NATIONAL POLICY FRAMEWORK FOR LAND TRANSPORT TECHNOLOGY

ACTION PLAN: 2016–2019
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Version Control

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<th>Description of changes</th>
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<tr>
<td>1.0</td>
<td>August 2016</td>
<td>Initial document with 2016-2019 action plan</td>
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Contact us

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1. The Transport and Infrastructure Council

The Transport and Infrastructure Council brings together Commonwealth, State, Territory and
New Zealand ministers with responsibility for transport and infrastructure issues, as well as the
Australian Local Government Association.

In November 2015 the Council agreed on a long-term vision for an infrastructure and transport
system that will enhance Australia's productivity, competitiveness and liveability and shape the
work of the Council over the coming decades. The Council will continue to place a strong focus on
those policy issues that would benefit from collaboration across the three levels of government.

Capitalising on the opportunities afforded by emerging technologies is a key part of realising the
Council’s vision. To that end this document outlines in detail Australia’s approach to emerging
transport technologies (including Intelligent Transport Systems) and builds on previous work by the

More information on the work of the Council is available from
2. Introduction

Transport technology (both internationally and in Australia) is changing rapidly, bringing with it many potential benefits for our transport networks. These benefits include improved transport productivity, more efficient use of existing infrastructure, reduced congestion and avoided deaths and injuries.

Governments, industry and research institutions are actively exploring the best ways to develop and deploy new transport technologies. For example, Australian governments are already preparing for connected vehicles, which can communicate with other vehicles, road-side infrastructure, and with other devices such as mobile phones. This will enable vehicle and transport systems to cooperatively work together to deliver optimised transport outcomes. Automated vehicles are another emerging technology with significant potential to improve the safety, efficiency and convenience of transport (especially for seniors and the disabled). These technologies are complementary to each other, and together could radically transform the ways that people travel and that our infrastructure and cities are constructed.

Transport infrastructure is also improving. Cost-effective sensors and improved communications technology are facilitating more efficient models of operating and maintaining roads and railways. Improved information flows, such as real-time public transport information, are increasingly providing travellers with access to more flexible, efficient and convenient transport services. Digital systems, including smart phones, are generating unprecedented amounts of data, which can be shared and analysed to improve infrastructure planning and operations.

Australian governments recognise that these on-going advances in transport technology have the potential to fundamentally improve the safety, efficiency, sustainability and accessibility of Australia’s transport systems. Australian governments are focused on implementing the right policy settings to support and take advantage of these opportunities.

On this basis, this policy framework outlines an agreed national approach to policy, regulatory and investment decision-making for technologies in the land transport sector. This framework will be underpinned by a three year action plan, outlining governments’ short to medium term priorities.

This document details:

- the national policy framework objective;
- the strategic context for new transport technologies;
- key issues for government;
- the role for governments in the deployment of new transport technologies; and
- a three year national transport technology action plan.
3. Framework Objective

The objective of this framework is to foster an integrated policy approach by governments to the development and adoption of emerging transport technologies, in order to achieve improved transport safety, efficiency, sustainability and accessibility outcomes.

This framework will:

- facilitate the efficient and timely uptake of transport technologies to meet consumer demands and improve service delivery;
- guide the consistent implementation, integration and uptake of transport technology across all jurisdictions and all land transport modes;
- outline the role for government on issues such as regulation, standards and investment, in order to provide certainty to industry and the community; and
- promote innovation and competition through support for compatible and interoperable transport technologies and open access to transport data.

The action plan accompanying this document will ensure that individual actions by Australian governments are appropriately prioritised, efforts are not duplicated and that key learnings from individual projects are shared appropriately.
Rapid Advances in Vehicle Automation

Vehicles with a relatively high level of automation, such as self-parking or traffic jam assist, are already commercially available in Australia. Most major vehicle manufacturers, as well as several large technology companies and universities, are developing vehicles with higher levels of automation, including vehicles that are designed to require no human control. It is significant that automated test vehicles now have several million kilometres of experience in real-world conditions.

Over the next two decades many analysts predict that highly automated vehicles will become a significant part of the vehicle fleet, although it remains unclear how quickly this transition might occur and how often (if ever) human drivers will need to take over control. In the long-term, the potential benefits of automation include improved safety, reduced congestion and pollution, and enhanced mobility for the young, elderly and disabled. Passengers may also benefit from increased leisure or productive time, and reduced costs from sharing an automated taxi. Automated vehicles could also reduce the need for parking space in city areas.

