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Attn: Automated Vehicles Team
National Transport Commission
Level 3, 600 Bourke Street
Melbourne
VIC 3000

Dear Sirs

Submission: Safety Assurance for Automated Driving Systems Consultation RIS

The Australian Road Research Board (ARRB) would like to congratulate the National Transport Commission (NTC) on its efforts to increase Australian readiness for connected and automated vehicles (AVs). There are hopes these technologies may deliver the next leap forward in transport safety, productivity and sustainability.

The NTC has identified the problems as (i) AVs being not able to deliver the safety outcomes promised, (ii) there may be a lack of consumer confidence and (iii) there are regulatory barriers to the Australian market. Hence the regulatory response with the solution set (Options 1-4).

A broader perspective

Never before has there been a greater demand by cities and communities all over the world for global interoperability of mobility services and products enabled by big data, internet of things, automation and connectivity. In the face of this tidal wave of technological change, new concepts of operations are possible, requiring attention to policy, regulatory frameworks, architectures and business models to truly maximise the full potential to deliver sustainability outcomes as cities get larger and larger.

We argue the problem should be looked at more broadly in terms of preparation for a future mobility state which delivers outcomes that include sustainability, productivity as well as safety. A Safety Regulator may be required not just for automated driving systems (ADS) but for many other technology innovations that deliver smart mobility services (for example, electric vehicles, shared vehicles, innovative vehicles and connected vehicles).

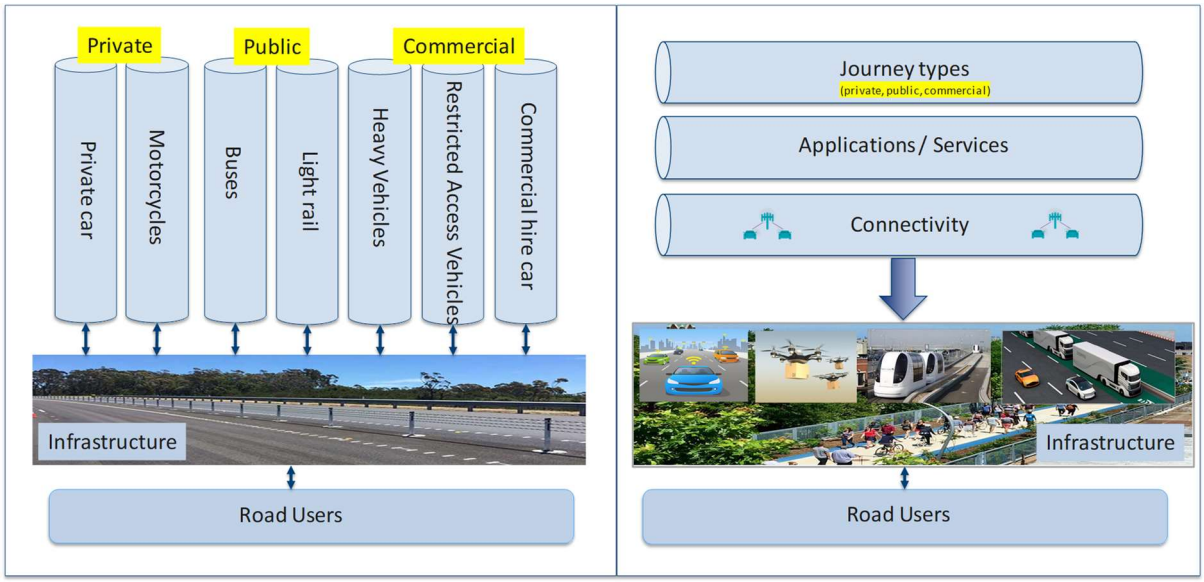
If the goal is to achieve road safety outcomes, other options supporting advanced driver assistance systems (ADAS), such as automatic emergency braking, lane keep assist, etc, should receive greater emphasis as they will deliver the greatest short term benefits.

