Victorian Government submission to National Transport Commission's RIS on 'safety assurance system for automated vehicles'

The introduction of automated vehicles (AVs) is expected to bring significant societal benefits, including safety, efficiency and environmental benefits, as well as providing accessible mobility options for those who do not currently have access to a private vehicle or are restricted due to age or impairment.

Victoria's position

Victoria fully supports the safe introduction of AV technology. This means ensuring that AVs are designed, deployed and managed safely. This is fundamental to the successful adoption by the community, and the realisation of potential benefits.

The Victorian Government is of the view that, at a minimum, the only acceptable option for a safe automated vehicles scheme is one which:

- relies on general safety duties, in line with other transport safety schemes
- covers the full lifecycle of software and hardware in a dynamic environment
- provides proportionate and flexible compliance and enforcement tools
- enables national uniformity without transferring control to the Commonwealth.

At the Transport and Infrastructure Council Meeting in May 2018, the Victorian Minister for Roads and Road Safety communicated Victoria's preference for Option 4: *Legislative safety assurance plus a primary safety duty*.

The RIS identifies Option 4 as the preferred option. Victoria supports this position and considers it the only workable option. While Victoria agrees with the overall conclusion of the RIS, the option analysis and assessment of relative merits has flaws.

Specific elements of the RIS are addressed below.

The problem statement

Victoria requests that the problem statement focus more on creating a safer road system. The problem is that without regulation of automated driving system entities (ADSEs), there is the potential for negative safety outcomes in the short term, resulting in a lost opportunity for improved safety outcomes in the long term. The adoption rate of AVs will, to some degree, be a function of safety and security, or perception of safety.

The assessment of Option 4

The RIS suggests that Option 4 is the costlier option. The assessment does not recognise that health and safety laws have public safety duties, as well as safety duties on designers, manufacturers and suppliers of vehicles/vehicle systems to ensure safe operation so far as is reasonably practicable.

Section 23 of the Victorian *Occupational Health and Safety Act 2004* (the OHS Act*)* extends the duty to the health or safety of the public. The National *Work Health and Safety Act 2011* similarly covers 'other persons' at section 19(2).

The implication is that inclusion of a general safety duty in Option 4 does not create a new obligation that results in additional regulatory burden. Instead, the effect of including the general safety duties in the scheme is to provide sector specific regulators (i.e. road safety regulators such as VicRoads) with the capacity to monitor compliance and enforce these duties.

This approach is consistent with, and aligned to, the model which has already been successfully applied in the design and implementation of safety schemes regulating rail safety, marine safety, bus safety and most recently, commercial passenger vehicle safety.

The benefit of adopting an outcomes focused, risk based approach to regulation is that it is not prescriptive, is flexible enough to address changes in circumstances and risk factors, and does not limit or impede innovation in risk management and control.

Regulating the performance of ADSEs through a general duty can be cost effective because of the market ADSEs operate in. Generally, in industry sectors where there are a large number of small employers, these employers benefit from greater assistance with OHS compliance. This could be through practical guidance or site visits. However, the market for ADSEs is expected to comprise of a small number of large, highly sophisticated, international businesses. For ADSEs, a regulator cannot, and does not need to, intervene in the design and production of highly complex global software systems.

The regulatory function is to administer the general duty and implement a constructive compliance regime, including flexible and proportionate enforcement. This will not impose a greater burden than other compliance regimes and is more effective than the blunt instruments of other options, which rely on impractical measures such as vehicle recalls.

Contrary to the assessment in the RIS, a general duty does not require a major investment in regulatory infrastructure and does not need to impose a significant burden on business.

The assessment of Options 2 and 3

Options 2 and 3 do not adequately account for the risks to community safety. Moreover, the discussion of relative merits in the RIS does not sufficiently deal with safety over the life of the vehicle or automated driving system (ADS).

Option 2 attempts to apply the existing laws designed for humans to an ADS. The National Transport Commission (NTC) clarified that Option 3 is certification on market entry. These are front-end permissions only. Relying on static regimes to address risks in a highly dynamic market is unacceptable to Victoria.

It is inevitable that the software will need to be updated over the life of a vehicle. The ADS changes with each update – even 'minor' software updates change functionality and create a different product, with the potential for unintended consequences. Significant updates and the cumulative effect of minor updates over time can lead to major changes to the ADS, including the way it interacts with the hardware and performs in different situations.

The software is expected to improve over time. However, risks can also increase over time. While it will be typical for well-tested ADSs to enter the Australian market (probably after operation in larger markets overseas), issues are more likely to arise through patches, upgrades and functional

extensions. Therefore, there are multiple points of risk, including if the software exceeds the capabilities of the hardware.

Options 2 and 3 provide no safety assurance for software throughout the entire life of a vehicle. This will also bring into question the capacity of OHS legislation to fill the gaps.

The need for end to end regulation

In November 2017, the Transport and Infrastructure Council resolved 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". Options 2 and 3 cannot provide end-to-end regulation if they cannot address key in-service risks. Road environments are complex, and a driven vehicle can encounter essentially an infinite number of scenarios. The technological approach for ADSs to safely deal with this will be complex and dynamic. It will not be feasible to only use prescriptive certification to assure safety.

This is particularly troubling in a context where it is foreseeable that: software/heuristic updates are likely to be required frequently; or Artificial Intelligence (AI) and Machine Learning (ML) is likely to be applied as part of the implementation of ADS.

