Submission to the NTC
Issues paper – Vehicles and Safety: Heavy Vehicle National Law Review

August 2019

Prepared by ADVI Centre of Excellence

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Australia & New Zealand Driverless Vehicle Initiative

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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.

The 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 is proud to have the NTC as a supporting partner to the Initiative.

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 with the Police across the nation, to safely run events, pilots and demonstrations on and around public roads. To this end we are well placed to understand the importance of enforcement agencies to 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.

Who to contact for further information?

Should you wish to contact ADVI, please do so by emailing us at: info@advi.org.au.

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Feedback relating to the Issues paper

Summary

ADVI supports the objectives of the Heavy Vehicle National Law (HVNL) Review and welcomes the opportunity to respond to "*Vehicle standards and safety, Issues paper*", July 2019. Heavy vehicles perform a vital role in moving freight on our roads which makes supporting safer and more productive vehicles critical to the success of the sector.

It is relevant to examine the potential impacts of emerging technologies in the discussion around developing a modern, outcome focused HVNL. There is vast potential for driverless technology to improve not only safety outcomes in the heavy vehicle sector but to also enhance productivity through simplified administration and compliance processes as well as increased flexibility.

Trucking is an area where driverless technology may be commercially realised first. In part, this is due to the economic incentives around freight and the nature of highway driving. Yet whilst driverless technology is getting closer to achieving full autonomy, the industry still faces a range of barriers, limiting the uptake of these safety technologies.

One of the more critical lessons we have learnt from the regulation and governing of driverless technologies is the need for an agile approach. Long-standing policymaking processes are typically incompatible with the features of emerging technologies. Additionally, the development of policies and regulation are no longer restricted to government but increasingly require the efforts of a range of stakeholders.

The HVNL Review presents a recast opportunity to incorporate driverless technologies into future law. Importantly, this recast will enable multiple stakeholders to shape the HVNL under a shared vision which can enhance the safety and productivity of the heavy vehicle sector. With the objectives of the HVNL Review in mind, through this submission ADVI encourages:

- the HVNL has regulatory flexibility that can keep pace with the evolving technological landscape;
- safer vehicle technologies such as Automated Heavy Vehicles (AHV) and Platooning are encouraged;
- adoption of data-driven approaches to enhance heavy vehicle sector outcomes; and
- planning for the interoperability of the future transport ecosystem.

ADVI notes the earlier work of the NTC, *Regulatory options for automated vehicles*[1] which provides parallel content for this *Issues paper*. As part of this work, the Commission released detailed analysis of legislation impacting driverless vehicles in Australia, recognising the HVNL could present a regulatory barrier for automated heavy vehicles (AHVs). As such, ADVI will not be re-covering similar content for this submission.

ADVI further notes the NTC is currently consulting on the role and regulation of different parties to assure the safe operation of driverless vehicles through the *In-service safety for automated vehicles Regulation Impact Statement.*

[1] National Transport Commission (2016) Discussion paper: Regulatory options for automated vehicles Regulatory options for automated vehicles: ANNEX pg.1 https://www.ntc.gov.au/Media/Reports/(264DF9EA-6247-42C9-8D07-F39E76E95258).pdf

Opportunity in Paradigm Shift

The HVNL Review is an opportunity to contribute to the successful development of the future transport ecosystem. Automation, electrification and digitalisation are poised to transform the freight industry as emerging innovations like electric vehicles (EVs), shared vehicles, innovative vehicles and connected vehicles are creating a new transport ecosystem. The timing of the HVNL review is well placed to ensure the regulation is adaptive to these trends.

As emerging technologies advance and evolve, requirements for regulation will continue to change. As noted by the International Transport Forum, there is an increasing gap between regulatory frameworks in road freight transport and underlying policy objectives[2].

The World Economic Forum has developed a framework[3] for modernising policies and regulation in this evolving environment. ADVI suggests the WEF framework is a resource that may lend itself to strengthening the HVNL Review. The framework offers regulators a way forward for navigating and essentially enhancing the operating system for global cooperation. The design parameters include investigations into the technology-proofing and agility of approaches.