If the goal is to prepare Australia for next generation technology solutions that deliver increased mobility outcomes, the approach needs to embrace regulatory responses within relevant operational frameworks (urban, regional and remote) and business models for such mobility services.

However we do appreciate the immediate safety needs for ADS and while supporting the RIS, suggest that the broader perspective not be lost but noted for consideration and inclusion in later stages.

The future land transport network

The figure below shows the current land transport framework on the left-hand side and a future framework for land transport on the right-hand side. The silos in which we regulate and operate land transport as shown on the left hand side are changing to the layers on the right hand side. ARRB suggest this is the environment in which the proposed safety agency would operate[1]. We are already beginning to see such changes with the new mobility models that are appearing in Australia.



Core functions in the future land transport network

It seems likely for the next 10-20 years, the land transport system will transition into a more complex eco-system, where vehicles operating under the current regulatory framework interoperate with various ADSs. As yet many parts of the operational framework and infrastructure elements for ADSs and ADSEs remain unresolved (such as roads, airspace, security, positioning, electronic traffic regulations, accident investigation/big data, traffic management and electric charging). Before we select an Option, ARRB considers it desirable to have a clearer understanding of how the whole system would integrate.

With our knowledge of AVs at present, we may be able to articulate 80% of the requirements for the regulation. But, from our experience, the remaining 20% can only be gained through testing and real-world trials conducted on test beds for the anticipated range of operational environments (urban, regional and remote). The roles and responsibilities of the actors in each of those deployments, along with the research outcomes, will further inform and refine the Options proposed.

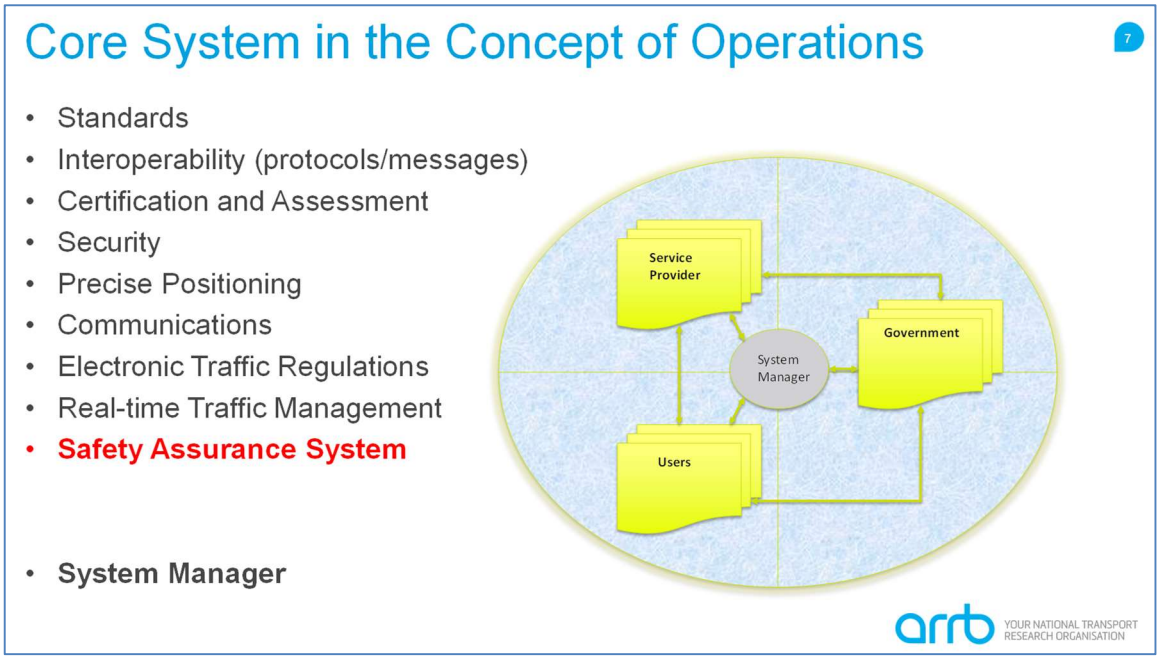
While ARRB does appreciate the immediate safety needs for ADS, we suggest that there be future opportunities to refine the selected Option with the learnings from our trials and test beds. ARRB suggest applications for semi-autonomous vehicles and AVs travelling at speeds capable of injuring vulnerable road users in the event of a collision are only considered for approval should evidence be provided of sufficient benefits based on testing and real-world trials.

