



AUSTRALIAN
DRIVERLESS VEHICLE INITIATIVE



Submission in response to the Inquiry into the Social Issues relating to land-based driverless vehicles in Australia

Prepared by the Australian Driverless Vehicle Initiative

February 2017





1. Introduction

What is ADVI?

The Australian Driverless Vehicle Initiative (ADVI) is the peak advisory body focussed solely on driverless vehicle technology across Australia and New Zealand, and is a trusted adviser to government and industry partners.

ADVI was officially launched on 21 July 2015 in Adelaide by the South Australian Premier, Jay Weatherill, and the organisation is now widely recognised across Australia, New Zealand and on the international level.

Over time, ADVI has welcomed over 90 Australian and international organisations and funding partners from a range of sectors, including:

- Automotive industry
- Communications and technology industries
- Insurance and banking industries
- Legal and advisory industries
- Defence industry
- Taxi and car sharing industries
- Parking industry
- Automobile clubs
- Media and industry facilitators
- Local Councils
- State and Commonwealth Governments
- Australian research partners
- International research partners
- Industry associations

Program of work

ADVI has three core national programs of work, namely:

1. **Scientific research:** field trial development and evaluation, research program development, knowledge transfer and dissemination, scientific quality and rigour.
2. **Informing policy and risk:** identification of emerging risks and concerns, social research, development of position papers and supporting materials.
3. **Media and advocacy:** promotion and public participation, industry and media engagement, government relations and public awareness.

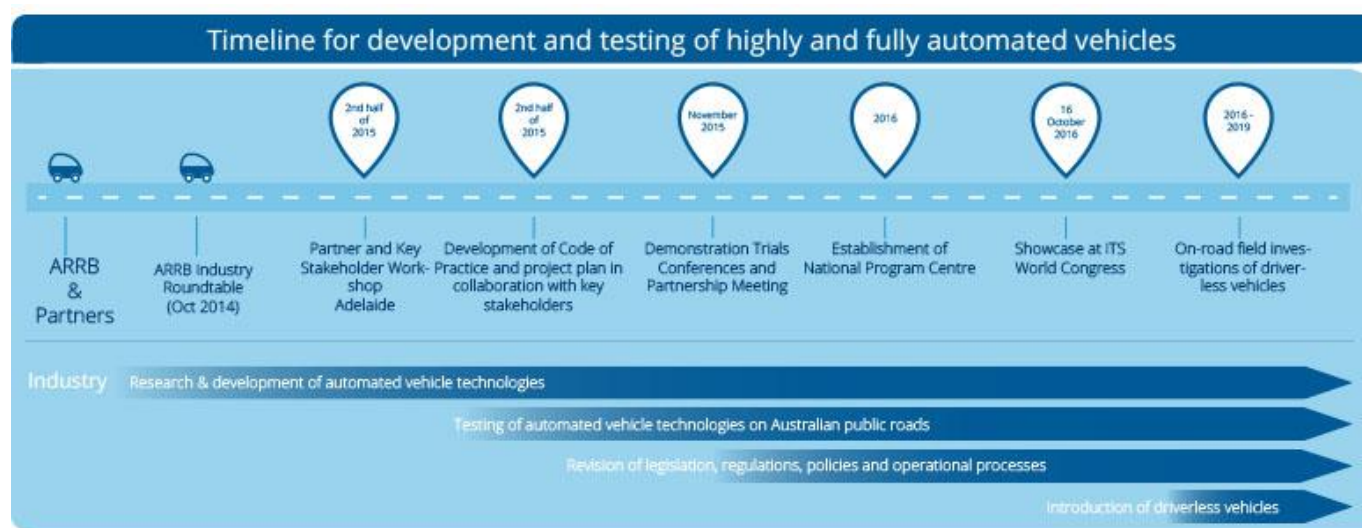




As the above points demonstrate, ADVI's role is to investigate and help inform the development of robust national policy; performance criteria; legislation; regulation; business models and operational procedures; and processes to pave the way for the introduction of self-driving vehicles to Australian roads.

