



*Australia &
New Zealand
Driverless Vehicle
Initiative*

Thought Leadership Paper Integrated Transport Planning

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This paper represents a Thought Leadership position of the Australia and New Zealand Driverless Vehicle Initiative (ADVI) as a collaboration of its partners. It does not purport to reflect the position of individual partners nor commit them to a particular direction or technology position.

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Executive Summary

Most Australian motorists agree that the arrival of fully autonomous vehicles is now a matter of when, not if. While older drivers may fondly remember the halcyon days of manual windows, drum brakes and the arrival of seatbelts, today's motorists enjoy modern vehicles packed with the latest safety technologies and comfort features as standard.

But what hasn't kept pace with technology are the future planning approaches used to keep an integrated network flowing efficiently.

Urban and regional transport planners continue to rely on age-old quantitative data sets to inform future infrastructure investment. But when confronted with such fast-paced technology changes - especially in the realm of driverless cars - how can today's planners confidently develop future solutions when the data they traditionally draw on doesn't yet exist?

In coming years, transport planning must evolve into a more 'integrated' process that embraces a much larger view of mobility, and consider the changing transport options of users – especially with predictions of a decline in car ownership.

Future transport planning in the age of autonomous vehicles doesn't have to resort to crystal ball planning for solutions. Australia can draw on efforts currently underway in many other countries, and embrace the Mobility-as-a-Service concept as a first step towards incorporating automated vehicles into the transport mix.

A co-ordinated approach is critical

ADVI believes that Governments should adopt a nationally co-ordinated approach to future transport system planning that includes automated vehicles – a move supported by the Transport and Infrastructure Council in its National Policy Framework for Land Transport Technology.

To modernise traditional transport planning approaches, planners will need to embrace well-based assumptions in the short-term transition rather than initially rely on established quantitative data to shape future infrastructure investment decisions.

And finally, the gradual introduction of fully autonomous vehicles of all types within the next 10-20 years must be considered as part of future integrated mobility patterns.

Autonomous vehicles will impact planning

The mindset of what is considered as a road 'upgrade' must shift from being focussed on the physical space to the interface between vehicles and infrastructure. Autonomous vehicles are likely to add pressure to maintenance processes due to their reliance on accurate road markings and signage.

While the demand for mass transit will continue, autonomous vehicles could offer significant cost advantages over public transport, especially when point-to-point transport becomes more readily available.



Vehicles will share space more safely with vulnerable road users such as cyclists and pedestrians. Whether it is parking planning, freight systems or intermodal terminals, the advent of this new vehicle type is sure to have a fundamental influence on future city designs and grid patterns.

Debate and discussion must occur

This paper articulates issues that ADVI believes will impact transport planners and their future focus. While some points may be embraced and others debated, now is the time to challenge the status quo.

Either way, it is critical that everyone enters this discussion with an open mindset and a willingness to consider change - because not fully considering the ramifications of driverless vehicle technology could see Australia facing far-reaching and costly consequences.

Background

With Australia's population expected to grow to 30.5 million by 2031 there can be little doubt that rising urban congestion levels will present a huge challenge in the years to come. When compared to 2011 figures, the cost of traffic delays are expected to grow by a staggering 290% - or \$53.3 billion – by 2031¹.

Adding to network demands, Australia's freight task by 2020 is expected to be double what it was in 2006. By 2050, it will be triple its current size, correlating with national GDP growth, as well as Asian and intrastate demand.

To accommodate these increased volumes it is essential to have greater collaboration in transport planning to ensure the Australian taxpayer's investment delivers the best return to the national economy.

The basic principle of urban and regional transport planning has remained unchanged for decades, and involves quantitative analysis of data to inform policy and decision-makers about future investments in infrastructure to make the transport system and the surrounding land use work together.

While the car remains one of the main transport modes, transport planning has evolved into a more 'integrated' process that takes a larger view of mobility, and gives due consideration to different transport options for users wanting to access workplaces, retail, services, leisure and other destinations of travel. Integrated land use and transport planning is now a core consideration for Australian capital cities.

However, medium to long term planning of transport is still based on the assumption that future transport needs and methods, including vehicle technologies, will continue to remain the same. That is in contrast to society's rapidly changing perception of the car as the preferred mode of travel, and a decline in private car ownership.