As outlined in the Issues paper, the HVNL Review seeks to develop a modern law that enables the use of new technologies and is flexible. Yet arguably, the HVNL definition is rather fixed:

> *"The primary purpose of the HVNL is to ensure a safe and efficient heavy vehicle journey. This is made up of a safe driver, a safe vehicle and a suitable route."*

This definition assumes a driver is present, which may not be the case for heavy vehicles in the future transport ecosystem. Additionally, in a future scenario of high-level truck automation, the need for certain enforcement actions may be obsolete e.g. rules relating to driver work hours when much or all of the driving task is shifted from the driver to the vehicle or a remote-controller.

Learnings in regulatory flexibility may be taken from 2018 United States policy: *Automated Vehicles (AV) 3.0*[4]. The policy outlines out how to deploy self-driving trucks with an approach that removes unnecessary constraints to self-driving trucks whilst retaining necessary safety rules. In adapting definitions of 'driver' and 'operator' it no longer assumes a driver is present, nor the driver of a commercial truck is human:

> *"…in the case of vehicles that do not require a human operator, none of the human-specific Federal Motor Carrier Safety Regulations (FMCSRs) (i.e., drug testing, hours-of-service, commercial driver's licenses (CDL)s, and physical qualification requirements) apply."*

An alternate approach was taken by the New Zealand Ministry of Transport in 2016. The *Regulation 2025: Emerging Insights*[5] project explored the impact of technology on transport systems and societal adoption. The project concluded that whilst the current regulatory framework could be adjusted to deal with emerging transport technologies, because new risks would emerge, it could be more logical to introduce a bespoke set of regulations to deal with the intelligent aspects of a new transport system.

[2] International Transport Forum, 2017, Data-led Governance of Road Freight Transport, p. 6, https://www.itf-oecd.org/sites/default/files/docs/data-led-governance-road-freight-transport.pdf.
[3] World Economic Forum (2019) Globalization 4.0 Shaping a New Global Architecture in the Age of the Fourth Industrial Revolution. http://www3.weforum.org/docs/WEF_Globalization_4.0_Call_for_Engagement.pdf
[4] United States Department of Transportation, *Preparing for the Future of Transportation: Automated Vehicle 3.0*. https://www.transportation.gov/av/3
[5] New Zealand Ministry of Transport https://www.transport.govt.nz/news/multi/regulation-2025-final-report-launched/

Safety is paramount

Encouraging safer vehicles onto our roads is key to the ADVI vision; we strongly support *Draft Regulatory Principle 1* of the Issues paper and praise the NTC for encouraging the widespread adoption of safe vehicle technologies.

Research suggests human error and dangerous human choices cause up to 94 per cent of serious crashes[6]. In 2018, there were 155 fatalities on Australian roads involving heavy rigid or articulated trucks with 69% occurring in regional or remote locations[7]. This has further significance considering Australian truck traffic is forecast to increase 50% between 2010 and 2030[8]. Long-distance truck operation presently requires concentrated vigilance from drivers to ensure safety; the work is tiring and is associated with increased health risks for drivers.

The use of vehicle automation has the potential to make the driving task easier, safer and more productive (refer to Karl, C., et al[9] for further information). In use for over a decade, AHVs in mining have led to increased safety, efficiency and productivity outcomes for the industry. ADVI Core Partner Fortescue Metals Group has 112 driverless trucks, with its autonomous fleet recently delivering a 30 per cent improvement in productivity. Automated ports also offer a mature use-case of automated technology.