AI and ML features are incorporated into the design of the ADS with the aim of dynamically improving the safety of the ADS over time while it is in-service. A process that relies on a prescriptive, ex-ante permission cannot account for this dynamically or respond to innovation. Conversely, a general duty, which relies on what is reasonably practicable at the time, is more suited to rapidly developing technology, including AI and ML.

A general safety duty will ensure that risks associated with the use of AVs is managed by those best placed to do so. A general safety duty is also business model neutral. It is unclear what ownership models will emerge as AVs become more prolific – on-demand subscription services may begin to dominate the market or private ownership may continue at high rates. These uncertainties have implication for who is accountable for what and when.

A general duty accommodates different business models by allocating responsibility according to the parties best placed to manage those responsibilities. Other options create accountability problems, such as in instances where modifications are made.

If Option 3 were modified to require self-certification for major upgrades it could partially overcome these risks. However, self-certification against Australian regulatory requirements is likely to impose a greater burden over time than a general duty.

The certification requirements themselves need to remain up to date in an area of technology that is evolving quickly. A modified Option 3 would create costs to Government to 'keep up' with advances in technology and create costs to ADSEs for an outcome that is likely to become less valuable over time. Option 3, whether modified or not, represents an old, inflexible regulatory response to a highly dynamic market.

Option 4 provides a dynamic safety framework. The duty, *so far as reasonable practicable*, will apply to every software update and every interaction between the software and the hardware. Moreover, what constitutes *reasonably practicable* evolves over time to reflect incremental or revolutionary change in the global market.

Requested revision to the RIS Options

The Multi-Criteria Analysis (MCA) used in the RIS to evaluate different options assesses Option 3 and Option 4 as being of equivalent effectiveness in addressing in-service issues over the lifecycle of the vehicle (table 7). Victoria is unable to understand how this can be the case. A general duty applies for the life of vehicle, whereas Option 3 does not address software updates or other changes, such as a manufacturer or vehicle owner changing the ADSE providing the software. Victoria requests amendments to the RIS to reflect this.

Similarly, the regulatory cost analysis in table 9 of the RIS rates Option 4 as higher cost. This was done without a discussion of how a safety duty would operate. As discussed above, a light touch approach under Option 4 would achieve the desired outcomes. There are additional costs associated with Options 2 and 3 due to current obligations under OHS laws. Victoria requests additional discussion and amendment to the RIS to reflect this.

Nationally consistent laws

A key flaw in the MCA assessment is the assumption that there will be one national regulator covering market entry and in-service operation of AVs. This need not be the case. Victoria supports nationally consistent regulation, not necessarily one national regulator.

Option 4 assumes a general safety duty that mirrors duties in occupational health and safety law. As is the case with other schemes, the sector specific general safety duty proposed under Option 4 would apply to the extent to which it is not inconsistent with OHS duties. The OHS Act is the parent Act and takes precedence. Option 4 could be modified to have a national regulator responsible for market entry but on-road regulatory responsibility would be administered by the jurisdictions based on a national ADS safety duty.

The risk identified in the RIS is that "when ADSs become ready for deployment ADSEs will face inconsistent and/or uncertain regulatory barriers to the supply of ADSs in the Australian market". Certainty and consistency can be provided without there being a national regulator. This has been demonstrated under the national work health and safety framework.

There are significant arguments against establishing a national regulator for the regulation of ADSEs. Namely, it would further fragment the regulation of road safety – amplifying the existing problems associated with the separation of light and heavy vehicle safety.

Other issues in relation to assumptions of a national regulator, compared to nationally consistent laws are:

- the overlap with registration and licensing which is the states' responsibility
- the role of state and local government to plan, manage and maintain road infrastructure
- the role of the police in each state enforcing conditions of use, such as on appropriate roads.

Victoria requests that the RIS consider other models.

The Safety Criteria

The safety criteria provide a reasonably comprehensive coverage of the foreseeable issues with the introduction of AVs to market. There are, however, some key areas Victoria would like to see addressed in the RIS.

a) Safe system design and validation

There does not seem to be any specific safety criteria which sufficiently addresses aftermarket or "non-integrated" ADSs. Whether an aftermarket system can be used in a single vehicle or in multiple vehicle architectures, "compatibility" should be an additional criterion, or be mentioned in the safe system design criterion. This would allow the ADSE to specify which vehicles (make, model, variant etc.) could have the ADS installed.

b) Human-machine Interface

The examples provided with regard to the information to be communicated by a human-machine interface (HMI) are limited to the stages after an ADS has been activated. Whilst this may be where most of the safety risks arise, it is critical to have a user-friendly method of activating the ADS which does not impact negatively on safety. Knowing how and when an ADS may be activated is just as important as how and when an ADS may be deactivated, whether initiated by the ADS or by a fallback-ready user. Therefore, the initial hand-over phase should be expressly included.

c) On-road behavioural competency

Victoria believes that on-road behavioural competency needs to include the predictability of driving behaviour to ensure other road users can safely interact with AVs. This is critical in the short- to medium-term where there will be a mixed fleet.

d) Education and training

It should be highlighted that education and training must be an ongoing responsibility, including when a system update has been applied. Improving the AV literacy of the entire community is critical to achieving the consumer confidence and understanding required to ensure their safe use, and to facilitate the uptake required to experience their potential benefits.

ADSEs should also be required to ensure information is available to jurisdictions, to enable them to continue to perform their function in providing registration and licensing services. How this is managed should not be prescribed, however it should be as streamlined as possible and not impose unreasonable burden on industry or government.