

# Submission to NTC DRAFT Discussion paper – Regulatory options to assure automated safety in Australia (June 2017)

July 2017

Prepared by ADVI Centre of  
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## 1. Preamble

### *What is ADVI?*

The Australia and New Zealand Driverless Vehicle Initiative (ADVI) is the national peak advisory body for autonomous vehicle technology and is a trusted adviser to government and industry partners.

Led and coordinated by the Australian Road Research Board (ARRB), the ADVI initiative is now a cooperative partnership program comprising of more than 100 Australian and international organisations, and is funded by partners from a range of sectors.

ADVI has three core programs of work:

1. Scientific research: field trial development and evaluation, research programme 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.

ADVI has released an analysis of the Economic Impacts of Autonomous Vehicles on Jobs and Investment in Australia. While various analysis has occurred overseas the ADVI paper is relevant to Australia and to the work being undertaken by the NTC. The analysis establishes the means for automated vehicles to drive major economic outcomes in terms of public and private benefits. This highlights the benefits and costing and how choice, timing and implementation of the NTC options can maximise economic benefits.

The ADVI initiative is managing the safe and successful introduction of driverless vehicles onto Australian roads, and will ultimately position Australia as an international role model in the development of new technologies and attract developers, innovation and investors.

ADVI brought the first successful on-road test of a driverless vehicle anywhere in the southern hemisphere, and more on-road testing in real-world conditions will be a key part of future research and evaluation efforts. ADVI and ADVI partners individually have, and continue to, work very closely across industry and all levels of Government across the nation, to safely run events, pilots and demonstrations on and around public roads. To this end we are well placed to understand, support and protect the interests of the community in relation to these emerging technologies.

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.

Running parallel with those efforts, work is also underway to raise public awareness and encourage a change in mindset through knowledge-sharing, demonstrations, and simulated and in-field investigation trials.



Australia &  
New Zealand  
Driverless Vehicle  
Initiative

***Who to contact for further information?***

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## **2. Feedback relating to the NTC Regulatory options to assure automated safety in Australia (June 2017) discussion paper**

### **Summary**

ADVI welcomes the opportunity to contribute to the development of the “Regulatory options to assure automated safety in Australia (June 2017)”. NTC as part of the ADVI collaboration has access to the widest ecosystem to rapidly explore how this emerging technology should be introduced into Australia and ADVI has drawn upon that expertise to inform this response.

ADVI notes the separate options proposed may be too narrow. There is no mention of infrastructure, and the options do not contemplate a range of likely emerging issues in relation to licensing, wider requirement for ongoing software upgrades, platooning, cyber security, big data and others. It is critical that consideration include broader issues.

While the options paper provides detailed discussion of the options, ADVI considers the major issues to be

- single approval and management mechanism in Australia
- national coordination and provide international leadership
- immediate introduction of national voluntary Self-Certification scheme
- longer term establish Pre-Market Approval supported by mandatory Self-Certification to encourage and enable innovation
- Industry Safety Management systems
- broader need to consider and establish economic, social and environmental objectives
- increasing public support, and
- all levels of Government engaged.

The ADVI analysis of the Economic Impacts of Autonomous Vehicles on Jobs and Investment in Australia details the major choices relevant to Australia and how these can be driven in terms of public benefits (e.g. reduced traffic congestion / reduced road deaths) and private benefits (time savings / increased productivity). Detailed estimates are provided with distribution and level of economic benefits dependent on choice, timing and how the introduction of automated vehicles is managed. The ADVI paper can be found at <http://advi.org.au/2016/09/30/position-paper-economics-impacts-of-automated-vehicles-on-jobs-and-investment/>.

Market uncertainty remains a significant barrier that can impede investment, implementation and erode expected benefits. This requires building community support supported by establishing social and environmental objectives. As recently illustrated in South Australia, the early implementation of laws to permit trials of autonomous vehicles and the offer of seed funding has resulted in large numbers of trials currently being assessed for approval in 2017 and the creation of new industry.