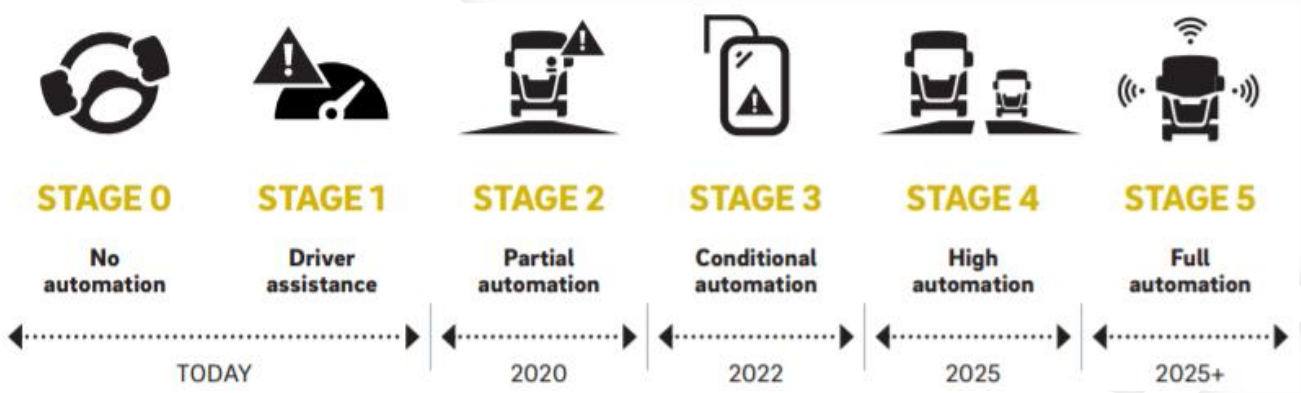
The two current prominent use cases of AHV on public roads are outlined below: single AHV and platooning technology.

Automated Heavy Vehicle

Technology providers and truck OEMs have been quickly moving into the automated space, with many currently working on vehicles with Stage 3 and Stage 4 functionality. Single AHVs currently operate internationally on public roads using Radar, LiDAR (which generally detects objects like cars to 250 metres) and advanced camera-sensing systems. Some camera systems have a vision range of around 1,000 metres.

The technical roadmap for the development and rollout of AHVs consists of multiple stages with increasing automation.

The stages of autonomous driving



Source[10]: SAE, Roland Berger

[6] National Highway Traffic Safety Administration (2015) https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety

[7] Department of Infrastructure, Regional Development and Cities (2019) Australian Roads Deaths Database (to February 2019), BITRE https://bitre.gov.au/statistics/safety/fatal_road_crash_database.aspx

[8] Department of Infrastructure, Regional Development and Cities (2014) Trends: Infrastructure and Transport to 2030, pg. 10 Commonwealth of Australia https://infrastructure.gov.au/infrastructure/publications/files/Trends_Infrastructure_and_Transport_to_2030.pdf

[9] Karl, C., Kutadinata, R. & Germanchev, A (Forthcoming) Operations of Automated Heavy Vehicles in Australia and New Zealand, paper for the 26th ITS World Congress, Singapore, 21-25 October 2019.

[10] Roland Berger (2018) In Focus: Shifting up a gear Automation, electrification and digitalization in the trucking industry file:///C:/Users/lorretta.jessop/Downloads/roland_berger_trucking_industry.pdf

Even at a basic level of 'automation', electronic stability control has resulted in improved safety outcomes with the number of crashes being reduced to approximately 20 per cent.[11] As highlighted by Roland Berger, as IT providers partner with start-ups and OEMs, the development of Stage 4 and 5 capabilities will be advanced:

> *"Specialized technology companies are also busy working on specific areas of automated vehicles, such as video safety technology, next-generation vision technologies, high-definition mapping, deep learning, artificial intelligence and computing and processing technology."*

Whilst driverless vehicles and technologies are rapidly advancing, there is vast potential for commercial deployment in Australia, however regulation is not keeping pace. In the USA, the Federal Motor Carrier Safety Administration and the National Highway Traffic Safety Administration are preparing for AHVs by publishing advance notices of proposed rulemaking consulting on regulations that may need amending, revision or removal to enable AVs on highways.

A number of ADVI Partners are working with overseas OEMs in the automated trucking space, with companies such as Peloton, Daimler, Scania and Volvo currently developing relevant use cases for early deployment. Investment around automated freight movement has grown significantly in the USA, China and across Europe. There is significant potential for the technology to have commercial deployment in Australia.

