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Automated vehicles, the ‘driver dilemma’, stopping powers, and paradigms of regulating road traffic

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ABSTRACT

This article examines the driver dilemma as it applies to the increasing automation of road traffic with a focus on roadside enforcement stopping powers. The driver dilemma exists where road traffic laws are expressed as directed toward human drivers. As automation increases, it becomes more problematic who is the driver, in fact and in law, for the purposes of international and national road traffic laws. An obvious solution to the driver dilemma is to enact reforms that deem automated driving systems ‘drivers’ under road traffic laws. This can be seen in recent amendments to the *Vienna Convention on Road Traffic*. However, the deeming solution has limitations. Through a case study on specific Australian provisions that authorise roadside enforcement officers to stop vehicles, two paradigms informing regulation of road traffic are revealed. The legacy paradigm, founded on the unity of driver and vehicle, conceives road transport involving individuals with an expectation of freedom of movement. The deeming solution attempts to preserve this paradigm. The case study also revealed an alternative paradigm of road traffic as a system that should be regulated to ensure overarching public policy goals. This alternative paradigm is evident in the specific passenger transport laws, where stopping powers are expressed as vehicle-centric. There is no driver proxy and no need for a further wrong for the powers to be enlivened. The article concludes that automated transport futures need this alternative paradigm of road traffic regulation and vehicle-centric rules should be a template for more adaptable road traffic laws.

1. Introduction

For over 100 years the primary addressee of road traffic law has been an entity known as the ‘driver.’ This was recognised in the *Geneva Convention on Road Traffic*¹ and the *Vienna Convention on Road Traffic*², and has been reflected in the domestic road traffic law of nation states.³ Until recently, whoever was the ‘driver’ was uncontroversial. The driver is identified as the human occupying the ubiquitous ‘driver’s’ seat. However, the emergence of automated vehicles (AVs) presents a significant challenge to road traffic laws.⁴ ‘Driverless’ vehicles, and even

vehicles where there is substantial automation of the dynamic driving task, problematise road traffic laws addressed to a driver.⁵ This article focuses on the ‘driver dilemma’ for road traffic law particularly through the laws that empower roadside enforcement to stop vehicles, to identify different paradigms for regulating road traffic. It found that there are examples of road traffic laws that are ‘vehicle-centric’ rather than ‘driver-centric’ and these provide an insight into post-driver road traffic regulation.

There is a significant literature that highlights the challenges of automation for road traffic laws, surveying how vehicle automation will

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E-mail addresses: mark.brady@cdu.edu.au (M. Brady), k.tranter@qut.edu.au (K. Tranter), Belinda.Bennett@newcastle.edu.au (B. Bennett).¹ *Convention on Road Traffic of 1949* (in force 26 March 1952) UNTS 9 Art 4.² *Convention on Road Traffic of 1968* (in force 21 May 1977) UNTS 1402 Art 8.³ Nynke E Vellinga, ‘Automated Driving and its Challenges to International Traffic Law: Which Way to Go?’ (2019) 11 *Law, Innovation and Technology* 257, 258.⁴ Kiliaan APC van Wees, ‘Technology in the Driver’s Deat: Legal Obstacles and Regulatory Gaps in Road Traffic law’ in Steven Van Uytzel and Danilo Vasconcellos Vargas (eds), *Autonomous Vehicles: Business, Technology and Law* (Singapore: Springer 2021), 22.⁵ Vellinga, (n 3) 259; Nynke E Vellinga, ‘From the testing to the deployment of self-driving cars: Legal challenges to policymakers on the road ahead’ (2017) 33 *Computer Law and Security Review* 847, 856-857; National Transport Commission, Australia, *Changing Driving Laws to Support Automated Vehicles* (Policy Paper, May 2018) 8 (Changing Driving Laws).<https://doi.org/10.1016/j.clsr.2024.106076>

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require reforms to road rules, liability rules and data privacy regimes within specific jurisdictions.⁶ This article focuses on a specific subset of road traffic laws, the laws that allow roadside enforcement to stop vehicles. There is a suggestion that the familiar ‘rules of the road’ will not be needed in an automated vehicle future. However, in this future roadside enforcement would still need powers to stop vehicles. Through focusing on road stopping powers in Australian law, this article traces not only the driver dilemma manifested in rules addressed to human drivers but identifies a subset of powers that authorise vehicles stops that are not driver dependent. These provisions evidence an alternative regulatory paradigm, one that is vehicle-centric and indifferent to the existential category of the entity undertaking the dynamic driving task (whether human, automated driving system or a hybrid combination of both). Through highlighting examples of vehicle-centric road traffic rules there is identified an alternative way to frame road traffic law for an automated transport future.

This argument is in four parts. The first part overviews AVs and then highlights the driver dilemma for existing road traffic law by looking at stopping powers in various jurisdictions. It concludes by suggesting that the recent reform to the *Vienna Convention on Road Traffic* that deems AVs to have a driver (‘deeming solution’) is potentially inadequate to provide for an AV future. The second part undertakes a case study of the driver dilemma and Australian roadside stopping powers. This case study highlights two ‘paradigms’ of road traffic regulation. The predominate ‘driver-centric’ paradigm where vehicles are considered ‘private’ and there needs to be an evident ‘wrong’ to empower intervention and an alternative ‘vehicle-centric’ paradigm where system-wide public policy goals of safety and accessibility support powers addressed to vehicles. The third part highlights how a vehicle-centric paradigm for road traffic regulations could provide a clearer guide to reforming road traffic laws for an automated vehicle future than the deeming solution.

This paper focuses on the powers vested in roadside enforcement officers (such as police) to stop vehicles because these will remain relevant in an AV future.⁷ There are three clear situations where roadside enforcement would need to stop an AV. The first is in relation to enforcement of road traffic laws. While AV proponents assume that AVs would strictly comply with the road rules,⁸ reducing the need for roadside enforcement officers to stop vehicles to issue fines for traffic infringements such as speeding or failing to comply with road signage, there would remain needs for stopping powers.⁹ This could range from stopping a malfunctioning AV to checking loading and defects. The second is in relation to road obstacles where there is a need to stop

vehicles to ensure public safety; for example, a hazard has blocked a road. The third is in relation to broader law enforcement where police need to stop vehicles to prevent or investigate a crime.¹⁰ Due to the likelihood for roadside enforcement to stop vehicles within automated transport futures, nations will need to articulate stopping powers adequately to cover AVs.

2. Automated vehicles and the driver dilemma

2.1. The driver dilemma

Increasing automation of vehicles disrupts existing understandings of who is a driver of a vehicle.¹¹ This is a fundamental challenge to existing road traffic law. The *Vienna Convention on Road Traffic* establishes that ‘every moving vehicle or combination of vehicles shall have a driver’ and that ‘every driver shall possess the necessary physical and mental ability and be in a fit physical and mental condition to drive.’¹² Reference to physical and mental ability and condition presupposes the entity that is anticipated to be a driver – a human.¹³ This assumption is reinforced by the definition of ‘Driver’ in Art 1 as ‘means any person who drives a motor vehicle or other vehicle.’¹⁴

The historically unproblematic connection between human drivers and vehicles for road traffic law has meant that national laws that set out a jurisdictional specific road traffic rights and obligations have tended to be addressed to the ‘driver.’ To understand how automation challenges the driver dependent paradigm of road traffic laws, some more detail is required on AV technology and how it is classified.

