited to, driving modes.
partial automation*	When the ADS may take control of steering, acceleration and braking in defined circumstances but that the human driver must continue to monitor the driving environment and the driving task, and intervene if required.
readiness-to-drive obligations	Obligations on a fallback-ready user to ensure they are able to operate the vehicle and are receptive to reengagement requests should it become necessary (for example, remain vigilant and hold an appropriate licence)
SAE	Society of Automotive Engineers
safety assurance system	A regulatory mechanism for governments to assess the safety performance of an automated vehicle to ensure it can operate safely on the network.

Term	Definition
system failure*	A malfunction in a driving automation system or other vehicle system that prevents the driving automation system from reliably sustaining dynamic driving task performance (partial or complete).
WP.1	Working Group on Road Traffic Safety established in 1988 as an intergovernmental body with the aim of improving road safety. In 2017 it was renamed the Global Forum for Road Traffic Safety.
WP.29	World Forum for Harmonization of Vehicle Regulations, which creates regulatory instruments relating to motor vehicles and their equipment. It reports to the UNECE Inland Transport Committee.

* Terms marked with an asterisk are quoted or paraphrased from SAE International Standard J3016.

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