COUNCIL OF CAPITAL CITY LORD MAYORS

PARLIAMENTARY INQUIRY INTO AUTOMATED MASS TRANSIT

House of Representatives Standing Committee on Industry, Innovation, Science and Resources

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Council of Capital City Lord Mayors

8 Geils Court, DEAKIN, ACT Ph: 02 6285 1672

Email: info@lordmayors.org

Note: This correspondence sets out the views and commentary of the CCCLM, but does not necessarily represent the full agreement of all participating councils.

The Council of Capital City Lord Mayors (CCCLM) appreciates the opportunity of providing comments to the House of Representatives Standing Committee on Industry, Innovation, Science and Resources inquiry into automated mass transit.

The CCCLM represents the interests of the Lord Mayors (and the ACT Chief Minister) of Australia's eight capital cities. Australia's capital cities drive national economic growth, innovation and creativity. Capital cities are home to over 77% of our population, employ 69% of Australia's workforce producing 70% of our GDP – accounting for almost one thousand two hundred billion dollars of economic activity during 2016-17.

We welcome the Federal Government's initiative in commencing dialogue on the introduction of automated mass transit in Australia, we are confident that outcomes of this inquiry will contribute to the development of an appropriate environment that encourages and facilitates delivery and operation of automated of mass transit systems.

We offer the following comments, and note our interest in remaining part of the discussion as the development of policy for the introduction of automated mass transit systems in Australia evolves.

In most instances, local government is not responsible for mass transit planning and operation. Despite this, city councils and the ACT Government are actively considering the role of automated transport in their policies, strategies and planning decisions. We believe national coordination is vital for their safe deployment.

National coordination will ensure consistency of policy and assurance of safety regardless of location or operating environment, and enable cross-jurisdictional collaboration. Most of our cities are participating in national conversations around safely bringing this technology to market and will continue to keep a close watch on global and national developments in the automated transport space.

RAIL MASS TRANSIT

City councils are not directly involved in the development and operation of rail mass transit but we note the development of driverless rail mass transit in Australia, and the implications for existing systems operating in capital cities.

Autonomous heavy rail mass transit is new to Australia (for example, the new Sydney Metro) however is relatively more mature in global markets with over 1000km of networks (examples include Dubai, London, Singapore and Vancouver).

Autonomous technology has the potential to improve safety, increase service reliability, maximise capacity and reduce travel times for rail-based mass transit. While autonomous heavy rail mass transit has many benefits, the rail corridors in which they operate are required to be fully segregated from all other potential conflicting modes and movements (for example pedestrians, cyclists and other vehicles).

As with road vehicles, automation is a spectrum. There are many opportunities to modernise aspects of rail operation – such as signalling – to improve reliability and capacity, without transition to fully automated (driverless) mass transit.

Only recently has autonomous light rail mass transit been tested in Germany. While this technology is in its infancy, it has the potential to improve operating efficiencies and reduce operational costs.

ROAD MASS TRANSIT

Fully-autonomous road-based mass transit has not yet reached a level of maturity to be rolled out for use on public roads, however, the technology currently trialled in private vehicles and small shuttle buses does have the potential to be upscaled to full sized buses. Despite significant optimism about their potential in the early 2000s, non-rail guided busways have had limited application.

Light rail services have the ability to operate in mixed traffic as well as dedicated corridors. Automation of these modes, while possible, will need to carefully consider operations in mixed environments and the potential infrastructure upgrades required to enable automation, as well as the potential to reduce conflict by minimising general traffic where appropriate. In these environments, specific attention is required to protecting people walking, gathering in places or riding bikes. Attention will also need to be made to the accessibility and walkability of the precincts that the rail corridor passes through.

ADELAIDE

Adelaide has a unique Bus Rapid Transit (BRT) system that connects major regional centres with the City. The Adelaide 'O-Bahn', a high speed, high frequency guided busway operates in a mixture of dedicated fully segregated corridor and interchanges, to dedicated bus lanes and mixed traffic conditions.

Adelaide's O-Bahn has many similar characteristics to light rail, and would be a good contender to trial and test autonomous technology to enable closer headways through platooning (less than 20 seconds), improved safety and improve operations. The O-Bahn buses are equipped with anti-collision detection systems with automatic breaking to provide improved safety at high speeds.

There has been recent interest from Adelaide Councillors in pursuing trackless trams as an alternative to light rail, without the level of disruption caused by the construction of tram tracks. Investigations and opportunities for development will be explored going forward with specific regard to their autonomous possibilities.