Rather than choice of a single option ADVI supports a hybrid approach that provides the necessary regulation and flexibility to both assure the public and also provide the ready use of autonomous technology as it evolves. The role of Government is critical to assure the public of the safety of the new technologies. This should be underpinned by a requirement on industry to prepare a safety management system (SMS) to ensure product safety including during in-service use. This best

caters for the diverse types of safety currently in development which is likely to continue through innovation. This is critical to ensure safety prior to roll-out and also the continuing use of the technology. Implementation should proceed at the earliest opportunity in order to achieve the greatest benefits for Australia. Where a voluntary scheme may be necessary in the interim this should be made mandatory when possible.

Early adoption of the technology enables Australia to provide global leadership to build international criteria suitable to Australia rather than simply following international standards.

In the medium to longer term ADVI supports a Pre-Market Approval mechanism in order to assure the public of the safety of the new technology and to achieve the greatest national and international consistency. Public support is critical for realising the maximum benefits of the technology increasingly becoming important as the role of drivers decline with increasing levels of autonomy. Again SMS remains relevant to manage the risks of the diverse types of technology and the use thereof in-service.

Government role to ensure safety is paramount to assure the safety of the technology to the public and successfully realise the significant benefits. Whereas measurement of safety is best measured over time, establishing targets ensures coordinated action to achieve optimal safety.

Introduction of autonomous vehicles will increasingly rely on infrastructure which requires a coordinated approach with safety rather than this being considered in isolation.

Further work is currently being undertaken in highlighting the importance of the Commonwealth Government. This builds on the Economic paper establishing the need for the Commonwealth to take a stronger 'central' approach to avoid current obstructions in order to maximise the benefits for Australia.

Please see ADVI's responses to the discussion paper's consultation questions in the following table.

NTC Question	Response
<p>1. Should government have a role in assessing the safety of automated vehicles or can industry and the existing regulatory framework manage this? What do you think the role of government should be in the safety assurance of automated vehicles?</p>	<p>It is critical that Government has a role in assessing the safety of autonomous vehicles to provide clarity and address any community concern. Consumer support is critical for the uptake of the technology and to achieve this Government role is essential. The NTC paper states the public currently accept the higher risk of driving on road. It is contended that this is because the public do not understand the risk and consider themselves to be a very good driver who will not crash.</p> <p>We do not believe that this acceptance of risk is transferable to a highly autonomous vehicle given they will need to solely trust new untested technology. The public are likely to consider safety to be increasingly important as the role of drivers reduce. Consequently we believe it is critical that Government has visible role in assessing the technology as currently applies with the ADR and to assure the public of the safety of the technology. This includes establishing clear targets for improvement of safety to ensure coordinated action of all stakeholders.</p>
<p>2. Should governments be aiming for a safety outcome that is as safe as, or significantly safer than, conventional vehicles and drivers? If so, what metrics or approach should be used?</p>	<p>Measurement of safety is acknowledged to be problematic. Significant problems also exist in determining safety at any point in time. Instead safety is generally measured over time, typically over a 5 year period in order to better understand safety. Ambitious safety targets should be set to encourage a coordinated approach to drive down the unacceptable levels of death and serious injury (e.g. 50% reduction). Industry should be required to record, manage and report incidents (near miss and actual) as a means of determining ongoing safety. Regulator have ability to require testing of incidents/ redress to demonstrate safety.</p> <p>Moreover measuring safety has the potential to be highly prescriptive and stifle innovation. Safety is only one measure and consideration should also be given to increased mobility, efficiency, reliability or sustainability allowing approval of safe vehicles with strong alternative benefits but not improved safety. There is also need for national and international consistency and restrictive barriers should be avoided. Until international agreement is reached, assurances at least as good as current conventional vehicles should be sought through a safety assurance system. The measurement of safety can be reconsidered considering demonstrated safety, failure, crash and incident rate and as use of the technology become more mainstream and more widely used over time.</p>
<p>3. Should the onus be placed on the automated</p>	<p>In the short term as we are in the testing and training environment and the technology continues to evolve, industry</p>

