

AUTONOMOUS VEHICLES AND POLICE DE- ESCALATION

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ABSTRACT—Several experts predict that autonomous vehicles will become mainstream in the next few decades. Although autonomous vehicles will have massive implications for law enforcement, the technology has received little to no attention in criminal procedure and policing scholarship. This Essay introduces a new vector into the nascent law and policy discourse on autonomous vehicles and policing—de-escalation and officer safety. Although largely overlooked in this discourse, officer safety is a crucial topic given its powerful role in shaping officer training, departmental policies, and Fourth Amendment law.

This Essay argues that autonomous vehicles and their included technologies (for instance, sensory technology, real-time high definition (HD) mapping, and network connectivity systems) have promise to decrease possibilities for escalation during vehicle stops in at least five ways: (1) vehicles will be programmed to follow traffic rules, making traffic stops much less common; (2) sensory technology will prevent vehicles from hitting other vehicles or persons, decreasing motor vehicle assaults against officers; (3) driver's license requirements could be eliminated, taking the enforcement of driver's license laws out of the hands of police; (4) DUI law reforms could abolish the need for officers to conduct DUI stops, investigations, or arrests; and (5) sensory technology in vehicles will reduce investigations associated with hit-and-run offenses, and will simplify accident investigations overall. This Essay explores how these potential changes have vast implications for Fourth Amendment law, officer training, and law enforcement policy on motor vehicle stops.

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INTRODUCTION

Driving on roads and highways could soon look radically different. Several automotive manufacturers and high-tech companies are investing billions of dollars to develop autonomous vehicles (also called self-driving cars) for the marketplace.¹ Over thirty states have recently enacted legislation, and more states are introducing bills, related to autonomous vehicles.² Experts predict that autonomous vehicles will become mainstream

¹ See Danielle Muoio, *19 Companies Racing to Put Self-Driving Cars on the Road by 2021*, BUS. INSIDER (Oct. 17, 2016, 1:12 PM), <http://www.businessinsider.com/companies-making-driverless-cars-by-2020-2016-10> [https://perma.cc/3QRJ-XX93].

² See *Autonomous Vehicles: Self-Driving Vehicles Enacted Legislation*, NAT'L CONF. ST. LEGISLATURES (Mar. 19, 2019), <http://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx> [https://perma.cc/KBD8-N6UY].

in the next few decades and potentially fully replace human-controlled vehicles.³

As the self-driving car revolution gains speed, tort scholars and policymakers are turning their attention to how the new technology will transform traffic liability rules and motor vehicle regulations.⁴ Much less attention, however, is being paid to autonomous vehicles and policing. There is little to no discussion of autonomous vehicles in existing criminal procedure and policing scholarship.⁵ Most law enforcement agencies are not seriously considering or preparing for the new technology,⁶ and the few police chiefs and sheriffs that have considered the issue are largely claiming that law enforcement is being left out of major strategic and policy discussions on autonomous vehicles.⁷

All signs indicate, however, that autonomous vehicles will have massive implications for law enforcement. Traffic stops, accident investigations, and motor vehicle stops on criminal suspects are major components of police work today.⁸ Currently, traffic stops are the most common way that civilians come into contact with the police.⁹ In the nascent discourse on autonomous vehicles and policing, some police chiefs and sheriffs are warning that the new technology will largely undermine crime

³ Kevin Davis, *Preparing for a Future with Autonomous Vehicles*, POLICE CHIEF MAG. (July 2016), <http://www.policechiefmagazine.org/preparing-for-a-future-with-autonomous-vehicles> [https://perma.cc/LZ7C-78H7]; Ed Sappin, *Will Self-Driving Cars End the Big Automakers?*, FORBES (Apr. 13, 2018, 9:00 AM), <https://www.forbes.com/sites/forbesnycouncil/2018/04/13/will-self-driving-cars-end-the-big-automakers/#7d4baa85356d> [https://perma.cc/MYM9-USHL].

⁴ See, e.g., Kenneth S. Abraham & Robert L. Rabin, *Automated Vehicles and Manufacturer Responsibility for Accidents: A New Legal Regime for a New Era*, 105 VA. L. REV. 127, 129 (2019) (arguing that autonomous vehicles will necessitate updating manufacturer liability rules); Mark A. Geistfeld, *A Roadmap for Autonomous Vehicles: State Tort Liability, Automobile Insurance, and Federal Safety Regulation*, 105 CALIF. L. REV. 1611 (2017) (exploring federalism and duty of care questions posed by autonomous vehicles); Tracy Hresko Pearl, *Hands on the Wheel: A Call for Greater Regulation of Semi-Autonomous Cars*, 93 IND. L.J. 713, 716 (2018) (arguing that the risks of autonomous vehicles in general, and semi-autonomous vehicles in particular, necessitate greater federal regulation).

⁵ See *infra* Part I; Elizabeth E. Joh, *Automated Seizures: Police Stops of Self-Driving Cars*, N.Y.U. L. REV. ONLINE (forthcoming 2019) (manuscript at 1) [hereinafter Joh, *Automated Seizures*].

⁶ See Robin Washington, *Driverless Cars Are Coming. What Does That Mean for Policing?*, MARSHALL PROJECT (Sept. 29, 2016, 6:00 AM), <https://www.themarshallproject.org/2016/09/29/driverless-cars-are-coming-what-does-that-mean-for-policing> [https://perma.cc/L7G7-V8MA].

⁷ See, e.g., Pete Bigelow, *On the Path to Autonomous Vehicles, Police Officers Get Left Behind*, CAR & DRIVER (Apr. 27, 2017), <https://www.caranddriver.com/news/on-the-path-to-autonomous-vehicles-police-officers-get-left-behind> [https://perma.cc/4HH6-2EFL] (noting that not one member of the U.S. Department of Transportation's advisory committee on autonomous vehicles has a law enforcement background).

⁸ GARY W. CORDNER, POLICE ADMINISTRATION 28 (Routledge 9th ed. 2016) (1979).