BRISBANE

Brisbane City Council proposes to upgrade Brisbane's public transport system with the introduction of Brisbane Metro. Brisbane Metro is a high-frequency mass transit system that will cut travel times, reduce Brisbane central business district (CBD) bus congestion and improve services to the suburbs. Two Brisbane Metro routes are proposed as shown in Figure 1; Metro 1 – Eight Mile Plains to Roma Street, and Metro 2 – Royal Brisbane and Womens Hospital (RBWH) to University of Queensland.

Brisbane Metro is included on Infrastructure Australia's Infrastructure Priority List as a high priority project, and the Australian Government has committed to part funding the project. The project is now in procurement phase.

Brisbane Metro will deliver a new fleet of 60 Metro vehicles, each able to carry up to 150 passengers (see Figure 2). Council will be assessing a range of vehicles from Australian and international suppliers to determine their suitability for the project. The Metro vehicle fleet will expand over time to accommodate growth and demand for services.

Metro vehicle features include Wi-Fi connectivity and customer information systems to provide real-time travel updates and voice announcements of the next station.

The energy source for the vehicles will be determined through the procurement process which has commenced. Consultation with industry has already revealed a number of options.

Although automated (ie. driverless) operation is not being considered for the first stage of Brisbane Metro, however, it is likely to be an option for future stages. Brisbane Metro will introduce new vehicle and passenger management systems to improve the efficiency and reliability of busway operations and provide a better experience for customers. System features include:

- dynamic vehicle bay allocation at Metro stations
- real-time vehicle location and travel updates
- passenger information displays and voice announcements
- Wi-Fi connectivity
- access to real-time travel updates.

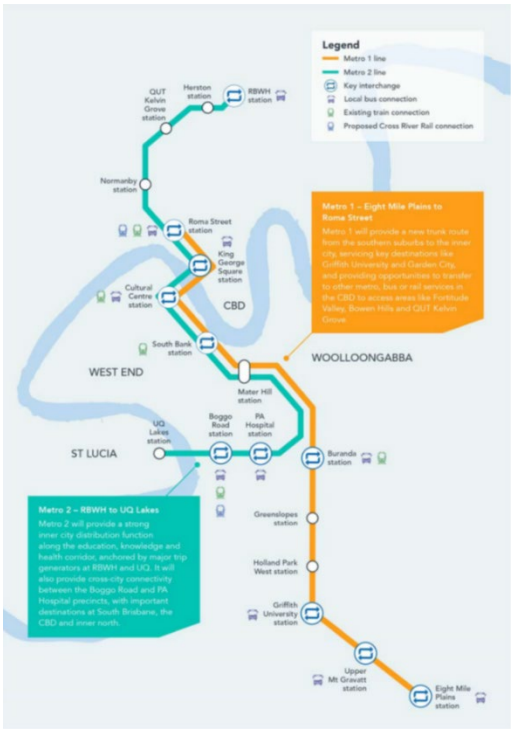


Figure 1 - Brisbane Metro Routes

Figure 2 Concept Metro Vehicle (artist impression)

POINT TO POINT AND LAST MILE TRANSPORT USING AUTONOMOUS VEHICLES

Much work remains to be undertaken by governments at all levels to put in place legislation and policies to ensure that the introduction of automated vehicles lead to positive outcomes including safety of all road users and reduced congestion.

For example, Brisbane City Council, in collaboration with the Queensland Government's Department of Transport and Main Roads, is considering the future congestion impacts of automated vehicles on the Brisbane network. At this stage the impacts are highly dependent upon the scenarios under consideration, including the uptake and the degree to which automated vehicles may be shared.

Widespread deployment of automated vehicles is not foreseen in the short or medium term. In the meantime, development of Cooperative Intelligent Transport Systems (C-ITS) offers substantial advances in safety and congestion management. The Cooperative and Automated Vehicle Initiative (CAVI), being conducted by the Queensland Department of Transport and Main Roads, and the trials being conducted by Transurban in the Brisbane metropolitan area will provide Council with insights on the way forward in developing systems on its own network.

With the appropriate operating environment, automated vehicles present considerable opportunity for cities. Evidence suggests that shared vehicles will reduce the need for bus services, as private or shared alternatives replace bus operations. This could result in greater development of housing without car parking and increase activation and safety in streets as people use shared services. Evidence of this has already been seen with the introduction of Uber and other ride sharing services. As automated vehicles become more widespread, they are expected to drive down costs, which will in turn dramatically improve accessibility and economic activity in our city centres.

Peri-urban developments are increasingly suffering from a lack of coordinated and economically viable public transport provision, to provide frequent, convenient, reliable and secure public transport options. These areas also typically comprised of those who can least afford to rely on private vehicle travel, based on demographics and census data analysis.

