Submission by
Toyota Australia
to

House of Representative's inquiry into the social issues relating to land-based driverless vehicles in Australia

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Key facts

Toyota Australia facts and statistics	▪ Presence in Australia since 1959 ▪ 14 consecutive years as Australia's best-selling automotive brand with 17.8% market share in 2016 ▪ 3,900 employees ▪ 2016 sales: o Toyota domestic sales: 209,610 o Passenger: 87,572 ⟨42%⟩ o SUV: 63,099 ⟨30%⟩ o Light commercial: 58,939 ⟨28%⟩ o Lexus domestic sales: 9,027 o Passenger: 3,522 ⟨39%⟩ o SUV: 5,505 ⟨61%⟩ ▪ Australian vehicle production: 90,242 ▪ Australian vehicles exported: 60,805 ▪ Australian engines produced: 92,766 ▪ Australian engines exported: 7,343 Export countries: 13

Overview

Toyota Australia welcomes the opportunity to provide input to the ***Australian Parliament's House of Representatives Standing Committee on Industry, Innovation, Science and Resources' inquiry into the social issues relating to land-based driverless vehicles in Australia.*** Automated vehicles present a shift in which transport is undertaken across the globe. Toyota fully recognises and is optimistic about the associated societal benefits of such technology, including improved road safety, increased productivity and better environmental outcomes.

In order to fully realise the benefits of automated vehicles, Toyota Australia recommends that a number of potential barriers to their entry should be overcome. These barriers include inconsistencies in the trials of automated vehicles across various jurisdictions as well as regulatory challenges in performing trials.

Testing across multiple states and territories in Australia will ensure autonomous vehicles are able to function and adapt to the different conditions in the respective locations. Without a common approach, there will be inconsistencies in trial processes and unnecessary costs incurred to OEMs.

As the development of regulations and road laws to cater for autonomous and connected vehicle technologies is moving at a slower pace than the technology, there will be a gap and Toyota Australia recognises the regulatory challenges that exist in adopting this technology, namely:

- Safety
- Responsibility
- Ownership of data
- Preconceived definitions
- Interactions with infrastructures

This report will set out Toyota Australia's recommendations to overcome the barriers mentioned above and therefore move closer to achieving the significant benefits associated with autonomous and connected vehicles.

1. Consistent Approach across States and Territories

National Trial Guidelines

The publication of the national trial guidelines is expected in May 2017. Toyota believes that in considering the conditions to include in the national guidelines, it is imperative to utilise best practice from the trials that are undertaken around the globe. The main conditions to be addressed include the infrastructure and road network efficiency to support the operation of autonomous vehicles as well as the driver skill requirement whilst performing on-road trials. Traffic signals and line markings also need to be consistent, as well as the frequency and bandwidth for operational requirements.

As an example, the Vienna Convention is adopted by state jurisdictions in Australia. However, at times there are inconsistencies within road signs and this is a potential issue for autonomous vehicles – e.g. the speed limit assigned by State as 80kph may be revised by local council to 60kph ⟨w/o consultation⟩. Therefore, by standardising the infrastructure nationally to support the use of autonomous vehicles and in this case, the speed limit sign, any real-time updates within the road rules could be detected by autonomous vehicles without any concerns for issues.

The pictures below depict inconsistencies within road markings in Victoria which will impact the results of autonomous vehicle trials.

Picture below left suggest multiple lane usage (Parking & slow vehicle thoroughfare), therefore requires unique algorithm for highly automated and fully automated vehicles. Picture below right suggest traffic to merge left but instructs to merge right and onto median strip.

In highly automated and fully automated vehicles it will cause potential issues during trials.

Roles of Government

Toyota supports a single national guideline and a single application process for organisations that wish to undertake trials of automated vehicles. Toyota would be open to multiple application processes provided the technology trialled is different for each application. A single guideline and process will minimise red-tape and administrative work for both the governments and trialling organisations and in turn promote the development and rollout of automated vehicle technology.

In addition, Toyota fully supports cross-border cooperation within state and territory road transport agencies primarily because most automotive and technology industries see Australia as a single market for investment and innovation. Thus, the collaboration would mean savings in resources. Toyota believes that results from trials and initial deployments of connected and automated vehicles across the different states and territories in Australia should be shared and studied by all jurisdictions. Based on these results, each state or territory will then have more information on the suitability of testing environments for local use. Additionally, this will in turn ensure higher consistency levels in the testing parameters as well as exemptions granted or to be granted for trialling organisations in Australia.

