

Guide to the in-service safety for automated vehicles— Consultation Regulation Impact Statement

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User guide

Title	Guide to the in-service safety for automated vehicles—Consultation Regulation Impact Statement
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Overview

The National Transport Commission (NTC) is consulting on how to ensure automated vehicles are able to operate legally on Australian roads and support their safe operation once they are on roads ('in-service').

This guide supplements the release of our **Consultation Regulation Impact Statement (RIS) on In-service safety for automated vehicles**. You can read more on the issues in this guide in the consultation RIS, which also includes further questions you may want to consider. The RIS is supported by a **cost-benefit analysis** of four proposed options which was prepared by independent consultants PwC.

Who should read this guide?

The RIS suggests there may need to be additional duties on some people or organisations to ensure automated vehicles are able to operate safely and legally on Australian roads. We are therefore seeking views from a wide range of people. Groups and individuals who may wish to contribute their views include consumers, legal experts, road safety experts, governments and individuals and businesses with a role in the safety of automated vehicles such as manufacturers and repairers.

This guide provides an overview of the key issues we are consulting on. It will assist you in deciding whether to provide a submission to our consultation. We anticipate that it will be particularly useful to those who have not previously submitted on the automated vehicle reforms and those who are only interested in some issues in the RIS.

Submissions are due by **26 August 2019**.

What are we doing?

1.1 Context

Automated vehicles have the potential to provide a significant range of benefits to Australian society. Transport ministers asked the NTC to develop regulation for automated vehicles so that Australia can be an early beneficiary of the potential benefits, which include: improvements in road safety, improved access and mobility options, more efficient traffic flow and potential reductions in congestion and in the costs associated with congestion.

In November 2018 transport ministers agreed that the entity seeking to bring automated driving systems (ADSs) to Australia, which we call the Automated Driving System Entity (ADSE), must demonstrate how it will manage safety risks before their ADS can be supplied in the Australian market. It will do this by self-certifying against a set of safety criteria and obligations. Ministers also asked the NTC to do further work to propose an appropriate regulatory framework for the ongoing in-service safety of automated vehicles.

In 2018 we consulted on an overarching and positive general safety duty on the ADSE. The proposed safety duty was modelled on the duty of care found in work health and safety law and would require an ADSE 'to ensure the safety of the ADS so far as reasonably practicable'. A general safety duty aims to ensure that in-service safety risks not identified at first supply are managed, and unsafe behaviours that are not otherwise captured by prescribed offences are prevented.

We received feedback through consultation that:

- a number of parties, other than the ADSE, have a significant role in ensuring the safe operation of automated vehicles
- the role of these parties should be considered in determining what duties and obligations may be appropriate to ensure the safety of automated vehicles
- like the ADSE, parties with an influence on the safety of automated vehicles may not be appropriately covered by existing regulation
- some parties, such as repairers and modifiers, are covered by negligence law, but it may be desirable to extend a statutory safety duty to them. This would allow a government regulator to take action, in addition to those to whom the duty is owed.

To appropriately respond to feedback on previous consultations, including the 2018 consultation, we have further explored the influence of parties other than the ADSE in ensuring in-service safety.

More background on the project can be found in chapter 1 of the consultation RIS.

1.2 Key concepts

Automated vehicle technology introduces many new concepts and terms. Key terms as part of this guide are:

Automated driving system (ADS) means the 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 SAE levels 3, 4 or 5 of automation.

Automated driving system entity (ADSE) means the self-nominated party that will certify that the ADS can safely perform the driving task in place of a human driver. The ADSE will self-nominate at first supply when applying to the Commonwealth government for type approval of the ADS.

Automated vehicle means a vehicle with conditional to full automation (SAE levels 3-5). It is a vehicle that has an automated driving system which means that it is capable of performing the entire dynamic driving task on a sustained basis without human input. It is distinct from vehicles with automated features to assist a driver (SAE levels 1-2) which still require a human driver to perform part of the dynamic driving task.

Conditional automation (SAE level 3) means the ADS undertakes the entire dynamic driving task in situations within its 'operational design domain'. 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.

Dynamic driving task means all the operational and tactical functions required to operate a vehicle in on-road traffic. This includes steering, acceleration and deceleration, object and event detection and response, manoeuvre planning and enhancing conspicuity through lighting signalling etc. The dynamic driving task excludes strategic functions like trip planning (where and when to travel and route selections).

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.