Platooning

Platooning is the linking of two or more vehicles in convoy, with the truck at the head of the platoon acting as leader, automatically controlling the acceleration and braking of trailing platoon-vehicles. Vehicles maintain a set, close distance between each other. Platooning primarily relies upon the technologies of connected braking, Forward Collision Avoidance and disc braking.

Overseas, changes to regulations such as driver distance has enabled driverless and platooning trials to take place on public roads. Public trials of platooning first took place in Germany in the 1990s. More recently, the ENSEMBLE Initiative[12] is testing (2018-20) multi-brand truck platooning (Volvo Group, DAF, Daimler, Iveco, MAN and Scania) on cross-jurisdictional European roads. This real-world testing across national borders the impact on traffic, infrastructure and logistics will be assessed, whilst gathering relevant data of safety-relevant scenarios and necessitating harmonisation of approval requirements. These cross-jurisdictional trials offer learnings for the Australian regulatory and operational environment.

Intelligent Transport Systems and Big Data Opportunities

Emerging technologies are an opportunity to adopt data-driven approaches to regulating road-based transport.

ADVI looks forward to the establishment the National Freight Data Hub[13] which offers the potential to enhance safety as well as efficiency outcomes. Over the next decades, as varying levels of automated vehicles interact with other road users and infrastructure, it will be essential to collect data on how the regulatory framework interacts with infrastructure elements to gain a better understanding of how the entire transports system will integrate. Cloud-based computing, telecommunications systems, vehicle and repair data will soon be as much a part of the vehicle infrastructure as the bitumen and white lane markings which form a road.

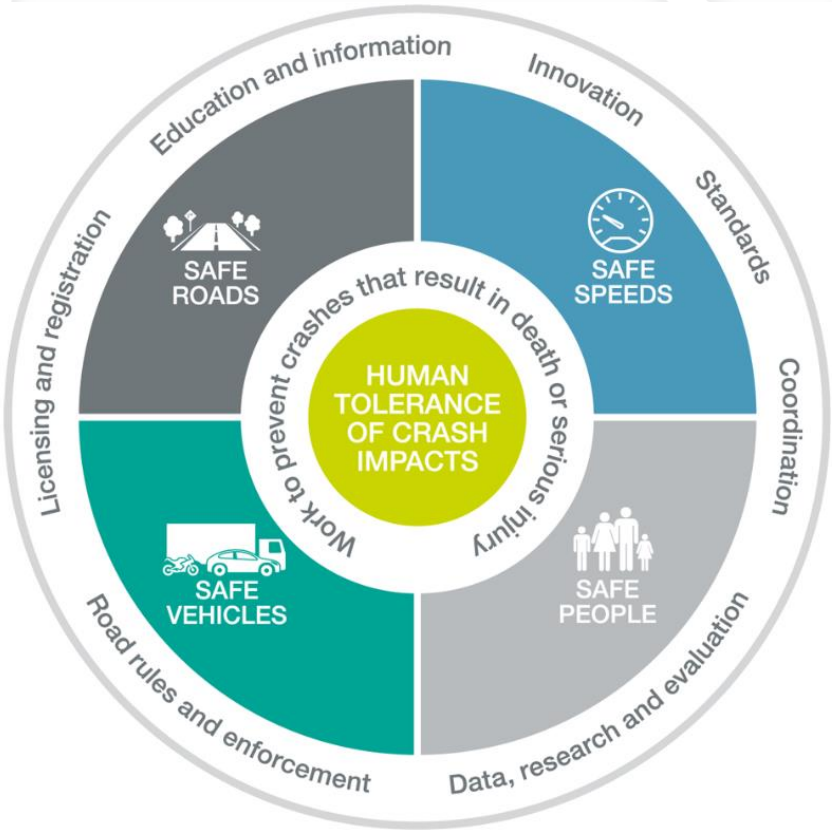
Technologies creating big data include the in-vehicle systems of on-board diagnostics, vehicle condition monitors, in-cabins sensors, vehicle navigation and tracking, advanced driver assistance systems) and road-side/infrastructure systems (e.g. weigh-in-motion, RFID/Bluetooth transponder/receivers, automatic license plate readers, cloud-based computing platforms, variable/dynamic message signs).[14]