2. Regulatory Challenges

Existing Regulatory Framework

The current regulatory framework across all states and territories in Australia only supports on-road trials of automated vehicles where a human driver is responsible for "driving" the vehicle. As highly and fully automated vehicles will also need to be trialled on public roads, Toyota is of the opinion that the definition of *driver* and *driving should* remain as they are at this stage, and continue to rely on exemptions granted on a case-by-case basis. Discussions on these definitions are ongoing within WP.29 & WP.1. The Australian Government should participate in or follow these international meetings closely to understand from a global perspective what efforts are being undertaken to establish new regulatory concepts relating to the definition of automated driving concurrent with technological maturity. The current *"WP.29 Proposal – Definitions of Automated Driving and General Principles for developing a UN-Regulation"* should be used as a reference in the meantime.

[Working Party 29 ⟨WP.29⟩ is the World Forum for Harmonization of Vehicle Regulations, which is the international UN Regulations for vehicle safety and environmental performance. Working Party 1 ⟨WP.1⟩ relates to Road Traffic Safety. The Department of Infrastructure and Regional Development ⟨DIRD⟩ represents the Australian government at WP.29 and WP.1.]

As for the definition of *control* and *proper control*, it should ultimately be addressed through Australian Road Rules and state and territory traffic laws. The rationale for this stance is that it provides the most clarity for both consumers and OEM's, which is critical when implementing such an evolutionary technology such as automated vehicles. An important caveat however is that these changes in road rules should only be implemented once the technology for high and full automation is readily available to the market. In the interim, Toyota Australia supports the development of nationally enforced guidelines. While there are some drawbacks with the introduction of guidelines, such as a lack of enforceability ⟨which would maintain a certain level of risk from the perspective of an OEM⟩, they would be an appropriate short term solution to address the ambiguity that currently exists in relation to the definition of 'control' and 'proper control'.

The challenge for legislators will be to ensure that the legislated definitions cater for the different levels of automation in addition to conventional vehicles ⟨i.e. 'mixed fleets'⟩, and that the clarification in ambiguity on the automated vehicle front does not have any unintended consequences when it comes to defining 'control' and 'proper control' for the non-automated fleet.

The definition of 'control' and 'proper control' used in legislation should be based on globally harmonised regulations. WP.29 has a proposal for the definitions of automated driving and the general principles for developing a UN-Regulation, and therefore is a comprehensive framework on which to base local legislation as it takes into account levels of automation, system performance requirements and specific use cases for the vehicles. As the Department of Infrastructure and Regional Development is participating in ongoing discussions within WP.29 & WP.1, the Australian Road Rules should therefore be aligned with the outcome of these international working parties in order to align with the objective of harmonisation.

Introduction of C-ITS

Toyota supports Australian Communications and Media Authority's (ACMA) proposed regulatory arrangements to support the introduction of C-ITS in the 5.9 GHz band (5.855-5.925 GHz) in Australia and issuing a new Class License under section 132 of the Radio Communications Act 1992, for C-ITS transceivers in vehicles, roadside infrastructure and carried by people. The class license will refer to the relevant European standard, ETSI Standard EN 302 571.

Management of Data and Security

C-ITS applications through the deployment of connected and automated vehicles will involve significant amounts of data. Therefore, the management of access and ownership of data is vital to provide security and assurance to the public.

Cooperative Credential Management System (CCMS) is both a framework and infrastructure currently adopted by the EU and US. Toyota believes that the government should consider adopting this security solution in Australia as it provides a considerable amount of security and assurance in the C-ITS space and is aligned to the national interest in the global harmonisation of C-ITS.

Toyota Australia in conjunction with Federal Chambers of Automotive Industry (FCAI) suggest three broad definition of information, namely;

1. Traffic and Environment Information (Infrastructure)
2. Owner / driver operational information (Driver)
3. Vehicle systems operation information (OEM)

Based on the categories above, the criticality of data, level of security and data ownership will then need to be assessed and prioritised accordingly. By clarifying and defining the ownership of this data and outlining how it will be secured, this will instil the public's acceptance of this technology.

3. Conclusion

Toyota Australia strongly supports the push to introduce autonomous vehicles to the local market as there are significant benefits to be gained by the society. In order for this to occur, Toyota Australia recommends overcoming the two main barriers to the entry of the autonomous and connected vehicles as identified.

Additionally, Toyota Australia believes that the government, regulators and industry stakeholders should continue its cooperation with the international community in the automated and connected vehicle technologies.

The involvement of Australia in the Automated Vehicle and C-ITS activities is important due to Australia's limited market influence in the automotive industry. Therefore, Australia's current global harmonisation direction should be maintained and necessary actions should be taken to align and strategically contribute to the development of the automated and connected vehicle technologies.