In other areas, physical constraints including narrow corridors and terrain difficulties prevent regular public transport vehicles from achieving walkable catchments. With existing public transport networks unable to provide sufficiently fine-grained services, especially to those experiencing temporary or permanent mobility impairments, traditional public transport will need to adapt to meet the needs of their customers and to encourage alternative and sustainable modes of transport.

Figure 3 below outlines the types of mobility impairments and how it implicates movement distances.

Type of disability	Percentage unable to move more than the stated distance m				
	18	68	137	180	360
People who use wheelchairs	0	5	5	60	85
People with vision impairment	0	0	5	50	75
People who use walking aids	10	25	40	80	95
Ambulatory people	5	15	25	70	80

Figure 3: Demonstrated ability of people with disabilities to move more than a stated distance without a rest. Source: AS1428.1-1992

A lack of affordable and accessible transport creates a key risk for social exclusion.

Mobility has also been identified as a key factor in healthy ageing, which given current demographics, is crucial for Australia's wellbeing and economic outlook.

The advent of driverless shuttles for point-to-point or point-to-transit services, presents an economical way of covering distances too short to travel by private vehicle but too far to walk, as well as providing for public transport penetration into areas with challenging topography.

It is expected that, in the majority of cases, autonomous transport will be fuelled by electricity or other zero emission fuel sources. Our cities are committed to renewable energy, and for example, the ACT Government are committed to fully renewable energy by 2020 and zero emissions by 2045, and its action plan includes support for the transition to electric vehicles.

Electric (including Hydrogen Fuel Cell) buses will provide considerable benefit to cities. Currently the noise and vibration of buses reduces the appeal of city streets, particularly for alfresco etc which reducing liveability of our cities. Buses operating on electric power trains do not have these impacts and would therefore enhance the city environment. The same can be said about pollution, with diesel buses increasing the level of particulates in the air. This is particularly problematic around tourist destinations given the perception of Australian cities being a clean healthy alternative of international visitors.

Fuel cell vehicles cannot be introduced without refuelling infrastructure. The market will not provide refuelling infrastructure without potential customers. The Commonwealth needs to address this issue by:

- setting National standards for autonomous vehicles to ensure that they can traverse across the country
- ensuring current policies do not impede upon the introduction of autonomous vehicles, including potential impacts on the insurance industry.

COMMONWEALTH ROLES AND RESPONSIBILITIES IN THE DEVELOPMENT OF THESE TECHNOLOGIES

As new autonomous vehicles enter the market (for both private and public use), the Commonwealth Government must provide leadership with regard to safety, regulation, vehicle design (manufacturing standards), compatibility and infrastructure standards. This will also need to include data and communications between vehicles and infrastructure (Vehicle to Vehicle – V2V and Vehicle to Infrastructure – V2V), data sharing policy and regulations, cyber security and infrastructure readiness.

We understand that the Transport and Infrastructure Council is currently considering national coordination needed in this space.

Additionally, the CCCLM supports the role of the National Transport Commission (NTC) in developing a national policy approach and harmonised state and territory legislation to facilitate successful introduction of automated vehicles into Australia. We consider the appropriate role of the Commonwealth is to:

- establish a single agency, separate to existing Commonwealth agencies, to administer the safety assurance system and apply sanctions and penalties that are specific to safety assurance
- facilitate (in consultation with state and territory governments) national standards development
- facilitate a uniform approach on limiting government collection, use and disclosure of information collected by C-ITS and automated vehicles
- undertake national policy and economic reforms (eg road pricing, taxation reforms) in consultation with state, territory and local governments, to facilitate the uptake of electric and automated vehicles.

MOBILITY-AS-A-SERVICE (MAAS)

A key to influencing travel choice and supporting public transport modes in a driverless future will be the development of an independent and mode agnostic Mobility-as-a-Service (MaaS) application. MaaS has

been extensively discussed around the world as a method to improve access and information to customers about the varying and available transport options. MaaS has the potential to reduce private vehicle reliance and should be used as a tool to encourage/incentivise active and shared (public) transport choices over other modes.

The New Zealand Transport Agency is locally leading the way in this field with the Government-led Mobility Marketplace, which aims to provide a complete one stop shop for all personal transport needs with a future ability to provide credit for active travel choices to be spent on other transport options when required. It is also providing a tremendous source of data to assist in prioritising services, identifying service and infrastructure gaps and evaluating transport projects.

MaaS led at a National level would provide a consistent platform across Australia, support sustainable public and active transport and provide a database for bodies such as Austroads and Infrastructure Australia to further advance transport knowledge and support the prioritisation of national transport infrastructure funding. It would also provide a useful tool for tourists navigating our vast Country and linking in to nearby tourist attractions, similarly to what has been produced for Queenstown, New Zealand.