However, it is also important for policy makers to consider what other effects automated vehicles might have on transport networks. For example, more convenient travel might mean longer and more frequent car trips, increased urban sprawl or reduced use of public transport. Appropriate policy and regulatory decision-making will be key to ensuring that the potential benefits of automation materialise, and that any downside risks are appropriately managed.
The Potential of Connected Vehicles

The next generation of connected vehicles, called Cooperative Intelligent Transport Systems (C-ITS), are an emerging technology that allows a vehicle to communicate with other vehicles (V2V), road-side infrastructure (V2I) and other devices, such as mobile phones (V2P). This technology has an exciting potential to improve safety by providing drivers with warnings of imminent collisions or dangerous conditions ahead. Austroads has previously estimated that full deployment of C-ITS equipped vehicles with collision avoidance applications could prevent 25-35 per cent of serious crashes.¹

Mass production vehicles with V2V capability are expected to enter the US market by 2017. Australian governments are already preparing for the introduction of C-ITS equipped vehicles in Australia (including addressing security and geo-positioning requirements). In the future, automated vehicles may use V2I to interface with traffic lights, or V2V to detect vehicles not in line of sight. Experts believe that a combination of connected and automated technology is required to realise the largest potential improvements to congestion and safety.

4. Strategic Context

4.1 How Can Current and Emerging Transport Technologies Help?

Efficient transport networks are an important enabler for a competitive, productive and growing economy, and for facilitating connections between people. Decisions about transport infrastructure can have a significant impact on other policy areas, such as the amenity and liveability of our cities. Finding innovative ways of moving goods and people can create new business opportunities, generate value for travellers and help to build a flexible and adaptable economy that will sustain Australia’s well-being into the future.

Current and emerging technologies can help to achieve these important outcomes by improving transport safety, efficiency, sustainability and accessibility.

4.1.1 Safety

Technologies such as seat belts, road-side breath testing, speed cameras, airbags and improved vehicle standards have been key contributors to improved road safety outcomes in Australia. Between 1970 and 2015, the annual road fatality rate declined from 30.4 to 5.1 deaths per 100,000 people, despite strong growth in vehicle ownership. Even with this progress, the economic cost of road crashes is estimated to be around $27 billion annually\(^3\), in addition to the immeasurable social cost.

Through the National Road Safety Strategy (NRSS) 2011-2020\(^4\), the Transport and Infrastructure Council has adopted the long term vision that no person should be killed or seriously injured on Australia’s roads. The NRSS is based on the Safe System approach which calls for a holistic view of the road transport system and the interactions between roads, travel speeds, vehicles and road users. Emerging transport technologies have considerable potential to reduce the number and severity of crashes by providing warnings to drivers, or by reducing the need for human decision-making potentially achieving a system with safety performance similar to or better than air, maritime and rail transport. Such technologies include:


- **Driver advisory and assistance systems**, such as blind-spot warnings, speed limit advisories, lane departure warnings and electronic stability control. In the future, connected vehicle technology will improve the types of warnings that drivers are able to receive; and

- **Automated systems**, including adaptive cruise control, lane keep assist and autonomous emergency braking. Autonomous emergency braking, for example, is estimated to prevent 20–40 per cent of certain crashes\(^5\). In the future, higher levels of automation, including vehicles that require no human control, may significantly reduce the number of road deaths, potentially by as much as 80 or 90 per cent\(^6\).

Through the NRSS and the supporting Action Plan for 2015–2017, there is an agreed programme of work underway to both implement priority vehicle safety standards and accelerate the market uptake of vehicle technologies with significant safety potential. The Action Plan lists targeted technologies including autonomous emergency braking, lane departure warning and intelligent speed advisory systems.

### 4.1.2 Efficiency

Demand on Australia’s infrastructure is growing, driven by population growth, increasing economic output and long-term urbanisation trends. The social and economic costs of congestion are estimated to reach around $30 billion a year by 2030\(^7\). Australia’s freight network is also growing, with demand for road and rail freight expected to more than double between 2010 and 2040\(^8\).

Building new infrastructure is not always the solution to meeting growing demand. Major infrastructure projects are complex and expensive to deliver, particularly as all Australian governments face competing demands for public spending. In Australia’s capital cities, the limited availability of land can be a significant constraint. These factors mean that there is a need to use existing infrastructure more efficiently.