Underpinning those activities is the need to raise public awareness through knowledge-sharing, demonstrations, as well as simulated and in-field investigation trials. ADVI has produced the following video to assist the public to better understand the driverless future and importance of it, a link to this video can be found [here](#).

Figure 1 following also describes the activities to date of ADVI and those planned into the future which is under pinned by a learning-by-doing approach.



ADVI is proud to be in a lead role to manage the safe and successful introduction of driverless vehicles onto Australian roads, which will ultimately position Australia as an international role model in the development of new technologies and attract developers, innovation and investors.

ADVI welcomes the opportunity to provide comments to the Standing Committee on Industry, Innovation, Science and Resources to help best inform the inquiry into issues relating to land-based driverless vehicles in Australia.

ADVI program and Partner highlights

- July 2015: ADVI is launched by Premier Jay Weatherill in Adelaide with 25 partners
- November 2015: ADVI coordinated the first successful on-road test of a driverless vehicle anywhere in the southern hemisphere, with a Volvo XC90 demonstrating the technology on a closed, controlled section of Adelaide's Southern Expressway.
- March 2016: ADVI partner, Volvo Australia, demonstrates automated vehicle technology at its North Ryde headquarters to the NSW Staysafe Committee to inform a Parliamentary Inquiry into driverless vehicles.
- April 2016: ADVI sends a contingent to the Netherlands to observe the truck platooning at Helmond as part of the European Truck Platooning Challenge/Intertraffic Conference.
- April 2016: ADVI founding partner, the Government of South Australia, announces an Australian-first by passing laws to allow for on-road trials of driverless cars in South Australia.



ADVI program and Partner highlights (cont)

- May 2016: More than 120 Australian and international delegates attend the single-day ADVI Annual summit in Adelaide.
- May 2016: ADVI makes formal submission to NTC regarding regulatory options for automated vehicles.
- May 2016: ADVI hosts Australian attendance of TNO Program Manager Automated Driving and truck platooning expert, Mr Bastiaan Krosse, and coordinates a series of briefings with government, industry and transport representatives from New South Wales, Victoria and South Australia.
- June 2016: ADVI partner, Bosch Australia, launches state of the art technology complex in Victoria
- June 2016: ADVI reaches 50 partners
- July 2016: ADVI sends a delegation to the United States centred on the Automated Vehicle Symposium in San Francisco, including meetings with Tesla, OTTO, Californian DMV and tour of Google X and Tesla in Mountain View, California.
- August 2016: ADVI is an exhibitor at the SACE Research Project Expo in Adelaide, engaging more than 3500 students from 72 schools during the 2-day event.
- September 2016: ADVI partner, RAC, successfully trials Australia's first driverless shuttle bus, built by NAVYA.
- September 2016: ADVI releases its thought-leadership paper regarding the 'Economic impacts of automated vehicles on jobs and investment'.
- October 2016: US-based Peloton Technology announced as partnering with ADVI to explore truck platooning opportunities in Australia.
- October 2016: ADVI partner, Telstra, successfully trials Vehicle-to-Infrastructure technology over Telstra's 4G network in South Australia as a pivotal first step in developing Vehicle-to-Everything technology.
- October 2016: ADVI releases the results of the most comprehensive Australian consumer survey on driverless vehicles.
- October 2016: ADVI partner, Bosch launches self-driving Tesla
- October 2016: ADVI partner, ITS Australia, successfully hosts the 23rd World Congress on Intelligent Transport Systems in Melbourne, with autonomous vehicles showcased through a range of presentations and demonstrations.
- October 2016: ADVI Partner, Government of South Australia announces \$10M Future Mobility Lab Fund.
- Nov-Dec 2016: A series of ADVI Capital City Forums are held across the nation to engage with local industry and share information on a range of ADVI partner projects.
- November 2016: Victorian Government announces two projects on Eastlink and Transurban road networks to assess road infrastructure for Driverless vehicles
- December 2016: ADVI partners NT Government and EasyMile launch self-driving shuttle in Darwin
- January 2017: ADVI reaches 90 partners
- January 2017: South Australians glimpse the future of motoring, celebrating the arrival of a self-driving pod, manufactured by UK-based company and ADVI partner, RDM Group.





