Connected and automated vehicles: current initiatives and issues

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Part of the Tranzinfo Hot Topics series, this issue offers a selection of material on current initiatives, trials and research in connected and automated vehicles (CAV), and an overview of some issues facing the industry.

Taxonomy and definitions for terms related to on-road motor vehicle automated driving systems J3016

SAE publishes a taxonomy for motor vehicle automation ranging in level from no automation to full automation. The definitions can be used to describe the automation of on-road vehicles, systems within vehicles, and the operation of vehicles.

Contents:

Australian initiatives

Connected and automated vehicle trials
Austroads
Provides details of connected and automated vehicle trials in each Australian state and in New Zealand via an interactive map.

[Australia's rethink on transport infrastructure: new report](#)
Australian Trade and Investment Commission (Austrade), September 2018
Austrade has released a report that analyses Australian expertise and capability in the development of intelligent transport systems and connected and automated vehicle (CAV) technology. Includes case studies.

[Australian Driverless Vehicle Initiative (ADVI)](#)
A partnership of government, industry and academic partners (driven by ARRB Group) working collaboratively to research, investigate and help inform the development of robust national policy, legislation, regulation and operational procedures and processes to bring driverless vehicles safely and successfully to Australian roads.

[Connected and Automated Vehicles Program](#)
Austroads
The Austroads CAV program is working closely with key government and industry stakeholders towards establishing the required supporting frameworks.

[iMOVE CRC](#)
A consortium of 44 industry, government, and research partners engaged in a concerted 10-year effort to improve Australia's transport systems through collaborative R&D projects.

South Australia

[South Australia, EasyMile and Transit Australia Group sign a MOU to advance AV manufacturing and technology in South Australia](#)
South Australian Government Ministerial Media Statement, July 2018
The South Australian Government has signed an MOU with Transit Australia Group (TAG) and French company EasyMile to deliver autonomous vehicles into South Australia and Asia Pacific markets.

[Future Mobility Lab Fund](#)
In 2016 the South Australian Government provided $10 million over three years to projects that demonstrate, develop, or contribute to the applied research of future mobility technologies that provide real benefits to the community.

[Driverless vehicles](#)
Department of Transport, Planning and Infrastructure (DPTI), 2018
Companies, universities and other groups considering applying to undertake a trial in South Australia are encouraged to make early contact with the Department of Planning Transport and Infrastructure (DPTI).

Western Australia

[RAC Intellicar](#)
Royal Automobile Club (WA)

The RAC WA will trial an on-demand driverless 'Intellicar' from French car maker Navya in Perth, one of only three cities in the world where the car is being tested.

[RAC Intellibus](#)
Royal Automobile Club (WA)
With support from the State and Federal Governments, the City of South Perth and the vehicle manufacturer Navya, RAC's Automated Vehicle Trial is helping WA prepare a roadmap for the safe transition to this new technology.

[Automated vehicles: are we ready?](#)
Main Roads Western Australia, 2015
Report highlights the potential implications for Main Roads of the introduction and wider use of Automated Vehicles (AVs) on Western Australian roads. It will inform Main Roads' strategic decision-making in this area.

Victoria

[LaTrobe University completes driverless Autonobus trial](#)
Melbourne's La Trobe University has completed its on-campus trial of Navya's driverless Autonobus shuttle and has released [a report](#) with findings and recommendations.

[Evidence base released for automated and zero emissions vehicles infrastructure advice](#)
Infrastructure Victoria, August 2018
Infrastructure Victoria has released a number of research documents that it will use as an evidence base for advice to the Victorian Government on the infrastructure required to support automated and zero emissions vehicles.

[Automated and connected vehicles](#)
VicRoads
Encourages trials and partnerships to improve road safety and provide other benefits for Victoria.

[Victorian connected and automated vehicle trials: phase one – partially automated vehicles.](#)
Transurban, 2018
Transurban's trial of partially automated vehicles, the kinds already on our roads today, set out to understand the infrastructure changes that we may need to make now and over the next few years. The trial highlighted the importance of ensuring drivers are aware of how to use driver-assisted features safely.

New South Wales

Smart Innovation Centre
Transport for NSW
NSW's hub for collaborative research and development of safe and efficient emerging transport technology.

Cooperative Intelligent Transport Initiative (CITI)
NSW Centre for Road Safety
Australia's first C-ITS testing facility.