⁹ ELIZABETH DAVIS ET AL., U.S. DEP'T OF JUSTICE, CONTACTS BETWEEN POLICE AND THE PUBLIC, 2015 1 (2018), <https://www.bjs.gov/content/pub/pdf/cpp15.pdf> [https://perma.cc/3DLQ-65NF].

detection and criminal investigations by eliminating pretextual traffic stops,¹⁰ a strategy they consider to be a major crime-fighting tool.¹¹ At the same time, curbing traffic stops (especially pretextual ones) could have significant benefits for members of minority communities, who are disproportionately targeted and harmed by these practices.¹²

This Essay introduces an important, yet missing, vector in the developing scholarly and policy discourse on autonomous vehicles—de-escalation and officer safety. To the extent that safety concerns are a focus in the current discourse, the emphasis is primarily on drivers and pedestrians, not officers.¹³ This Essay explores how autonomous vehicles and their included technologies (for instance, sensory technology, real-time HD mapping, and network connectivity systems) have promise to transform officers’ interactions with automobiles in ways that reduce the possibility of escalation during motor vehicle stops. Society should embrace these potential changes because escalation during automobile encounters undermines both officer and civilian safety.

This Essay contends that autonomous vehicles and their included technologies can decrease the possibility of escalation during motor vehicle stops in at least five ways: (1) vehicles will be programmed to follow traffic rules, making traffic stops much less common; (2) sensory technology will prevent vehicles from hitting other vehicles or persons, decreasing motor vehicle assaults against officers; (3) driver’s license requirements could be eliminated, taking the enforcement of driver’s license laws out of the hands of police; (4) DUI law reforms could abolish the need for officers to conduct DUI stops, investigations, or arrests; and (5) sensory technology in vehicles will reduce investigations associated with hit-and-run offenses, and will simplify accident investigations overall.¹⁴

In bringing de-escalation and officer safety to the discussion on autonomous vehicles and policing, this Essay makes two significant contributions. First, it pushes against a growing critique among law enforcement leaders that autonomous vehicles are only bad for the police

¹⁰ See Elizabeth E. Joh, *Discretionless Policing: Technology and the Fourth Amendment*, 95 CALIF. L. REV. 199, 209 (2007) [hereinafter Joh, *Discretionless Policing*] (defining pretextual stops as “occasions when the justification offered for the detention is legally sufficient, but is not the actual reason for the stop”).

¹¹ See Devon W. Carbado, *From Stopping Black People to Killing Black People: The Fourth Amendment Pathways to Police Violence*, 105 CALIF. L. REV. 125, 156 (2017) (noting that a newspaper published by the International Association of Chiefs of Police stated that using traffic stops to detect criminal activity is “our most effective tool for interdicting criminals”).

¹² See *infra* Part I.B.

¹³ See *infra* Part I.A.

¹⁴ See *infra* Part II.

because the technology will eliminate pretextual traffic stops, which officers currently rely on as a crime-fighting tool.¹⁵ This critique misses a critical component of the cost-benefit analysis on autonomous vehicles and policing—namely, officer safety. Second, this Essay shows that the potential safety benefits from autonomous vehicles offer a new platform to improve public perceptions of safety in officer training, departmental policies, and Fourth Amendment law on motor vehicle stops.¹⁶

Two caveats are in order. First, given that scholars and policymakers are just beginning to explore the topic, I recognize that there are many open questions about how autonomous vehicles will affect policing. Thus, the scope of this Essay is narrow. Its purpose is to expose the potential benefits of autonomous vehicles that stem from reducing possibilities for police escalation and the implications of this reduction for officer training and policing laws and policies.¹⁷

Second, it is important to recognize that the current technology surrounding autonomous vehicles is far from perfect.¹⁸ Some experts argue that it may take years or even decades to overcome current testing and

¹⁵ See *infra* Part I.B.

¹⁶ See Jordan Blair Woods, *Policing, Danger Narratives, and Routine Traffic Stops*, 117 MICH. L. REV. 635, 637–39 (2019) [hereinafter Woods, *Traffic Stops*] (noting that “[t]he narrative that routine traffic stops are fraught with danger to the police is longstanding”). In order to stress the dangers of being complacent on the scene and hesitating to use force, police academies regularly show officer trainees video clips of officers being randomly shot during traffic stops that otherwise appear entirely routine. Seth W. Stoughton, *Police Body-Worn Cameras*, 96 N.C. L. REV. 1363, 1397–98 & nn.139–44 (2018) (discussing the popularity among police officers of videos depicting violence against police officers and collecting sources). Courts, including the U.S. Supreme Court, consistently assume that routine traffic stops pose grave dangers to the police. See, e.g., *Arizona v. Johnson*, 555 U.S. 323, 330 (2009) (quoting *Michigan v. Long*, 463 U.S. 1032, 1047 (1983)) (“[T]he Court has recognized that traffic stops are ‘especially fraught with danger to police officers.’”); see also *Maryland v. Wilson*, 519 U.S. 408, 414 (1997) (discussing the danger posed to police officers by passengers of stopped vehicles). Autonomous vehicles may help to make clearer what is already true, but widely underappreciated—traffic stops are not as perilous for officers as the currently dominant danger narrative suggests. See Woods, *Traffic Stops*, *supra* note 16, at 640.

¹⁷ These contributions to the scholarly conversation are necessary due to the significance of officer safety in shaping officer training, departmental policies, and Fourth Amendment law. See Woods, *Traffic Stops*, *supra* note 16, at 637–39 (discussing how danger narratives shape Fourth Amendment law on traffic stops); see generally Anna Lvovsky, *The Judicial Presumption of Police Expertise*, 130 HARV. L. REV. 1995, 2068 (2017) (discussing courts’ deference to police expertise); Alice Ristroph, *The Constitution of Police Violence*, 64 UCLA L. REV. 1182, 1205–07 (2017) (discussing how courts defer to concerns about officer safety).

¹⁸ See Peter Hancock, *Are Autonomous Cars Really Safer Than Human Drivers?*, CONVERSATION (Feb. 2, 2018, 6:29 AM), <https://theconversation.com/are-autonomous-cars-really-safer-than-human-drivers-90202> [https://perma.cc/9AJ9-EDWE] (discussing the dangers posed by autonomous vehicles). See generally HARVEY ROSENFIELD, CONSUMER WATCHDOG, SELF-DRIVING VEHICLES: THE THREAT TO CONSUMERS (2017), https://www.consumerwatchdog.org/sites/default/files/resources/self_driving_consumer_threat_report.pdf [https://perma.cc/F4MY-ECQY] (discussing criticisms of self-driving cars).

validation obstacles for autonomous vehicles to become commonplace.¹⁹ This Essay assumes for the sake of argument that the technology will continue to rapidly advance as investment continues²⁰ and will move beyond these testing and validation obstacles in the long run.