2. Social Issues and Recommended Actions

1. General social acceptance levels

In 2016, ADVI designed, administered and analysed the first Australian national survey on Australian public opinion of driverless vehicles. With driverless vehicle technology having the potential to fundamentally influence the lives of most Australians, it is critical to engage and educate the community so that they can understand and prepare for the change to come. Early-adopters are likely to be younger, tech-savvy members of the community, many of whom are choosing to forgo the right of passage in obtaining a licence, while acceptance from other drivers will be harder to achieve because they favour the traditional model of control.

As such, it is critical to monitor the ‘mood’ of the community and tailor education and engagement tactics in response, particularly if there is a need to address any noted point of widespread concern.

Specifically, the aim of the landmark research was to gauge public awareness, understanding and opinions about driverless vehicles in Australia, for people aged 18 years and over.

Before the implementation of this benchmark survey, almost nothing was known about public awareness, understanding and opinions about driverless vehicles in Australia – except for a smaller-scale survey administered in Western Australia by the Royal Automobile Club.

Preparation, administration and analysis of the ADVI survey was funded by ADVI. The landmark survey was designed by a sub-group of ADVI members – The Australian Road Research Board (ARRB; study leader), The University of NSW Centre for Integrated Transport Innovation, Main Roads Western Australia, Monash University Accident Research Centre, AECOM and Suncorp. The survey also received ethics approval from the UNSW.

The survey was distributed to over 5200 respondents, representative of the Australian general population (18+ years of age) from all States and Territories. A preliminary analysis of the data has been completed by the Australian Road Research Board and UNSW, while a final report is being prepared.

The high-level outcomes, which are documented in this inquiry response, are categorised into the following six clusters:

1. Awareness of driverless vehicle technology
2. Trust in AVs
3. Perceived benefits of using an AV
4. Perceived concerns of using AVs
5. Driverless public transport
6. Willingness to pay for AVs

Awareness of driverless vehicle technology

Findings suggest that Australians have had very little exposure to driverless vehicles. While most respondents reported having heard about or seen vehicles (44% and 45%, respectively) that can self-drive in some situations, less than 10% have driven a car that can drive itself in some situations.



Trust in AVs

Australians seem quite positive about AV safety, even though they have hardly experienced them first-hand (i.e. driven one). This is evidenced by the finding that 46% of respondents agreed that a self-driving car will be safer than a human driver, while only 25% disagreed (the remaining respondents were 'neutral').

Perceived benefits of using AVs

There are a number of potential social, financial and environmental benefits that may come with the use of AVs. Out of a range of potential benefits gleaned from existing literature (see Table 1.1), stakeholders and experts in the field, Australians believe the greatest benefits from self-driving vehicles will be that they will allow mobility for people with driving impairments or restrictions (e.g. medical conditions, vision impairments; 82% agreed), reduced insurance premiums (due to there being less crashes typically associated with human error; 62% agreed), reduced vehicle repair costs (again due to there being less crashes; 61% agreed) and will allow vehicle occupants more time to perform other activities (56% agreed).