NTC Question	Response
<p>driving system entity to demonstrate the methods they have adopted to identify and mitigate safety risks?</p>	<p>should be required to demonstrate the safety of the technology through Self-Certification and monitoring safety and failure rate over time. This would provide the opportunity for Government to better understand the technology and provide time for necessary amendment and system changes.</p> <p>In the medium to longer term Government should become involved in assessing safety through Pre-Market Approval whereas limited capacity should continue as necessary for industry to Self-Certify safety in order to provide for new innovative technologies and there is no other means to approve use — see response to Q7 below.</p> <p>In both the interim and the longer term industry should also be required to demonstrate the methods used to identify and mitigate safety risks and in-service use following sale.</p>
<p>4. Are the proposed assessment criteria sufficient to decide on the best safety assurance option? If not, what other assessment criteria should be used for the design of the safety assurance system?</p>	<p>As highlighted in the ADVI paper (<i>Economic Impacts of Autonomous Vehicles on Jobs and Investment in Australia</i>) it is important that Australia is an early adopter of AV technology and proactively implementation and pursues opportunities.</p> <p>This requires a single approval process in place of the current fragmented approach currently provided through the involvement of nine (9) governments. Australia comprises about 1.5% of global vehicle sales and cannot afford this level of complexity if it is to realise the significant benefits that may be achieved. Coordination of the single system should also include related infrastructure requirements.</p> <p>The requirement for industry to prepare a safety management approach is considered the best means to provide the necessary flexibility while protecting safety.</p> <p>In the short-term ADVI supports the proposed safety criteria subject to the following comments</p> <ul style="list-style-type: none"> <li>• Safety may be improved through also demonstrating full safety risk identification and mitigation over time.</li> <li>• Accountability and probity should also include requirement for insurance and clarifying that an entity is legally accountable in an Australian jurisdiction.</li> <li>• Safe operational design domain should include link to limitation of use to identified ‘use-case’ template.</li> </ul> <p>As awareness of the technology improve the criteria can be improved and informing and aligning with international standards.</p>
<p>5. Should governments adopt a transitional approach to the development of a safety assurance system? If so,</p>	<p>ADVI advocates for a hybrid approach of a safety assurance system.</p> <p>Firstly by enabling the immediate use of the proposed assessment criteria for the approval of current levels of autonomous vehicles. This will ensure optimum safety and</p>

NTC Question	Response
<p>how would this work?</p>	<p>enable awareness of the technology to increase. The safety management criteria can continue to evolve as awareness of the technology improves and informing and aligning with international standards.</p> <p>Secondly through the management of access to the road network. Self-certification should be made available at the earliest opportunity to be assessed with the proposed high level safety Assessment criteria. This would enable voluntary Self-Certification to be implemented quickly and improved by making it mandatory when possible. This is to be underpinned by a SMS to manage the risks of in-service use. Proponents should also be required to submit details of the certification and the SMS to Government.</p> <p>In the medium to longer term, Pre-Market approval should include in line with and consistently with approach in other jurisdictions (EU) with mandatory self-certification to provide necessary flexibility for small number of new innovative vehicles. As explained above, both methods should be underpinned by a SMS to manage the risks of in-service use.</p>
<p>6. Is continuing the current approach to regulating vehicle safety the best option for the safety assurance of automated vehicle functions? If so, why?</p>	<p>Current approach fails to provide adequate national consistency to protect safety. Import restrictions are overly restrictive, road rules do not provide sufficient regulation and there is no recognition of automated driving system in transport law. Neither does it provide effective restriction on after-market modification and fitting of autonomous technology to current vehicles in-service, such as by backyard mechanics. This represents significant risk that must be managed given the evident availability already on-line. Also as reported by the NTC (p27) previous work by the NTC has found no support amongst stakeholders for removing regulatory barriers for autonomous vehicles without some regulatory oversight.</p> <p>Consumer protection law may provide some redress but as evident with regulation of Motorised Mobility Scooters there are considerable gaps.</p> <p>ADVI proposal of mandatory self-certification as best means to promote safety and flexibility for new innovative technologies. This is superior to current exemption framework to provide better clarity and consistency. In medium to longer term, proposed Pre-Market Approval is specific to autonomous technologies while also consistent with current ADR approach.</p>