Even if it takes decades until autonomous vehicles reach their prime, it is important in the current moment to think about how the technology can facilitate de-escalation during police encounters. Law enforcement leaders have expressed concerns that law enforcement is being left out of the current policy and strategy discussions on autonomous vehicles.²¹ For instance, in January 2017 the U.S. Department of Transportation created a twenty-five person advisory committee to focus on automated transportation.²² Not a single person appointed to the committee was affiliated with law enforcement.²³

Thus, now is the time for researchers, industry players, and institutional actors that regulate the police (for instance, legislatures, policymakers, and law enforcement leaders) to start seriously considering these issues before the technology is developed and the moment has passed. Neglecting how autonomous vehicles relate to police work can potentially inhibit developing the technology in ways that mutually benefit officers and civilians during police encounters and motor vehicle stops in particular.

This Essay proceeds as follows. Part I sets the stage by describing major themes in the early scholarly and policy discourse on autonomous vehicles and policing. Part II discusses five ways that autonomous vehicles and their included technologies have promise to reduce escalation during motor vehicle stops in ways that benefit officer as well as civilian safety. Finally, Part III discusses the broader implications of this de-escalation potential on Fourth Amendment doctrine, officer training, and departmental policies involving motor vehicle stops.

¹⁹ See generally Philip Koopman & Michael Wagner, *Challenges in Autonomous Vehicle Testing and Validation*, 4 SAE INT'L J. TRANSP. SAFETY 15 (2016) (laying out the validation challenges that must be overcome to ensure the safety of autonomous vehicles); see also Aarian Marshall, *After Peak Hype, Self-Driving Cars Enter the Trough of Disillusionment*, WIRED (Dec. 29, 2017, 7:00 AM), <https://www.wired.com/story/self-driving-cars-challenges> [<https://perma.cc/6WDQ-DU6M>] (discussing when autonomous vehicles may become commonplace).

²⁰ See Muoio, *supra* note 1 (demonstrating that multiple car manufacturers and technology companies are devoting substantial capital to developing autonomous vehicles).

²¹ See Bigelow, *supra* note 7.

²² *Advisory Committee on Automation in Transportation (ACAT)*, U.S. DEP'T OF TRANSP. (Apr. 13, 2017), <https://www.transportation.gov/acat> [<https://perma.cc/B8TL-LN32>].

²³ *ACAT Member Profiles*, U.S. DEP'T OF TRANSP. (Jan. 11, 2017), <https://www.transportation.gov/acat/members> [<https://perma.cc/T953-5RQ5>] (listing members and affiliations of the advisory committee).

I. AUTONOMOUS VEHICLES AND POLICING

This Part outlines major themes in the early scholarly and policy discourse on autonomous vehicles and policing. Importantly, the topic of de-escalation and officer safety is missing from these early discussions.

A. *Traffic Safety*

There is growing agreement among scholars and policymakers that autonomous vehicles will considerably improve traffic safety.²⁴ Autonomous vehicles will be programmed to comply with traffic laws, and built-in sensors are expected to prevent collisions with other vehicles or people.²⁵ According to the latest available data, in 2016 there were 7,277,000 police-reported motor vehicle traffic crashes.²⁶ Over 3.1 million people were injured and 37,461 people were killed in those crashes.²⁷ The number of traffic accidents are predicted to decline with the use of autonomous vehicles,²⁸ resulting in fewer injuries and fatalities.²⁹

Almost one-third of traffic crash fatalities involve alcohol-impaired drivers.³⁰ In 2017 alone, there were 10,874 fatalities caused by alcohol-impaired driving.³¹ Some advocates stress that autonomous vehicles could end the problem of drunk driving by removing human drivers from the vehicle's control.³² Mothers Against Drunk Driving (MADD), for instance,

²⁴ See Geistfeld, *supra* note 4, at 1615 (discussing expected traffic safety benefits of autonomous vehicles).

²⁵ Harry Surden & Mary-Anne Williams, *Technological Opacity, Predictability, and Self-Driving Cars*, 38 CARDOZO L. REV. 121, 137–38 (2016); Jay L. Zagorsky, *Cops May Feel Biggest Impact from Driverless Car Revolution*, CONVERSATION (Mar. 16, 2015, 5:39 AM), <https://theconversation.com/cops-may-feel-biggest-impact-from-driverless-car-revolution-38767> [<https://perma.cc/JZU7-P24R>].

²⁶ NHTSA'S NAT'L CTR. FOR STATISTICS & ANALYSIS, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., POLICE-REPORTED MOTOR VEHICLE TRAFFIC CRASHES IN 2016 1 (2018), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812501> [<https://perma.cc/XJJ3-DHX8>].

²⁷ *Id.*

²⁸ Zagorsky, *supra* note 25.

²⁹ Geistfeld, *supra* note 4, at 1611.

³⁰ NHTSA'S NAT'L CTR. FOR STATISTICS & ANALYSIS, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., ALCOHOL-IMPAIRED DRIVING: 2017 DATA 1 (2018), <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812630> [<https://perma.cc/J9EJ-LNPJ>]. "Alcohol-impaired" means that a driver's blood alcohol concentration was 0.08 g/dL or above. *Id.*

³¹ *Id.*

³² See, e.g., Katherine L. Hanna, Comment, *Old Laws, New Tricks: Drunk Driving and Autonomous Vehicles*, 55 JURIMETRICS 275, 276 (2015); Ryan Gallagher, *Drinking & Riding? DUIs in the Age of Self-Driving Cars*, DMV.ORG (Oct. 17, 2017), <https://www.dmv.org/articles/alcohol-and-self-driving-cars> [<https://perma.cc/BW5P-W5DQ>].

recently released a statement emphasizing that autonomous vehicles “hold incredible potential to completely eliminate drunk driving.”³³

The National Highway Traffic Safety Administration (NHTSA) estimates that human error causes approximately 94% of serious traffic accidents.³⁴ Common errors include distraction, sleep deprivation, and intoxication.³⁵ Early testing indicates that autonomous vehicles will drastically reduce these errors by largely removing human drivers from the vehicles’ operation.³⁶

For instance, in 2009, Google started its self-driving car project, which has since developed into an autonomous car development company called Waymo.³⁷ Since testing started in 2009, Waymo’s vehicles have clocked more than 10 million miles on routes frequented by pedestrians without being involved in one fatal accident.³⁸ Waymo has reported approximately three dozen non-fatal accidents since testing began.³⁹ Notably, the company attributes these accidents primarily to human error and not the autonomous vehicles.⁴⁰ In 2017, Waymo announced that it began testing autonomous cars

³³ MADD Statement on Autonomous Vehicle Technology, MADD (Sept. 14, 2017), <https://www.madd.org/press-release/madd-statement-autonomous-vehicle-technology> [<https://perma.cc/B72A-VMEQ>].