First Supply means the market entry of motor vehicles to Australia.

In-service safety means the safety of automated vehicles once the vehicles are on the roads or 'in-service'.

Remote driver (sometimes described as a remote operator or teleoperator) is a human who can operate the automated vehicle, but who is not seated in a position to manually operate vehicle controls such as brakes and steering. A remote driver may operate the vehicle from outside it or inside it.

1.3 The problem and risks

The problem statement

In our current regulatory environment, when automated vehicles become ready for deployment:

- they may introduce new in-service safety risks that the market will not eliminate or mitigate
- nationally inconsistent approaches to in-service safety and multiple regulators without clearly-defined roles could be a regulatory barrier to market entry.

Automated vehicles may introduce new in-service safety risks that the market will not eliminate or mitigate

Transport ministers have agreed to a regulatory framework for the first supply of automated vehicles to the Australian market. This 'first supply' framework does not extend to safety risks arising over the lifetime of the vehicle. It also does not consider the role of parties beyond the ADSE in ensuring that an ADS is safe.

The effectiveness of an ADS on Australian roads over the lifecycle of the vehicle is relatively unknown and untested. The software and technology required for automated vehicles will be incredibly complex. Automated vehicles will require significantly more lines of code than vehicles currently on the market.

There is a need to consider the points in time when risks to the safety of an ADS may arise and which parties may create risks. For example, risks may arise when an automated vehicle is repaired. If repairs, either to ADS software or hardware or other components of the vehicle are inadequate, they could affect the performance of the ADS. This could lead to increased crash risk. Inadequate repairs may be a result of a repairer's lack of understanding of the ADS's operation, or a failure to properly assess the impact of repairs.

Physical or software modifications to the ADS itself or other parts of the automated vehicle might interfere with the operation of the ADS, and aftermarket fitment of an ADS to a conventional vehicle could result in an unsafe vehicle. Modifications of an ADS by a person who did not design the system, or has insufficient understanding of it, could cause it to function in unintended ways, making it unsafe.

Example: Repairer's influence on in-service safety

Marc is an independent mechanic. He is repairing a scratch on the bumper of an automated vehicle but damages a radar sensor on the front of the vehicle. The vehicle's owner subsequently drives the vehicle, which no longer accurately detects distances between itself and objects in front of it. The vehicle crashes into the back of another vehicle that has stopped in front of it at a red traffic light.

Nationally inconsistent approaches and multiple regulators could be a regulatory barrier to market entry

ADSEs, governments and other parties with a role in the in-service safety of automated vehicles could face unnecessary costs arising from unclear, nationally inconsistent or fragmented in-service regulation. These parties could also face costs of interacting with, and understanding the roles of, multiple regulators who may not have clearly defined roles.

Specifically, there are risks that:

- regulation to manage in-service safety would be nationally inconsistent and not transferable across jurisdictions, leading to additional and unnecessary costs. ADSEs and other parties with a role in the in-service safety of automated vehicles may need to understand up to eight different regulatory schemes.
- overlapping, duplicated regulation between states and territories may result in unclear and uncertain in-service safety expectations.

These costs and risks would act as a disincentive for ADSEs to enter the Australian market, creating a regulatory barrier to market entry. If there are regulatory barriers to the introduction of ADSs, consumers may not be able to realise the full benefits of automated vehicles.

Further information on the problem and risks can be found in chapters 3 and 4 of the RIS.

1.4 What are the key issues we are seeking views on?

There are three key issues related to the in-service safety of automated vehicles that the NTC is particularly interested in getting views on from a broad range of stakeholders. These key issues are:

1. Should there be additional regulation to ensure the in-service safety of automated vehicles?
2. Who should regulation apply to?
3. Should there be an overarching general safety duty on relevant parties to ensure the safety of the ADS 'as far as reasonably practicable'?

We provide more information about these issues below.

1.5 Should there be additional regulation to ensure the in-service safety of automated vehicles?

Because of the risk to human life posed by unsafe or inadequately controlled vehicles, Australia thoroughly regulates conventional vehicles and drivers, particularly when they are on public roads.

Road safety is a priority for all Australian governments. Current regulation to ensure road safety includes road and traffic laws and more general laws including consumer protection, negligence, and work health and safety laws.

There are gaps and inadequacies in current regulation to provide for the in-service safety of automated vehicles.

