Your ref
Our ref 20170712
File ref 20170712

ARUP

1 Nicholson Street
East Melbourne, 3002
Victoria
Australia

t +61 +61396685500
David-P.Young@arup.com
www.arup.com

National Transport Commission
Level 3/600 Bourke Street
Melbourne VIC 3000
Ph: (03) 9236 5000
Email: enquiries@ntc.gov.au
www.ntc.gov.au

27 July 2017

To whom it may concern

Comments and feedback on Regulatory options to assure automated vehicle safety in Australia Discussion paper

Thank you for the opportunity to attend the NTC's workshop held at the Engineers Australia offices on 5th July 2017. It was extremely valuable to be able to be present, hear the latest from the work that the NTC is undertaking around developing regulations for AVs and also talk with the other workshop participants.

This letter is a summary of our views on the challenges of regulation options to assure Autonomous Vehicle (AV) safety in Australia and considers the work that the NTC is undertaken and the results of my personal research in to the field of road safety/road trauma levels and AV transition.

As a general letter on my views the letter addresses a number of the questions (Questions 3, 5, 6, 7 and 8) raised within the NTC report outlined as follows:

> *3. Should the onus be placed on the automated driving system entity to demonstrate the methods they have adopted to identify and mitigate safety risks?*
>
> *5. Should governments adopt a transitional approach to the development of a safety assurance system? If so, how would this work?*
>
> *6. Is continuing the current approach to regulating vehicle safety the best option for the safety assurance of automated vehicle functions? If so, why?*
>
> *7. 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?*
>
> *8. 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?*

Challenges

The following highlights some of the key challenges we see for implementing regulations for AV's in an Australian context. The key challenges a regulatory approach must address are:

- **Pace of change** - The regulatory approach needs to be implemented quickly. We are currently seeing disruptive technology such as AV's proliferate through our traffic network and system at an increasing pace. While the current proliferation of AVs is a comparatively low proportion of the vehicle fleet we can assume that this may change rapidly. Quick implementation of a regulatory framework is required to ensure we are not passed by technology. As touched upon during the workshop this may require a hybrid of regulatory approaches.
- **Adaptable** - Given the need to implement a framework quickly it is likely that any approach implemented will also need to adapt in the future. It is very likely that as AV technology adapts that a framework will also need to adapt. The framework for regulations set out at this early stage must therefore be considered but not so rigid as to preclude adjusting the regulations in the future. As highlighted above this need suggests that a combination or phased approach to regulation may be required.
- **Holistic** - A fundamental of the Australian and global road safety community is the concept of the *Safe System*. Detail regarding the Safe System and the reasons for its importance are provided below however, in summary, the Safe System framework states that each element of the transport system impacts a user's safety and therefore the chance of fatality or serious injury. Any regulatory framework adopted within Australia cannot ignore this. Whether it be that this framework speaks to others in a clear way or that this regulation address this on its own is obviously something that needs to be considered therefore.

The Safe System

As identified above the *Safe System* is the guiding principle behind road safety action in Australia and internationally.

The *Safe System* was adapted from the Swedish vision zero concept and accepted by the World Health Organisation as the key philosophy guiding road safety. In 2010 when the WHO released their plan for a decade of action on road safety the *Safe System* was a fundamental of that approach. The WHO's view and initiative, and therefore also the safe system as its foundation, has also been adopted by Austroads and Australian road authorities and driven much of road safety policy and investment since 2010.

The *Safe System* is built on the principles that death and serious injury are an unacceptable trade-off, having considered that humans make mistakes and that humans can only tolerate certain forces. There are five key elements of the system: Safe Roads; Safe Speeds; Safe Vehicles; Safe People and Post-Crash Response. For reference further detail on the *Safe System* Approach is described by the following AustRoads guides:

- Austroads Guide to Road Safety Part 1
- Austroads Research Report AP-R509-16, Safe System Assessment Framework

The introduction of AVs and Connected Autonomous Vehicles (CAVs) is leading to a shift in the way the road safety challenge should be framed and presents a challenge for advocates of road safety. The *Safe System* highlights though that even with this disruptive technology the focus of road safety policy and regulation need to be holistic. A holistic

approach means that any regulation that is focussed on AVs and CAVs (*the vehicle*) needs to also consider, or at least connect with other policy and regulations which address the other pillars of the Safe System.