The use of technology has significant potential to improve the efficiency of existing assets. For example:

- **Smart infrastructure**, such as signals on motorway on-ramps or variable speed limits, can significantly improve traffic flows at relatively low cost. Emerging systems can remotely


\(^{6}\) Ibid


monitor assets and predict the need for maintenance, helping to reduce costs and prevent disruptions to travellers. Better communications on railways can safely allow shorter following distances between trains;

- **Real-time information** can help travellers plan an efficient journey, including facilitating optimal route selection, efficient connections with public transport and access to transport related services like parking. Real-time information can also enable transport system operators to better respond to incidents and manage demand. A related area is on-demand transport, where smart phones can be used to provide more convenient access to transport and mobility services, including across different transport modes;

- **New vehicle technologies**, including automated and connected vehicles, could bring a step change improvement in mobility. Automated vehicles may be able to travel closer together, or be summoned on-demand for more convenient first and last mile trips. Communications between connected vehicles and road-side infrastructure could allow traffic management to be optimised; and

- **Data** generated by these applications is an additional resource that can be analysed to improve planning, investment decision-making, and transport operations, such as by adding new public transport services during anticipated peak periods. Data can also support the design and delivery of new infrastructure. For example Building Information Modelling (BIM) can be used to create highly detailed and shared digital models of new infrastructure, improving investment and operational decision-making over the entire life of an asset.
Smarter Infrastructure and Traffic Management

Australia has a strong record of success in implementing smart infrastructure and traffic management systems. One of the earliest smart traffic management systems – coordinated traffic signals that respond to changing traffic conditions – was pioneered in Australia and is now exported overseas. Australia was also an early adopter of electronic tolling, and importantly was able to achieve a nationally consistent system of electronic tags and receivers that communicate over the 5.8 GHz radio frequency band. This means that motorists need only use one tag, regardless of who owns and operates the particular toll road.

More recently, active traffic management measures that integrate systems such as variable speed limits, on-ramp signalling and variable message signs have been demonstrated to significantly improve traffic flow on motorways in Melbourne, Brisbane and Sydney. These types of investments tend to be low cost and high return, and can delay the need for expensive civil construction works. For example, the installation of ramp metering on the Monash Freeway in Melbourne increased throughput by 19 per cent during the morning peak – reducing the need to build an additional lane.

Smart infrastructure capabilities will continue to improve. Data61 (part of the CSIRO) is trialling a bridge monitoring system using 2,400 sensors to maximise the service life of the Sydney Harbour Bridge road deck without significantly increasing expenditure. In this example, continuous machine learning and predictive analysis of the sensor data provides early warning of problems before bridge users are affected.

In Queensland, an Emergency Vehicle Priority (EVP) system has been successfully trialled, which automatically provides green lights for emergency services vehicles responding to incidents. This system improved travel times by up to 20 per cent, with no measurable impact on congestion.

Image courtesy of VicRoads
4.1.3 Sustainability

Energy use and CO₂ emissions are closely linked to the transport sector because fossil fuels are the principal form of transport fuel in Australia. In 2014-15, domestic transport was the second largest energy user in Australia (behind electricity generation), and contributed to around 17 per cent of Australia’s CO₂ emissions.

As Australia’s population and economy grows, so will the transport sector, potentially leading to increased energy usage and emissions. Transport is projected to be Australia’s main form of energy usage by 2035. Road vehicles, particularly light passenger and commercial vehicles, are forecast to continue to be the single largest source of emissions in the transport sector.

Many transport technologies that provide efficiency benefits also have flow on environmental benefits because shorter trips and free flowing traffic imply fuel savings and emission reductions. Driver assistance systems can be programmed to provide information on environmental performance, for example on optimal gear selection. Greater uptake of low and zero emission vehicles, shared mobility and active travel options would also have significant environmental benefits.

4.1.4 Accessibility

Australia’s transport systems must serve the needs of all users, including the elderly and those with a disability. Australian governments see the ability to move around the community as underpinning all aspects of life for all people. This is an important issue as Australia’s population ages and lives longer, and the number of non-drivers grows.