[11] European Transport Safety Council 2016, Prioritising the safety potential of automated driving in Europe, briefing paper, ETSC, Belgium.
[12] Krosse, B, 2018, ENabling SafE multi-brand platooning for Europe, 22nd ITVHA meeting, Copenhagen, Sept
[13] ARRB National Freight Data Hub to be Established, 2019 https://www.arrb.com.au/news/national-freight-data-hub-to-be-established
[14] International Transport Forum, 2017, Data-led Governance of Road Freight Transport, p. 6, https://www.itf-oecd.org/sites/default/files/docs/data-led-governance-road-freight-transport.pdf.

Enhanced data analysis from these technologies offers new opportunities for lighter but more comprehensive and widespread enforcement actions. Additionally, rather than confining telemetrics data as a tool for meeting heavy vehicle compliance and enforcement objectives, data can be indicators to evaluate HVNL outcomes and be fed back into system for ongoing improvement. If data collection and analysis is streamlined, this same data could also be utilised to improve supply-chain productivity, as per the National Freight and Supply Chain Priorities[15].

Whilst a move away from current prescriptive HVNL is a step in the right direction, we advocate for compliance through the development of a performance-based criteria, as opposed to a focus on enforcement. This builds on the success of other performance-based standards in Australia and takes a more holistic approach involving all elements of the Safe System (figure below). This approach places liability across the chain of responsibility, recognising the driver, infrastructure and vehicle play key roles in safety[16].

Safe System Principles Diagram



Source: National Road Safety Strategy as adapted from Safer Roads, Safer Queensland: Queensland's Road Safety Strategy 2015–21[17]

[15] Inquiry into National Freight and Supply Chain Priorities (2018) Commonwealth of Australia. https://infrastructure.gov.au/transport/freight/freight-supply-chain-priorities/index.aspx

[16] Karl, CA, 2018, Future Concept of Operations with Connected and Automated Vehicles, paper 72, 6th Australian ITS Summit, Sydney, August, NSW.