Many jurisdiction such as the European Union (EU), the United States (US), the United Kingdom (UK), Canada and Australia adopt the Society of Automotive Engineers (SAE) *Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles J-3016* (SAE J-3016) as the standard classification for automated driving.¹⁵ The SAE standard defines road vehicle automation as, ‘vehicle driving automation systems that perform part or all of the dynamic driving task (DDT) on a sustained basis’.¹⁶ The DDT is defined by the SAE as ‘all of the real-time operational and tactical functions required to

⁶ For example Tina Sever and Giuseppe Contissa, ‘Automated Driving Regulations – Where are we Now?’ (2024) 24 *Transportation Research Interdisciplinary Perspectives* 101033; Lin Xu and others, ‘Impact and Revolution on Law on Road Traffic Safety by Autonomous Driving Technology in China’ (2023) 51 *Computer Law and Security Review* 105906; Amanda Brown and others, ‘Regulating Future Driving: Automated Vehicles and the Harmonisation of Australian Laws’ (2023) 48 *Monash University Law Review* 1; Tom Mackie, ‘Proving Liability for Highly and Fully Automated Vehicle Accidents in Australia’ (2018) 34 *Computer Law & Security Review* 1314; Jenny Lundahl, *Steering the Future: An Overview of Current and Upcoming Regulations in Automated Driving Version 0.5*, (2024); Matthew Channon and James Marson, ‘The Liability for Cybersecurity Breaches of Connected and Autonomous Vehicles’ (2021) 43 *Computer Law & Security Review* 105628.

⁷ National Transport Commission, Australia *On-road Enforcement for Automated Vehicle* (Discussion Paper, July 2022) 12 (On-Road Enforcement Discussion Paper); National Transport Commission, Australia *On-road Enforcement for Automated Vehicle* (Paper, September 2023) 11 (On-Road Enforcement Paper).

⁸ See Marcus Burke, ‘Regulation of In-Service Safety Risks of Automated Vehicles’ in Gereon Meyer and Sven Beiker (eds), *Road Vehicle Automation 8* (Cham: Springer 2020), 40.

⁹ Tracy Hresko Pearl, ‘The Fourth Amendment in the Age of Autonomous Vehicles’ (2022) 30(1) *George Mason Law Review* 179, 188-91.

¹⁰ Tracy Hresko Pearl, ‘Traffic Stops in the Age of Autonomous Vehicles’ in Goreti Marreiros and others (eds) *EPIA Conference on Artificial Intelligence* (Cham: Springer 2022), 7; On-Road Enforcement Discussion Paper (n 7) 30.

¹¹ National Transport Commission, Australia, *The Regulatory Framework for Automated Vehicles in Australia* (Policy Paper, February 2022) 58 (Regulatory Framework); Kieran Tranter, ‘The Challenges of Autonomous Motor Vehicles for Queensland Road and Criminal Laws’ (2016) 16(2) *Queensland University of Technology Law Review* 59.

¹² *Convention on Road Traffic of 1968* (in force 21 May 1977) UNTS 1402 Art 8 (2) and (3).

¹³ Vellinga, ‘Automated Driving and its Challenges to International Traffic Law’ (n 3), 259-60; Ronald L. Leenes, ‘Regulating New Technologies in Times of cChange’ in Leonie Reins (ed), *Regulating new technologies in uncertain times* (The Hague: T.M.C. Asser Press 2019), 9.

¹⁴ *Convention on Road Traffic of 1968* (in force 21 May 1977) UNTS 1402 Art 1.

¹⁵ European Parliament, *Automated Vehicles in the EU*, (Briefing, January 2016); US Department of Transportation, National Highway Traffic Safety Administration, *A Framework for Automated Driving System Testable Cases and Scenarios* (NHTSA, September 2018); Law Commission and Scottish Law Commission, *Automated Vehicles: Joint Report*, (2022), 12; Government of Canada, Transport Canada, *Guidelines for Testing Automated Driving Systems in Canada*, <https://tc.canada.ca/en/road-transportation/innovative-technologies/connected-automated-vehicles/guidelines-testing-automated-driving-systems-canada> accessed 7 August 2023; National Transport Commission, Australia *Automated Vehicle Program Approach* (September 2020), 8, 19.

¹⁶ Society of Automotive Engineers, *Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles J3016_202104* https://www.sae.org/standards/content/j3016_202104 accessed 7 August 2023, 4.

operate a vehicle in on-road traffic¹⁷ which include lateral and longitudinal vehicle motion via steering, brakes and acceleration, monitoring the driving environment, object and event response execution, manoeuvre planning.¹⁸ The various levels of automation under SAE J-3016 describe the changing responsibilities toward the DDT as the level of driving automation increases. For example, at level 0 the human is in control of the entirety of the DDT, and as the level increases there is a shift in control toward the automated driving system (ADS), until level 5 where the human has no physical input into the vehicle control beyond providing a destination. The ADS is defined as ‘the hardware and software that are collectively capable of performing the entire DDT on a sustained basis.’¹⁹ Fig. 1 provides an overview of SAE J3016.

A further concept required to understand ADS is the operational design domain (ODD). The SAE defines the ODD as the ‘operating conditions under which a given driving automation system or feature thereof is specifically designed to function.’²¹ The ODD acknowledges that the DDT is different depending on the type of roadscape being navigated. For example, the act of driving in city, rural and remote environments involve different DDTs and awareness.²² It is anticipated that an ADS might have different levels of autonomy depending on the ODD. For example, an ADS might be assured to operate at level 4 on a highway but revert to level 2 in urban environments.

As automation rises, and the DDTs shift from the human driver to the ADS, this will affect the adaptability of road traffic laws that are addressed to the driver. With level 3 ADSs the human driver has responsibility to monitor the ADS as the ‘fallback-ready user’.²³ The fallback-ready user in a level 3 vehicle will be required to retake control, whether in response to prompts, or in the event ADS failure.²⁴ It is anticipated that the full-back ready user of a AV with an ADS operating at level 3 would still fall within the understanding of driver for road traffic laws.

With a level 4 ADS, the ADS will be able to drive the vehicle.²⁵ The human occupant may nevertheless be able to respond with roadside enforcement processes where necessary. In these circumstances ‘the user would (from a practical perspective) need to be the driver of the vehicle as in a conventional vehicle’.²⁶ However, at level 5 this becomes increasingly problematic. Level 5 AVs require no human input for the duration of the journey. Within the vehicle, the humans are passengers, and it is likely that level 5 vehicles will not have capacity for onboard occupants to exercise control over the DDTs.²⁷

Accordingly, road traffic laws that are directed to a driver will be increasingly affected as the level of automation increases. At level 5 the human occupant cannot be considered the driver of the vehicle. However, the ADS, while factually the driver in the sense that it is responsible for the DDTs within its ODD, is not the driver at law. For example, current Australian road traffic laws define driver as a ‘person’.²⁸ However, ‘person’ is not defined. Where a statutory term is not specifically

defined in a legislative enactment recourse can be had to relevant Interpretation Acts.²⁹ These define ‘person’ as a ‘natural person’ or a corporation.³⁰ An ADS does not meet either of these definitions. This means that under the existing Australian road traffic laws when an ADS is operating there is no ‘driver’.³¹ The vehicle will still be ‘driven’ by the ADS as defined in Australian road traffic laws, as being ‘in control of the steering, movement or propulsion of a vehicle’.³² However, as the ADS is not a ‘person’ it cannot be a driver for the purposes of Australian road traffic laws. This has very real effects for road traffic laws, and especially roadside enforcement powers. For example, the *Road Safety Act 1986* (Vic) s 64A specifies that:

The driver of a motor vehicle who knows, or ought reasonably to know, that they have been given a direction to stop must stop the motor vehicle as soon as practicable after being given the direction and remain stopped until a police officer or a protective services officer indicates that the driver may proceed.³³

This rule explains what a driver should do if instructed to halt a vehicle. However, an AV with an ADS ‘in control of the steering, movement or propulsion of a vehicle’ does not have ‘driver’ as understood under Australian law. The nexus between the vehicle and the legal entity that the power is directed to is disrupted: ‘Penalties directed at the human driver would no longer serve the purpose of influencing proper and safe driving behavior’.³⁴ Formally, an AV with an ADS operating above level 3 would not be subject to the rule.