Technology can help address this problem by facilitating more convenient access to transport. This can include providing real-time public transport information or on-demand transport services (such as flexible bus services). In the future, fully automated vehicles may also provide greater mobility to those unable to drive themselves.
4.2 Key Issues for Government in Deploying New Transport Technologies

There are a number of operational and policy challenges for governments associated with the deployment of new transport technologies. It is essential that governments get the right policy and regulatory settings in place in order to eliminate unnecessary barriers to deployment, encourage innovation and support technology uptake in the transport and infrastructure sectors.

4.2.1 Safety, Security and Privacy

The safety, security and privacy of any new technology is of primary importance. For example, ensuring that connected and automated vehicles can be safely operated on public roads will be key to maintaining community confidence and support. This includes protecting such systems from cyber-attacks. New vehicle technologies could also create large amounts of personal data. Australian governments are already taking steps to ensure that any personal data is afforded appropriate levels of protection, in-line with community expectations. Monitoring and evaluation of security and privacy requirements is required given the complex and ubiquitous nature of the emerging digital data environment.

4.2.2 Digital Infrastructure

New technologies are likely to require access to new types of digital infrastructure. For example, some in-vehicle devices might require access to more accurate satellite positioning information, highly accurate 3D maps, a shared security system or fast mobile broadband. Upgrades to traffic signals may be required to enable them to communicate wirelessly with approaching vehicles. Australian governments, as part of the action plan to this document, will investigate what digital infrastructure will be required in the future, and the best way to provide it.

4.2.3 Data

Many new transport technologies create large amounts of data. This data can be used to provide real-time information to travellers, or to improve the way that governments operate, maintain and invest in infrastructure assets. This data doesn’t necessarily have to come from vehicles or roadside infrastructure – smart phones, smart street lights and many other devices connected to the ‘internet of things’ can provide useful information. The increase in the number of these devices has led to an unprecedented increase in the amount of data available (a trend commonly referred to as ‘big data’). A key issue for Australian governments is fully exploring the potential of big data in the transport sector and addressing challenges in data access, capture, storage and analysis.
Automated Vehicles – What Needs to Happen Next?

While Australia is a world leader in some aspects of automation, such as the automated trains and heavy vehicles already being used in the mining industry, automated passenger vehicles are yet to undergo significant real-world testing in Australian conditions. Australian governments need to ensure that, in the near future, real-world testing (and eventually deployment) is able to occur in a safe and efficient way. A significant dimension of this is demonstrating to the public that automated vehicles are reliable and safe to use.

This preparatory work is already underway. The National Transport Commission is investigating what regulations are outdated and need to be changed. Austroads, on behalf of State and Territory road agencies, is examining what public authorities might need to do to ensure our infrastructure is ready for automated vehicles, as well as the potential implications for vehicle registration and driver licensing.

In 2015 the Australian Driverless Vehicle Initiative\(^9\) demonstrated a highly automated Volvo XC-90 on a closed road in Adelaide – a first in the Southern Hemisphere. Further public demonstrations and trials in partnership with industry and government will continue.

The action plan to this document outlines the commitment of Australian governments to accelerate work to test and deploy automated vehicles.

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4.2.4 Standards and Interoperability

Consistent standards are required to achieve interoperability between equipment and services from different vendors and different jurisdictions. Interoperability can be difficult to achieve due to significant jurisdictional differences in infrastructure conditions, patterns of use and pre-existing information technology systems.

Previous work in this area has included the development of a National Intelligent Transport Systems Architecture. This ‘Architecture’ is effectively a guideline for transport agencies that provides for a consistent approach to describing, developing, and integrating intelligent transportation systems and applications.

Australian governments will continue to collaborate to ensure that interoperability issues are addressed and will adopt international standards and deployment approaches unless there is a clear need for a unique Australian requirement.

4.2.5 Disruption and Change

One of the biggest challenges for government is that the technological environment can evolve rapidly, creating new and sometimes unexpected policy issues and disrupting established markets and business models. For example, the increasing popularity of transport services such as Uber, Coseats and Catchalift bring potential benefits such as cheaper and more flexible transport options, but also concerns over competition with taxis, safety, insurance standards and pricing. It can often take considerable time for regulation to respond to these changes.

Governments and government agencies will also experience this disruption and change. Traditional sources of transport related revenue, such as vehicle registration, driver licensing and fuel excise will be impacted as the size and characteristics of the vehicle fleet shift. Transport agencies will need to invest in new skills such as data analysis, as the importance of using information technology and data to improve the efficiency of existing infrastructure assets grows. Some roles, such as the enforcement of road rules, may change or become obsolete, as human decision-making is increasingly removed from the driving task.