NTC Question	Response
<p>7. Is self-certification the best approach to regulating automated vehicle safety? If so, should this approach be voluntary or mandatory? Should self-certification be supported by a primary safety duty to ensure automated vehicle safety?</p>	<p>Self-certification is consistent with current voluntary approach in USA. This has resulted in some problems and consideration is being given to USA to a mandatory scheme consistent to Pre-Market Approval. It is also noted that voluntary self-certification also does not adequately manage in-service usage or the risk of after sale modification and thereby possess significant risk. .</p> <p>As indicated above ADVI supports a mandatory self-accreditation model in the short term supported by a primary safety duty to ensure automated vehicle safety. Additional prescriptive offences should also be considered consistent with the mandatory approach to minimise the risk of unscrupulous/ incompetent manufactures and unsafe vehicles with a limit on the number of vehicles that may be Self-Certified to reduce the risk as much as possible – see response to Q12.</p> <p>If a mandatory scheme is not possible in the immediate period, a voluntary scheme should require industry to at least submit its self-certification and associated details to Government. This would ensure Government is aware of all vehicles, observe and learn in preparation of the medium to longer term.</p> <p>It is proposed that mandatory self-certification continue in the medium to longer term to ensure optimum safety and provide necessary flexibility for small numbers of innovative vehicles that otherwise do not meet standards due to new innovation. To address significant risk approval be limited to specific use case or may consider cap on numbers of imports until the technology is proven including the ability to ban unsafe vehicles. This ensure public have wide opportunity to experience technology while limiting risk of unscrupulous/ incompetent manufactures and unsafe vehicles with significant crash rate being widely used. Large scale supply instead be managed through Pre-Market Approval for proven technology. This would include recognition of approval in other countries with similar standards emphasising the importance of international harmonisation.</p> <p>Importantly the staged implementation enables Australia to provide leadership in developing international standards while also providing national and international uniformity. This will also demonstrate safety to the public while also allowing necessary flexibility for new innovation in order for Australia to realise the greatest benefit.</p> <p>Necessary proof ideally should be provided on basis of ‘as far as reasonably practical’ provided this does not erode international consistency.</p> <p>Note the NTC paper confuses references to voluntary and mandatory schemes and questions posed.</p>