Queensland

Cooperative and Automated Vehicle Initiative
Queensland Department of Transport and Main Roads
The goal of CAVI is to test cooperative and automated vehicle technologies that make roads safer by contributing towards the vision of zero road deaths and serious injuries on the state's roads.

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International initiatives

Smart mobility projects and trials across the world
iMOVE CRC webpage
Details of many pilot programs, projects, and trials of Intelligent Transport Systems and related industries taking place across the world.

Autonomous vehicles readiness index: assessing countries' openness and preparedness for autonomous vehicles
KPMG, 2018
Provides an in-depth view of what it takes for countries to meet the challenges of self-driving vehicles, evaluating the preparedness of a cross-section of 20 countries globally.

Global driverless vehicle survey 2018
BakerMacKenzie, 2018
The Survey provides a high-level insight into the development and deployment of rules to accommodate automated driving for 33 jurisdictions.

Great Britain

The Centre for Connected and Autonomous Vehicles
Department for Transport & Department for Business, Energy & Industrial Strategy

By working closely with industry, academia and regulators, the Centre aims to make the UK a premier development location for connected and automated vehicles.

[Smart Mobility Living Lab](#)
Designed to operate as an open innovation environment for the exchange of ideas and development of technical and business solutions for the future development of smart mobility solutions.

- [GATEway – Greenwich Automated Transport Environment](#)

A research project led by TRL (UK Transport Research Laboratory) to understand and overcome the technical, legal and societal challenges of implementing automated vehicles in an urban environment. Now completed.

- [UK Autodrive](#)

UK Autodrive is an ambitious three-year project that is trialling the use of connected and self-driving vehicles on the streets of Milton Keynes and Coventry using cars provided by project partners Ford, Jaguar Land Rover and Tata Motors European Technical Centre. The programme will also trial a fleet of lightweight, self-driving 'pods' for use on pavements and other pedestrianised areas.

[Move_UK](#)
Primarily focused on reducing the timescale and cost of validating Automated Driving Systems (ADS). The project involves the live trial of vehicles fitted with ADS in real world conditions on the roads of Greenwich, London.

United States

[ITS Research - Automation](#)
US Department of Transportation
Research areas include enabling technologies, safety assurance, transportation system performance, testing and evaluation, and policy and planning.

[Waymo](#)
An independent self-driving technology company (began as the Google self-driving car project).

[The Partnership for Transportation Innovation and Opportunity (PTIO)](#)
Waymo, Uber, Ford, and others have joined forces to explore the 'human impact' of self-driving cars. While society prepares for the practical impact of autonomous vehicles, efforts must also focus on the human impact as it relates to Americans' careers and jobs.

Europe

[Connected Automated Driving Europe](#)
The European Commission has set up two projects that work together with a broad range of international stakeholders to ensure that CAV technologies are deployed in a coordinated and harmonised manner.

- [Scout](#)
- [Cartre](#)

[Eucar (European Council for Automotive Research and Development)](#)
The European Council for Automotive R&D of the major European passenger car and commercial vehicle manufacturers.

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Regulatory and liability issues

[Changing driving laws to support automated vehicles: policy paper](#)
National Transport Commission, 2018
This policy paper sets out recommendations for legislative reform to provide clarity about the situations when an automated driving system (ADS), rather than a human driver, may drive a vehicle; ensure there is a legal entity that can be held responsible for the operation of the automated driving system; establish any new legal obligations that may be required for users of automated vehicles; and outline further work that needs to be done to transform agreed policy into legislation.

[Safety assurance for automated driving systems: consultation regulation impact statement](#)
National Transport Commission, 2018
Outlines three key risks that need to be addressed to ensure the safe commercial deployment of automated vehicles in Australia.

[Assuring the safety of automated vehicles: policy paper](#)
National Transport Commission, 2017
Sets out the high-level design of a safety assurance system for automated vehicles in Australia based on mandatory self-certification until the development of international standards for automated driving systems.

[Guidelines for trials of automated vehicles in Australia](#)
National Transport Commission & Austroads, 2017
The national guidelines are intended to promote Australia as a testbed for automated vehicle technology. The guidelines are also intended to help trialling organisations to ensure safety when testing automated vehicle technology on Australian public roads.