There are several regulatory approaches that could be implemented to ensure relevant parties with an influence on the in-service safety of automated vehicles operate safely:

- Prescriptive rules
- Performance-based regulation

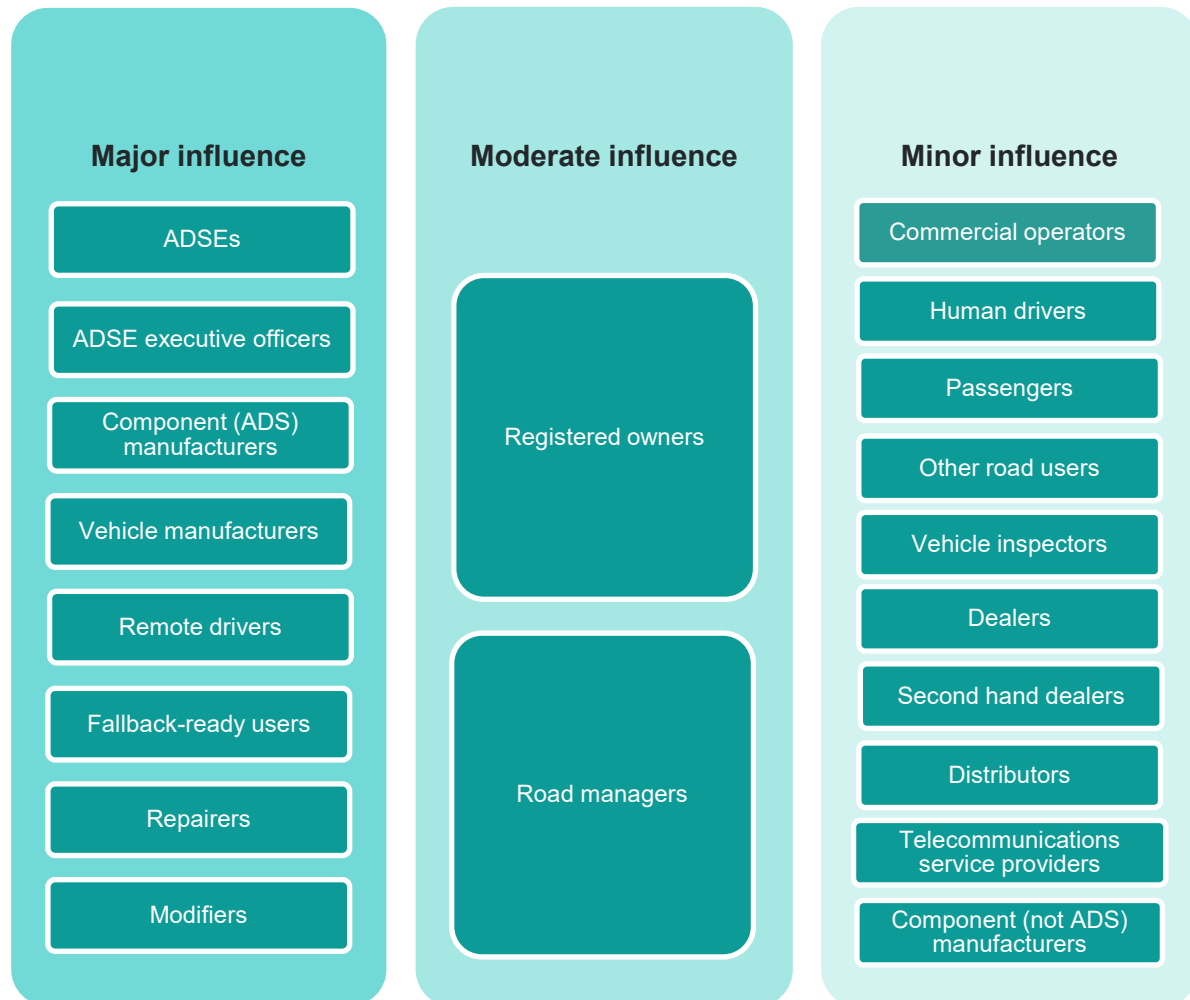
- General safety duties.

Further discussion of the existing regulatory frameworks and the three regulatory approaches to safety can be found in chapters 5 and 6 of the RIS.

1.6 Who should the regulation apply to?

Our RIS has identified the following parties as having major, moderate or minor influence on the in-service safety of automated vehicles:

Figure 1. Parties with an influence on in-service safety of automated vehicles



The ADSE will be a new party. It is the party that will be responsible for the safe performance of its ADS. It will certify that its ADS can safely perform the driving task in place of a human driver.

