NSW GOVERNMENT | Transport for NSW

Your ref: D16/20750
PI16/00011

Mr Greg Aplin MP
Chair
Staysafe (Joint Standing Committee
on Road Safety)
Parliament House
Macquarie Street
SYDNEY NSW 2000

Dear Mr Aplin

I refer to the Committee's letter of 30 June 2016 to the Deputy Secretary, Freight, Strategy and Planning about the Committee's Inquiry into Driverless Vehicles and Road Safety in NSW.

Transport for NSW is delighted to be able to assist the Committee's inquiry. As an organisation, we strive to be at the forefront of innovation to deliver the best outcomes for our customers. Our investigation into driverless vehicles and the potential road safety benefits is indicative of this goal.

Please find enclosed responses to supplementary questions received from the Committee and an annotated transcript of the Transport for NSW testimony.

Should you have any further questions, Mr Bernard Carlon, Executive Director of the Centre for Road Safety would be pleased to take your call on [redacted].

I trust the above information is of assistance.

Yours sincerely

[redacted]

Tim Reardon
Secretary

Encl 30 JUL 2016

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Responses to the Staysafe 'Inquiry into Driverless Vehicles in NSW' hearing supplementary questions

SUPPLEMENTARY QUESTION #1: Potential Road Safety Benefits

The Motorcycle Council of NSW quoted the RAND corporation, a global policy think tank, suggesting that to 'verify that self-driving cars are as safe as human drivers, 275 million miles (442.57 million km) must be driven fatality free'.

- *Are you aware of an internationally recognised benchmark, which would be useful in clearly verifying that self-driving cars are as at least safe as human drivers?*
- *Do you consider that we need such as benchmark?*
- *Are you aware of any country using or developing such a benchmark?*

Response

Transport for NSW would recommend the use of two internationally accepted benchmark measures for comparing the safety of self-driving and human driven vehicles, namely:

1. deaths and injuries per 100 million vehicle kilometres travelled (VKT) by type of vehicle control system.
2. deaths and injuries per 10,000 registered motor vehicles by type of vehicle control system.

Given that improved road safety is one of the predicted main benefits for self-driving cars, Transport for NSW would see considerable benefit in developing a benchmark to be able to compare safety performance of self-driving cars to human driven cars.

Transport for NSW is not aware of any country using or developing such a benchmark.

Background

The Department of Infrastructure & Regional Development through the Bureau of Infrastructure, Transport & Regional Economics (BITRE) produces an annual Road Trauma Australia Statistical Summary.

These annual summaries are used to benchmark the road safety performance of Australian jurisdictions over a ten year period. The annual summaries are based on data from two databases: the Australian Road Deaths Database and the National Crash Database.

The National Crash Database was developed in order to monitor progress against the statistical targets set out in the National Road Safety Strategy. Its scope is all fatal and injury road crashes. At present it covers the years 2008 to 2013, and updates are annual.

Non-fatal road traffic crash casualty data (referred to in the annual reports as 'hospitalised injury') is collated from published reports by the Australian Institute of Health and Welfare (AIHW) and by the National Injury Surveillance Unit (NISU), as well as from unpublished National Hospital Morbidity Database reports compiled by NISU.

The majority of tables in the annual report use population based rates for comparison, generally deaths or injuries per 100,000 population. Such a benchmark could not be used to compare the safety of a human vs a self-driving vehicle.

Table 2.3 of the annual statement uses a travel based exposure measure, namely annual fatalities per 100 million vehicle kilometres travelled (VKT) by jurisdiction.

Table 2.4 of the annual statement uses a vehicle based measure, namely occupant fatalities per 10,000 registered motor vehicles by jurisdiction.

The World Health Organisation's Global Status Report on Road Safety reports benchmarks road safety performance globally. The report only uses population based road safety

measures and therefore could not be used as a template for reporting on the safety performance of self-driving vehicles.

Source

Bureau of Infrastructure, Transport & Regional Economics (BITRE Road Trauma Australia 2014 Statistical Summary

World Health Organisation Global Status Report on Road Safety, 2015: Summary.

SUPPLEMENTARY QUESTION #2: Systems Failures

The possibility of technology failure in vehicles and the supporting infrastructure is raised a number of times throughout the NSW Government submission. The submission notes that Government and industry will need to plan for a range of scenarios.

- *Do you consider that robust 'Back-up solutions' in possibility of technology failure should be a prerequisite for the introduction of driverless technology in NSW?*

Response

Current discussions internationally around technology failures suggest that manufacturers will need to demonstrate how their vehicle will deal with technology failures.

Some international jurisdictions have suggested requiring manufacturers to show that their relevant processes comply with ISO 26262 (automotive functional safety standard), and not be prescriptive about the way its product deals with failures.

NSW is currently exploring legislative frameworks to address driverless vehicles and will continue work within the context of the national regulatory frameworks.

The UNECE Working Party 29 is responsible for harmonising global regulations for vehicle regulations. Vehicles supplied to the majority of markets around the world must meet safety standards set by UNECE WP 29. UNECE WP 29 is closely monitoring developments in driverless cars, and has stated that it will not approve vehicles with automated systems unless they are backed by sound technical standards.

Background

Road vehicles – Functional safety - ISO 26262 is an international standard for functional safety of electrical and/or electronic systems in production automobiles defined by the International Organization for Standardization (ISO) in 2011.