NTC Question	Response
<p>8. Is pre-market approval the best approach to regulating automated vehicle safety? If so, what regulatory option would be the most effective to support pre-market approval?</p>	<p>This is supported in the medium to longer term to provide necessary Government assurance of safety which would provide for large wide spread importation/ supply of proven technology. This is intended to provide an improved process to the current approach to maximise public confidence in the new technologies and maximise the benefit for Australia.</p> <p>Lack of public support for autonomous technology remains a significant risk to the adoption of the technology and realisation of benefits.</p> <p>ADVI agrees with the NTC assessment that Pre-Market Approval provides the highest certainty for the community and continuing limited mandatory self-certification is necessary to provide the necessary flexibility to provide for innovation and not stifle continuing improvements in safety, efficiency or mobility.</p>
<p>9. Is accreditation the best approach to regulating automated vehicle safety? If so, why?</p>	<p>Accreditation is typically high cost and not supported as it is best suited for commercial application, particularly for on-going going compliance. At this point there is no clear indication that Australia will be able to move away from the high level of private ownership and this is not suited to accreditation.</p> <p>ADVI challenges the evident assumption in the NTC paper that accrediting authorities do not need detailed and expert knowledge of all technologies. It is considered that authorities will need detailed knowledge and understanding in order to properly set standards and administration of the accreditation schemes as currently applies in similar Australian schemes.</p>
<p>10. Based on the option for safety assurance of automated vehicle functions, what institutional arrangements should support this option? Why?</p>	<p>ADVI supports a single approach to ensure national consistency through either – (1) Commonwealth, (2) National entity, (3) Lead jurisdiction or (5) Fully Commercial Quasi government entity. It is expected political and other pressure will apply in choice of best option and whether jurisdictions would be willing to provide reference of powers. ADVI considers the Commonwealth is best placed to lead development of national approach to be managed by national entity (options 2, 3 or 5).</p> <p>The only concern of option 5 is that it may be overly costly for applicants which may be a barrier for some technology vendors. In the longer term, with greater number of industry participants, option 5 is unlikely to be a significant barrier as economies of scale are generated and costs fall. Option 2 provides alternative national entity that can be supported by Government, at least in the short term.</p> <p>Either private entity (options 2 and 5) are considered a more appropriate means of management. These provide a more collaborative model across levels of Government, industry and</p>

NTC Question	Response
	<p>academic bodies with greater flexibility and less bureaucracy than a Government entity. Significantly, a private entity, would be less aligned with any level of Government and more readily acceptable to the diverse range of stakeholders. Separation of road owner and regulator also provides a simpler model to manage with a separate entity also able to accept accountability for outcomes, including economic, across Government and the wider industry and community.</p> <p>ADVI does not support individual jurisdictions regulating approval. Even if national guidelines are developed, jurisdictional legal systems will ensure inconsistent application risked further by local pressure.</p> <p>Australia remains a small market of global vehicle sales that is significantly isolated and significant barriers will be created if a single approval mechanism is not available.</p> <p>Consideration of Safety should also include infrastructure in order to ensure a coordinated approach. This should include if manufacturers should pay for new infrastructure that is required of if lower speed limits apply in a specific operational design domain. Infrastructure this should be managed through a Regulated Asset Base as recommended by Infrastructure Australia.</p>
<p>11. How should governments manage access to the road network by automated vehicles? Do you agree with a national approach that does not require additional approval by a registration authority or road manager?</p>	<p>Ideally autonomous vehicles best suited for general access and use of autonomous technology be restricted to 'use case' suitable to the level of the specific technology. This provides the best opportunity to regulate the wide range of available technologies. Consideration should be given in the short term to imposing 'use case' approval of autonomous technology through the vehicle registration system whereas through the medium to long term this could alternatively be managed through Pre-market approval. Whichever model is chosen requires a collaborative approach across all levels of government (local, State and Commonwealth), industry and community.</p> <p>As highlighted above, community support is essential to realise benefits and at a minimum, industry proponents should be required to establish effect community engagement as part all of access applications.</p>
<p>12. How should governments ensure compliance with the safety assurance system?</p>	<p>A primary duty to provide safe automated vehicles is supported. This will ensure consistency between WHS, transport and Consumer laws and thereby encourage wider compliance. Such laws should be supported through additional specific sanctions targeting particular non-compliant behaviour including providing false statements/ information, failure to obey direction/</p>

NTC Question	Response
	<p>undertaking, use of an AV in circumstances without requisite certification/ approval. Penalties can also better match the specific risk.</p> <p>Specific offences has the added advantage of assisting better communication and awareness of specific illegal behaviour and is generally easier and more readily enforced</p> <p>Particular risk exits in enforcement of requirements of international companies not otherwise present in Australia or with a minimal presence. Consideration must be given to establishing legal forum and payment of damages in such circumstances including enforcement of community engagement strategy.</p>