³⁴ NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP’T OF TRANSP., BUDGET ESTIMATES: FISCAL YEAR 2018 1 (2018), https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/fy2018-nhtsa_cj-05162017-final.pdf [<https://perma.cc/2EKV-RZ6B>].

³⁵ Surden & Williams, *supra* note 25, at 128.

³⁶ *Automated Vehicles for Safety*, NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., <https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety> [<https://perma.cc/R78P-F3YX>] (discussing benefits of autonomous vehicles).

³⁷ *Our Journey*, WAYMO, <https://waymo.com/journey> [<https://perma.cc/6AL9-27TJ>].

³⁸ Kirsten Korosec, *Waymo’s Self-Driving Cars Hit 10 Million Miles*, TECHCRUNCH (Oct. 10, 2018), <https://techcrunch.com/2018/10/10/waymos-self-driving-cars-hit-10-million-miles> [<https://perma.cc/4QKP-3K5R>]; *Race to Robot Cars Continues After Fatal Crash*, YAHOO! (Mar. 28, 2018), <https://sports.yahoo.com/race-robot-cars-continues-fatal-crash-080430856.html> [<https://perma.cc/4KNF-GPXG>] (quoting Waymo’s CEO John Krafcik).

³⁹ Currently, California is the only state that requires autonomous vehicle developers to submit collision reports. Jack Stewart, *Why People Keep Rear-Ending Self-Driving Cars*, WIRED (Oct. 18, 2018, 7:00 AM), <https://www.wired.com/story/self-driving-car-crashes-rear-endings-why-charts-statistics> [<https://perma.cc/P7F9-ZSW7>]. As of June 2019, Waymo has filed nine collision reports for 2019. Waymo filed twenty-five collision reports for 2018, one report for 2017, and zero reports for 2016. *Report of Traffic Collision Involving an Autonomous Vehicle (OL 316)*, STATE OF CAL. DEP’T OF MOTOR VEHICLES, https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/autonomousveh_01316 [<https://perma.cc/QM85-48YR>]. Between 2009 and 2015, Waymo reported sixteen crashes. Matt Richtel & Conor Dougherty, *Google’s Driverless Cars Run into Problem: Cars with Drivers*, N.Y. TIMES (Sept. 1, 2015), <https://www.nytimes.com/2015/09/02/technology/personaltech/google-says-its-not-the-driverless-cars-fault-its-other-drivers.html> [<https://perma.cc/8BCR-Z2VP>].

⁴⁰ Richtel & Dougherty, *supra* note 39.

without a safety driver in the driver's seat,⁴¹ bringing us one step closer to fully autonomous vehicles.

These expected traffic safety benefits of autonomous vehicles are directly relevant to law enforcement. FBI statistics show that vehicle-related accidents account for most accidental law enforcement officer deaths.⁴² In 2017, forty-seven officers were accidentally killed in the line of duty—thirty-five of whom were involved in motor vehicle crashes and six of whom were pedestrian officers struck by vehicles.⁴³ The number of officers who suffer non-fatal injuries during traffic accidents each year is much greater.⁴⁴

In addition, a major part of police work today involves traffic enforcement, including responding to and investigating traffic accidents.⁴⁵ Each year, law enforcement officers issue tens of millions of traffic citations.⁴⁶ With autonomous vehicles being programmed to follow the rules of the road, researchers stress that autonomous vehicles will reduce the need for law enforcement to spend vast human and financial resources on enforcing traffic laws.⁴⁷

B. Criminal Law Enforcement

Another key issue is whether the new technology will undermine policing by significantly reducing or eliminating traffic stops, especially

⁴¹ Andrew Krok, *Waymo Ditches Safety Drive Self-Driving Public Pilot*, CNET (Nov. 7, 2017, 8:00 AM), <https://www.cnet.com/roadshow/news/waymo-ditches-safety-driver-in-self-driving-public-pilot> [<https://perma.cc/UFA4-2RZ5>].

⁴² Michelle Ye Hee Lee, *Are Most Job-Related Deaths of Police Caused by Traffic Incidents?*, WASH. POST (July 12, 2016), https://www.washingtonpost.com/news/fact-checker/wp/2016/07/12/are-most-job-related-deaths-of-police-caused-by-traffic-incidents/?utm_term=.91b2a4bcc8a0 [<https://perma.cc/AGJ4-Q5MS>].

⁴³ CRIMINAL JUSTICE INFO. SERVS. DIV., FED. BUREAU OF INVESTIGATION, 2017: LAW ENFORCEMENT OFFICERS KILLED AND ASSAULTED tbl.65 (Type of Accident and Activity of Victim Officer at Time of Incident, 2013–2017), <https://ucr.fbi.gov/leoka/2017/tables/table-65.xls> [<https://perma.cc/E46U-QNWF>].

⁴⁴ See generally Tom LaTourrette, *Risk Factors for Injury in Law Enforcement Officer Vehicle Crashes*, 38 POLICING: INT'L J. OF POLICE STRATEGIES & MGMT. 478, 478 (2015) (studying risks police officers face from traffic accidents on the job).

⁴⁵ CORDNER, *supra* note 8, at 28.

⁴⁶ NAT'L CTR. FOR STATE COURTS, STATE COURT CASELOAD DIGEST: 2016 DATA 16 (2018), http://www.courtstatistics.org/~media/Microsites/Files/CSP/National-Overview-2016/SCCD_2016.ashx [<https://perma.cc/HX9H-CZZB>] (reporting that the total incoming traffic violations/caseloads reported by state courts between 2007 and 2016 ranged from 44.9 million to 56.3 million cases per year; COURT STATISTICS PROJECT, NAT'L CTR. FOR STATE COURTS, EXAMINING THE WORK OF STATE COURTS: AN ANALYSIS OF 2010 STATE COURT CASELOADS 31 (2012), http://www.courtstatistics.org/~media/Microsites/Files/CSP/DATA%20PDF/CSP_DEC.ashx [<https://perma.cc/3CF7-ATB5>].