The way that physical infrastructure is designed may also change. For example, automated vehicles may require less extensive road signage and reduced parking space in city areas. Investment in infrastructure that caters for technological advancements will need to be balanced against the risk of constraining unforeseen innovations.

Given the transformative potential of emerging transport technologies, it is likely that the transport sector will experience more disruptive changes in the future. This policy framework will assist governments in preparing for those changes that are able to be anticipated, while taking a flexible approach to unexpected issues as they arise.
5. Australia’s Approach

5.1 What Role for Government?

Australian governments are strongly committed to encouraging the deployment of new transport technologies. In many cases the private sector will bring new technologies to market on a commercial basis, in order to meet demand from consumers. This may require little, if any, government intervention.

In other situations there will be a strong rationale for government action. This may occur where the largest benefits require coordinated action, where there are limited incentives for consumers to take up beneficial technology, or where public investment will benefit the network as a whole. Some emerging technologies may require government (and industry) to support enablers such as security systems or communications infrastructure. Where governments do act, meeting the needs of travellers for a safe, efficient and convenient transport system should be a priority.

Governments will also ensure that an appropriate regulatory environment is maintained. Proponents of new technologies will need to demonstrate the appropriate levels of safety, security and privacy. Governments will remove or amend regulation that becomes obsolete or outdated.

On this basis, Australian governments will undertake four main roles relating to the deployment of transport technology:

1. **Policy leadership:**
   - provide a clear, nationally coordinated approach across different levels of government, being responsive to changes in the technological environment;
   - facilitate collaboration between parties, including industry and researchers;
   - raise public awareness and acceptance of beneficial new technologies; and
   - efficiently manage transitions between old and new technologies (such as between human-controlled and automated vehicles). This includes considering flow-on effects to other transport modes and related policy areas such as urban planning.

2. **Enabling:**
   - ensure that the private sector is able to bring beneficial new technologies to market, including by supporting investment in digital infrastructure and/or data streams (such as highly accurate geo-positioning systems and real-time information on road conditions); and
   - support private sector innovation in the transport sector, such as by providing open and consistent access to transport data. Where practical, data will be aggregated to the national level.
3. **Supportive regulatory environment:**
   - ensure that community expectations of safety, security and privacy are appropriately considered in new technology deployments;
   - remove regulatory barriers to new technology in a proactive fashion;
   - wherever possible, provide certainty about future regulatory requirements.

4. **Investment:**
   - invest in research, development and real-world trials that benefit the entire transport network customer base or provide a sound basis for government decision-making (including in collaboration with the private sector).

5.2 **Principles for Government Action**

Australian governments have agreed on the following policy principles to inform a consistent approach to the delivery of the roles identified in section 5.1. A principles based approach has been adopted to provide flexibility and to acknowledge that important differences between jurisdictions will impact on decision-making.

**Policy Principles**

1. Government decision-making on transport technologies will be based on capacity to improve transport safety, efficiency, sustainability and accessibility outcomes.

2. New technologies should be implemented in a way that is consumer centric (i.e. designed to meet the needs of those using the service). This includes consideration of:
   - options to deliver transport information and services in a way that is consistent and familiar, and
   - the diverse needs of travellers, in particular travellers with a disability, vulnerable road users such as cyclists and pedestrians, and users of multiple modes of transport.

3. Where government investment is required to support the deployment of new technologies, that investment will be evidence based, consistent with long-term strategic planning and will deliver value for money.

4. Where feasible, government agencies will avoid favouring particular technologies or applications, in order to encourage competition and innovation. New applications should support interoperability, backwards compatibility and data sharing, and should account for possible future transitions to other technology platforms.
5. Planning for transport technologies will build on existing infrastructure networks (including public transport) and seek to leverage existing consumer devices (such as smart phones) where appropriate.

6. When considering regulatory action, governments will consider low cost approaches such as collaborative agreements or self-regulation before pursuing formal regulation.