This is the driver dilemma for road traffic laws as AVs increase in automation. The founding paradigm of road traffic laws has been that vehicles are connected in law and fact to a legal entity – the driver – who is the addressee of the laws and AVs fundamentally break this connection.

2.2. Global disruption to stopping powers

The driver dilemma in relation to stopping powers can be identified across jurisdictions. In the UK, EU, and North America, powers of officials to interact with vehicles on roads has been through the regulation of human drivers. Furthermore, recent international reforms that focus on deeming ADS drivers for road traffic purposes might not be sufficient to address the driver dilemma.

2.2.1. United Kingdom

In the UK, a police constable or a traffic officer in uniform may give directions to stop a person driving a mechanically propelled vehicle.³⁵ The operative phrase in the UK is ‘person driving’ and failure to comply with such a direction constitutes an offence.³⁶ The long-standing power to stop vehicles expanded from police with the Police Reform Act 2002 to be exercisable by transport authority officers³⁷ and the Driver and

¹⁷ *ibid* 9.

¹⁸ *ibid*.

¹⁹ *ibid* 6.

²⁰ *ibid* 28-9.

²¹ *ibid* 17.

²² See generally, Law Commission and Scottish Law Commission (n 15).

²³ SAE (n 16) 22.

²⁴ *ibid*.

²⁵ *ibid* 31-2.

²⁶ *ibid* 42-3.

²⁷ Mark Brady, Kieran Tranter and Belinda Bennett, *Applicability of State and Territory Roadside Enforcement Powers to Automated Vehicles: Report for the National Transport Commission* (July 2021), 8 <https://www.ntc.gov.au/sites/default/files/assets/files/QUT%20report%20-%20Applicability%20of%20state%20and%20territory%20roadside%20enforcement%20powers%20to%20automated%20vehicles%20-%20July%202021.pdf> accessed 1 November 2023.

²⁸ See for example *Road Transport Act 2013* (NSW) s 4 “driver” means any person driving a vehicle.’

²⁹ Ross Carter ‘Interpretation Acts—Are They, and (How) Do They Make for, Great Law?’ (2021) 43(1) *Statute Law Review* 1, 28-9.

³⁰ See for example *Interpretation Act 1987* (NSW) Schedule 4 definition of ‘person’. *Convention on Road Traffic of 1968* (in force 21 May 1977) UNTS 1402 Art 1(v).

³¹ *Changing Driving Laws* (n 5) 16; *On-Road Enforcement Discussion Paper* (n 7) 23.

³² See for example *Road Transport Act 2013* (NSW) s 4 “drive” includes ... be in control of the steering, movement or propulsion of a vehicle.’

³³ *Road Safety Act 1986* (Vic) s 64A.

³⁴ van Wees, (n 4) 34.

³⁵ *Road Traffic Act 1988* s 163(1).

³⁶ *ibid* s 163(3).

³⁷ Pat Hagan, ‘Stopping Power: Who has the Power to Stop Trucks and Why?’ (2004) 199(5069) *Commercial Motor* 34, 35.

Name		Execution of steering and acceleration/ deceleration	Monitoring of driving environment	Fallback performance of DDT	System capability (driving modes)
Human driver monitors the driving environment		Human driver	Human driver	Human driver	n/a
0	No Driving Automation				
1	Driver Assistance	Human driver and system	Human driver	Human driver	Some driving modes
2	Partial Driving Automation	System	Human driver	Human driver	Some driving modes
ADS monitors the driving environment		System	System	Human driver	Some driving modes
3	Conditional Driving Automation				
4	High Driving Automation	System	System	System	Some driving modes
5	Full Driving Automation	System	System	System	All driving modes

Fig. 1. SAE's taxonomy for terms related to driving automation systems.²⁰

Vehicle Standards Agency ("DVSA").³⁸ The Road Traffic Act 1988 was amended in 2005 expanding police powers to stop vehicles where there is a reasonable belief the driver is without insurance or a valid licence.³⁹ In 2011 vehicle stopping powers were further expanded with the Road Vehicles (Powers to Stop) Regulations,⁴⁰ which provides DVSA officers power to stop and inspect commercial vehicles in certain circumstances.⁴¹ Scholars note a disproportionate application of police stop and search powers across the UK,⁴² with calls to 'ensure that stop and search can only be used where there is a "reasonable suspicion of criminality."' ⁴³ Nevertheless, in the UK the powers to stop are clearly directed to a human driver to whom directions are given with respect to stopping vehicles.

2.2.2. European Union

In the European Union there is no general power to stop vehicles across member states. The regulation of motor traffic is undertaken by each member state and enforcement powers are articulated differently across jurisdictions. The power to stop vehicles is commonly found under domestic traffic laws which incorporate Article 6 of the *Vienna*

Convention on Road Traffic,⁴⁴ with respect to stopping powers being directed toward 'road users'.⁴⁵ For example, in Germany under the *Road Traffic Regulations*,⁴⁶ directions to stop are given to 'road users'⁴⁷ rather than drivers.⁴⁸ In Spain, under the *Traffic and Road Safety Code*,⁴⁹ directions may be given to both road users,⁵⁰ and drivers,⁵¹ while the Italian *Highway Code*⁵² provides that 'agents responsible for regulating traffic'⁵³ may direct road users,⁵⁴ drivers,⁵⁵ or vehicles to stop.⁵⁶ There

⁴⁴ Convention on Road Traffic of 1968 (in force 21 May 1977) UNTS 1402 Art 8.

⁴⁵ *ibid* Art 6(2).

⁴⁶ *Road Traffic Regulations 2013* (DE) [Straßenverkehrs-Ordnung] StVO § 36. https://www.gesetze-im-internet.de/stvo_2013/BJNR036710013.html accessed 7 August 2023.

⁴⁷ *ibid* Art 36(5).

⁴⁸ The *Road Traffic Act and the Compulsory Insurance Act (Autonomous Driving Act) 2021* (DE) allows SAE level 4 vehicles to operate in Germany, and 'Driver is also the one who activates a highly or fully automated driving function': *Act Amending the Road Traffic Act and the Compulsory Insurance Act (Autonomous Driving Act) 2021* (DE) § 4. Library of Congress 'Germany: Road Traffic Act Amendment Allows Driverless Vehicles on Public Roads' <https://www.loc.gov/item/global-legal-monitor/2021-08-09/germany-road-traffic-act-amendment-allows-driverless-vehicles-on-public-roads/> accessed 7 August 2023.

⁴⁹ *Traffic and Road Safety Code (EN)* [Código De Tráfico Y Seguridad Vial] § 2 Reglamento General de Circulación, Artículo 143: Señales con el brazo y otras] https://www.boe.es/biblioteca_juridica/codigos/codigo.php?id=20&modo=2¬a=0 accessed 7 August 2023.

⁵⁰ *ibid* Art 143 (1), 2(c).

⁵¹ *ibid* Arts 143 3(e).

⁵² *Highway Code 1992* (Italy) [Codice della strada (D.Lgs. n. 285/1992)] <http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:1992;285> accessed 7 August 2023.

⁵³ *ibid* Art 43(1).

⁵⁴ *ibid* Art 43(3)(b).

⁵⁵ *ibid* Art 43(3)(a).

⁵⁶ *ibid* Art 43(5).

³⁸ Previously known as the Vehicle and Operator Services Agency ("VOSA"). GOV.UK 'DVSA services and information' <https://www.gov.uk/government/organisations/vehicle-and-operator-services-agency> accessed 7 August 2023; David Craik, 'Stopping Power' (2004) (May) *Motor Transport* 14; Hagan (n 37) 35.

³⁹ Clare Kinsella and John McGarry, 'Computer Says No: Technology and Accountability in Policing Traffic Stops' (2011) (55) *Crime, Law, and Social Change* 167, 167-8.

⁴⁰ Road Vehicles (Powers to Stop) Regulations 2011. See Hagan (n 37) 35.