Table 1.1

Greatest perceived benefit	Mobility for the impaired (82%)
	Reduced insurance premiums (62%)
	Reduced overall vehicle repair costs (61%)
	More time on other things (56%)
	Environmental benefits (39%)
	Fuel savings (38%)
Least perceived benefit	Reduced travel time (31%)

The "other activities" respondents were most likely to perform when in a self-driving vehicle included observing the scenery (78% agreed), interacting with passengers (76% agreed), eating and drinking (64% agreed) and doing nothing at all (58% agreed; See Table 1.2)



Table 1.2

Least likely	Sleeping (28%)
	Grooming (e.g. applying makeup) (33%)
	Doing work (36%)
	Reading a book, newspaper, magazine (42%)
	Resting (52%)
	Using personal devices (e.g. mobile phone, iPad) (57%)
	Doing nothing at all (58%)
	Eating / drinking (64%)
	Interacting with other passengers (76%)
Most likely	Observe the scenery (78%)

Perceived concerns of using AVs

Understanding any perceived concerns regarding AVs is crucial, as they can represent significant barriers to the uptake and use of the technology. Based on the findings of the survey (Table 1.3), Australians are most concerned about being legally and financially responsible if the vehicle crashes or makes a mistake (e.g. speeding; 92% expressed this concern), allowing their children to ride in an AV by themselves (90% expressed this concern), and the ability of the AV to performance safely in all conditions (e.g. in poor weather, at night etc. 82% expressed this concern).

Table 1.3

Least concerning	Data privacy (72%)
	Riding in a car with no driver (73%)
	Cars moving by themselves from one location to another while unoccupied (78%)
	Vehicle security (e.g. hackers taking control) (79%)
	The ability of your car to perform safely in all conditions (80%)
	Allowing your child to ride in the car by themselves (90%)
Most concerning	Being legally and financially responsible if the car is involved in an accident or makes mistakes (e.g. speeding) (92%)



Driverless public transport

Findings from the survey suggest that Australians aren't very comfortable with the concept of driverless public transport. Only 43% of respondents stated they were comfortable to travel on public transport (bus, taxi) with no driver, and only 46% stated they were comfortable to share a driverless car with other people (i.e. share car).

Willingness to pay

Interestingly, it was found that only 38% of respondents were willing to pay more for a fully self-driving vehicle than their current car. Of those that were willing, on average, respondents were willing to pay approximately \$9k more. On the other hand, the Australian public seem positive about driverless vehicles as almost 40% are willing to pay more than their current car to own an AV despite less than 10% of respondents having experienced one first-hand (i.e. driven one).

Most respondents (83%) reported that they would drive a driverless car manually from time to time if given the opportunity, which may impact on their willingness to pay if this option is not allowed in future by manufacturers.

Recommendation

- *The Federal Government invest funding to allow ADVI to annually update the community survey results, to monitor, gauge and track public acceptance and understanding of driverless vehicles and tailor education and engagement activities in response.*
- *The Federal Government note the work currently underway by NTC in developing ADVI-endorsed national guidelines to govern trials of driverless vehicles, as outlined in the "National guidelines for automated vehicle trials discussion paper, November 2016."*
- *The Federal Government to follow the lead taken by the Governments of the United States, United Kingdom and Singapore to support a national agenda for driverless vehicles in Australia.*

2. Passenger and non-passenger safety

Amongst the many benefits offered by driverless vehicle technologies, it is ADVI's position that improvements to road safety are amongst the most important. Road users the world over are already reaping the safety benefits of those automated vehicle features that have already been introduced to the marketplace, such as electronic stability control, lane departure warnings and autonomous emergency braking.

Driverless vehicles will create a safer environment for active travel, and allow vehicles to 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. Importantly, any delays in introducing this technology to Australian roads will certainly delay realisation of the critical safety benefits on offer to the community.

ADVI-commissioned research undertaken in 2016 found that 47 per cent of Australians agree that driverless vehicles will be safer than traditional vehicles. While a positive result, given the fact that most Australians have not actually driven a vehicle with AV technologies, it also flags the pressing need for more testing within an Australian environment to strengthen public confidence.



The result of automating driving functions that are typically prone to human error has opportunity to reduce, and even eliminate, road crashes. What is not yet known within the Australian context is how driverless vehicles would interact with non-driverless vehicles and other road users, including pedestrians.