An ADSE may be:

- the manufacturer of the ADS
- the manufacturer of both the ADS and the vehicle which incorporates it
- the manufacturer of the vehicle only and not the ADS
- any other party or individual bringing the ADS to market in Australia.

We consider that existing regulation does not place sufficient requirements and incentives on the following parties to ensure in-service safety:

- ADSEs
- ADSE executive officers
- Remote drivers
- Fallback-ready users
- Repairers.

More information on the parties and whether they are sufficiently covered by existing regulation can be found in chapters 4 and 5 of the RIS.

- A. Have we correctly identified the parties with an influence on the in-service safety of automated vehicles and accurately described their role? If you identify additional parties, please explain what their role is. [This question is from chapter 4 of the RIS]
- B. Have we accurately assessed each party's influence on the in-service safety of automated vehicles? If not, please provide details. [This question is from chapter 4 of the RIS]

1.7 Should there be an overarching general safety duty on the relevant parties to ensure the safety of the ADS 'as far as reasonably practicable'?

A mix of approaches, including a general safety duty on ADSEs, ADSE executive officers and potentially repairers, could address the new in-service safety risks automated vehicles will introduce.

A general safety duty is an example of 'principles-based' regulation, which moves away from reliance on detailed, prescriptive rules towards more broadly stated principles.

A general safety duty would require relevant parties 'to ensure the safety of the ADS so far as reasonably practicable'. A general safety duty aims to ensure that in-service safety risks not identified at first supply are managed, and unsafe behaviours not otherwise captured by prescribed offences are prevented.

The Australian Road Rules create uniform rules for road users such as drivers, cyclists and pedestrians. These rules help to ensure drivers are predictable to other road users, which is necessary to ensure the safe and efficient movement of traffic. To prevent accidents, the ADS will need to be similarly predictable to other road users.

The road rules were designed to address the risks presented by human road users. It lists obligations that can be understood and complied with by humans. The road rules were not designed to regulate an ADS, which may present different risks to human drivers.

A decision needs to be made on what driving laws are required for ADSs and how ADS driving rules should be implemented in Australian law.

More information about the general safety duty and which parties it should apply to can be found in chapter 6 of the RIS. Information about driving laws for ADSs is found in chapter 7 of the RIS.

- C. Do you think that a general safety duty to ensure the safe operation of the ADS 'so far as reasonably practicable' is appropriate to address the safety risks? [This question is from chapter 6 of the RIS]
- D. If a general safety duty were introduced, which parties should it apply to? [This question is from chapter 6 of the RIS]
- E. Do you think there are any new risks posed by second-hand ADS components, after-market modifications or the transfer of ownership of automated vehicles, which may not be adequately addressed by existing regulation designed for conventional vehicles? [This question is from chapter 5 of the RIS]
- F. Do you think there should be specific driving rules for ADSs like the Australian Road Rules, or would it be sufficient to simply require them to 'drive safely'? [This question is from chapter 7 of the RIS]

1.8 What options are we proposing?

To address the problem, we are putting forward four potential options:

Option 1 is the baseline option. It does not introduce any new safety duties or obligations for the in-service safety of automated vehicles. Instead, in-service safety is managed separately by each state and territory through existing regulatory frameworks.

Advantages: The existing regulatory framework is well established and understood by the relevant parties who currently use it (for example, conventional vehicle manufacturers), so there will be minimal disruption for these parties if they are moving into the automated vehicle market. This option could be appropriate for the initial stages of commercial deployment, when the automated vehicle market in Australia will be limited in scope.

Disadvantages: The key disadvantages of option 1 are that it precludes a national approach to the in-service regulation of automated vehicles, and that existing regulation does not place sufficient requirements on ADSEs, ADSE executive officers, fallback-ready users, remote drivers and repairers.

Option 2 introduces new in-service duties enforced by state and territory regulators under state and territory laws based on a national model law. There are two versions of this option which differ in terms of the form of obligations, one with prescriptive safety duties (**option 2a**) and the other with general safety duties (**option 2b**).

ADSEs, ADSE executive officers and potentially repairers will be subject to new prescriptive safety duties (**option 2a**) or general safety duties (**option 2b**) to manage in-service safety.

Advantages: Like all the reform options, option 2 would address the known and anticipated in-service safety risks of automated vehicles through automated vehicle-specific legislation. Option 2b would also address the unforeseen safety risks of automated vehicles by placing by encouraging parties who are subject to a

general safety duty to take a proactive approach to identifying and responding to safety issues.