7. If required, best practice regulatory approaches will be adopted to ensure regulation is cost efficient, transparent, proportionate to the risk, fit for purpose and done in consultation with affected stakeholders. This includes adopting relevant international or regional standards, unless there is a compelling reason for a unique Australian requirement.
Case Study: Connected Heavy Vehicles

The Cooperative Intelligent Transport Initiative (CITI) is one of the world’s first large scale test projects of vehicle-to-vehicle and vehicle-to-infrastructure communications in heavy vehicles. The trial is taking place on 42km of accident prone road between Port Kembla and the Hume Highway, New South Wales. The Australian and New South Wales governments are funding the $1.4 million project on a 50:50 basis.

The first stage of the project, completed in November 2015, involved 58 heavy vehicles, two light vehicles and a motorcycle being fitted with wireless communication devices, in order to share collision warnings with each other. Participating vehicles are also receiving speed and red light warnings from specially installed road-side infrastructure along the route. The University of Sydney’s Australian Centre for Field Robotics is currently analysing data collected as part of the trial to determine the accuracy of the system. Stage Two of the project aims to install communication devices in an additional 60 vehicles, including buses and passenger vehicles, by the end of 2017.

In April 2016 the New South Wales Government announced a further trial of vehicle-to-infrastructure communications in heavy vehicles. During the trial the timing of traffic signals at more than 100 locations in Sydney will be adjusted to accommodate approaching heavy vehicles. The trial hopes to demonstrate that reducing the need for slow acceleration and deceleration by heavy vehicles can improve traffic conditions for all road-users.

Image courtesy of Dominic Wall

This action plan outlines Australia’s national priorities for implementing new transport technologies. The individual measures described below have been identified and agreed through discussions between Australian governments and with industry.

The action plan will be a three year program of work (2016-2019), and accordingly focuses on issues that can be addressed in the short term. Changes in the technological environment can occur rapidly, making it difficult to plan beyond this three year horizon. A more viable and agile approach is to review and evaluate the action plan on an annual basis to ensure it responds to new and emerging issues, and achieves long-term outcomes over time.