⁴⁷ Zagorsky, *supra* note 25.

pretextual ones.⁴⁸ Pretextual traffic stops enable officers to use a traffic violation as a justification to pull over vehicles when their true motivations are to investigate unrelated crimes.⁴⁹ If autonomous vehicles are programmed to follow traffic rules, then there will be much fewer traffic violations for officers to use as pretexts for vehicle stops, which could improve citizen and officer safety alike.⁵⁰

Some commentators stress that communities of color could benefit in major ways if autonomous vehicles end or significantly curb pretextual traffic stops.⁵¹ Pretextual traffic stops are a pervasive and institutionalized law enforcement practice today.⁵² A long line of legal scholarship criticizes pretextual traffic stops for enabling racial profiling on roads and highways, and increasing opportunities for law enforcement to question, seize, search, and apply force to minority drivers and passengers.⁵³ Studies show that people of color bear the brunt of intrusive police conduct and its attendant harms during pretextual traffic stops.⁵⁴

Some law enforcement leaders, however, have advanced two counterarguments that relate to the role of traffic stops as a crime-fighting tool.⁵⁵ First, they argue that if autonomous vehicles eliminate or significantly

⁴⁸ Dan Fink, *Autonomous Cars: Driving on Auto Pilot*, POLICE MAG. (June 22, 2014), <http://www.policemag.com/channel/vehicles/articles/2014/06/autonomous-cars-driving-on-auto-pilot.aspx> [<https://perma.cc/8B9D-JSUT>].

⁴⁹ Carbado, *supra* note 11, at 130; Joh, *Discretionless Policing*, *supra* note 10, at 209; L. Song Richardson, *Implicit Racial Bias and the Perpetrator Perspective: A Response to Reasonable but Unconstitutional*, 83 GEO. WASH. L. REV. 1008, 1014 (2015).

⁵⁰ Dorothy J. Glancy, *Autonomous and Automated and Connected Cars—Oh My! First Generation Autonomous Cars in the Legal Ecosystem*, 16 MINN. J.L. SCI. & TECH. 619, 663 (2015) [hereinafter Glancy, *Autonomous and Automated*]; Washington, *supra* note 6.

⁵¹ Martine Powers, *Could Self-Driving Cars Be One Solution to Police Shootings During Traffic Stops?*, WASH. POST (July 12, 2016), https://www.washingtonpost.com/news/dr-gridlock/wp/2016/07/12/could-self-driving-cars-be-one-solution-to-police-shootings-during-traffic-stops/?utm_term=.2b1bbd1498a9 [<https://perma.cc/V3RH-UBDJ>].

⁵² Carbado, *supra* note 11, at 155–56 (noting how law enforcement agencies are “very much aware of the on-the-ground implications of *Whren*”). In *Whren v. United States*, the U.S. Supreme Court rejected the idea that pretextual traffic stops violate the Fourth Amendment. 517 U.S. 806, 813 (1996).

⁵³ See, e.g., Devon W. Carbado, *(E)Racing the Fourth Amendment*, 100 MICH. L. REV. 946 (2002); Angela J. Davis, *Race, Cops, and Traffic Stops*, 51 U. MIAMI L. REV. 425 (1997); Samuel R. Gross & Katherine Y. Barnes, *Road Work: Racial Profiling and Drug Interdiction on the Highway*, 101 MICH. L. REV. 651 (2002); David A. Harris, “*Driving While Black*” and All Other Traffic Offenses: *The Supreme Court and Pretextual Traffic Stops*, 87 J. CRIM. L. & CRIMINOLOGY 544 (1997).

⁵⁴ See Frank R. Baumgartner et al., *Targeting Young Men of Color for Search and Arrest During Traffic Stops: Evidence from North Carolina, 2002–2013*, 5 POL., GROUPS & IDENTITIES 107 (2017); see also, e.g., I. Bennett Capers, *Criminal Procedure and the Good Citizen*, 118 COLUM. L. REV. 653, 690 (2018).

⁵⁵ See, e.g., Ian Adams & Arthur Rizer, *Self-Driving Cars Could Change Landscape of Policing*, SAN DIEGO UNION-TRIB. (Dec. 23, 2016, 2:00 PM),

reduce traffic stops (especially pretextual ones), then law enforcement will have much fewer opportunities to detect criminal activity, investigate crime, and apprehend criminal suspects.⁵⁶ Second, they claim that traffic stops are visible reminders to society that the police has a public presence,⁵⁷ and thus deter crime.⁵⁸ In their view, autonomous vehicles would weaken this alleged deterrent by eliminating or significantly reducing traffic stops.⁵⁹ One of the major open questions, however, is what a “traffic stop” might look like and whether police will continue the practice with autonomous vehicles.⁶⁰

Scholars are starting to consider how autonomous vehicles could engender major shifts in policing strategies away from traffic enforcement. Autonomous vehicles will have the capacity to record various types of data, including past locations.⁶¹ Therefore, as Professor Orin Kerr has hypothesized, autonomous vehicles could give rise to greater law enforcement reliance on car trips to reconstruct past events during criminal investigations.⁶² With this potential, scholars and commentators warn that autonomous vehicles could facilitate government surveillance in ways that create new forms of discrimination and privacy abuse.⁶³ In this regard, autonomous vehicles could become a new site of big data policing.⁶⁴

Scholars and law enforcement leaders have also started exploring how autonomous vehicles could create new criminal enforcement problems.⁶⁵ For

<http://www.sandiegouniontribune.com/opinion/commentary/sd-autonomous-vehicles-policing-traffic-20161223-story.html> [<https://perma.cc/U43L-RSAU>].

⁵⁶ Davis, *supra* note 3.

⁵⁷ Zagorsky, *supra* note 25.

⁵⁸ *Id.*

⁵⁹ *Id.*

⁶⁰ Joh, *Automated Seizures*, *supra* note 5 (discussing what traffic stops might look like when officers stop autonomous vehicles).

⁶¹ Dorothy J. Glancy, *Privacy in Autonomous Vehicles*, 52 SANTA CLARA L. REV. 1171, 1196 (2012) [hereinafter Glancy, *Privacy*] (discussing implications of this recorded data).

⁶² Orin Kerr, Opinion, *How Self-Driving Cars Could Determine the Future of Policing*, WASH. POST: VOLOKH CONSPIRACY (June 16, 2017), https://www.washingtonpost.com/news/volokh-conspiracy/wp/2017/06/16/how-self-driving-cars-could-determine-the-future-of-policing/?utm_term=.376af6e02653 [<https://perma.cc/NF3G-PAHN>].

⁶³ DIRECTORATE OF INTELLIGENCE/STRATEGIC ISSUES GROUP, FED. BUREAU OF INVESTIGATION, AUTONOMOUS CARS PRESENT GAME CHANGING OPPORTUNITIES AND THREATS FOR LAW ENFORCEMENT 2 (2014) [hereinafter FBI REPORT]; Lindsey Barrett, Note, *Herbie Fully Downloaded: Data-Driven Vehicles and the Automobile Exception*, 106 GEO. L.J. 181, 184 (2017); Chasel Lee, Note, *Grabbing the Wheel Early: Moving Forward on Cybersecurity and Privacy Protections for Driverless Cars*, 69 FED. COMM. L.J. 25, 38–39 (2017).