⁴¹ David Lowe and Clive Pidgeon, *Lowe's Transport Manager's and Operator's Handbook 2018* (Kogan Page Publishers 2018) 436.

⁴² Genevieve Lennon and Kath Murray, 'Under-Regulated and Unaccountable? Explaining Variation in Stop and Search Rates in Scotland, England and Wales' (2018) 28(2) *Policing and Society* 157, 159-60.

⁴³ Lee Bridges, 'The Legal Powers and their Limits' in Rebekah Delsol and Michael Shiner, (eds) *Stop and Search: The Anatomy of a Police Power* (Palgrave Macmillan 2015) 9, 29.

has been increasing movement toward greater harmonisation of enforcement power across Europe.⁵⁷ The primary reason underpinning the trend toward harmonisation of enforcement power is road safety,⁵⁸ which according to the European Commission ‘already exists in the field of commercial road traffic’.⁵⁹ In 2011, the European Transport Safety Council (“ETSC”) recommended the adoption of ‘a Directive on Cross-Border Enforcement as soon as possible’.⁶⁰ The European Transport Safety Council (“ETSC”) recognises power of enforcement as ‘an inseparable part of road safety policy at all levels of governance’.⁶¹ The chief power currently supporting enforcement in the European Union falls under Directive (EU) 2015/413,⁶² which has a primary purpose of ‘facilitating cross-border exchange of information on road-safety-related traffic offences’.⁶³ Following the *Valetta Conference on Road Safety* in March 2017,⁶⁴ the EU endorsed the Valetta Declaration recommendations with a commitment ‘to improving road safety’ across the EU.⁶⁵ Between March and April 2019, the European Commission opened feedback on its *Cross-Border Enforcement of Road Traffic Rules* initiative.⁶⁶ The proposed amended Directive would increase data sharing between European road and policing authorities in relation to vehicles, vehicle offences and drivers and is awaiting adoption at the time of writing.⁶⁷

This discussion shows the significant connection between powers to stop and road safety and an ongoing program of sponsored work on enforcement cooperation between jurisdictions. However, what seems to have been absent in the EU is consideration of how dependent national roadside enforcement powers are on human drivers in the context of wider AV adoption.⁶⁸

2.2.3. North America

There are no overarching legislative provisions governing the power to stop vehicles in the United States. The power to stop vehicles is dealt

with at the individual state level, while influenced by the US Constitution, and particularly the Fourth Amendment⁶⁹ protections against unreasonable search and seizure without probable cause,⁷⁰ and case law⁷¹ have broadened traffic stops to allow for reasonable suspicion a ‘driver’ was engaging in criminal activity.⁷² The operative phrase in the US with respect to stopping power is again ‘person’ or ‘driver’.⁷³ There is considerable scholarship on roadside enforcement focused on disproportionate application of stopping powers across various social and racial groups.⁷⁴ Jordan Blair Woods argues that autonomous vehicles will introduce a new ‘vector’ in law enforcement, which has the potential to improve officer safety and ‘decrease possibilities for escalation during vehicle stops’.⁷⁵ At present in the US, roadside enforcement that stops a vehicle without reasonable suspicion would usually be held unconstitutional.⁷⁶ For example, in California, *People v Bell* held that a ‘traffic stop is justified at its inception if based on at least reasonable suspicion that the driver has violated the Vehicle Code or some other law’,⁷⁷ and in New York the US Supreme Court held the ‘decision to stop an automobile is reasonable where the police have probable cause to believe that a traffic violation has occurred’.⁷⁸ In all cases the US enforcement powers are directed toward humans drivers. In the context of stopping automated vehicles, the 2020 Rand Report into *Autonomous Road Vehicles and Law Enforcement* noted:

It is essential for law enforcement to be able to communicate directly with AVs and/or their owners or operators in order to conduct traffic stops or convey important information during emergencies (e.g., instructions to pull over and allow emergency vehicles to pass).⁷⁹

In Canada, no requirement (of reasonable suspicion) exists, and police may stop ‘persons’ ‘operating a motor vehicle’⁸⁰ for traffic regulation and safety and for other purposes, where vehicle operators may be stopped ‘with little if any cause’.⁸¹ In Canada, *R v Ladouceur*, held it is

⁵⁷ See, *Parliament and Council Recommendation (EC) 2004/345 of 6 April on Enforcement in the Field of Road Safety* [2004] OJ L 111/75. See Paolo Cestra *Road Policing: A New Concept: A Research on Legal and Operational Aspects of Police Cooperation and Cross-border Enforcement* (Pacini Editore, 2020).

⁵⁸ *Parliament and Council Recommendation (EC) 2004/345 of 6 April on Enforcement in the Field of Road Safety* [2004] OJ L 111/75; Paolo Cestra and Eugenio Zaniboni ‘Road Policing as a European Union Challenge: Legal and Operational Aspects of Police Cooperation and Cross-Border Enforcement’ (2022) 22 *European Law Enforcement Research Bulletin* 145.

⁵⁹ *European Commission Communication 2004/C concerning Commission Recommendation of 21 October 2003 on Enforcement in the field of Road Safety* [2004] 93/04 Article 17.

⁶⁰ European Transport Safety Council, *Traffic Law Enforcement across the EU Tackling the Three Main Killers on Europe’s Roads* (11 February 2011) 30.

⁶¹ *ibid* 5.

⁶² *Parliament and Council Directive (EU) 2015/413 of 11 March 2015 Facilitating Cross-Border Exchange of Information on Road-Safety-Related Traffic Offences* [2015] OJ L 68/9.

⁶³ *Ibid* [21].

⁶⁴ *Valetta Declaration on Improving Road Safety*, https://eumos.eu/wp-content/uploads/2017/07/Valetta_Declaration_on_Improving_Road_Safety.pdf accessed 7 August 2023.

⁶⁵ *Parliament and Council Communication DGE/2A on Council conclusions on road safety - endorsing the Valetta Declaration of March 2017* [2017] 9994/17 JL/EL 1 TRANS 252.

⁶⁶ European Commission, *Cross-border enforcement of road traffic rules* https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/2131-Cross-border-enforcement-of-road-traffic-rules_en accessed 7 August 2023.

⁶⁷ *ibid*.

⁶⁸ Yuko J. Nakanishi and Pierre M. Auza. ‘Connected Vehicles and Driving Automation Systems’ in Shimon Y. Nof (ed) *Springer Handbook of Automation*. (Springer, 2023, 2nd ed) 1103.

⁶⁹ For an examination of police traffic stops with respect to the US Fourth Amendment see, Wayne R LaFave, ‘The Routine Traffic Stop from Start to Finish: Too Much Routine, Not Enough Fourth Amendment’ (2004) 102(8) *Michigan Law Review* 1843. See also Pearl (n 9).

⁷⁰ U.S. Const., amend. IV.

⁷¹ *Kanas v. Glover*, 140 S.Ct. 1183 (2020).

⁷² Wayne K Gorman, ‘The Constitutional Stopping of Motor Vehicles in Canada and the United States: A Comparative Analysis’ (2020) 56(3-4) *Court Review* 100, 105; George M Dery ‘Imposing a Daily Burden on Thousands of Innocent Citizens: The Supreme Court Unnecessarily Limited Motorists’ Fourth Amendment Rights in *Kansas v. Glover*’ (2022) 28(1) *William & Mary Journal of Race Gender & Social Justice* 363.

⁷³ Pearl (n 9) 194.

⁷⁴ See for example, Donald Tomaskovic-Devey, Marcinda Mason and Matthew Zingraff ‘Looking for the Driving While Black Phenomena: Conceptualizing Racial Bias Processes and their Associated Distributions’ (2004) 7(1) *Police Quarterly* 3; Patricia Warren, ‘Driving While Black: Bias Processes and Racial Disparity in Police Stops’ 44(3) *Criminology* 709; Brian R Kowalski and Richard J Lundman, ‘Vehicle Stops by Police for Driving While Black: Common Problems and Some Tentative Solutions’ (2007) 35(2) *Journal of Criminal Justice* 165.