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<td>1</td>
<td>Establish a regulatory framework for testing automated vehicles</td>
<td>Transport and Infrastructure Senior Officials’ Committee (TISOC) /National Transport Commission</td>
<td>Late 2017</td>
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<td>Testing of automated vehicles on public roads in Australia is an important step towards realising the potential benefits of automated technology. In particular, real-world testing and trials are necessary to ensure that automated systems can operate safely and efficiently in Australian conditions, and for building public confidence. Australian jurisdictions will commit to remove any identified barriers, and ensure that manufacturers are able to safely test automated vehicles in real-world conditions by the end of 2017. This work will be informed by the National Transport Commission project to identify regulatory barriers to automated road and rail vehicles and by work undertaken by Austroads and its road agency members on consistent guidance for supporting on-road testing.</td>
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<td>2</td>
<td>Develop national operational guidelines to support the on-road use of automated vehicles</td>
<td>Austroads</td>
<td>Late 2017</td>
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<td>The future deployment of automated vehicles may require road managers to change the way that road transport systems are developed, operated and used. This may include the design and maintenance of various road attributes, the management of traffic, the registration of vehicles, and the training and licensing of drivers. To optimise the potential safety and mobility benefits of automated vehicles, guidelines for road agencies and other road operators will be developed that outline a nationally consistent approach to these operational functions. This will include guidance on how infrastructure being developed today can be prepared for future technologies, allowing these technologies to be deployed at lower cost when they eventually become available. This work will include consultation with a range of stakeholders including the National Transport Commission, the Commonwealth, jurisdictions, and industry.</td>
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<td>3</td>
<td><strong>Undertake priority trials and research of Intelligent Transport Systems</strong>&lt;br&gt;Over the term of this action plan Australian governments, researchers and the private sector will move to undertake more trials and demonstrations of Intelligent Transport Systems. This will include smart infrastructure, connected vehicles and automated vehicles (particularly following the removal of regulatory barriers in Action 1). It is in Australia’s national interest to trial solutions to the most pressing transport problems first, and to share learnings between governments to avoid the need for the same trial to be undertaken in several jurisdictions. To facilitate this outcome senior transport officials will collaborate on a prioritised schedule of proposed trials (in consultation with interested research and industry stakeholders) and establish a formal mechanism for sharing technical outcomes.</td>
<td>TISOC</td>
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<td>4</td>
<td><strong>Develop a connected vehicle (Cooperative ITS) infrastructure road map</strong>&lt;br&gt;Industry consultation during the development of this framework highlighted that certainty about the provision of connected road-side infrastructure is critical for industry planning, and for ensuring that there is a strong commercial incentive to make connected vehicles available to the Australian market at an early stage. A connected vehicle infrastructure road map will be developed to provide greater certainty to industry on infrastructure deployment methods and indicative timeframes, to ensure that Australia is well placed to take advantage of this emerging technology.</td>
<td>TISOC</td>
<td>Mid 2017</td>
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<td><strong>Publish a connected vehicle (Cooperative ITS) statement of intent on standards and deployment models</strong>&lt;br&gt;Industry has highlighted the need for an early understanding of the connected vehicle standards and deployment models likely to be adopted in Australia. A statement of intent will provide industry with this guidance. This work will examine both non-regulatory approaches to deployment which could be adopted by convention, as well as regulatory standards which may form part of Australia’s formal framework of vehicle regulation (and corresponding links with international standards set by the United Nations). Industry consultation and foundational work on approaches to standards and compliance models already completed by Austroads will inform this project.</td>
<td>TISOC/ Commonwealth</td>
<td>Early 2017</td>
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<td><strong>Develop a nationally agreed deployment plan for the security management of connected and automated vehicles</strong>&lt;br&gt;Preventing cyber threats and malicious acts will be the key challenges in deploying connected and automated vehicles. The model emerging internationally to address cyber security issues is referred to as a Security Credential Management System (SCMS). A SCMS verifies the identity of a device (such as an individual vehicle) so that messages received from that device can be trusted.&lt;br&gt;This action will explore the options for meeting emerging security management requirements, and consider the costs, risks, feasibility and timing of those options as well as looking at overseas experience. Consideration will also be given to the role of government, and to whether other telematics and intelligent transport services could also utilise an SCMS. The output from this action will be a nationally agreed plan for security management, including whether a national SCMS is required in Australia.</td>
<td>TISOC/ Austroads</td>
<td>Mid 2018</td>
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<td>7</td>
<td><strong>Investigate options to provide enhanced geo-positioning information to the land transport sector</strong>&lt;br&gt;Future transport technologies will require access to positioning information with higher levels of accuracy and integrity (for example in order to tell which lane a vehicle is travelling in, rather than just on which road). Some international markets are meeting these higher level positioning requirements using satellite-based augmentation services across select geographic regions. In Australia, however, access can be limited to subscription services, proprietary equipment and private positioning networks (especially outside of urban areas) without a consistent performance standard. This action will investigate options for next-generation delivery of enhanced positioning (including private sector involvement) for the land transport sector.</td>
<td>Commonwealth</td>
<td>Late 2017</td>
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<td>8</td>
<td><strong>Improve the availability of open data in the transport sector</strong>&lt;br&gt;Governments can assist industry, researchers and the public to develop innovative solutions to transport problems by providing open access to transport data. Australian governments are committed to an open-by-default approach to transport data and through this action will improve the availability of open access transport data. In particular, existing jurisdictional data sets will be consolidated into national level information in a shared format, and made available through a common portal. New datasets will also be created, including improved information on speed zones across Australia and a national map of low-gear warning zones (which could be used to provide safety warnings to drivers).</td>
<td>All jurisdictions</td>
<td>2016-19</td>
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<td>9</td>