⁶⁴ See generally ANDREW GUTHRIE FERGUSON, THE RISE OF BIG DATA POLICING: SURVEILLANCE, RACE, AND THE FUTURE OF LAW ENFORCEMENT 1–6 (2017) (describing big data policing).

⁶⁵ ROBERT FINKELSTEIN & ROB DAVIS, POLICE FOUNDATION, AUTONOMOUS CARS FOR LAW ENFORCEMENT 6, (2017), <https://www.techcastglobal.com/wp-content/uploads/ckfinder/userfiles/files/White%20Paper%20Mod%201%20Autonomous%20Cars%20L>

instance, criminals might use unoccupied autonomous vehicles to anonymously transport illegal drugs or weapons.⁶⁶ Or terrorists might use unoccupied autonomous vehicles to drive explosives or chemical weapons into public spaces and buildings.⁶⁷ Self-driving cars might also bring changes to the underground commercial sex industry by providing new spaces for people to buy and sell sex.⁶⁸

Cybersecurity is another related issue. Experts stress that smart criminals could hack and use autonomous vehicles to execute their criminal plans.⁶⁹ For instance, they might hijack the control systems of autonomous vehicles to exceed speed limits and evade the police.⁷⁰ Other experts, however, stress that autonomous vehicles may not be as vulnerable to hacking in the future, especially as industry collaborations and cybersecurity features improve with the progression of the technology.⁷¹

* * *

In sum, there is growing consensus among stakeholders that autonomous vehicles have considerable benefits for traffic safety. Some law enforcement leaders, however, are concerned that these benefits will come at the cost of impairing police work by making crime detection and criminal investigations more difficult. Important for the purposes of this Essay, de-

aw%20Enforcement%202020March%202017.pdf [https://perma.cc/9NJZ-8NFS] (noting that “[a]utonomous vehicles will make possible new kinds of crimes and criminals”).

⁶⁶ FBI REPORT, *supra* note 63, at 1 (describing that autonomous vehicles “open up greater possibilities . . . for a car to be more of a potential lethal weapon than it is today”); Davis, *supra* note 3; Joseph J. Kolb, *Will Autonomous Vehicles Improve Highway Safety?*, 1 POLICEONE DIG. EDITION, Spring 2018, at 8, 11, https://publications.policeone.com/2018/P1_DigitalEdition_HighwaySafety_Spring2018.pdf [https://perma.cc/XQ3X-RSKL].

⁶⁷ James Black, Commentary, *Autonomous Vehicles: Terrorist Threat or Security Opportunity?*, RAND CORP. BLOG (Jan. 3, 2018), <https://www.rand.org/blog/2018/01/autonomous-vehicles-terrorist-threat-or-security-opportunity.html> [https://perma.cc/VCD2-L8HZ]. Stakeholders are already considering potential solutions to terrorist threats from unoccupied autonomous vehicles. For instance, a patent application was recently filed for a built-in detection system that could detect the presence of hazardous materials in autonomous vehicles and disable the autonomous features of the vehicles when potential weapons of mass destruction are detected. U.S. Patent App. No. 14/521866, (filed Oct. 23, 2014).

⁶⁸ Danielle Paquette, *People Are Going to Sell Sex in Driverless Cars, Researchers Say*, WASH. POST (Nov. 12, 2018), https://www.washingtonpost.com/business/2018/11/12/people-are-going-sell-sex-driverless-cars/?noredirect=on&utm_term=.8bcb876fe3ae [https://perma.cc/Y683-C2CD].

⁶⁹ See, e.g., Rob Toews, *The Biggest Threat Facing Connected Autonomous Vehicles Is Cybersecurity*, TECHCRUNCH (Aug. 25, 2016), <https://techcrunch.com/2016/08/25/the-biggest-threat-facing-connected-autonomous-vehicles-is-cybersecurity> [https://perma.cc/YXK2-9CA8].

⁷⁰ FINKELSTEIN & DAVIS, *supra* note 65, at 6.

⁷¹ See, e.g., Alex Hern, *Assume Self-Driving Cars Are a Hacker’s Dream? Think Again*, GUARDIAN (Aug. 30, 2017, 2:00 AM), <https://www.theguardian.com/technology/2017/aug/30/self-driving-cars-hackers-security> [https://perma.cc/E5AF-JAHM]; AUTOMOTIVE INFO. SHARING & ANALYSIS CTR., <https://www.automotiveisac.com> [https://perma.cc/K2QG-8Y5B].

escalation and officer safety are not a focus of these discussions on autonomous vehicles and policing.

II. AUTONOMOUS VEHICLES AND POLICE DE-ESCALATION

This Part examines five ways that autonomous vehicles and their included technologies (for instance, sensory technology, real-time HD mapping, and vehicle connectivity systems) have promise to reduce possibilities for escalation during motor vehicle stops: (1) vehicles will be programmed to follow traffic rules, making traffic stops much less common; (2) sensory technology will prevent vehicles from hitting other vehicles or persons, decreasing motor vehicle assaults against officers; (3) driver's license requirements could be eliminated, taking the enforcement of driver's license laws out of the hands of police; (4) DUI law reforms could abolish the need for officers to conduct DUI stops, investigations, or arrests; and (5) sensory technology in vehicles will reduce investigations associated with hit-and-run offenses, and will simplify accident investigations overall.

A. *Traffic Stop Occurrences*

As society moves towards autonomous vehicles programmed to follow traffic rules, many moving traffic violations will disappear.⁷² With fewer traffic violations, it is expected that traffic stops will significantly decline.⁷³ In turn, there will be fewer traffic stops to escalate into violence.⁷⁴

At the same time, autonomous vehicles might not eliminate all traffic violations. Two possible exceptions are registration and equipment violations (for example, driving with a broken headlight or taillight). For this reason, it is important to consider other ways that autonomous vehicles could facilitate police de-escalation besides simply decreasing the volume of traffic stops.

B. *Motor Vehicle Assaults and Fleeing Drivers*

Autonomous vehicles have the potential to reduce the dangers officers face when interacting with fleeing motorists or approaching stopped vehicles. A key feature of autonomous vehicles is that built-in sensors will largely prevent collisions with other vehicles or people.⁷⁵ This will

⁷² Brian Fung, *How Driverless Cars Could Kill the Speeding Ticket — and Rob Your City*, WASH. POST (Jan. 22, 2016), https://www.washingtonpost.com/news/the-switch/wp/2016/01/22/how-driverless-cars-could-kill-the-speeding-ticket-and-rob-your-city/?utm_term=.78b911388835 [<https://perma.cc/8A7G-TYPQ>].