[Safety benefits of cooperative ITS and automated driving in Australia and New Zealand](#)
Austroads, 2017
Identifies emerging Cooperative Intelligent Transport Systems (C-ITS) and Automated Driving applications and assesses their potential safety benefits for Australia and New Zealand.

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[Registration, licensing and CTP insurance issues associated with automated vehicles](#)
Austroads, 2017
The key vehicle registration issues identified revolve around vehicle standards, compliance at market entry, compliance in-service and vehicle ownership. The key driver licensing issues revolve around driver training, driver testing and licensing. For CTP insurance, the critical issues concern the impact of AVs on no-fault and at-fault schemes, the impact of no driver being in the vehicle if a crash occurs, the impact of changing vehicle ownership models, the assignment of liability, and the impact on insurance premiums and determination of risk.

[Transforming mobility: a regulatory roadmap for connected and automated vehicles.](#)
NRMA (NSW), 2017
The looming transition to connected and automated vehicles will transform mobility. While users will be presented with new and accessible mobility solutions, Australia's regulatory environment and transport network will be profoundly impacted.

[Radiocommunications (Intelligent Transport Systems) Class Licence 2017](#)
The release of the [ITS Class Licence](#) in January 2018 marks an important milestone towards enabling the next generation of connected and automated vehicles to be introduced to the Australian market. The ITS Class Licence will allow connected vehicles and roadside infrastructure to share data using the 5.9 GHz radio frequency band. Importantly the licence aligns with international developments, particularly in Europe.

[Automated driving systems 2.0: a vision for safety.](#)
U.S. Department of Transportation, 2017
The new policy serves as NHTSA's current operating guidance for Automated Driving Systems (ADS), SAE Automation Levels 3-5.

[Future environment net assessment: autonomous vehicles](#)
US Office of Cyber and Infrastructure Analysis, Dept. of Homeland Security, 2017
As vehicles become increasingly connected and a part of the Internet of Things, vulnerabilities and potential consequences are likely to increase unless cybersecurity is better integrated into vehicle design and development. Legal and regulatory gaps exist on issues such as collision liability and safety standards.

[The key principles of cyber security for connected and automated vehicles](#)
UK Department for Transport, UK Centre for the Protection of National Infrastructure, 2017
Cars are more vulnerable than ever to hacking and data theft. These key principles have been created for use throughout the automotive sector, the CAV and ITS ecosystems and their supply chains.

[Regulatory reforms for automated road vehicles: policy paper](#)
National Transport Commission, Canberra, 2016
This policy paper sets out transport and infrastructure recommendations for policy and regulatory reforms to support automated road vehicles in Australia. It recommends that the Commonwealth and state and territory governments support on-road trials, remove unnecessary legal barriers, and provide for the safe operation of automated vehicles.

[National policy framework for land transport technology action plan 2016-2019](#)
Transport and Infrastructure Council, 2016
The three-year action plan includes the regulatory framework, operational arrangements, national collaboration, security, positioning, data, research and trials of connected and automated vehicles. It also covers policy principles to guide decision making and the role of governments in regulation, standards and investment.

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Urban transport/planning issues

[Infrastructure preparedness for connected and automated vehicles and electric vehicles](#)
ARRB, 2018
The Australia and New Zealand Driverless Vehicle Initiative (ADVI) Policy and Risk Group has released a document to challenge the status quo of infrastructure planning by providing thought leadership around how infrastructure must be considered and planned to be most productive as part of the Connected and Automated Vehicle (CAV) future.

[Autonomous vehicle implementation predictions: implications for transport planning](#)
Victoria Transport Policy Institute (British Columbia), 2018
Explores autonomous vehicle benefits and costs and impacts on transportation planning issues. Investigates how quickly self-driving vehicles are likely to be developed and deployed based on experience with previous vehicle technologies, and how they are likely to affect travel demands and planning decisions such as optimal road, parking and public transit supply.

[Australian Satellite-Based Augmentation System](#)
In the 2018 Budget the Australian Government announced an investment of $225 million that it will support the development of an Australian Satellite-Based Augmentation System and upgrade Australia's ground Global Navigation Satellite System network. This will be important for the introduction of connected and automated vehicles and will have a particular impact on remote and regional areas where current connectivity is poor.

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[Automated vehicles: do we know which road to take?](#)
Infrastructure Partnerships, 2017
Recommends that government take the middle road – coordinating community and industry engagement and monitoring AV penetration into the road network – to ensure that transport policy and investment decisions neither significantly lead, nor significantly lag, community choices.