[17] https://www.roadsafety.gov.au/nrss/safe-system.aspx

A Vision for the future

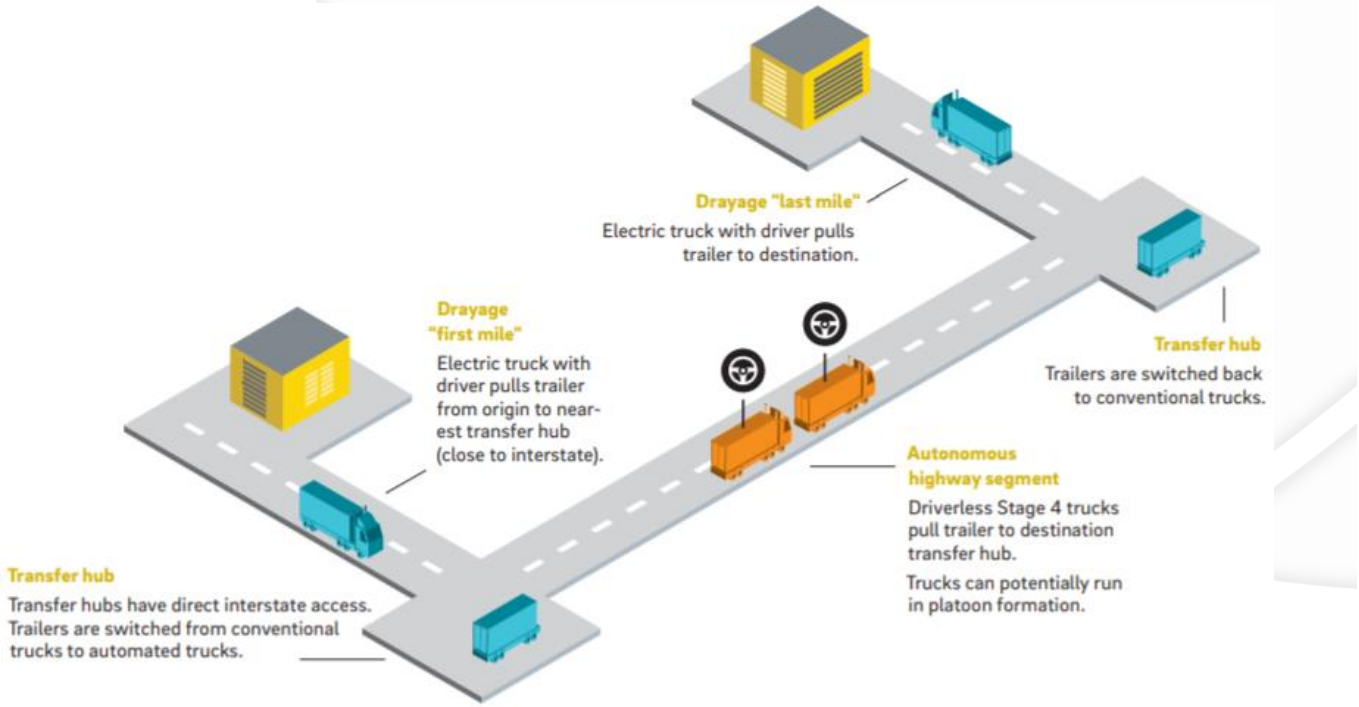
Moving into a complex transport ecosystem will see AHVs expanded from the confines of mines, harbours and terminals to the public realms where conventional and driverless vehicles operate in unison. This will likely include specialised interactions between electric drayage trucks and long-haul AHV through on-demand booking (diagram below).

The need to work together, across sectors, remains paramount. The diversity of ADVI membership, which includes researchers, regulators, policymakers, operators, community, insurance and industry, reflects the importance of the collaborative effort required for prepare for the next generation of transport solutions.

The ideal HVNL is one that has all jurisdictions commit to a nationally consistent system of regulation. Additionally, any regulation of data ownership and access should be nationally consistent to prevent any complication and difficulty arising when a vehicle travels interstate.

The regulatory approach of the aviation sector lends itself as a case study to this review. In recent times, the sector has had to adapt to the rapid uptake of remotely piloted aircraft systems technologies ('drones') in both the recreational and commercial sectors. The Civil Aviation Safety Authority (CASA) set forth to implement an effective aviation safety regulatory framework in order to enable the safe and efficient integration of RPAS into the Australian aviation sector. To accomplish this, CASA is consulting widely to develop policy, standards, regulations and guidance material that reflect an appropriate and proportionate approach to the relevant levels of risk, and is consistent with international best practice[18].