⁷³ Glancy, *Autonomous and Automated*, *supra* note 50, at 661–62.

⁷⁴ Elizabeth E. Joh, *Automated Policing*, 15 OHIO ST. J. CRIM. L. 559, 560 (2018).

⁷⁵ Surden & Williams, *supra* note 25, at 137–38; Zagorsky, *supra* note 25.

significantly undermine the ability of motorists to intentionally hit officers or occupied patrol cars with motor vehicles. In related work, I have shown that the motor vehicle is a commonly described assault weapon against officers during traffic stops that escalate into violence against the police.⁷⁶

Autonomous vehicles prompt related questions about whether technological features other than anti-collision sensors can de-escalate police encounters involving fleeing motorists. On this issue, the direction of the technology is admittedly less clear. Perhaps law enforcement officers will be empowered to shut off autonomous vehicles at their own discretion.⁷⁷ Assuming it does not violate the Fourth Amendment,⁷⁸ this ability could prevent motorists from fleeing or hitting officers or patrol cars while attempting to flee.

There has already been some industry pushback, however, against granting officers this authority. For instance, reports recently surfaced that U.S. transportation regulators had a closed-door meeting in March 2018 during which they grappled with whether police officers should be empowered to disable autonomous vehicles during an emergency.⁷⁹ A thirty-nine-page report from the meeting revealed that participants were skeptical to allow this because of the possibility that hackers or terrorists could exploit the same features that would allow police to stop autonomous vehicles.⁸⁰

Even if officers will not be empowered to automatically shut off autonomous vehicles for legal or political reasons, the direction of the technology could shape the moments before officers apprehend fleeing motorists. If autonomous vehicles are programmed to follow legal speed limits, then officers could simply follow motorists that flee in autonomous vehicles until the drivers eventually stop, without assuming the risk of being hit. Or if officers are able gain access to an autonomous vehicle's GPS data

⁷⁶ Jordan Blair Woods, *Policing, Danger Narratives, and the Motor Vehicle* (manuscript on file with author) [hereinafter, Woods, *Motor Vehicle*] (discussing how the motor vehicle as a weapon source is underappreciated in policing data); see also Woods, *Traffic Stops*, *supra* note 16, at 673 & n.166 (presenting results from an empirical study on violence against the police during traffic stops showing that after personal weapons (hands/fists/feet), the motor vehicle was the second most commonly described weapon used to assault officers during routine traffic stops for only traffic violations, and the most commonly described weapon used to assault officers during traffic stops that involved criminal enforcement beyond a traffic violation).

⁷⁷ Elizabeth E. Joh, *Policing Police Robots*, 64 UCLA L. REV. DISCOURSE 516, 529 n.77 (2016) (noting the possibility that police officers would be able to shut off autonomous vehicles).

⁷⁸ See generally Joh, *Automated Seizures*, *supra* note 5 (examining the Fourth Amendment implications of automated traffic stops on autonomous vehicles).

⁷⁹ David Shepardson, *U.S. Regulators Grappling with Self-Driving Vehicle Security*, REUTERS (July 10, 2018, 2:22 PM), <https://www.reuters.com/article/us-autos-selfdriving/u-s-regulators-grappling-with-self-driving-vehicle-security-idUSKBN1K02OD> [<https://perma.cc/4A4Q-XBZC>].

⁸⁰ *Id.*

in real-time, then officers may not need to follow fleeing motorists at all.⁸¹ High-speed police pursuits, considered to be an inherently dangerous aspect of policing,⁸² could significantly decline, if not disappear.

Technological features in autonomous vehicles may also address officer safety concerns when they approach stopped vehicles, such as being assaulted with car doors.⁸³ In 2016, Jaguar Land Rover filed a patent application for a new system that uses sensors in car door handles and elsewhere around the car in order to prevent the car doors from denting.⁸⁴ The sensors work by detecting how close a car is to an obstacle (for instance, other vehicles, lampposts, pillars, or walls) before calculating how far the car door can open.⁸⁵ A mechanism built into the car door then increases resistance the closer it gets to an object, making it harder to open the car door quickly and cause damage.⁸⁶ The system also includes signals, such as indicator lights, to alert others that a door is about to open.⁸⁷

These sensory systems could make it more difficult for motorists in autonomous vehicles to open their doors to intentionally hit officers. If incorporated into windows, the technology could also make it more difficult for motorists to intentionally close their windows on officers' arms and hands. In addition, the alerts could give officers more time to move out of the way and avoid these types of assaults.

C. *Unlicensed Drivers*

Autonomous vehicles could produce radical changes in driver's license laws and perhaps make driver's licenses obsolete.⁸⁸ The logic is that if human

⁸¹ FBI REPORT, *supra* note 63, at 2.

⁸² See, e.g., John Hill, *High-Speed Police Pursuits: Dangers, Dynamics, and Risk Reduction*, FBI L. ENFORCEMENT BULL., July 2002, at 14, 15.

⁸³ Michael Schlosser, *Unknown and Known Risk Vehicle Stops*, POLICE MAG. (July 13, 2018), <https://www.policemag.com/342506/unknown-and-known-risk-vehicle-stops> [<https://perma.cc/5WFA-8NJC>] (discussing the driver's door as "the most critical" observation point when officers approach stopped vehicles during traffic stops).

⁸⁴ Richard Gray, *Sensors in Doors Promise an End to Car Park Dings*, TIMES (London) (Dec. 12, 2016, 12:01 AM), <https://www.thetimes.co.uk/article/sensors-in-doors-promise-an-end-to-car-park-dings-nrwvskxrm> [<https://perma.cc/TL6V-B6PQ>].