[Integrated transport planning: thought leadership paper](#)
Australian Driverless Vehicle Initiative (ADVI), 2017
Governments should adopt a nationally co-ordinated approach to future transport system planning that includes automated vehicles. Assumptions and parameters used in transport planning must be updated and new mobility 'ecosystems' integrated with transport planning.

[Paths to a self-driving future: five transition steps identified.](#)
KiM/Netherlands Institute for Transport Policy Analysis, 2017
A 'self-driving future' is highly probable. Policy measures can accelerate this transition, however 'showstoppers' may emerge: developments that impede the transition.

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Social and economic impact

[Driverless vehicle report predicts major productivity boost for Australia and new employment opportunities](#)
Australia and New Zealand Driverless Vehicle Initiative (ADVI), 2018
The autonomous vehicle industry is set to provide Australia with a major productivity boost as soon as 2025, with the development of high value products and services and new job opportunities, according to a report commissioned by the Australia and New Zealand Driverless Vehicle Initiative (ADVI).

[Safer roads with automated vehicles?](#)
International Transport Forum, 2018
This report examines how increasing automation of cars and trucks could affect road safety and which security vulnerabilities will need to be addressed with the rise of self-driving vehicles.

[Social issues relating to land-based automated vehicles in Australia](#)
Australian House of Representatives Standing Committee on Industry, Innovation, Science and Resources, 2017
The Committee's brief was to establish whether the social changes likely to be brought about by the introduction of highly automated vehicles in Australia are being adequately considered.

[Preliminary findings from the first Australian National Survey of Public Opinion about Automated and Driverless Vehicles](#)
Australian Driverless Vehicle Initiative (ADVI), 2017
Responses from 5263 participants were collected and analysed regarding their level of awareness of automated vehicles generally, and their opinions specifically about partly- and fully-automated cars.

[Costs and benefits of emerging road transport technologies](#)
Bureau of Infrastructure, Transport and Regional Economics (BITRE), 2017
The intent of this report is to identify and, where possible, quantify the costs and benefits of the following three technology categories: Intelligent Transport Systems, Co-operative ITS, and Automated Vehicles.

[Safety benefits of cooperative ITS and automated driving in Australia and New Zealand](#)
Monash University Accident Research Centre/Austroads, 2017
The adoption of key Cooperative Intelligent Transport Systems (C-ITS) and automated driving technologies could prevent a significant number of fatal and serious injury crashes in Australia and New Zealand.

[Automation of the driving task: some possible consequences and governance challenges](#)
OECD/International Transport Forum, 2017
The possible consequences of the advent of fully automated vehicles (AVs) for personal transport are assessed. A shared-user model is considered preferable to an owner-user model, and public-sector intervention is considered necessary to secure the successful integration of AVs with mass transit.

[Capturing the climate benefits of autonomous vehicles](#)
UC Davis Institute for Transport Studies, 2017
Autonomous vehicles could reverse years of progress in reducing greenhouse gas emissions or provide new opportunities for accelerating emission reductions. Policy options that pair autonomous technology with low-emission electric vehicles and shared-ride services can ensure climate benefits are realized from AV technology and potential emissions increases are minimized.

[Economics impacts of automated vehicles on jobs and investment: position paper](#)
Australian Driverless Vehicle Initiative (ADVI), 2016
Automated vehicles can drive major economic outcomes in terms of public benefits (e.g. reduced traffic congestion / reduced road deaths) and private benefits (time savings / increased productivity). The scale and distribution of economic benefits will depend on how the introduction of automated vehicles is managed.

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Australia

Air Services Australia Library
ARRB Group, MG Lay Library
Arup Library
Austroads
Centre for Automotive Safety Research Library
Commonwealth Department of Infrastructure and Regional Development Library
Hargrave-Andrew Library, Monash University
Jacobs Library
Main Roads Western Australia Library
Queensland Department of Transport and Main Roads Library
Transport Library, Transport for NSW
SA Department of Planning, Transport & Infrastructure Library
SMEC Library
Tasmanian Department of State Growth Library
University of Tasmania Launceston Campus, incorporating former Australian Maritime College Library
Victorian Government Library Service
Victorian Transport Accident Commission Library
WA Department for Transport Library

New Zealand

Ministry of Transport Library
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