⁷⁵ Jordan Blair Woods, ‘Autonomous Vehicles and Police De-escalation’ (2019) 114 *Northwestern University Law Review* 74, 74.

⁷⁶ Gorman (n 72) 105.

⁷⁷ *People v. Bell* 43 Cal.App. 4th 754 (1996) 761.

⁷⁸ *Whren v. United States* 517 US 806 (1996) 810. *Whren* has been heavily criticised decision as legitimising the racial profiling of drivers, see Gabriel J. Chin and Charles J. Vernon. ‘Reasonable but Unconstitutional: Racial Profiling and the Radical Objectivity of *Whren v. United States*’ (2014) 83(3) *George Washington Law Review* 882.

⁷⁹ Sean E. Goodison et al, Rand Report, *Autonomous Road Vehicles and Law Enforcement: Identifying High-Priority Needs for Law Enforcement Interactions with Autonomous Vehicles Within the Next Five Years* (Rand Corporation, 2020) 11.

⁸⁰ *Canadian Criminal Code* (R.S.C., 1985, c. C-46) s320.11: ‘operate means (a) in respect of a motor vehicle, to drive it or to have care or control of it.’

⁸¹ Gorman (n 72) 100-101.

permissible to conduct roadside stops, for the purpose of checking insurance, driver's licence, vehicle roadworthiness and for sobriety tests.⁸² This was narrowed in *R v McGlashen* to permit roadside traffic stops as long as the stops are 'truly random routine checks'.⁸³ Whilst enforcement terminology may be appropriate for autonomous vehicles, through being directed toward vehicle operators, or fallback-ready users, how this applies to highly automated vehicles in practise is unclear. Again, in Canada the primary addressee is the driver, and that driver is assumed to be human, to whom power to stop vehicles are addressed.

2.3. Recent amendments to the Vienna Convention and the deeming solution

In response to the driver dilemma for road traffic law, the United Nations Economic Commission for Europe's Inland Transport Committee proposed at the Global Forum for Road Traffic Safety Global Forum for Road Traffic Safety in September 2021 amendments to the *Vienna Convention on Road Traffic* inserting SAE definitions of ADS and 'dynamic control'.⁸⁴ In addition it proposed a new Art 34 *bis* that:

The requirement that every moving vehicle or combination of vehicles shall have a driver is deemed to be satisfied while the vehicle is using an automated driving system which complies with:

- (a) domestic technical regulations, and any applicable international legal instrument, concerning wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles, and
- (b) domestic legislation governing operation.⁸⁵

These amendments were accepted by January 2022 and entered into force on 14 July 2022.⁸⁶ They recognise and support the significant domestic reforms currently directed to establishing frameworks for AV accreditation and assurance.⁸⁷ They also address, formally, the driver dilemma within the Convention in deeming an ADS that complies with 'domestic technical regulations and any applicable international legal instrument' a vehicle with a driver. This 'deeming' approach has immediate attraction in the broader content of road traffic law. By declaring an AV with an ADS to satisfy the definition of a driver, it ensures that provisions where the driver is the addressee of a rule – such as a driver must stop at a red light – apply to AVs. It assists in the current development and adoption period, there is no ambiguity whether an AV should comply with the road rules, notwithstanding that an ADS is not a person. However, this 'deeming solution' has potential limitations.

First, as identified by many authors, deeming an ADS enabled AV as having a 'driver' for compliance with the road rules, leaves undetermined who should carry the liability for a breach.⁸⁸ ADS are complex systems but do not have legal personality. Since the early 2010s legal reflection on AVs, the issue of who is responsible for paying a fine if an AV is booked not complying with a road rule has been an ongoing

issue.⁸⁹ This is being practically addressed in many jurisdictions through proposed regulatory schemes that will establish an ADS Entity (ADSE) that has a formal relationship with the corporate manufacturer or retailer of the AV and a specialist national in-service regulator that would work with ADSEs to ensure compliance and safety of ADS in national use.⁹⁰

Second, there is the distinction between the issue of ensuring an ADS when undertaking the DDT of an AV comply with the normative expectations of the road rules, and the pragmatic needs of roadside enforcement to stop vehicles. This has three dimensions, especially evident when focusing on stopping powers. The first is that stopping powers in domestic national laws are not only found in codified road traffic laws, but in criminal and other provisions. Amending just the road traffic laws to deem an AV with a lawful ADS as a vehicle with a driver would not inherently address the driver dilemma for these other powers. Second, many of the stopping powers are fault dependent. The power to stop is not only directed to drivers but limited to where drivers have done a wrong (broken a road rule such as failed to stop at a stop sign for example).⁹¹ This potentially reinscribes the driver dilemma within each rule, because the approach, in Art 34 of the *Vienna Convention on Road Traffic* deems an AV to have a driver if it has a lawful ADS⁹², it does not deem the ADS a 'driver'. However, for most stopping powers it is the driver's wrong that is a precondition of the power. For these to be operational the ADS would need to the driver that has undertaken the empowering wrong, however Art 34 *bis* does not go this far. The third is the pragmatic technical issue of how roadside enforcement officers can communicate the instruction to stop and the concerns around backdoor communication channels into ADSs that could be exploited by cyber-criminals. As part of ongoing reform programs in relation to in-service regulation of AVs many nations are investigating technical standards for law enforcement to communicate with ADS.⁹³

Third, there is the utility question of the preserving the existing rules of the road in an AV future. The rules of the road developed to ensure human controlled vehicles were ordered and predictable based on experience of human capacities to react to stimuli, limits in controlling vehicles and the need for ordered and predictable roadscapes. However, some of the possible long-term benefits of an AV future come from AVs *not* complying with existing road rules. A potential benefit is in an increase in the carriage capacity of road infrastructure through maximising vehicle density.⁹⁴ It is suggested that AVs could safely travel at higher speeds and with less gap between vehicles than vehicles driven by humans or integrate through cross intersections in a seamless knitted formation. This suggests the benefit of ADS not being deemed drivers and therefore not constrained by the existing human-centric road rules.

Given the centrality of the driver as the core focus of road traffic law

⁸² *R v Ladouceur* [1990] 1 SCR 1257, 56 CCC (3d) 22. See David M. Tanovich 'The Constitutionality of Searches Incident to Vehicle Stops' (1993) 35(3) *Criminal Law Quarterly* 323.

⁸³ *R v McGlashen* [2004] OJ No 468, 115 CRR (2d) 359.

⁸⁴ Economic Commission for Europe Inland Transport Committee, *Informal Paper on Remote Driving*, (2021).

⁸⁵ *Convention on Road Traffic of 1968* (in force 21 May 1977) UNTS 1402 Art 34 *bis*.

⁸⁶ Sever and Contissa (n 6) 5.

⁸⁷ See Lundahl (n 6).

⁸⁸ van Wees, (n 4) 34.

⁸⁹ Frank Douma and Sarah Aue Palodichuk, "But Officer, it wasn't my Fault... the Car Did it!": Criminal Liability Issues Created by Autonomous Vehicles' (2012) 52 *Santa Clara Law Review* 1157; Adam Thierer and Ryan Hagemann, 'Removing Roadblocks to Intelligent Vehicles and Driverless Cars' (2015) 5 *Wake Forest Journal of Law and Policy* 339.

⁹⁰ See Lundahl, (n 6) 32-6; Sever and Contissa (n 6) 11-3.

⁹¹ This is explored further in Part 3.1 in relation to Australian driver-centric stopping powers; Law Commission and Scottish Law Commission (n 15) 4.

⁹² Sever and Contissa (n 6) 10.

