Department of Transport

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Public Transport Authority

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CWS 741

Mr Paul Retter AM
Chief Executive and Commissioner
National Transport Commission
Level 3 / 600 Burke Street
Melbourne, VIC, 3000

Dear Mr Paul

Regulatory Options to Assure Automated Vehicle Safety in Australia – Discussion Paper

Thank you for the opportunity to comment on your discussion paper, *Regulatory options to assure automated vehicle safety in Australia – Discussion paper*. I welcome the opportunity to contribute to this work and recognise the importance of the development of a clear national regulatory structure for connected and automated vehicles that balances the drive to innovate with the need to ensure public safety.

This detailed response (in Attachment 1) has been developed in consultation with Main Roads Western Australia, the Department of Transport and the Public Transport Authority (the Portfolio) which have collaborated with the NTC on national policy development related to the introduction of automated vehicle (AV) technologies. The Portfolio strongly supports the goals and direction of the NTC's AV work program, and national consistency in the development of related regulatory structures.

The development of an SAS for AVs is a foundational step towards the safe and acceptable introduction of highly automated vehicle technology on Australian roads; a development which I hope will significantly reduce road trauma for Western Australians long into the future. I commend the NTC for adopting a systems approach to safety management when developing the options in the paper, in line with the Commission's own *Land Transport Regulation 2040* recommendations.

The Portfolio cautiously supports an SAS model based on compulsory self-certification in the short to medium term, with the development of additional control mechanisms appropriate to the risk and liability taken on by the community and governments. In the longer term it would be appropriate to consider more comprehensive regulatory models as the technology, market and international regulatory expertise mature.

I thank the NTC for the proactive approach taken in regards to consultation on this work. In particular, I would like to extend my thanks to James Williams and Geoff Allan for taking the time to travel to Perth and consult with Western Australian stakeholders.

If you require any further information please contact Mr Brett Hughes on 08 6551 6140, or email brett.hughes@transport.wa.gov.au.

Yours sincerely

Richard Sellers
Director General - Transport

2 / 8 / 2017

Portfolio responses to the discussion paper questions are as follows:

Q1: Should government have a role in assessing the safety of automated vehicles or can industry and the existing regulatory framework manage this? What do you think the role of government should be in the safety assurance of automated vehicles?

The Portfolio **agrees** that government has a role in ensuring safety for automated vehicles.

The term "assessment" in this question is vague and the lack of definition could cause vague responses. The term requires some further definition before responses can be clearly understood.

The Portfolio considers that the role of government in relation to Connected and Automated vehicles is to:

- provide an environment in which the private sector can innovate;
- minimise the safety risk to the public; and
- utilise technology for the Government's own purposes.

Safety regulation in general can be used to address market failures, including those posed in the development of vehicle markets, such as informational asymmetry and safety related externalities. Safety assurance facilitates market development by ensuring that consumers, manufacturers and governments are confident that products can be used safely, without causing undue risks to product users or members of the public.

Currently Australian governments do not have the testing standards, tests, auditing or other processes to comprehensively assess emerging AV technologies. However, Australian governments can develop high level mandatory safety criteria and place the onus on industry to demonstrate that they (industry) have adequate quality management and other processes, and to test and validate their AV technologies against the criteria.

The current road safety management system relies heavily on the Australian Design Rules (ADRs). Such specification based assessments are unlikely to ever sufficiently keep up with new technology developments and are therefore unlikely to be adequate. Design rules may not be a policy tool fully capable of assessing the competency of an automated driving system to operate within the transport environment. As the NTC has indicated, relevant United Nations (UN) standards or design rules for AVs may be 10 to 15 years away from being fully developed. Therefore, a safety assurance system (SAS) for AVs needs to be established, which should be based on performance outcomes, not specifications or rules.

While some regulatory burden will be imposed in the implementation of any regulatory intervention, the Portfolio is of the opinion that the benefits of well-developed regulation on AV market development are likely to exceed any costs imposed on industry and consumers and is likely to be required in the situation which will emerge.