However, this technology stands to achieve a significant reduction to the number of crashes. A recent US study released in October 2013 by the non-profit Eno Centre for Transportation found that if 90% of vehicles were driverless, road crashes would fall from 5.5 to 1.3 million per year.

ADVI is well-advanced in implementing a national program designed to assess current technology options available across the globe, identify those most likely to be suitable for Australian conditions, and then undertake testing of that technology within a controlled environment. In time, real-world on-road assessment of appropriate technology solutions will occur on Australian roads within a range of mixed interactive urban and regional traffic environments.

With safety being one of the core focus areas of the ADVI program, some of the nation's leading safety authorities, including Australian Road Research Board, RAC, RAA and RACV, SAFER – Vehicle and Traffic Safety Centre, are active program partners to ensure safety issues are considered through a robust assessment approach.

With ADVI research finding that 70% of Australians want a self-driving car able to take over when they feel tired or bored, and just under three quarters (73%) of Australians wanting driverless vehicle to transport them when they feel physically or mentally unable to drive manually, it is critical for the Federal Government to take advantage of the well-advanced program underway by ADVI and its program partners.

By aligning with ADVI, government can better understand how this technology could be embedded in current long term road safety strategies and transport plans.

Recommendation

- ***The Federal Government acknowledge ADVI's program of work already underway regarding assessment of safety issues/benefits and driverless vehicles.***

3. Legal responsibility and insurance

There is little doubt that liability issues in regards to the introduction of fully driverless vehicles are highly complex, and warrant greater review in order to achieve road safety and consumer protection outcomes, and create a globally-competitive Australian automotive market.

Through its Policy and Risk Group, ADVI is considering its position on critical issues such as private versus public data, data ownership and secure access. Having some of the nation's largest insurers participate in the ADVI program has provided direct access to the insurance and risk sectors to advance discussions on consumer safety matters, and privacy and protection via personal injury schemes – which will ultimately influence business models of manufacturers, repairers, mechanics, insurers and the greater automotive supply chain and industry.

ADVI continues to advocate for a broader review of the insurance eco-system, and has encouraged the NTC to monitor the Productivity Commission Review into Data Availability and Use to ensure regulation of data ownership and access is nationally consistent and not impacted by state border issues.



It is ADVI's view that a transitional period will see a diverse mix of technology where humans and driverless vehicle technology will interact, prompting the ongoing need for personal insurance, including compulsory third party (CTP) personal injury insurance, property damage insurance and product liability insurance.

ADVI is well-advanced in engagement with the insurance sector, which can assist to fast-track understanding of the complexities involved for the Federal Government, and clearly identify what role it needs to take.

While acknowledging the uncertainty created by the advent of driverless vehicles, ADVI considers that there will always be a role for insurance in the automotive industry. However, what an insurance industry looks like and how it evolves will inevitably change in line with driverless technology when it is introduced in Australia and continues to develop.

It is the responsibility of government to work with key organisations such as ADVI to ensure that consumers have confidence in the safe operation of a vehicle and certainty on liability and remedies for loss, injury and damage in the event of an accident.

ADVI acknowledges that we need to understand more about how liability is allocated in the fully driverless system. Currently all of the manufacturers are located outside of the Australian jurisdiction and this may complicate the enforcement effort.

While some vehicle manufacturers have publicly stated their preparedness to accept full liability for a crash involving one of their vehicles when in driverless mode, the legal basis for this warranty remains unclear, as well as mechanisms for assessing and determining an outcome for property and personal injury claims.

Recommendation

- ***The Federal Government note the work already underway by ADVI and its program partners in relation to insurance and risk issues associated with the introduction of driverless vehicles on Australian roads.***

4. Potential impacts on employment and different industry sectors (such as the taxi industry)

Depending on how the Australian introduction of driverless vehicles is ultimately managed, they can drive major economic outcomes in terms of 'public' benefits, including reduced traffic congestion and reduced road deaths, as well as 'private' benefits such as time savings and increased productivity.