To date the work undertaken by the NTC has focussed primarily on the vehicle and therefore as a part of any future work or regulatory recommendations we urge the NTC to consider how a preferred approach would reference other elements of the Safe System.

Mapping the Safe System to Regulation

The range of proposed approaches assessed by the NTC report highlights the breadth of potential outcomes for AV safety regulations. As highlighted above it is my view that the regulatory option needs to take into consideration the *Safe System* – and therefore consider the relationship between the vehicle, the road, the user (including both vehicle occupants and vulnerable road users), supporting road infrastructure (e.g. speed signage) and emergency services.

Below we have provided a view on how each of the regulatory options "maps" to or has the capacity to address the *Safe System* principles introduced above.

- **Continue current approach:** the current approach which includes a combination of addressing the roll out of AVs through adapting Australian Design Rules (ADRs) and Road Rules tends to focus heavily on two elements of the *Safe System*, being *the vehicle* and *the user* (i.e. the driver). It does not appear, at least initially, that this approach would influence the remaining pillars of the system as significantly.
- **Self-certification:** In this approach the freedom to produce a set of criteria for the automotive manufacturers to comment against means that additional elements of the *Safe System* could be considered. The manufacturers will however only have control over how the vehicle responds to these other elements of the *Safe System*, not how they themselves are maintained or assessed.

  Having the ADRs and Road Rules as a back-up to the self-certification process means that the existing control over other elements of the *Safe System* remains, however it is suggested that updates to some of the ADRs should be considered to ensure they reference to and complement the new self-certification approach.
- **Pre-market approval:** Pre-market approval appears to focus heavily on *the vehicle* and the vehicle system (a proxy for *the user*/driver). The continued application of ADRs again reinforces the focus of this approach on *the vehicle*. Given the government has control over the testing process there is an opportunity to expand this focus to the remaining elements of the *Safe System* however initially this approach appears to miss other elements of the *Safe System*.
- **Accreditation:** Accreditation may allow the best opportunity to consider the entire S*afe System*. As a part of the accreditation approach whatever regulatory body, or bodies, take responsibility for accreditation of AVs could also be groups in control of, or given advisory roles to address, the other pillars of the *Safe System*. An example of this would be the potential role of Austroads which, if engaged by or a part of the accreditation system, could ensure consistency and a connection between the way road infrastructure is addressed and how vehicles and vehicle systems are developed to align with the capability of the road network.

In conclusion no single approach appears to address the *Safe System* in its entirety. A combination of enhanced approaches therefore likely the best alternative to address this shortcoming. The most important element of the government's response though will be

how any regulation relates to, and complements, other regulatory frameworks which influence the safe system.

An example of an outcome or regulation which better aligns with the Safe System philosophy would be for the final regulation to appropriately cross reference road transport and vehicle legislation and guidelines such as the Australian Road Rules and Austroads guidelines. This would enable the regulation to acknowledge / identify the minimum standards of vehicle behaviour and infrastructure that will be required for an AV or CAV to operate in its autonomous (self-drive) mode. These documents would then need to be updated accordingly to provide appropriate guidance on this issue. For example the Austroads guidelines would be able to identify a minimum standard for street signage and road markings that are required.

Thank you for the opportunity to comment and we welcome hearing more on the outcomes of this study.

Yours sincerely

Dr David Young
BEng (Hons) BSc PhD MIEAust CPEng
Senior Planner

cc Russel Whale
Dr John McCarthy