Regulatory options to assure automated vehicle safety in Australia

RAC's Response to the National Transport Commission's Discussion Paper

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RAC
For the better

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Automated vehicle (AV) technology is rapidly advancing and is potentially the biggest disruption to the mobility sector since the invention of motor cars. Many vehicles now have built in AV or driver-assist technologies and are rapidly becoming increasingly automated, that is, requiring less driver intervention.

The National Transport Commission's (NTC) Discussion Paper Regulatory options to assure automated vehicle safety in Australia (Discussion Paper), is part of a national program to provide a regulatory framework for AV technology and contains four options to ensure AV safety:

- **Option One** continues the current approach with no additional regulatory oversight, i.e. rely on existing safeguards in Australian Consumer Law and road transport laws.
- **Option Two** proposes self-certification by automated driving system entities[1] via a statement of compliance containing high level safety criteria developed by government.
- **Option Three** proposes pre-market approval in which automated driving systems[2] are certified by a government agency as meeting minimum prescribed technical standards prior to market entry.
- **Option Four** consists of accreditation under which an agency accredits an automated driving system entity once it has identified and managed safety risks to a legal standard of care.

Representing over one million Western Australian members, RAC is a leading advocate on the mobility issues and challenges facing our State and we work collaboratively with all levels of government to ensure Western Australians can move around using safe, easy, and sustainable mobility options.

Since 2015, RAC has been working to test and evaluate a fully driverless, electric shuttle bus and on the 31st of August 2016, RAC, with support from State and Local Government launched Australia's first Automated Vehicle Trial. In one of the first public trials globally, Navya's Arma now named RAC Intellibus, takes passengers along a 3.5 kilometre route in South Perth. As at the time of this submission on 4 August 2017, more than 8,600 people had registered to take part in the trial, and nearly 4,000 people had ridden on RAC's Intellibus, which had travelled over 3,400 kilometres.

Further in August 2017, RAC acquired a second Navya Arma to support our AV Trial program which aims to better understand how AVs operate and consider their likely impacts in an Australian-specific environment.

The development and implementation of a set of design and safety standards to assure AVs are able to meet minimum standards and in turn enforce compliance with them is an important step. This will necessitate that manufacturers build a safe platform, allow regulators to enforce compliance and build community trust and confidence in the technology. That being the case, it is certainly a challenging task to determine and apply a set of standards to a range of vehicles where the technology supporting the driving behaviour remains largely in development, testing and trialling. Given the potential for AVs to improve road safety outcomes, we welcome the opportunity to provide a submission in response to the NTC Discussion Paper.

RAC's Intellibus: Australia's first Automated Vehicle Trial

In this purposeful trial, RAC is seeking to understand how AVs operate and consider their likely impacts on Australia. The Trial's three aims are to:

1. Increase understanding about the potential impacts and opportunities from the advent of AV technology;
2. Give Australians the chance to see, use and experience AV technology; and
3. Further help Australia prepare a roadmap for changes to support and safely transition to AV technology.

[1] Automated driving system entity (ADSE) means the legal entity responsible for the ADS. This could be the manufacturer, operator or legal owner of the vehicle, or another entity that is seeking to bring the technology to market in Australia.
[2] Automated Driving System (ADS) means: the hardware and software that are collectively capable of performing the entire dynamic driving task on a sustained basis. It is a type of driving automation system used in vehicles operating in conditional, high and full automation mode.

The Trial involves three stages, with each stage designed to test and evaluate AV technology in a variety of settings, involving increasing levels of complexity, then, interactions with road users.

Stage 1: Closed testing on a private track;

Stage 2: Closed stage undertaken on public roads outside of peak periods, without the Intellibus carrying passengers; and

Stage 3: Open stage on public roads with the opportunity for the public to register and potentially ride on the Intellibus.

When RAC made an application to the Department of Infrastructure and Regional Development in January 2016 and again in April 2017 to import a Level Four High Automation vehicle, we were required to do so under the 'Testing and Evaluation' category as the vehicle did not comply with Australian Design Rules (ADRs). This application required supporting documentation, including a 'letter of in principle support' from the State Government transport regulator, the Department of Transport. Further, we provided other available information such as vehicle specifications, project proposals and the Vehicle Identification Number.

With no pre-existing test guidelines for Level Four High Automation vehicles in place, RAC worked hands-on with local specialist technicians involved in the commissioning of autonomous mining vehicles and Navya, to develop an extensive test program. The tests were designed to observe the vehicle and investigate the boundaries of its behaviour including its perception and operation in autonomous mode. The tests also considered the system behaviour in different traffic scenarios including give way points, roundabouts and controlled stops, helping RAC to understand sensor range and sensitivity. This informed the configuration of the shuttle for public roads in the following two stages of the Trial.

Challenges when setting safety standards for AVs

Currently, the safety of a driven vehicle is assessed in two distinct ways. Vehicle design and safety standards are assessed according to compliance with ADRs or international regulations such as the United Nations Commission for Europe standards. In comparison, vehicle drivers are assessed on their driving ability and compliance with road rules in the form of driving assessments, probation periods, then enforcement measures which encourage adherence to traffic acts, codes and regulations.

As the level of automation increases in vehicles, AVs are not only vehicles in the traditional sense, but they are also the driver. Current regulations can apply to vehicles in that they can set standards with a view to reducing the impact of a crash and the severity of injury but are limited in that they cannot set standards for the driving task which leads to that crash.