PREPARATION FOR CONNECTED AND AUTONOMOUS VEHICLES

Connected and Autonomous Vehicles (CAVs) are vehicles that are connected using many communication technologies to communicate with the driver, other cars and roadside infrastructure including mass transit vehicles.

As the adoption of CAVs increases and their technologies improve, opportunities arise to develop data systems that draw upon the information generated by their onboard systems and integrate their use into public transport, including:

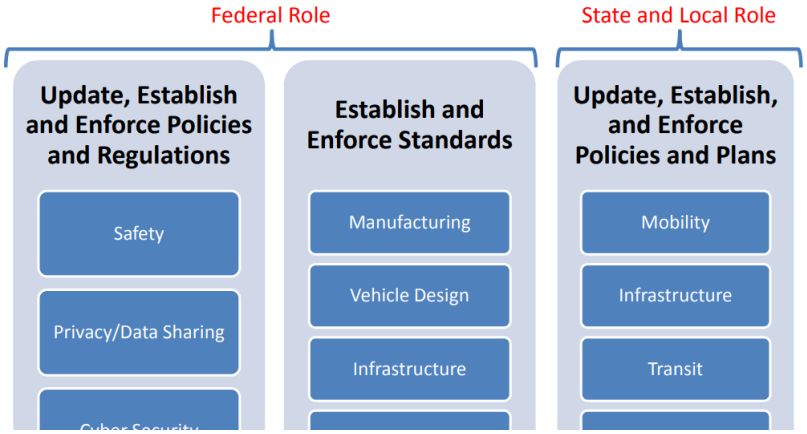
- Smart infrastructure that communicates with connected vehicles, such as:
    - Wrong Way Detection – apply real-time CAV data to support wrong way detection, prevention systems and driver information/warnings.
    - Queue Management – use real-time CAV data to warn approaching vehicles of an impending queue to avoid rear-end crashes, as well as advising of alternative routes and modes.
    - Signal Phasing and Timing – integrate real-time CAV data with local traffic signal controllers to optimise signal phasing and timing plans, that could prioritise mass transit vehicles.
    - Curve Warning – apply real-time CAV data to activate dynamic curve warning signs where travel speeds exceed acceptable thresholds for vehicles. The warning system should be able to detect speed and vehicle classification to determine whether illuminated warning signs should be triggered.
- Incorporating automated buses as part of transit fleets to provide flexibility in operating within a demand responsive mode or along fixed routes.

Considerations that may require national standards and policy include:

- Developing of mass transit corridors and their dedication
- Prioritising the movement of people over vehicles and providing a mode agnostic approach with a greater emphasis on public transport services and infrastructure

- Addressing the potential challenges of empty vehicle kilometres by autonomous vehicles and added network congestion which has the potential to impact on mass transit vehicles and services.
- Safeguarding the transport network for technology enhancements, efficiency improvements and safety
- Addressing the costs associated with upgrading transit fleets to new emerging vehicle types
- Phasing and introducing autonomous mass transit vehicles and their interaction with mixed vehicle types
- Ensuring flexibility and adaptability of emerging technologies while also standardising requirements for transport and infrastructure
- Lowering the cost of implementation for both vehicle and infrastructure components
- Developing positions and standards for the design of the urban form and buildings, including planning reforms to future proof spaces in buildings as private vehicles are phased out, including adaptive reuses of spaces allocated as car parks.

The proposed role of both Commonwealth and State Governments has been identified in a recent publication from WSP on Driverless Vehicles. A similar approach should be adopted by Governments for autonomous mass transit.



Proposed Government Role in Driverless Vehicles from L Isaac 2016 "Driving Towards Driverless: A Guide for Government Agencies" WSP

CONCLUSIONS

Autonomous mass transit has the potential to significantly improve the provision of service to Australian cities. Autonomous mass transit can increase accessibility and coverage, reduce social exclusion while improving connectivity and reducing costs for the provision of services.

The Commonwealth Government needs to play a key role in the regulation, standardisation and control on the various elements of autonomous mass transit to ensure that future mobility is inclusive, serve the needs of our communities and maximises the efficiency of our cities.

We are supportive of the role automated mass transit (including autonomous vehicles) can play in our future transport network. The progressive automation of transport fleets is considered inevitable, and the

infrastructure and policy need of an automated future must be considered now. National support for automation will signal Australia's suitability as a testbed for the industry, invite innovation and collaboration, and allow us to trial infrastructure and policy solutions at an early stage.