Disadvantages: Option 2 relies on states and territories implementing national model law. There is the potential for inconsistent safety outcomes between states and territories where they derogate from the model law. In addition, option 2a would be less effective in addressing unforeseen safety risks. Regulated parties could face greater costs due to the need to comply with new automated vehicle-specific duties. Under option 2a, these costs may increase further over time when additional prescriptive duties are introduced to capture new risks as they emerge.

Option 3 introduces new in-service general safety duties enforced by a single national regulator through Commonwealth law.

ADSEs, ADSE executive officers and potentially repairers will be subject to new general safety duties.

Advantages: Like option 2, option 3 would address the known and anticipated in-service safety risks of automated vehicles through implementation of automated vehicle-specific legislation. Like option 2b, it would also address unknown risks by encouraging parties who are subject to a general safety duty to take a proactive approach to identifying and responding to safety issues. This option would achieve greater national consistency in safety approaches than options 1 and 2 as it would create a single market for automated vehicles.

Disadvantages: Although there is a lower risk of overlapping regulation, some risk remains because the Commonwealth cannot regulate some in-service aspects of safety. States and territories would need to separately fill any gaps in the coverage of the national law. If the regulator were to be a new body, the upfront costs to government to set up the regulator could be significant, as would the time needed to establish a national regulator. Though there will only be one consistent set of national duties, as with option 2, compliance costs for parties covered by general safety duties may be higher than if there was no new automated vehicle-specific regulation. However, this cost must be measured against potential increased cost to industry under option 1 due to the patchwork of legislation to which they will be subject.

Option 4 introduces new in-service general safety duties enforced by a single national regulator through state or territory applied law.

ADSEs, ADSE executive officers and potentially repairers will be subject to new general safety duties.

Advantages: Like options 2 and 3, option 4 would address the known and anticipated in-service safety risks of automated vehicles through implementation of automated vehicle-specific legislation. Like options 2b and 3, it would enable a regulator to address the unforeseen safety risks of automated vehicles by encouraging parties who are subject to a general safety duty to take a proactive approach to identifying and responding to safety issues.

Disadvantages: As with option 3, if the regulator were to be a new body the upfront costs to government to set up the regulator under this option could be significant, as would the time needed to establish a national regulator.

More information on each of the options can be found in chapter 10 of the RIS. A **cost-benefit analysis** of the options presented in chapter 10 of the RIS has been conducted by the independent consultants PwC.

- G. Which option most effectively addresses the problem statement? [This question is from chapter 10 of the RIS]
- H. Is there another option or combination of options which could more effectively address the problem statement? [This question is from chapter 10 of the RIS]


Your views / what happens next?


Any individual or organisation can make a submission to the NTC. You may answer the questions in this User Guide, the questions found in the RIS or both. You do not need to answer all the questions. You may answer as many or as few questions as you like.

1.9 Selected questions to consider

- A. Have we correctly identified the parties with an influence on the in-service safety of automated vehicles and accurately described their role? If you identify additional parties, please explain what their role is.
- B. Have we accurately assessed each party's influence on the in-service safety of automated vehicles? If not, please provide details.
- C. Do you think that a general safety duty to ensure the safe operation of the ADS 'so far as reasonably practicable' is appropriate to address the safety risks?
- D. If a general safety duty were introduced, which parties should it apply to?
- E. Do you think there are any new risks posed by second-hand ADS components, after-market modifications or the transfer of ownership of automated vehicles, which may not be adequately addressed by existing regulation designed for conventional vehicles?
- F. Do you think there should be specific driving rules for ADSs like the Australian Road Rules, or would it be sufficient to simply require them to 'drive safely'?
- G. Which option most effectively addresses the problem statement?
- H. Is there another option or combination of options which could more effectively address the problem statement?

Making a submission

 Visit www.ntc.gov.au and select 'Submissions' in the top navigation menu.

 Send a hard copy to:

National Transport Commission
Public submission – In-service safety for automated vehicles
Level 3, 600 Bourke Street
Melbourne VIC 3000.

Where possible, you should provide evidence, such as data and documents, to support the views in your submission.

Publishing your submission

Unless you clearly ask us not to, we publish all the submissions we receive online. We will not publish submissions that contain defamatory or offensive content.

The *Freedom of Information Act 1982* (Cth) applies to the NTC.