INFRASTRUCTURE VICTORIA

Mr Marcus Burke
Project Director
Automated Vehicle Program
National Transport Commission
Level 3/600 Bourke Street
MELBOURNE VIC 3000

Dear Mr Burke,

Submission to 'Regulating government access to C-ITS and AV data' discussion paper

Infrastructure Victoria is pleased to provide this submission to the National Transport Commission in response to the 'Regulating government access to C-ITS and AV data' discussion paper.

Infrastructure Victoria is an independent advisory body operating under the *Infrastructure Victoria Act 2015*. It was established to take a long-term, evidence-based view of infrastructure planning and raise the level of community debate about infrastructure provision.

Advice on Automated and Zero Emissions Vehicles Infrastructure

In 2017, the Victorian Government asked Infrastructure Victoria to provide advice on what infrastructure might be required to enable both highly automated and zero emissions vehicles in the state. Our advice was delivered to the Government in October 2018, and is available on the Infrastructure Victoria website: www.infrastructurevictoria.com.au/AVadvice.

We consider the findings of Infrastructure Victoria's advice to be highly relevant to the context of C-ITS and AV data requirements and regulation currently being considered by the NTC. Our work did not specifically focus on privacy issues, as we were aware of the important work that the NTC is undertaking in this area. However, we made a number of evidence based recommendations around data collection, management, integration and governance to maximise the benefits of automated vehicles. Our recommendations and evidence highlight the importance of governments having access to some data sets if the social, economic and environmental benefits of connected and automated vehicles are to be maximised.

ICT infrastructure and data recommendations

To support the implementation of our advice, and ensure Victoria is prepared for the emergence of automated and zero emissions vehicles, Infrastructure Victoria made 17 recommendations to the Victorian Government. These recommendations cover transport, ICT infrastructure and data, energy, planning, waste and monitoring and coordination. Our research and recommendations on ICT are of particular relevance to the NTC's current consideration of C-ITS and AV data access by governments.

Infrastructure Victoria made the following ICT infrastructure and data recommendations as part of our advice:

- **Share more data:** Expand the availability of open, real-time information on government-owned transport system data and establish principles for data sharing between government and commercial transport service providers.
- **Integrate transport management:** Develop integrated transport management to enable better real-time coordination of the system across all transport modes, including network management of connected automated vehicles.
- **Boost ICT infrastructure:** Promote investment in ICT infrastructure where there is a safety and/or optimisation requirement for automated vehicles that the market is unable to satisfy commercially.

In particular, our recommendations to share more data and integrate transport management have implications for data access and privacy.

Share more data

Our work strongly indicated that both the provision of more open, real-time data on government-owned transport systems and agreeing principles for sharing data between government and companies operating automated vehicles will help to promote transport system efficiency, fair market competition, integration, consistency and user privacy.

We recommended that the Victorian Government initiate the following actions now, and review again in one year to measure progress and test ongoing relevance:

a) Review open data policies across all transport services to incorporate preparations for automated vehicles and new service models.
b) Ensure open data policies across all transport services account for quality, relevance and currency of data for automated vehicles and new service models.
c) Expand the availability of open, real-time public transport information, including passenger loading data, across the metropolitan and regional networks covering all modes, as recommended in our 30-year Infrastructure Strategy.
d) Agree data-sharing requirements and protocols with commercial transport service providers for network planning and performance improvement. These requirements and protocols could be implemented through the regulatory regimes that apply to commercial transport service providers.
e) Expand the availability of integrated ticketing, payment and sales systems to include public transport operators and third-party providers.
f) Consider how to alert connected vehicles to the presence of emergency vehicles.
g) Explore physical and digital technology solutions to communicate both planned and unplanned maintenance to connected vehicles.
h) Work with automated driving system manufacturers to confirm requirements and opportunities for data sharing to support a centralised traffic management approach.
i) Work with automated driving system manufacturers, public transport operators and other service providers to ensure open data and machine readable information requirements are reflected in agreements and APIs, and that available data is fit for purpose. The whole-of-Victorian Government API gateway could serve as a platform to help implement this.

Integrate transport management

Our research found that to achieve the potential benefits of automated vehicles, they will almost certainly need to connect to each other and/or to certain types of infrastructure. Realisation of the full benefits is likely to depend on an integrated approach to transport management to optimise traffic flow in busy areas. Infrastructure Victoria's 30-year Infrastructure Strategy, Plan Melbourne 2017-2050 and our technical analyses all highlighted the importance of an integrated transport system in addressing congestion and meeting the needs of Victoria's growing population.

We recommended that the Victoria Government do the following now:

a) Expand the availability of open, real-time information on government-owned transport data and establish principles for data sharing from automated driving systems manufacturers.

We also recommended that the following actions be taken once connected, automated vehicles are ready for optimisation. We suggest reviewing the market in 5 years' time to check if this has occurred:

b) Engage with automated driving system manufacturers to confirm requirements and opportunities to integrate automated vehicles into a centralised transport management approach.

c) Develop principles for data providers' accountability around data quality, device availability, timeliness/currency of data delivery, redundancy and fault tolerance.
d) Assess privacy concerns and develop a plan to address these in the context of fully integrated transport and centralised management, such as mechanisms that grant confidentiality or encryption.