⁹³ *Global Forum for Road Traffic Safety, Position statement on optical and/or audible signals in the context of driver assistance systems, advanced driver assistance systems and automated vehicles – submitted by Germany*, (ECE-TRANS-WP1-2021-ID, 83rd Session, Geneva, 2021) <https://unece.org/sites/default/files/2021-08/ECE-TRANS-WP1-2021-Informal%20document-2e.pdf> accessed 14 August 2023. In Australia see On-Road Enforcement Discussion Paper (n 7) 24-9.

⁹⁴ National Science and Technology Council and United States Department of Transportation, *Ensuring American Leadership in Automated Vehicle Technologies*, (2020), 2; Md Masud Rana and Kamal Hossain, 'Connected and Autonomous Vehicles and Infrastructures: A Literature Review' (2023) 16 *International Journal of Pavement Research and Technology* 264.

at the international and domestic levels, resolving the driver dilemma is essential for an AV transport future. Ensuring that roadside enforcement has the powers to stop AVs is important in that future. However, it is suggested that the solution to the driver dilemma is not as simple as deeming an AV with an ADS a 'vehicle with a driver' or deeming the ADS a driver. In next part the scope of the driver dilemma for stopping powers is considered in relation to specific powers in Australia. This reveals how embedded 'driver' is in most of the road traffic provisions. However, there are some powers that are not driver dependent. These suggest an alternative 'vehicle-centric' paradigm for road traffic regulation.

3. Case study of powers to stop vehicles in Australia

Australia is good site for the considering the details of the driver-dilemma. Like in the US road traffic law is a state matter. This means that there is a degree of diversity across the eight Australian state and territory jurisdictions with regards to the form, scope, and articulation of stopping powers⁹⁵, although there is also some of harmonisation of road traffic laws, especially in relation to the road rules.⁹⁶ Noting this it is also the situation that in all Australian jurisdictions many roadside enforcement powers are located outside of the road rules. Most of the Australian stopping powers authorise the stopping of vehicles in specific contexts. There are three core contexts for the stopping of vehicles: road traffic purposes, public safety, and criminal law enforcement. The driver dilemma manifests within these stopping powers as the entity that is not only the addressee of the power but also who's 'wrong' has enlivened the power.

3.1. Driver-centric stopping powers in Australia

All Australian states and territories have roadside stopping powers in relation to the enforcement of road traffic laws. Often these are directly connected to enforcement of the road rules or vehicle standards such as roadworthiness. For example, in New South Wales '[a]n authorised officer may, for the purpose of or in connection with exercising other powers under the road traffic legislation, direct ... the driver of a light vehicle ... to stop the vehicle.'⁹⁷ Analogous powers for roadside enforcement to stop vehicles in relation to the road traffic laws exist in the other states and territories.⁹⁸

The driver dilemma can be strongly identified in these stopping powers all of which are addressed to the 'driver.'⁹⁹ Further, these stopping powers are enlivened where the driver is doing something wrong or driving or operating the vehicle in breach of responsibilities and obligations under road traffic laws. The complexity is that the substantive obligations and responsibilities in Australian road traffic laws are also driver dependent. For example, the requirement to stop at a red traffic light is expressed as 'a driver approaching or at traffic lights

showing a red traffic light must stop.'¹⁰⁰ Australia has yet to resolve the relationship between driver-dependent obligations and responsibilities within road traffic laws and ADSs. There is a proposed design rule that makes it mandatory for ADS available in Australia to be certified as compliant with the Australian road traffic laws.¹⁰¹

The Australian stopping powers in relation to enforcing road traffic laws are doubly subject to the driver-dilemma; they are addressed to a driver and are dependent on a driver's breach of a substantive road traffic obligation to be empowered. A deeming reform proposal would have to ensure the ADS is adequately identified as the addressee of the power, while also dealing with the 'drivers' wrong' under the road traffic laws that empowered the powers.

A second common grouping of powers to stop vehicles relates to public safety. These powers in most of the Australian states and territories manifest the driver dilemma. There are two general categories. The first are stopping powers in relation to dangerous driving. For example, in Tasmania, grounds to stop arise where a person 'is or may be endangering the property, life or safety of another person'.¹⁰² However, this is not absolute. There are some specific provisions where a driver, and their use of the vehicle, is not a determinate that enlivens the power. For example, in New South Wales, powers to stop vehicles and erect roadblocks can be enlivened for safety concerns without the requirement for persons or drivers where:

circumstances exist on or in the vicinity of that road, road related area, place or school that are likely to give rise to a serious risk to public safety and the exercise of the powers may lessen the risk.¹⁰³

This power emanates not from the driver's use of the vehicle but from hazards or dangers within the broader environment. However, it is not an immediate power but requires a process of implementation involving decisions of a 'senior police officer.'¹⁰⁴ Some of the other states and territories have similar powers allowing stopping of vehicle, without any recourse to the driver, due to road-related safety concerns.¹⁰⁵ However, non-driver dependent stopping powers for safety are rare, most do require a person driving or using a motor vehicle in an unsafe manner for the power to be enlivened.¹⁰⁶

The third and broadest category of powers to stop vehicles relate to criminal law enforcement. There are two ways that these powers are articulated: person-dependent and vehicle-dependent. An example of a person-dependent power is in South Australia where a vehicle may be stopped where it contains a person 'suspected of having committed a major offence; or ... who has escaped from lawful detention'.¹⁰⁷ At one level this provision is not driver-dependent as 'person' can cover a non-driving occupant in an AV. In connecting the stopping power to intercepting a person, there is a limit where AVs are involved. It is conceivable that police might need to intercept an unoccupied AV for criminal enforcement or investigation.

Other Australian jurisdictions express stopping powers for law enforcement in a vehicle-dependent manner. In some jurisdictions power to stop vehicles is connected to specific categories of offences. For example in the Australian Capital Territory, the power to stop arises where an officer suspects 'a thing relevant to a serious offence or a thing

⁹⁵ Brady, Tranter and Bennett (n 27) 13-4.

⁹⁶ On-Road Enforcement Discussion Paper (n 7) 21. Since 1999 the Australian states and territories have adopted the harmonised 'Australian Road Rules' developed by the National Transport Commission. Although there are minor variations, this means that the wording of the core Australian road rules is the same across all states and territories. See Amanda Brown and others (n 6).

⁹⁷ *Road Transport Act 2013* (NSW) s 169A(2)(a).

⁹⁸ See for example *Transport Operations (Road Use Management) Act 1995* (Qld) s 31(1)(c); *Road Traffic Act 1961* (SA) s 40H(1); *Road Traffic Act 1961* (SA) s 40H(1); *Road Traffic (Administration) Act 2008* (WA) s 39(2); *Police Powers and Responsibilities Act 2000* s 60; Brady, Tranter and Bennett (n 27) 21.

⁹⁹ *Transport Operations (Road Use Management) Act 1995* (Qld) s 31(1)(c); *Road Traffic Act 1961* (SA) s 40H(1); *Road Traffic Act 1961* (SA) s 40H(1); *Road Traffic (Administration) Act 2008* (WA) s 39(2); *Police Powers and Responsibilities Act 2000* s 60.

¹⁰⁰ *Transport Operations (Road Use Management—Road Rules) Regulation 2009* (Qld) s 56(1).

¹⁰¹ *Vehicle Standard (Australian Design Rule 90/01 – Steering System) 2021* (Cth) Appendix B 4.2.23, 24. At the time of writing this reform has yet to be implemented.

¹⁰² *Police Powers (Vehicle Interception) Act 2000* (Tas) s 5(1).

¹⁰³ *Law Enforcement (Powers and Responsibilities) Act 2002* (NSW) s37(2)(b). See further Brady, Tranter and Bennett (n 27) 19.

¹⁰⁴ *ibid.*

¹⁰⁵ See for example *Police Powers (Vehicle Interception) Act 2000* (Tas) s 5(1) and *Road Traffic Act 1961* (SA) s 145.

¹⁰⁶ See for example *Police Powers and Responsibilities Act 2000* (Qld) s 27.