All technology operates within a system. Every technical system has a concept of operation[2] from the end users perspective. The figure below presents our view of the core functions or system for land transport in the future. In this system, we have many service providers including Automated Driving System Entities (ADSEs) as well as road users.

Safety Assurance is one of the core functions necessary. At this stage, the role of an overall System Manager is still a work-in-progress.

[1] adapted from "Broken Concepts – The Australian Communications Legislative Landscape, ACMA, August 2011, p7.

[2] A Concept of Operations describes how the system will operate from a users' viewpoint. It includes the stakeholders, their roles and responsibilities, the system design, the core functions and how the system operates, IEEE 1362.



Knowledge of Safety Assurance

An important consideration is the interoperations of the Safety Agency with the extant actors responsible for the safe operations of the current transport system. These roles are currently performed by state, national and other transport agencies related to public transport and other modes (bus, rail, maritime and aviation). For example, there may be opportunities to draw on knowledge and experience from aviation where some automated systems have been in use for some time, including some systems requiring pilot monitoring

There are also many well established "management systems" to learn from, in areas like quality, security, environment, asset, etc which fall under the ISO X001 series, e.g., ISO 9001, 39001, 27001, etc. In describing the competence of the system manager for auditing and certification of road safety management systems (ISO 17021-7:2014(E)), many of the clauses in the specification call for "personnel with the knowledge" of… *impact, processes, procedures, methods, performance, contexts, etc*, within the domain of operation of the system.

At present, the pool of personnel with such knowledge of ADS operations in road safety is limited. In Australia, we are just beginning on this learning curve as researchers, practitioners and regulators learn from their own local deployments. We need to recognise this weakness and address it by increasing our emphasis on developing such practical knowledge through further testing and real-world trials. A transition plan drawing on the experience and knowledge of those from other transport domains (aviation, maritime, rail), identifying the work streams needs and the development of detailed assessment guidelines for early consideration would be helpful.

Development of detailed assessment guidelines

Should Option Four be pursued, ARRB suggest more detailed assessment guidelines based on research evidence and known best practice be developed for the Government assessors of the ADSEs Statement of Compliance applications. Along with safety implications for all AVs, there are concerns raised by researchers about human limitations to remain alert and prepared to take over driving at short notice, while not engaged with the driving task.

Response to NTC questions listed in the RIS

We believe that we have addressed a majority of the NTC's questions on p 67-68 in the context of our earlier comments and therefore have not provided a question by question response.

Concluding comments

While ARRB agrees that the four options seem reasonable and the preferred fourth option seems the most suitable given our current knowledge, we suggest a broader perspective be considered with attention to the safe and efficient operation of the entire transport system. The areas of infrastructure provision, operational frameworks and commercial models need to be well understood in order to further develop regulation that is fit for purpose.

At the same time, we do recognise that there is a strong government desire to move ahead with something, rather than allow the vehicle industry to roll out AVs without an established regulatory framework, particularly with concerns over the road safety implications. So it is clear a 'do nothing' solution in the short term is not preferable. It would be prudent to make allowance for more aspects of the core system of operations to be also considered in future developments of the safety agency role within the overall land transport environment.

We thank you for the opportunity to provide feedback, we appreciate the NTC's inclusive efforts in working and sharing with us and will be pleased to provided further clarification and input as required.

Yours sincerely

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