The NTC's recent *Land Transport Regulations 2040* report recommends that transport regulators adopt a systems approach when considering safety issues. The Portfolio strongly supports the systems based thinking that has informed the NTC's consideration of options.

Q2: Should governments be aiming for a safety outcome that is as safe as, or significantly safer than, conventional vehicles and drivers? If so, what metrics or approach should be used?

The Portfolio **agrees** that governments should aim for safety outcomes that significantly exceed those achieved in conventional vehicles.

The Western Australian Government's road safety strategy *Towards Zero*, outlines the State's ongoing commitment to improve road safety outcomes, and clarifies that the Government does not accept that any death or serious injury on WA roads is inevitable. AVs are expected to contribute to the overall safety objectives of the Government through reductions in safety incidences occurring as a result of human error, therefore exceeding the standards of safety that currently exist.

Australian governments should be aiming for significantly safer outcomes than currently achieved with conventional vehicles and drivers. The US is considering the concept of AVs being required to be 90 per cent safer than human-driven vehicles at an 80 per cent confidence level. Research engineers at the University of Michigan are adapting the concept of 'accelerated longitudinal evaluation', which is widely used in the auto industry (for instance to test corrosion resistance of vehicle body components), to dramatically reduce (by a factor of 300 to 100,000) the distance of 11 billion miles that an AV test vehicle would need to be driven in simulated or real-world conditions to achieve that high level of confidence (University of Michigan, 2017)[1].

When metrics for safety are developed, perhaps the metric used should be based on the crash rates of "very safe drivers", defined in line with quantitative measures used by vehicle insurers when assigning risks based on driving behaviours. As a principle, governments should expect a much higher safety performance from an automated system than from a "good" human driver.

Any safety measures used should be logical and relevant. The goal of safety measurement should be to causally link observed safety outcomes to the design and performance of the automated driving system.

Within the clear safety goals of government, the goal of regulators should be to allow the market to innovate while minimising the safety risk to the public. As such, any evidence requirements for safety performance should be reasonable and efficient and should not pose a significant barrier to innovation.

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[1] University of Michigan (2017), "From the Lab to the Street: Solving the Challenge of Accelerating Automated Vehicle Testing", research report prepared by D Zhao and H Peng, M City, University of Michigan, Michigan, https://mcity.umich.edu/wp-content/uploads/2017/05/Mcity-White-Paper_Accelerated-AV-Testing.pdf , accessed 23 July 2017.

Q3: Should the onus be placed on the automated driving system entity to demonstrate the methods they have adopted to identify and mitigate safety risks?

The Portfolio **supports** the onus of risk identification and mitigation being placed on the driving system "entity".

The term "entity" is vague and requires further definition. It is not clear whether it refers to the owner, designer, manufacturer, operator, assessor or some other actor.

The Portfolio is of the opinion that the onus of responsibility for risk management should be placed on the party best able to control the risk. As such, we would support an approach where the identified driving system "entity" demonstrates the management of safety mitigation risks where appropriate, and is held accountable for failure to manage risks where it could reasonably be expected to do so.

National and international regulators will never be able to develop the testing standards, tests, audits and other processes required to comprehensively assess the safety performance of emerging technologies. It is unforeseeable that they will ever have the knowledge required to adequately specify safety requirements in detail. Regulators must be outcome focussed.

Q4: Are the proposed assessment criteria sufficient to decide on the best safety assurance option? If not, what other assessment criteria should be used for the design of the safety assurance system?

The Portfolio **agrees** with the proposed criteria, and would like to suggest additional criteria for consideration.

The criteria identified by the NTC are broad and comprehensive and take into account the complexity posed in the current transport environment. It may be worth expanding on issues considered as "other policy objectives" within the proposed safety assurance framework. Issues for consideration could include:

- Security and cyber security. The NTC should consider whether the proposed safety assurance model can be used to reduce the risks of cyber security.
- Privacy. Will the proposed systems protect customer privacy?
- Data specification and standards. Vehicle design specifications could potentially include data capture, use and management, which is of interest to Government for a number of policy objectives. Such data could be used for insurance, in crash investigations or for road infrastructure management, amongst other uses. The NTC could consider whether the safety assurance system is compatible with potential future data management requirements.