¹⁰⁷ *Summary Offences Act 1953* (SA) ss 74B(2), 74BAA(1).

stolen or otherwise unlawfully obtained, is in or on a conveyance'.¹⁰⁸ The term 'conveyance' is defined to include a 'motor vehicle'.¹⁰⁹ This connection to a serious offence that empowers the direct stopping of vehicles is also present in New South Wales.¹¹⁰ In Western Australia a lesser threshold of an offence (rather than a serious or indictable offence) enliven the stopping of vehicle powers.¹¹¹ The Western Australian provisions are the broadest articulation of this power. Directed to vehicles, they are not dependent on a person in a vehicle, and possibly can authorise the stopping of an unoccupied AV, and there is a lower threshold of 'an offence' rather than a more serious offence.

Nevertheless, this review of the stopping powers highlights some significant limits in relation to AVs. The general powers to stop in relation to road traffic law are universally dependent on a driver. Some of the more specific powers in relation to public safety and criminal law enforcement depart from this approach through expressing the power directly in relation to a vehicle. However, vehicle-centric powers are rare and limited to broader policy agendas of public safety or law enforcement. What has been shown is the scope of the driver dilemma for roadside enforcement powers in Australia but also that there are some alternative articulations of powers to stop vehicles that avoid the driver dilemma. Chris Dent has identified that the governing paradigm behind the laws and regulations of the Australian road has been in flux.¹¹² He identifies that there has been, even before increases in automation, a movement from a paradigm that was concerned with the governance of responsible individuals whose freedom of movement should be maximised, towards a collective risk management model.¹¹³ He suggests that underlying morality of fault and responsibility inherent in the individualist model has become supplanted by cost spreading, no-fault and system-wide considerations of collective values such as public safety.¹¹⁴ This transition can be glimpsed within the stopping powers, with a predominance of powers articulated as assuming driver responsibility, but with a limited number of powers directed to vehicles, irrespective of driver or driver conduct, in circumstances where there are overarching policy considerations.

The driver dilemma persists within the roadside enforcement powers because of the combination of two legacy assumptions underpinning road traffic law. First, that the driver is factually and legally responsible for the vehicle. Second, that vehicles, and travelling on roads, are a private matter: an individual's right. These legacy assumptions meant that for the state to impede in the right of movement of drivers there needed to be some justification such as the driver doing a wrong under the road traffic laws or the vehicle appearing to be defective, or the stopping related to investigation of a serious criminal offence.

However, what the stopping powers show in the diversity of their statutory expressions across Australia, is it is possible to formulate roadside enforcement powers that avoid the driver dilemma by focusing directly on vehicles. This is particularly evident in the Australian passenger transport laws – the specialist legislative regimes for buses, taxis and ride share services – where there are powers that manifest a vehicle-centric paradigm of road traffic regulation.

3.2. Vehicle-centric stopping powers in Australia

Australian states and territories have different approaches to legislation in relation to passenger transport. Some jurisdictions have

¹⁰⁸ *Crimines Act 1900* (ACT) s 209(1)(a). See further Brady, Tranter and Bennett (n 27) 19.

¹⁰⁹ *ibid* s 4.

¹¹⁰ *Law Enforcement (Powers and Responsibilities) Act 2002* (NSW) s 37(2)(a).

¹¹¹ *Criminal Investigations Act 2006* (WA) s 39(1).

¹¹² Chris Dent, 'Taking the Human Out of the Regulation of Road Behaviour' (2018) 40(1) *Sydney Law Review* 39.

¹¹³ *ibid*.

¹¹⁴ *ibid*.

omnibus legislation that encompasses bus services, traditional taxi services, and rideshare services,¹¹⁵ others have dedicated legislation for each form of service.¹¹⁶ However, regardless of the precise services that are regulated, a consistent feature are roadside enforcement powers that are vehicle-centric and not dependent on drivers. For example the New South Wales *Point to Point Transport (Taxis and Hire Vehicles) Act 2016* (NSW), enables authorised officers to 'stop and detain a motor vehicle that is being used on a road or road related area.'¹¹⁷ In the Northern Territory where an inspector has reason to believe 'a motor vehicle is being used to carry passengers for hire or reward, the inspector may ... stop the vehicle'.¹¹⁸ In South Australia, a direction may be given to a vehicle in similar circumstances where the officer suspects 'a vehicle that is, or is to be, used for the purposes of a passenger transport service, and for that purpose require a vehicle to stop'.¹¹⁹ In Western Australia the *Transport (Road Passenger Services) Act 2018* expressly provides that authorised officer may 'stop and detain the vehicle for as long as is reasonably necessary for the exercise of any other power of the authorised officer under this Act'.¹²⁰ The greater focus on 'vehicle' rather than 'driver' in these jurisdictions suggest that these powers seem to be adaptable for a AV transport future. The passenger transport laws manifest a different paradigm of road traffic regulation. They all have explicit objectives about the public interest in safe, efficient, and accessible passenger transport.¹²¹

For example, the South Australian *Passenger Transport Act 1994* (SA) has as its objects:

...the creation of a passenger transport network that—

- (i) is focussed on serving the customer; and
- (ii) provides accessibility to needed services, especially for the transport disadvantaged; and
- (iii) is safe; and
- (iv) encourages transport choices that minimise harm to the environment; and
- (v) is efficient in its use of physical and financial resources; and
- (vi) promotes social justice.¹²²

This is a very different orientation than the legacy road traffic laws that generally do not have explicit objects about safety of users, equity of access and cost effective.¹²³ The passenger transport legislation is orientated on the assumption that transportation is a 'system' and a public good, and as such there are expansive powers for dealing with passenger transport vehicles on the road. In these laws the primacy of the driver is diminished. Rather than powers directed to drivers, the powers are expressed as directed to vehicles. The private rights of the individual are deemphasised. There is no need for an obvious wrong by a

¹¹⁵ See for example *Transport Operations (Passenger Transport) Act 1994* (Qld) Schedule 3 'public passenger vehicle'; *Passenger; Transport (Road Passenger Services) Act 2018* (WA) s 4 'passenger transport service'.

¹¹⁶ See for example in New South Wales the *Point to Point Transport (Taxis and Hire Vehicles) 2016* (NSW) regulates taxis and ride services and the *Passenger Transport Act 2014* (NSW) regulates buses.

¹¹⁷ *Point to Point Transport (Taxis and Hire Vehicles) Act 2016* (NSW) s117(2).

¹¹⁸ *Commercial Passenger (Road) Transport Act 1991* (NT) s 66(a).

¹¹⁹ *Passenger Transport Act 1994* (SA) s 53(5)(b).

¹²⁰ *Transport (Road Passenger Services) Act 2018* (WA) s 169(1)(a).

¹²¹ *Transport Operations (Passenger Transport) Act 1994* (Qld) s 2; *Road Transport (Public Passenger Services) Act 2001* (ACT) s 2(e); *Transport (Road Passenger Services) Act 2018* (WA) s 3(a),(b); *Commercial Passenger Vehicle Industry Act 2017* (Vic) s 10; *Passenger Transport Act 2014* (NSW) s 3(a).

¹²² *Passenger Transport Act 1994* (SA) s 3(a).

¹²³ See for example *Road Traffic Act 1961* (SA); *Road Traffic (Administration) Act 2008* (WA); *Road Safety Act 1986* (Vic) when compared to *Transport Operations (Road Use Management Act) 1995* (Qld) that does have a set of objectives relating to efficiency and safety.

driver to enliven stopping powers. Powers exist because safe transport is a public good. This allows for the stopping of vehicles without an enlivening threshold. In highlighting that there are road traffic rules that dispense with the driver as the core addressee of rights and obligations, the stopping powers in the Australian passenger transport laws, show a direction for reform of road traffic law more generally. Instead of deeming an ADS a driver the focus is simply on the vehicle. However, the vehicle-centric passenger transport laws are located within a different paradigm of road traffic regulation, a conceptualising of road traffic as a system that has overarching public policy goals such as safety. In this there is an exemplar for pragmatic ways to reform road traffic law to be less driver dependent, and also to reconceptualise how to regulate road traffic for a automated transport future.