In developing an economic case in support of the Australian introduction of driverless vehicles it is critical to consider the avoided costs of congestion and road deaths from this technology.

The future avoidable social costs of traffic congestion in Australian cities has been estimated by Infrastructure Australia as being up to \$53.3 billion per annum by 2031-2, with total vehicle usage (in vehicle kilometres) increasing by 35%.

In addition, the annual economic loss of road crashes in Australia is estimated by the Department of Infrastructure and Regional Development to be \$27 billion per annum, with more than 187,000 road deaths record since records were first started back in 1925.



As such, the total 'avoidable costs' of \$80 billion serves as an appropriate baseline, to which the economic benefits of jobs and investment can be added. The UK has estimated £900 billion (AUD \$1.6 trillion) in increased productivity and increased trade by 2025 as Advanced Driver Assistance Schemes (ADAS) and Vehicle Technology (AVT) are progressively developed and utilised.

Similarly, Canadian research suggests that replacing conventional vehicles with self-driving vehicles would result in more than \$65 billion (\$AUD) in economic benefits for Canadians each year. This includes \$25 billion in lives saved, \$12 billion in avoided medical costs, \$20 billion in wasted time in traffic and \$8 billion in congestion avoidance.

ADVI's preference is for a 5-year funding and incentive package to focus on research, development, demonstration and deployment similar to £100 million (AUD \$177m) Intelligent Mobility Fund in the UK, which would be matched by industry.

It is ADVI's position that an 'Driverless Vehicle Accelerator Program' be initiated in Australia as a priority to ensure that 'near to market technologies' such as high speed highway assist (with drivers in control), remote car parking (using a hand-held device) and potentially truck platooning are available no later than 2020.

ADVI has program partners across a broad range of industries, including the taxi and parking industries. In September 2016 ADVI welcomed the NSW Taxi Council to its partnership program, and recognises that driverless vehicles will have a major impact on the taxi industry, which is why it is important that the industry is best-prepared to take advantage of the opportunities and meet the challenges that driverless vehicles will create.

With trials of driverless taxis in Australia expected before the end of the decade, it is likely that drivers will still have a role to play, and while that may be different to current tasks, there will still be a need to provide full customer care when it is required - particularly for people living with a disability, the elderly, and others needing a higher level of support during their point to point journey.

Similarly, ADVI has members of the car parking industry as program partners, who understand that the current car parking ecosystem will change significantly, as driverless vehicles navigate and park themselves, find the most cost-effective parking, and are highly utilised by consumers.

Those commercial parking operators who are agile will ultimately benefit from the emergence of a mobility-as-a-service. As commuters increasingly opt for a pick and drop-off service, the demand for multiple parking options will be reduced as private vehicle ownership also reduces over time in favour of other transport options.

This trend is reinforced by a recent PwC report, which found that despite the expensive costs of owning, maintaining and parking a vehicle, most vehicles sit idle 96% of the time.

The emergence of a mobility-as-a-service is an indicator that commuters will increasingly forgo vehicle ownership in favour a pick and drop-off service using shared options, reducing the demand for multiple parking options such as multi-storey, on street and at home. Based on current trends, ADVI predicts a convergence in coming years where shared, connected and driverless mobility combines to offer a mobility-as-a-service.

The first logical step is to see valet-assisted technology developed, which will see a vehicle navigate off-street parking without the aid of a driver, and summoned to a designated location using an internet-connected device such as a smartphone.



As part of an industry transformation, parking infrastructure will give way to different land use for many Australian cities, as parking providers consider how to adapt existing infrastructure, parking technologies, systems and functions to support a gradual transition to full automation.

Wilson Parking, arguably Australia's most experienced and largest carpark operator, is an ADVI program partner, and is exploring how to accommodate the impacts of connected and driverless vehicles.