Q5: Should governments adopt a transitional approach to the development of a safety assurance system? If so, how would this work?

The Portfolio **supports** a transitional approach to the development of safety assurance system.

The Western Australian experience is that national regulatory reforms in transport are complicated and may take a number of years to implement. Rushed implementation of a new regulatory scheme or system can lead to a number of perverse outcomes due to inadequate legislation, inexperienced regulators and/or implementation risk.

While the Portfolio supports the development and implementation of a SAS *as soon as practicable* to accommodate expected technology and market developments, Government must be realistic about the required timeframes and should not implement the regulatory system until it is ready to do so.

Government should provide opportunity for market deployment of suitably designed highly automated systems if they are ready to be marketed prior to the implementation of an SAS. In the near future, the Portfolio expects that any deployed highly automated technology is likely to be limited to a niche market operating in designated zones, rather than mass market deployment into an unrestricted road network. In this case, it may be possible to deploy technologies with some modification to existing exemption and trial frameworks.

The implementation of an SAS could be managed through an intergovernmental panel chaired by the Commonwealth in collaboration with States and Territories. Such a panel could also liaise directly with applicants wishing to deploy technology to enable earlier market deployment if Government can be assured that risks are appropriately managed.

Q6: Is continuing the current approach to regulating vehicle safety the best option for the safety assurance of automated vehicle functions? If so, why?

The Portfolio **does not support** continuing the current approach to regulating vehicle safety for the safety assurance of automated vehicle functions in the medium to long term.

The current approach to vehicle safety is based on a system of standards appropriate to manufactured goods, designed around ensuring the quality, functionality and safety of products on the market. It is based on a prescriptive approach which cannot keep up with the breadth and detail of technology. Such a regulatory model is out of date. An SAS for AVs must also consider the safety performance of the automated driving system undertaking the driving task. It is reasonable to expect that a more comprehensive set of regulatory tools will be required.

Design standards will still play a role in some specific requirements of a safety assurance model, and specific standards for AVs should be considered in parallel with the development of the SAS and the work of the United Nations. In particular, Government may need to consider whether it is appropriate to develop standards around devices involved in the storage and capture of data, such as "black boxes" for crash investigation, or for any other devices that may serve a regulatory purpose.

Q7: Is self-certification the best approach to regulating automated vehicle safety? If so, should this approach be voluntary or mandatory? Should self-certification be supported by a primary safety duty to ensure automated vehicle safety?

The Portfolio **cautiously supports** a self-certification option provided additional regulatory controls are available as required.

Any system to regulate safety needs to be tested. It is not possible to say which is best at this stage.

The self-certification approval approach may achieve the best balance between safety and innovation outcomes in principle, while being implementable within a short to medium time frame. If adopted, self-certification should be mandatory.

Given that those responsible for automated driving systems have a greater knowledge of automated system design and performance than regulators, it is appropriate that they bear the primary responsibility of identifying and managing risk. As the technology and market develops, international standards are developed, regulatory knowledge improves and best practice for risk measurement and modelling is identified, it may be appropriate to move to a more mature regulatory model such as pre-market approval or accreditation model.

Self-certification should not place a limit on Government preventing the adoption of certain elements of a pre-market approval or accreditation model where it may improve safety outcomes for the community.

Q8: Is pre-market approval the best approach to regulating automated vehicle safety? If so, what regulatory option would be the most effective to support pre-market approval?

The Portfolio considers that the pre-market approval approach has benefits, and **could be considered in the medium to long term**.

The proposed pre-market approval approach appears to be robust and comprehensive, provided the required minimum technical standards, testing processes and expertise to evaluate and approve AV technologies have been developed.

It may be appropriate to reconsider a pre-market approval approach once international best practice has developed further. Whether pre-market approval is the best option in the long run is likely to depend on the technology development path, market developments and the regulatory decisions made internationally.