Beyond the testing and trialling of prototypes, there must be standards which dictate the safeness of the vehicle and this can continue under the current and existing approach, that is, Option One. Safety can continue to be managed through existing safeguards such as ADRs, roadworthiness, road safety laws and Australian Consumer Law, including vehicle recall.

The process for setting standards must be flexible and dynamic enough to accommodate and encourage rapid technical change and strategic enough to progressively facilitate a lifting of the baseline vehicle safety features.

Australian road users do not receive the full benefit of vehicle safety features which are widely accessible in other markets. Option One can only be implemented if the Australian Government identifies new and appropriate approaches to ensure ADRs are updated more effectively and efficiently than they currently are.

As for the automated driving task, there is a need to consider the possibility of adopting a set of guiding principles which can be applied to operating systems of AVs and which could be better assured under the pre-market approval approach, Option Three or in the longer term, under the Accreditation model, Option Four.

Given the above, RAC considers that there will need to be a flexible and transitional approach to the regulatory options presented in the Discussion Paper to ensure that regulations are suitably able to assure the safety of automated vehicles in Australia. These options will need to be agile and adopt a transitional timeframe as the framework seeks to combine and regulate these two very separate and distinct tasks.

Perceptions of safety

Community perception and understanding is a useful way to gauge the general concerns of the community and RAC has been conducting a series of surveys designed to better understand awareness and understanding of AVs. The first survey was conducted in April 2016, four months prior to the launch of the Intellibus Trial. The survey showed that four in five Western Australians believe fully automated vehicles will be commercially available between 2020 and 2030[3]. Attitudes towards AVs are very mixed and safety is a major consideration, with respondents being uncertain whether we will be safer with

[3] RAC WA, (2016), "Autonomous vehicle survey", http://intellibus.rac.com.au/media/Autonomous%20Vehicles%20Survey_FINAL%20HR.pdf

or without them. Three in five respondents agree government should be investing to ensure readiness for AVs by 2025, and half (52 per cent) believe vehicle manufacturers and industry should be leading the way. Only one in five has confidence that government can be ready in this timeframe.

Despite AVs being in the early stages of development, almost half of Western Australians felt positively towards them (28 per cent of which felt extremely positive). Crash history, attitudes towards driving, and driving frequency did not have any impact on these attitudes. However, given the newness of the technology it is not that surprising that 30 per cent of Western Australians had negative feelings towards AVs.

When prompted, the benefits most Western Australians agreed would occur if all vehicles were fully autonomous were enhanced freedom and independence for the young, ageing and people with mobility difficulties, and more productive and efficient use of travel time. Males, those who drive vehicles with Level 1 and 2 automation and those with an awareness of AV were significantly more likely to have a higher level of agreement with all prompted benefits. In terms of concerns relating to the operation of AVs on WA's roads, when prompted, not being able to manually override the vehicle was the top concern, followed by cyber security issues and responsibility in the event of a crash.

More detailed analysis considering the relationship between attitudes towards AVs and opinions about the likelihood of prompted benefits occurring, revealed that fewer crashes and enhanced freedom were the two anticipated benefits which had the greatest influence on positive feelings. This was followed by reduced crash severity and less traffic congestion.

When it comes to receptiveness to use an AV, Western Australians were equally concerned about being an occupant in an AV as they were with being in another vehicle interacting with an AV. Nevertheless, one in two felt they would be very or extremely likely to use an AV which is privately owned (with 30 per cent being extremely likely to). Interestingly, those with no crash history were significantly less likely to want to do so than those with a crash history (28 per cent compared to 22 per cent). Those who considered themselves to be first to try new things and purchase the latest gadgets were significantly more likely to be willing to use an AV.

The same survey was repeated in December 2016, three months after the launch of the Trial. There was an increase of awareness of autonomous vehicles, or driverless vehicles when prompted (from 88 per cent to 91 per cent), as well as an increase in positiveness about AVs (from 46 per cent to 50 per cent).

Each person who participates in the RAC AV Trial receives a survey which asks similar questions to the above. Positiveness is very high for participants at 95 per cent as well as confidence in government to be ready for the introduction of driverless vehicles by 2025, which increased to 45 per cent, from 19 per cent in the first wave and 21 per cent in the second wave.

Across all three surveys, safety was the biggest concern, with 53 per cent of respondents in the post ride survey saying that they were very concerned about 'not being able to manually override the vehicle and take control if the system fails (compared to 79 percent in the first wave and 78 per cent in the second). Nearly 60 per cent were concerned about 'cyber security and threats of the system / your vehicle being hacked and overridden remotely' (compared with 74 per cent in the first wave and 72 per cent in the second wave).

Building community trust and confidence in the technology is pivotal to the uptake of AVs and these surveys show that there is community interest in understanding the driving ability of AVs and the susceptibility of AVs to be controlled by an external source.

In response to the Discussion Paper, RAC proposes that consideration be given to evaluating the framework to assure safety as it relates to AVs under two distinct categories: vehicle safety and driver safety (whether human or technology). When considered under these two categories, it is reasonable to expect the approach to setting and evaluating safety standards will be less complex.

A well-defined roadmap for how we plan and manage the challenges of regulating AV technology has never been more important to ensure the safe transition of AVs onto roads and maximise their contribution as part of an integrated transport system.