Like its parent standard, IEC 61508, ISO 26262 is a risk-based safety standard, where the risk of hazardous operational situations is qualitatively assessed and safety measures are defined to avoid or control systematic failures and to detect or control random hardware failures, or mitigate their effects.

ISO 26262 has the following goals:

- Provides an automotive safety lifecycle (management, development, production, operation, service, decommissioning) and supports tailoring the necessary activities during these lifecycle phases.
- Covers functional safety aspects of the entire development process (including such activities as requirements specification, design, implementation, integration, verification, validation, and configuration).
- Provides an automotive-specific risk-based approach for determining risk classes (Automotive Safety Integrity Levels, ASILs).
- Uses ASILs for specifying the item's necessary safety requirements for achieving an acceptable residual risk.
- Provides requirements for validation and confirmation measures to ensure a sufficient and acceptable level of safety is being achieved.

Source

Email from Austroads Cooperative ITS Program Manager

International Standards Organisation

Advice from the Commonwealth Department of Infrastructure and Regional Development, Australia's representative on UNECE WP 29.

SUPPLEMENTARY QUESTION #3: C-ITS Security

The NSW Government submission refers to the need to ensure IT security in relation to automated vehicle systems.

- *How big is the risk of vehicle software being hacked?*
- *What is being done to safeguard C-ITS technology from hackers?*
- *Is responsibility for C-ITS security wholly a role for government? What is the responsible forum for monitoring and developing proactive measures in relation to data security in relation to C-ITS and automotive technology?*
- *What further can be done to foster ongoing research and standards development in relation to C-ITS security in the NSW context?*

Response

The risk of 'hackers' impacting the function of automated vehicles has not been fully explored and will need to be properly addressed.

There is a significant amount of work occurring internationally to address C-ITS security (and vehicle security more broadly). The security model evolving is referred to as a Security Credential Management System (SCMS), which is based on a Public Key Infrastructure (PKI). Both the US and Europe are currently developing an SCMS to support trial deployments.

Australia is represented on the EU-US ITS Task Force Standards Harmonization Working Group by Transport Certification Australia.

Transport for NSW is represented on the Austroads Cooperative ITS steering committee who will lead the work on the Cooperative ITS security solution for Australia.

There is a proposal to undertake local research into vehicle security with the proposed iMOVE CRC. Cooperative Research Centres are funded under a Federal Government Program managed by AusIndustry, a division within the Department of Industry, Innovation and Science. A decision on funding the establishment of the iMOVE CRC is not expected until the end of the year at the earliest.

With reference to the response to the earlier question, the vehicle regulations developed by UNECE WP 29 also cover vehicle security.

Background

US Department of Transportation Connected Vehicle Pilot Deployments are using the FIPS 199 (Federal Information Processing Standard Publication 199, Standards for Security Categorisation of Federal Information and Information Systems) to assess risks associated with connected vehicle software and communication systems.

FIPS 199 requires Federal agencies to assess their information systems in each of the categories of confidentiality, integrity and availability, rating each system as low, moderate or high impact in each category. The most severe rating from any category becomes the information system's overall security categorisation.

In the new National Policy Framework for Land Transport Technology being developed by the Federal Department of Industry and Regional Development (which is pending approval

by Australian Roads Ministers in August), there is an action relating to a nationally consistent Cooperative ITS security solution for Australia.

Austroads is nominated as the lead for this action. Determining what the role of government will be in the operation of a national C-ITS security solution will be considered as part of this action (noting that the US and Europe are yet to determine this either).

SOURCE

NSW Government Submission Staysafe Enquiry into the safety of driverless vehicles.

Email from Austroads CITS Program Manager.

Wyoming Department of Transport - Connected Vehicle Pilot Deployment Program Phase 1, Security Management Operational Concept – ICF/Wyoming.

EU-US ITS Task Force Standards Harmonization Working Group Harmonization Task Group 6.

SUPPLEMENTARY QUESTION #4: Driver Risk Taking Behaviour

The Government's submission refers to the need to explore the impact of 'human factor' laws in the context of autonomous vehicles. For instance, one of the submissions indicates that even in cases of fully autonomous vehicles, there will be need for laws to ensure that at least of the occupants (who would provide the destination) should not be alcohol or drug impaired.

- *What are the implications for drink and drug driving laws, in so far as you have considered those?*

Response

Detailed review of the implications of autonomous vehicle technology for drink and drug driving laws has not yet been undertaken. Under the Road Transport Act 2013, drivers or persons occupying the driving seat of a motor vehicle on a road can be required to submit to roadside drug and alcohol testing, and relevant offences and penalties apply. This includes drivers of current vehicles that incorporate different levels of automation.

The Government submission outlines the likelihood that a mixed-fleet with different levels of technology will prevail on NSW roads for a number of decades, and drink and drug driving laws will continue to be important in the immediate and mid-term future. For drivers using automated vehicle technology that can require driver intervention (less than full automation), there is a strong need to ensure decision making and driving skills are not compromised by drugs and alcohol.

As new technologies with higher levels of automation emerge, factors that influence drink or drug driving behaviour may change, or other risky behaviours associated with drink and drug driving emerge. This may affect how we structure offences and penalties to address 'new' road safety risks or the changed driving context.

Ultimately, it is important that the very significant benefits achieved by NSW drink and drug driving policy over the last 35 years are not compromised. Clear and unambiguous evidence that fully autonomous vehicle technology can comprehensively address the risks would be required to support changes that weaken, or are perceived to weaken, drink and drug driving laws.