It is appropriate for Government to have an approval role for highly automated technologies that will be deployed on public roads. The Government acts as a default regulator and will maintain some element of implicit liability for activities that it allows, as Government holds a measure of the risk imposed on the community.

If some form of approval mechanism is adopted it is critical that Australian Governments make decisions quickly and in a collectively constructive manner –

both for pre-market approval and subsequent changes to approved driving systems (that is, software modifications).

Q9: Is accreditation the best approach to regulating automated vehicle safety? If so, why?

The Portfolio considers that an accreditation approach has benefits, and **could be considered in the medium to long term**.

Accreditation is the standard approach used in safety regulation in other transport fields such as rail and aviation, and has proven success in those environments. Accreditation has a number of advantages, the main being that it can be used as the basis for an SAS that covers the whole of the transport environment, thus being the most comprehensive of the proposed options. Given the level of change required for an accreditation system and the likely implementation costs, a comprehensive analysis of this option would be required before the Portfolio is able to offer support.

It will be appropriate to reconsider the development of an accreditation approach once international best practice has developed further. Whether accreditation is the best option in the long run is likely to depend on the technology development path, market developments and regulatory decisions made internationally.

Western Australia operates a compulsory accreditation system as part of the road safety environment for operators of certain heavy vehicles. It may be appropriate to consider accreditation elements for heavy vehicle operators or commercial fleet operators deploying certain automated functions. It may also be appropriate for the NTC to work with the National Heavy Vehicle Regulator (NHVR) and jurisdictions to consider the specific safety management implications of automated heavy vehicles at some stage in the future.

Q10: Based on the option for safety assurance of automated vehicle functions, what institutional arrangements should support this option? Why?

The Portfolio is of the view that institutional arrangements should be considered **after** a preferred SAS model has been determined by Ministers.

The Portfolio recommends that institutional arrangements for an SAS be considered in detail by the NTC once Ministers have decided on an appropriate regulatory option. Given the impetus to implement an SAS model as quickly as practical, the work should be given the highest priority and be appropriately resourced.

The Portfolio anticipates that the SAS will either require the establishment of a new body or an expansion of responsibilities for an existing regulatory body, with resourcing impacts for all jurisdictions.

The institutional arrangements are likely to be decided in conjunction with the safety assurance model, which will require authorities to be determined for different aspects, if required.

A panel of representatives from all Australian Federal and state/territory governments chaired by the Department of Infrastructure and Regional Development should be established to oversee all aspects of the creation and development of the SAS, with support from relevant experts.

Q11: How should governments manage access to the road network by automated vehicles? Do you agree with a national approach that does not require additional approval by a registration authority or road manager?

The Portfolio believes road access is **primarily the responsibility of states and territories**, although a national body could play a coordinating role for access, as well as integration between regulatory activities.

Roads remain under the authority of States and Territories, which are the asset owners and managers.

Road access management is a standard function of state government road and transport agencies who manage access for certain heavy vehicles and other non-standard vehicle types, through a range of regulatory tools including specified road networks, permits and restrictions placed on vehicle licences. In the case of heavy vehicles, the NHVR coordinates network access on behalf of jurisdictions, while participating jurisdictional road agencies continue to have responsibility for determining access levels.

It may be appropriate for local access management responsibilities to be maintained, particularly where road management functions are required. For example, there may be requirements for local government to manage tree canopies to reduce interference for communication systems on AV routes, or specific roadside infrastructure may be required at future stages.

The Portfolio is of the opinion that state governments should continue to determine road access, notwithstanding the possibility of a national body playing a coordinating role to ensure national consistency.

Q12: How should governments ensure compliance with the safety assurance system?

The Portfolio supports the adoption of a nationally collaborative compliance approach and agrees with the NTC's proposal to adopt a primary safety duty for parties with associated penalties. Other elements of compliance can be determined in more detail once an SAS option has been selected.

Other Issues

Government needs to ensure it has the capability to develop, deliver and manage safety regardless of which SAS is adopted. Care should be taken to ensure that the appropriate knowledge, skills and resources are developed and made available to agencies involved in the regulatory task.