With cost issues, environmental pressure and social preferences influencing more people to choose other transport options rather than going down the traditional path of obtaining a driving licence or buying a car²³, vehicle technology is also rapidly progressing - with most car manufacturers now planning to offer automated (or driverless) vehicles by 2020.

While still a relatively new concept in Australia, Mobility-as-a-Service (MaaS)⁴ is starting to pick up in other parts of the world, particularly in Europe. Incorporating automated vehicles into the mix of transport choices, would make MaaS substantially more attractive than owning a car and would contribute to the rapid decline of car ownership in the coming years.

¹ Australian Infrastructure Audit – Our Infrastructure Challenges, April 2015

² Raimond, T. and Milthorpe, F. *Why are young people driving less? Trends in licence-holding and travel behaviour* Australasian Transport Research Forum (ATRF) 2010 Proceedings, Canberra, Australia, 2010

³ <https://chartingtransport.com/2015/03/09/trends-in-drivers-license-ownership-in-australia/>

⁴ An alternative to personal ownership of cars, which provides mobility solutions as a service by unifying all available transport options through a single gateway that manages the trip. Users can pay via a monthly or pay-as-you-go subscription.

These changing dynamics mean that driverless technology could potentially be commonplace by 2030. That must be considered in the context that a recent United States survey found that out of 68 of the country's largest cities only 6% had regional transportation plans that considered the potential impacts of automated technology⁵.

It is timely for Australian state and territory governments to better understand how this technology could be embedded in their current long term plans. New major planning initiatives, such as Plan Melbourne Refresh (2016), Southeast Queensland plans submissions (2016) and Growing Sydney district plans (2016), do not consider use of automated vehicles. Transport authorities must start to consider how future infrastructure investments will ensure that automated vehicles are included in the integrated transport planning process.

ADVI Proposal

The ADVI proposal has a focus on three key points:

1. Governments must adopt a nationally co-ordinated approach to future transport system planning that includes automated vehicles.

There must be consensus and understanding among public and private sector stakeholders that the adoption of automated and driverless vehicles on the national transport network will be led by a fast-paced consumer environment.

ADVI proposes the Council of Australian Governments (COAG) should set out a national agenda that embeds automated vehicle implications into integrated transport and land use strategies. In its recent communique, the Transport and Infrastructure Council agreed to a National Policy Framework for Land Transport Technology which ensures that all levels of government undertake a nationally consistent approach that *'will reduce costs, provide certainty to industry, promote innovation and competition and ensure that Australians have early access to the newest technologies'*.⁶

This framework highlights a three-year action plan that outlines the national priorities for implementing new transport technologies⁷. Similarly, Roads Australia (RA) recognises that the impact of this technology is massive and requires a single national approach, and *'encourages the national co-ordination of the roll-out and management of automated and driverless vehicles'*.⁸

⁵ National League of Cities, *City of the Future: Technology & Mobility*, 2015

⁶ Transport and Infrastructure Council Communique, 4 August 2016

⁷ Transport and Infrastructure Council, *National Policy Framework for Land Transport Technology, Action Plan: 2016-2019*, August 2016

⁸ Roads Australia, *Preparing for our automated and driverless future*. Discussion Paper – National Summit on scope of automated vehicles, July 2016

2. Assumptions and parameters used in transport planning must be updated.

Because this is new technology there is little real-world data that can be used, so quantitative processes involved in transport planning (e.g. transport modelling) will need to initially rely on assumptions.

Because transport planning typically involves demand forecasting, a key challenge is to ensure assumptions have sufficient basis to avoid gross inaccuracies that could ultimately lead to wrong policy decisions. Transport authorities must start to reimagine their current long term transport plans and review the processes that led to their development.

3. New mobility 'ecosystems' are integrated with transport planning.

Whether it is in a passenger or freight context, autonomous vehicles must be considered as part of integrated mobility patterns. With land use planning influenced by the optimum utilisation of all transport modes (including automated vehicles) and existing infrastructure (roads, public transport, active transport), there must be greater collaboration to ensure positive user experiences and achieve best value for the Australian economy during and after the transition to automated and driverless vehicles.