ICT infrastructure technical report and findings

To inform the development of our advice, Infrastructure Victoria commissioned expert research in ten different areas, including ICT infrastructure and data. WSP completed a comprehensive technical report on the potential ICT infrastructure needs for implementing automated and zero emissions vehicles, with the following objectives:

1. Identify the minimum and optimal ICT requirements to enable automated vehicles in a defined range of uptake scenarios, and the gap between existing/planned ICT infrastructure capabilities and usage in Victoria, with all assumptions explicitly identified. The minimum assessment addressed the minimum possible ICT infrastructure to still ensure safe AV operation on critical Victorian roads, while the optimal assessment identified required ICT infrastructure to ensure vehicles could run optimally for most trip distances incorporating networks efficiencies, and the best use of existing assets.
2. Identify enablers, barriers, opportunities and risks of ICT infrastructure in automated vehicle uptake scenarios.
3. Provide a summary of infrastructure responses for potential automated vehicle uptake scenarios.

This report is available to download at: yoursay.infrastructurevictoria.com.au/download_file/303/380.

The 'minimal or optimal requirements' identified to support automated vehicles were:

- **Focus on the wider benefits:** While much of the focus of automated vehicle development is on the benefits of reducing accidents and making travel safer, our research has also identified that there are significant potential benefits for the operation of our road networks. Automated vehicles that are connected to each other and potentially to infrastructure could travel much more efficiently on our roads, resulting in significant improvements to road operation. Adding in the potential for shared automated vehicle fleets, could result in significantly improved performance on our roads. Planning and preparing for these opportunities is critical to achieve the full potential benefits of these vehicle technologies.
- **Need for radical change in approach to integrated transport management:** The nature and role of integrated transport management and the systems that support it will change. Automated vehicles are likely to become an increasingly important aspect of transport systems, allowing the operator to proactively predict and manage the network (with connected automated vehicle or shared fleets) via machine learning and potentially artificial intelligence. This would enable optimal network performance with connected vehicles.
- **Roadside ICT infrastructure:** WSP believes the existing roadside ICT infrastructure in Victoria is adequate for the introduction of automated vehicles, provided critical infrastructure is updated over time, with prioritisation for traffic signal controllers and tunnels management systems in critical network locations. A separate study into the specific requirements for these updates is suggested as this technology continues to evolve and mature.
- **Optimising vehicles on the network:** WSP recommends an extended industry liaison period before committing to any significant vehicle-to-infrastructure or V2X rollout funding. Instrumentation in critical infrastructure such as tunnels and bridges may be considered for funding on a case-by-case basis. In the short-term, WSP recommends investment in trials for these technologies so that future benefits are realised and industry and government roles are well understood. Based on today's costs, WSP estimates that, by 2046, the capital expenditure would need to be in the order of magnitude of $40m for a minimum rollout of V2X and $205m for optimal deployment (2018 dollars).
- **Improve mobile network coverage**: To fully realise the benefits of automated vehicles across Victoria, WSP suggests that the cellular data network would need to be extended to all sealed

roads. This is projected to increase the number of towers required 15-fold to 2,098 towers covering an additional 14,731 kilometres of road network at an estimated cost of about $1.1-$1.7 billion. While a significant proportion of this coverage is expected to be provided by commercial operators to address demand, the Victorian Mobile Black Spot Project and Australian Mobile Black Spot Program, which invest in telecommunications infrastructure to improve mobile coverage along major regional transport routes and in regional communities can also help support the introduction of automated vehicles in regional areas.

- **No need to upgrade backbone links:** Over the next three years, average network data speeds are estimated to increase from 18.8Mbps to 43.6Mbps. Average data traffic per capita per month is estimated to increase from 42.5GB to 125.8GB. WSP has estimated that, at most, the average automated vehicle would seek to transmit 500MB of data per month (mainly cellular) which is a fraction of the overall network use. Backbone links are therefore expected to be suitable to support this use, given the future given expansion of 4K video and other entertainment needs that network providers will also seek to support. Therefore, no significant infrastructure cost should be assigned to expanding backbone links based on current information. Further sensitivity analysis that even if modelled growth of traffic per vehicle increased a hundred-fold, there would still be no need to upgrade backbone ICT infrastructure.

Summary

In summary, we encourage the National Transport Commission to review the work completed in this area to date by Infrastructure Victoria to help inform policy development. The evidence base we developed on automated and zero emissions vehicles now forms the most comprehensive body of evidence in Australia, if not the world. In particular, our work shows the provision of more open, real-time data on government-owned transport systems and agreeing principles for sharing data between government and companies operating automated vehicles will help to promote transport system efficiency, fair market competition, integration, consistency and user privacy. Regulation of government access to C-ITS and AV data should balance privacy considerations with the importance of governments having access to some data sets if the social, economic and environmental benefits of connected and automated vehicles are to be maximised.

Thank you for the consideration of this submission. We would be pleased to meet with you to further discuss the submission and intersections between the NTC's work and that of Infrastructure Victoria. If you would like any further information, please contact Dr Allison Stewart, Project Director, on (03) 9936 1735 or allison.stewart@infrastructurevictoria.com.au.

Yours sincerely

Michel Masson
Chief Executive Officer
15/11/2018.