Interoperation of Driving Systems



Source:[19] Roland Berger

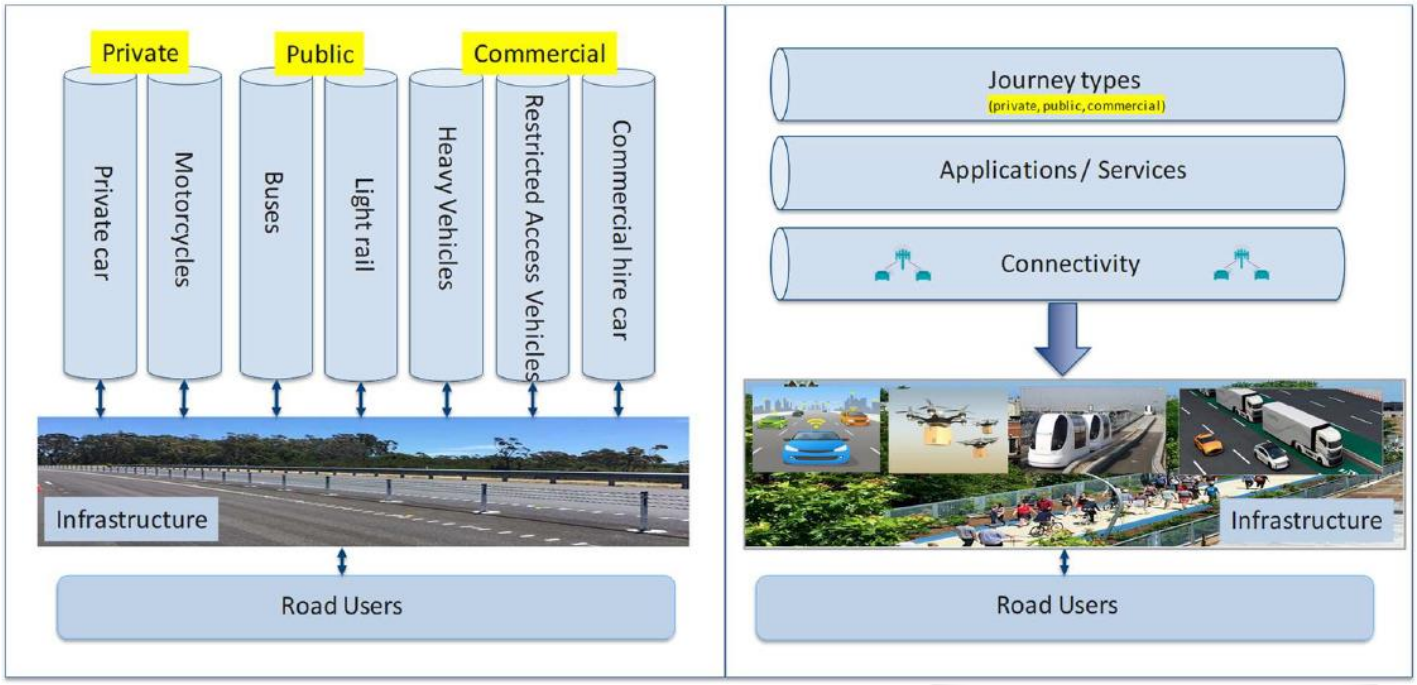
[18] Civil Aviation Safety Authority (2019) Proposed New Remotely Piloted Aircraft (RPA) Registration and RPA Operator Accreditation Scheme, Policy Proposal PP 1816US

[19] Roland Berger (2018) In Focus: Shifting up a gear Automation, electrification and digitalization in the trucking industry file:///C:/Users/lorretta.jessop/Downloads/roland_berger_trucking_industry.pdf

Further testing and trials of heavy vehicles in a range of operating environments will provide a clearer understanding of how the freight transport system will transition into a complex modal ecosystem. To this end, ADVI advocates the development of a set of national performance standards and test protocols for driverless vehicles. National off and on road test facilities that follow these nationally agreed testing protocols should also be established. This will build the knowledge base and help to calibrate what the safety outcomes should be.

Capturing safety and efficiency outcomes in the future transport ecosystem requires a cross-system view, rather than a siloed focus on particular vehicles, laws and policies. The following figure shows the current land transport framework (left side) contrasted with a future framework for land transport (right side). It serves to highlight the silos in which we currently regulate and operate land transport, with the expected changes in the sector due to new mobility models appearing in Australia. Wherein a particular mode of transport today may be legislated as a heavy vehicle, in the future it may legally embody multiple transport types throughout its journey in any given 24-hour period, e.g. people carrier, freight carrier or platoon vehicle.

Framework for Land Transport



Source: Adapted from the Australian Communications Legislative Landscape[20]

Concluding comments

We believe that we have addressed a majority of the NTC's questions in the context of our earlier comments and therefore have not provided a question by question response.

Thank you for the opportunity to provide feedback, we appreciate the NTC's inclusive efforts in working and sharing with us and will be pleased to provide further clarification and input as required.

[20] (Adapted from) Broken Concepts – The Australian Communications Legislative Landscape, ACMA, August 2011, p7.