Discussion Points

The following issues must be considered as part of current planning, and are generally based on those fully automated vehicle capabilities which are expected to be realised within a 10-20 year timeframe:

- In future, road 'upgrades' may not mean increasing the physical space for vehicles but focus on improving the interface between vehicles and infrastructure (i.e. V2I). This could also mean added pressure to maintenance processes as automated vehicles rely heavily on accurate road markings and signage. With automated vehicles expected to communicate with each other, existing road space could be used more efficiently.
- Transitioning the network to an automated and driverless future should be an immediate priority. Prioritising automated corridors and routes across a growing and integrated transport network requires an agile immediate-long term strategy. This could include retrofitting existing infrastructure to incorporate new technology or maximising valuable road space for all types of users. Consideration should also be given to the requirements of different road types – e.g. urban roads vs rural highways, arterial roads vs local streets.
- Automated vehicles should be added as a new mode in transport models. Model inputs and forecast assumptions need to be reviewed and modified over time to get the input parameters right. The transport modelling process may need to be overhauled, with consideration given to replacing the current four-step method (trip-based) with another method, such as an activity-based model.

- Availability and use of automated vehicles could lead to the evolution of public transport systems. While the need and demand for mass transit is likely to continue, there may be more differentials to levels of service and pricing for different demographics, and the distinctions between different service types (rail, buses, taxis and car sharing) may become increasingly blurred. There could be significant cost advantages of automated vehicles over public transport, especially when point-to-point transport becomes easily and readily available. Public transport infrastructure built with significant capital cost could be severely under-utilised, so it is critical for investments to be future-proofed so that they can be repurposed at minimal cost.
- Automated vehicles will create a safer environment for active travel. Vehicles will share space more safely with vulnerable road users such as cyclists and pedestrians, and automatically stop or slow down to avoid accidents. Safety in urban public spaces will be greatly improved due to complete compliance of road rules from next generation vehicles. However, the greater convenience of automated vehicles could potentially encourage a reduction of people engaging in active travel modes such as walking or cycling. Future planning processes should ensure that driverless vehicles and active transport are complementary rather than competing.
- Parking planning and allocations will drastically change. With automated vehicles able to park themselves, cheaper parking sites can be selected, which makes it possible for existing parking spaces at high value locations to be used for something else. As car sharing becomes more common, metropolitan areas are likely to be dotted with satellite shared parking sites or mini depots to ensure response times to users are minimised.
- Driverless vehicle technology could influence the design of cities and grid patterns. Current urban planning practice encourages compact land developments and promotes public transport and active travel to minimise car-dependency. With the advent of automated vehicles, this basic principle of densification could change.
- Regional and rural communities should be able to take advantage of the benefits of driverless technology. As an example, access to economical public transport can be made via locally-based automated vehicles.
- Freight systems and intermodal terminals should be designed to adopt automated vehicles and platooning for national and local freight and supply chains to fully realise freight productivity benefits.
- While the evolution of MaaS is becoming increasingly probable, consideration must be given as to who controls this future. This change in societal behaviours and transport 'use and ownership' needs to be accommodated institutionally and physically.
- The use of automated vehicles will occur and transition gradually, and in no chronological order. While there will not be an overnight switch, the need to accommodate such a change will be immediate – which is why it is important to plan for this technological evolution to ensure the interim period does not lead to later problems.

Summary

In summary, the following are ADVI's key position points:

- **Governments should adopt a nationally co-ordinated approach to future transport system planning that includes automated vehicles;**
- **Assumptions and parameters used in transport planning must be updated;**
- **New mobility 'ecosystems' are integrated with transport planning.**

As governments develop long term urban development plans, it is imperative that they understand the impacts of automated vehicles on the future transport and social environment.

Decisions on how transportation networks and systems are going to look like in the decades ahead are influenced by decisions being made today, without fully considering the advent of driverless technology, and could have far-reaching and costly consequences as a result. It is therefore critical to review current planning practices as a priority.

Australia needs a nationally-recognised set of guidelines on integrated transport planning that considers this new technology, from its infancy (next five years) up to its maturity (decades into the future), and ADVI is perfectly positioned to assist COAG to realise this critical need as a priority for the nation.