Recommendation

- ***It is ADVI's position that the Federal Government commit funds to manage the accelerated introduction of driverless vehicles and maximise employment outcomes targeting 20,000 new jobs by 2025, and realise the social and economic benefits of introducing AV's in Australia.***

5. Access and equity issues (such as increasing individual mobility for the elderly and people with disabilities)

While the general public can look forward to a safer, more productive motoring future, those who might be vision impaired, ageing, living with a disability, or have a medical condition that precludes them from owning a driver's licence, can also look forward to a new and exciting era of mobility.

The 2015 Survey of Disability, Ageing and Carers found that almost one in five Australians were living with disability. That equates to about 4.3 million people, or 18.3 per cent of the nation's population.

With several successful Australian driverless vehicle trials having already occurred, and planning of additional assessment events underway, ADVI is working with key interest groups to ensure that people living with a disability are not excluded in the planning and development of driverless technology and regulation in Australia.

Whether it has been the bionic ear, laser surgery, robotic body parts or any number of other innovative breakthroughs, the community has seen how technology can transform lives of people with disability.

The introduction of driverless vehicles offer a previously unobtainable level of freedom that could see them relying far less on carers, family and public transport. Driverless vehicles offer a user the opportunity to travel further to work, explore locations not serviced by public transport and better enjoy their transport experience.

Driverless vehicles may also offer an ideal solution to disabled parking and the challenges of finding a vacant and convenient spot to stop, with users being able to disembark outside a location of choice and let the vehicle park itself elsewhere.

Australia's ageing population also stands to benefit from new vehicle technology, which provides an effective transport solution and opportunity to maintain a full and independent life rather than the isolation that can come from losing independent mobility.

As the broader community increases its trust and acceptance of this new motoring technology, fully driverless vehicles that no longer eventually rely on the presence of a driver at any point will become a viable mobility option for the elderly and disabled people.



ADVI is working on an interim pilot program designed to test the use of existing advanced vehicle technology for those with a 'minor' impairment that precludes them getting behind the wheel in the first instance, with the intent being to identify additional pilot opportunities and candidates during 2017.

The Federal Government has opportunity to actively support and participate in those planning efforts.

Recommendation

- ***The Federal Government recognises ADVI's efforts, as the nation's peak advisory body, in proactively progressing partnerships with appropriate disability and health sector organisations to trial the application of driverless vehicle technologies, and considers participation in those efforts.***

6. Potential public transport applications

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, an Australian Infrastructure Audit (Our Infrastructure Challenges, April 2015) predicts that the cost of traffic delays could grow by a staggering 290% - or \$53.3 billion – by 2031.

Adding to that growing demand on the transport network, Australia's freight task by 2020 is expected to be double than 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.

While the car remains the main transport mode for most Australians, all levels of government must start to factor emerging transport options into transport planning to accommodate users wanting to access workplaces, retail, services, leisure and other destinations of travel.

Running parallel with the fact that most car manufacturers are now planning to offer highly automated or driverless vehicles post 2020, a decline in younger licence holders is also starting to emerge, thus providing the perfect climate for the introduction of shared automated mobility options.

ADVI is committed to a sustainability mobility for all Australians and we believe to achieve this driverless shared vehicles will be at the core. The introduction of these technologies are already apparent with deployments around Australia in 2016 in Perth and Darwin with many others to follow.

In 2017 there have already been two announcements associated with driverless vehicles: 1) Christchurch Airport, Navya shuttle deployment and 2) RDM Group announcing an Asia-Pacific base in Australia. Currently there are some regulatory barriers to the importation of these proven technologies and addressing some of these will help facilitate more widespread deployment.

ADVI has already made a number of submissions, and continues to provide briefing opportunities to governments and departments on key issues impacting on public transport and future planning, including:

- **Road Design** - particularly the need to improve the interface between vehicles and infrastructure, and exploring how existing road space could be used more efficiently.
- **Infrastructure Planning** – and the immediate need to prioritise driverless vehicle corridors and routes across a growing and integrated transport network as part of an agile immediate-long term strategy approach, which



could include retrofitting existing infrastructure to incorporate new technology or maximising valuable road space for all types of users.