4. Automated vehicles and future road traffic regulation

The vehicle-centric roadside enforcement powers in the Australian passenger transport laws provide a potential window into how to reform road traffic law for an AV future. At the level of the formal articulation of power, they show that it is possible for roadside enforcement powers to be expressed as directed to vehicles, avoiding the driver dilemma by disconnecting the vehicle as a road object from the entity responsibly for the DDT. This is not what is proposed by the deeming approach which tries to reconnect, as much as possible, the vehicle as a road object to the entity responsible for the DDT. However, the Australian passenger transport laws located these vehicle-centric powers in a distinct paradigm for transport regulation.

Road traffic law regulated ‘drivers.’ In doing so there is a founding orientation that road traffic regulation is about facilitating the movement of individuals.¹²⁴ This informed how roadside enforcement powers are framed. Most Australian roadside enforcement powers require a wrong by the driver to legitimatise the stopping of vehicles. This further means that non-driver dependent stopping powers, directed at vehicles, are piecemeal depending on an intervening public policy concern such as environmental hazards or investigation of serious criminal offences to be exercised.

The vehicle-centric powers in the passenger transport laws provide a template for roadside enforcement powers, and road traffic regulation generally, that avoid the driver dilemma. There has been reluctance to suggest such a seemingly radical change from the existing paradigm. Nynke E. Vellinga, identified that vehicle-centric paradigm can be seen in the international air and maritime regulations, and for road traffic would have advantages in a mixed fleet environment where the DDT of vehicles is being undertaken by humans and ADSs.¹²⁵ However, at least for the international road traffic conventions, Vellinga was of the opinion that the level of amendments required for a vehicle-centric reorientation ‘might not be politically feasible.’ suggesting the need that a vehicle-centric approach would require a new convention.¹²⁶

Vellinga in seeing the possible need for a new road traffic convention identifies that a change to a vehicle-centric paradigm for road traffic would be a substantial shift in how road traffic is conceived and regulated. The vehicle-centric paradigm re-imagines road regulation as not providing freedom of movement for individuals if they adhere to basic rules and standards, but as a system that should manifest public policy goals like safety and access. This reconceptualising of how the road is regulated, as Dent has observed, has been a process that has been on-

going in Australia for a long time,¹²⁷ arguably beginning with the compulsory third party insurance schemes in the 1930s.¹²⁸ The vehicle-centric enforcement powers can be seen as a manifestation of this trajectory of change. AVs undo the unitary of driver-vehicle complex that has underpinned road traffic regulation, and in doing so unravel the cultural foundation of automobility and car use that emerged in the twentieth century.¹²⁹ The motor vehicle is rapidly moving from a highly invested site for personal identity and freedom to one of many transport services a user can access. Automation is not the only factor facilitating these changes but is intertwined with electrification and new models of sharing and public access.¹³⁰ Ridesharing services in the early 2010s broke the legal barriers between general road traffic and passenger transport. Mobility-as-a-service (MaaS) platforms, underpinned by a diversity of electric personal mobility devices, are challenging the divisions between private and public mobility and between the road as a unique legal and regulatory space and other spaces.¹³¹ AVs are being developed and adopted within a changing context for how transport is accessed, and the technologies and infrastructure required.¹³²

This is placing significant pressure on legislatures and regulators to balance adoption of technologies that promise potentially safer, greener, and more accessible transport with public safety. This extends from broad reforms at developing processes and institutions for assurance and risk minimisation of AVs to addressing the driver dilemma within road traffic law, including powers of roadside enforcement to deal with vehicles while in-service on roads. The Australian case study highlighted that, at least for roadside enforcement powers, there are real-world, existing examples of vehicle-centric powers that could inform broader reforms. However, in doing so, movement away from the previous paradigm of how road traffic regulation needs to accelerate. Road traffic needs to be seen as a system where fundamental public policy goals such as safety, accessibility and – in a world of changing climate – sustainability, should be pursued. This would, as shown in the Australian passenger transport law, ground articulations of roadside enforcement powers in relation to vehicles without the need for the proxy of the driver.

5. Conclusion

This article examined the driver dilemma as it applies to the increasing automation of road traffic. The driver dilemma is that the bulk of road traffic law, internationally and in individual jurisdictions is addressed and focused on drivers. Furthermore, under road traffic laws drivers are limited to humans. The consequence of the driver dilemma is that it renders much of the existing road traffic law inapplicable to AVs. Through focusing on roadside enforcement powers to stop vehicles this article identified that powers directed to drivers to stop vehicles are problematic when applied to AVs where the ADS cannot at law be

¹²⁷ Dent (n 112).

¹²⁸ Queensland passed a comprehensive motor vehicle insurance scheme in 1936, see *Motor Vehicles Insurance Act 1936* (Qld).

¹²⁹ Dag Balkmar, & Ulf Mellström, ‘Masculinity and Autonomous Vehicles: A Degendered or Resegregated Future System of Automobility?’ (2018) 8(1) *Transfers* 44. See also, Sarah Redshaw, *In the Company of Cars: Driving as a Social and Cultural Practice* (Ashgate, 2017); Kieran Tranter, ‘Justice at the End of Fury Road’ in Kim Weinert, Karen Crawley and Kieran Tranter (eds) *Law, Lawyers and Justice through Australian Lenses* (Routledge, 2020) 258.

¹³⁰ Andreas Herrmann, Walter Brenner, & Rupert Stadler, *Autonomous Driving: How the Driverless Revolution will Change the World* (Emerald Group Publishing, 2018).

¹³¹ David Hensher, Corinne Mulley, Chin Ho, Yale Wong, Goran Smith, John Nelson, *Understanding Mobility as a Service (MaaS): Past, present and future* (Elsevier, 2020).

¹³² Katherine G. Rees, ‘Accelerate, Reverse, or Find the Off Ramp? Future Automobility in the Fragmented American Imagination’ (2016) 11(1) *Mobilities* 152.

¹²⁴ Jake Goldenfein, Deirdre K. Mulligan, Helen Nissenbaum and Wendy Ju, ‘Through the Handoff Lens: Competing Visions of Autonomous Futures’ (2020) 35 *Berkeley Technology Law Journal* 835, 892.

¹²⁵ Vellinga (n 3) 268-269.

¹²⁶ *Ibid* 269.

considered a driver. It also identified a founding paradigm of governing road traffic manifested through these laws. There was a baseline assumption of freedom of movement of drivers and for roadside enforcement to stop a vehicle there needed to be a manifested wrong by the driver. However, it identified that there are roadside enforcement powers in Australian law that are not dependent on a driver. These vehicle-centric powers exist where there were significant public policy grounds (environmental hazard, serious criminal investigations, passenger transport) to stop vehicles, irrespective of the driver's conduct. These represented a transition away from the freedom of movement paradigm of transport regulation to a more complex paradigm concerned with system-wide public policy goals. Increasing automation, through uncoupling the historical unity of vehicles and drivers is a catalyst for this transition. The Australian vehicle-centric roadside powers present an example of how law and policy makers can reform and recast existing laws to be fit for purpose for automated, and mobility diverse, transport futures.

Author contribution

Substantial work on this paper was completed while Belinda Bennett was Professor of Health Law at the School of Law, Queensland University of Technology (QUT).

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Mark Brady: Formal analysis, Writing – original draft, Writing –

review & editing. **Kieran Tranter:** Conceptualization, Writing – original draft, Writing – review & editing. **Belinda Bennett:** Writing – original draft, Writing – review & editing.

Declaration of competing interest

Belinda Bennett is a member of the National Transport Commission's Automated Vehicle Industry Insights Group.

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Data availability

Data will be made available on request.