<td><strong>Explore options to increase the uptake of telematics and other technologies for regulatory and revenue collection purposes</strong>&lt;br&gt;Vehicle telematics can deliver significant benefits for industry, government and motorists, particularly in terms of safety, productivity and protection of infrastructure assets. For example, heavy vehicle operators in Australian can already, on a voluntary basis, provide telematics data to regulators for compliance purposes, in exchange for increased access to the road network. Similarly, some insurance firms offer motorists reduced premiums if they can demonstrate, through voluntary telematics data, that they are low-risk drivers.&lt;br&gt;Wider adoption of telematics would allow governments to implement more efficient models of revenue collection. Improved telematics uptake could also inform infrastructure planning, ensuring that future investments meet user demands. In view of these potential benefits, this project will explore strategies for government and the private sector to accelerate the deployment of telematics and associated technologies.</td>
<td>TISOC</td>
<td>Mid 2017</td>
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<td>10</td>
<td><strong>Evaluate low–cost technologies to improve safety at rail level crossings</strong>&lt;br&gt;Crashes at rail level crossings tend to be particularly serious, causing an average of 37 fatalities annually in Australia. Technology based solutions have a significant potential to address this problem at low-cost compared to expensive civil works such as grade separation. For example, vehicle-to-infrastructure communications are able to warn road users of approaching trains in real-time. This project will explore the merits of the accelerated uptake of smart safety technology at level crossings, and how technological solutions could be better incorporated into rail safety planning.</td>
<td>TISOC</td>
<td>Late 2017</td>
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<td>11</td>
<td><strong>Explore how data from telematics and other intelligent transport systems can be used to optimise operations and planning for port precincts and intermodal terminals</strong>&lt;br&gt;The efficiency of Australia’s supply chains is a critical economic issue, given that even small improvements to supply chain efficiency can significantly improve Australia’s global competitiveness and productivity. This project will seek to explore how granular data collected from telematics devices and intelligent transport systems can be used to improve supply chain efficiency, focusing on understanding and optimising transport movements within port precincts as well as freight distribution patterns in nearby metropolitan areas. The value of any data collected for planning future intermodal terminals will also be considered.&lt;br&gt;A key challenge in collecting freight data is that different supply chain participants use different data standards and collection practices. The potential of a national freight labelling standard to improve data consistency and supply chain visibility will also be examined.</td>
<td>Commonwealth</td>
<td>Mid 2017</td>
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<td><strong>Investigate options for interoperable public transport ticketing</strong></td>
<td>TISOC</td>
<td>Late 2017</td>
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<td>Electronic public transport ticketing has become widely adopted in</td>
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<td>Australia, and has improved the convenience and efficiency of public</td>
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<td>transport. However, in many cases electronic tickets only work in a single</td>
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<td>city, or in some instances, only on a particular transport mode. This</td>
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<td>reflects the complexity and costs of deploying ticketing systems, and</td>
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<td>differing investment schedules in different locations over time. Into the</td>
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<td>future, as ticketing technology matures and existing systems require</td>
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<td>renewal, governments will have an opportunity to deploy systems that are</td>
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<td>interoperable across Australia and make better use of personal electronic</td>
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<td>devices such as smart phones. This action will investigate options for</td>
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<td>achieving this outcome over time, further increasing convenience and</td>
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<td>creating value for tourists and inter-state travellers.</td>
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<td>13</td>
<td>**Investigate the costs, benefits, and possible deployment models for</td>
<td>TISOC /</td>
<td>Mid 2017</td>
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<td>Automatic Crash Notification**</td>
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<td>Minimising the time that it takes emergency services to reach the scene</td>
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<td>of a crash is an important factor in preventing deaths and serious</td>
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<td>injuries. Automatic Crash Notification (ACN) uses sensors inside a vehicle</td>
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<td>to determine when a serious crash has occurred, and then provides</td>
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<td>emergency services with the exact location of the crash by transmitting</td>
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<td>data over the mobile (cellular) network. This technology is already</td>
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<td>available in a limited number of vehicles, and it may be worthwhile for</td>
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<td>governments to consider ways to encourage broader adoption. This project</td>
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<td>will consider the costs and benefits of different operational models and</td>
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<td>how ACN data could be better integrated with existing systems belonging to</td>
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<td>emergency services authorities.</td>
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<td>14</td>
<td><strong>Explore the merits of adopting new safety and traffic management</strong></td>
<td>TISOC</td>
<td>2016-19</td>
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<td>technologies**</td>
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<td>Governments face the ongoing challenge of deciding which transport</td>
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<td>technologies to adopt and when. Timing is a particularly important</td>
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<td>consideration – technologies need to be mature and the benefits proven</td>
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<td>before public funds can be committed to implementation. In the immediate</td>
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<td>future, Australian governments will explore the costs and benefits of the</td>
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<td>broader adoption of the following promising technologies:</td>
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<td>- <strong>Traffic Signal Prioritisation</strong> – green lights for emergency services</td>
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<td>and public transport vehicles at signalised intersections;</td>
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<td>- <strong>Managed motorways</strong> – techniques to maintain traffic flow on motorways,</td>
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<td></td>
<td>such as ramp signalling and variable message signs; and</td>
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<td>- <strong>Vehicle safety systems</strong> – such as autonomous emergency braking for</td>
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<td>heavy vehicles and anti-lock braking for motor cycles.</td>
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