- **New mode in transport models** – must include driverless vehicles, and the need to ensure that model inputs and forecast assumptions are modified over time to get the input planning parameters right. This could see the current four-step method (trip-based) replaced with an activity-based model.
- **Evolution of the Public Transport system** – which recognises that mass transit is likely to continue, while distinctions between different service types (rail, buses, taxis and car sharing) may become increasingly blurred over time. There could be significant infrastructure cost saving opportunities achieved by driverless vehicles, especially when point-to-point transport becomes easily and readily available. On demand and responsive public transport services will be key elements in the evolving public transport solution
- **Safety** - Driverless 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.
- **Parking planning** - Driverless vehicles will park themselves, allowing 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.
- **City design** - Current urban planning practices that focus on parking requirements and standard vehicle sizes will change as the type and mix of the fleet transforms. Compact land developments that promote public transport and active travel to minimise car-dependency will need to include alternative first and last mile transport considerations.
- **Supporting regional and rural communities** - Regional and rural communities should be able to take advantage of the benefits of driverless technology, with economic public transport benefits being on offer via locally-based driverless vehicles.
- **Freight systems** - Freight systems and intermodal terminals should be designed to adopt driverless vehicles and platooning for national and local freight and supply chains to fully realise freight productivity benefits.
- **Mobility as a service** - While the evolution of 'Mobility as a Service' 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.

As one example of current efforts in this space, in late 2016 ADVI program partner, RAC, trialled Australia's first driverless shuttle bus along the foreshore in South Perth. The driverless vehicle can perform all safety-critical driving functions without anyone behind the wheel in a controlled environment, and can carry 11 passengers and has average speed of 25km/h.

Recommendation

- ***The Federal Government recognises the benefits to Australia from a sustainable mobility solution and that the deployment of shared driverless vehicles be enabled through addressing regulatory barriers that currently exist preventing more widespread deployment.***



3. Recommendations

1. General social acceptance levels

- *The Federal Government invest funding to allow ADVI to annually update the community survey results, to monitor, gauge and track public acceptance and understanding of driverless vehicles and tailor education and engagement activities in response.*
- *The Federal Government note the work currently underway by NTC in developing ADVI-endorsed national guidelines to govern trials of driverless vehicles, as outlined in the “National guidelines for automated vehicle trials discussion paper, November 2016.”*
- *The Federal Government to follow the lead taken by the Governments of the United States, United Kingdom and Singapore to support a national agenda for driverless vehicles in Australia.*

2. Passenger and non-passenger safety

- *The Federal Government acknowledge ADVI’s program of work already underway regarding assessment of safety issues/benefits and driverless vehicles.*

3. Legal responsibility and insurance

- *The Federal Government note the work already underway by ADVI and its program partners in relation to insurance and risk issues associated with the introduction of driverless vehicles on Australian roads.*

4. Potential impacts on employment and different industry sectors (such as the taxi industry)

- *It is ADVI’s position that the Federal Government commit funds to manage the accelerated introduction of driverless vehicles and maximise employment outcomes targeting 20,000 new jobs by 2025, and realise the social and economic benefits of introducing AV’s in Australia.*

5. Access and equity issues (such as increasing individual mobility for the elderly and people with disabilities)

- *The Federal Government recognises ADVI’s efforts, as the nation’s peak advisory body, in proactively progressing partnerships with appropriate disability and health sector organisations to trial the application of driverless vehicle technologies, and considers participation in those efforts.*

6. Potential public transport applications

- *The Federal Government recognises the benefits to Australia from a sustainable mobility solution and that the deployment of shared driverless vehicles be enabled through addressing regulatory barriers that currently exist preventing more widespread deployment.*