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ *Id.*

⁸⁸ See Fink, *supra* note 48 (speculating that prospective future smart car owners will have to attend computer class training in place of obtaining a driver's licenses); Doug Newcomb, *You Won't Need a Driver's License by 2040*, WIRED (Sept. 17, 2012, 1:42 PM), <https://www.wired.com/2012/09/ieee-autonomous-2040> [<https://perma.cc/7WNR-XSLY>] (speculating that autonomous vehicles may lead to the disappearance of traffic lights, speed limits, and driver licensing).

drivers are not required to take control of autonomous vehicles, then there is no need to require a driver's license.⁸⁹

These reforms are politically feasible.⁹⁰ In 2017, Georgia enacted legislation amending the state motor vehicle code to exempt drivers of fully autonomous vehicles from driver's license requirements.⁹¹ In October 2016, California released a draft of regulations on autonomous vehicles, which stated that the most advanced autonomous vehicles would no longer be required to have a licensed driver if and when federal officials deem them safe enough.⁹²

In prior work, I discuss that these invocations of police authority are central to why many traffic stops on unlicensed drivers today escalate into assaults against officers.⁹³ These driver's license reforms would eliminate the authority for officers to initiate traffic stops based on driving with an invalid license. In addition, an invalid license would no longer be a justification for officers to order drivers out of cars, detain, or arrest drivers, thus reducing the potential for escalation into violence.

⁸⁹ See sources cited *supra* note 88 and accompanying text. *But see* Jennifer Bradley, *Will You Need a Driving License in the Age of Self-Driving Cars?*, BBC (July 31, 2017), <https://www.bbc.com/news/technology-40570592> [<https://perma.cc/54FH-7S56>] (arguing that until cars are fully autonomous, licensing requirements for self-driving cars should remain for safety reasons).

⁹⁰ See *Autonomous Vehicles*, *supra* note 2 (discussing each state's autonomous vehicle related bills).

⁹¹ S.B. 219, 2017 Ga. Laws 549, codified in part at GA. CODE ANN. § 40-5-21 (West 2017); *see also* W. Perry Hicks & Alan J. Ponce, *SB 219 – Autonomous Vehicles*, 34 GA. ST. U. L. REV. 231, 240–43 (2017) (discussing Georgia's amendments).

⁹² STATE OF CAL. GOVERNOR'S OFFICE OF PLANNING & RESEARCH, AUTOMATED VEHICLE PRINCIPLES FOR HEALTHY AND SUSTAINABLE COMMUNITIES (2018), http://opr.ca.gov/docs/20181115-California_Automated_Vehicle_Principles_for_Healthy_and_Sustainable_Communities.pdf [<https://perma.cc/D55K-LFTN>]; *see also* Justin Pritchard, *California Opens Pathway for Cars that Lack Steering Wheel*, BUS. INSIDER (Sept. 30, 2016, 8:53 PM), <http://www.businessinsider.com/ap-california-opens-pathway-for-cars-that-lack-steering-wheel-2016-9> [<https://perma.cc/62CR-Y9PE>]. Relatedly, in October 2018, the California DMV issued its first permit to allow the testing of driverless vehicles. *See* State of Cal. Dep't of Motor Vehicles, *DMV Issues Permit Authorizing Waymo to Test Driverless Vehicles in Santa Clara County* (Oct. 30, 2018), https://www.dmv.ca.gov/portal/dmv/detail/pubs/newsrel/2018/2018_81 [<https://perma.cc/38NC-6T8T>].

⁹³ Woods, *Motor Vehicle*, *supra* note 76 (presenting results from an empirical study on violence against the police during traffic stops finding that approximately 40% of stops that escalated into non-fatal assaults against officers involved drivers who did not have a valid driver's license); Woods, *Traffic Stops*, *supra* note 16, at 690 (presenting results from an empirical study on violence against the police during traffic stops finding that invocations of police authority for not having a valid driver's license was a major factor surrounding stops that escalated into violence against officers).

D. Intoxicated Drivers

Every year, there are over one million arrests for driving under the influence (DUI) in the United States alone.⁹⁴ If autonomous vehicles can transport intoxicated occupants without requiring them take control of the vehicles, then public safety will no longer be a valid justification to ban operating a vehicle while intoxicated or allow officers to conduct DUI stops, investigations, or arrests.⁹⁵

In prior work, I describe that these invocations of police authority are central to why many traffic stops on intoxicated drivers today escalate into assaults against officers.⁹⁶ Each step of the DUI investigation process—from the initial questioning, to ordering the driver out of the vehicle to conduct the roadside exercises, to the undertaking of the roadside exercises, to the arrest, to the transporting of the intoxicated driver to the testing facility, to the transporting of the intoxicated driver to jail—opens opportunities for the encounter to escalate into violence against the police (as well as civilians). If intoxicated drivers no longer pose a public safety threat with autonomous vehicles, then perhaps the only basis upon which officers can initiate stops on intoxicated drivers will be to help those in need of assistance.

These reforms have not yet emerged in the United States, and officers are still arresting drivers for DUI-related offenses when driving semi-autonomous cars on autopilot.⁹⁷ There are calls for these reforms, however, in the international arena. For instance, in October 2017, the National Transport Commission of Australia recommended that laws against driving under the influence no longer apply to occupants in autonomous vehicles

⁹⁴ MATTHEW CHAMBERS ET AL., BUREAU OF TRANSP. STATISTICS, U.S. DEP'T OF TRANSP., DRUNK DRIVING BY THE NUMBERS (2017), https://www.bts.gov/archive/publications/by_the_numbers/drunken_driving/index [<https://perma.cc/4X6N-XYDL>].

⁹⁵ See, e.g., Jeffrey K. Gurney, *Driving into the Unknown: Examining the Crossroads of Criminal Law and Autonomous Vehicles*, 5 WAKE FOREST J.L. & POL'Y 393, 422 (2015) (arguing that if an autonomous vehicle is capable of taking an intoxicated occupant home, “no punishment purposes are served by ticketing the operator for driving under the influence of alcohol”).

⁹⁶ Woods, *Motor Vehicle*, *supra* note 76 (presenting results from an empirical study on violence against the police during traffic stops finding that approximately 20% of the evaluated stops that escalated into non-fatal assaults against officers involved drivers who showed signs of intoxication during the stop); Woods, *Traffic Stops*, *supra* note 16, at 687–93 (presenting a typology based on results from an empirical study on violence against the police during traffic stops showing that early signs of intoxication are major contextual cues surrounding stops that escalate into non-fatal assaults against officers).

⁹⁷ See, e.g., Kevin Kelleher, *Man Arrested for Drunk Driving After Officers Found Him Asleep in Tesla Running in Autopilot Mode*, FORTUNE (Dec. 1, 2018), <http://fortune.com/2018/11/30/man-arrested-drunken-driving-asleep-tesla-autopilot-mode> [<https://perma.cc/9MSH-W7A3>].

with high or full automation.⁹⁸ Accordingly, the extent to which these DUI law reforms gain support in the United States will likely depend on the level of automation that self-driving cars achieve.⁹⁹

E. Hit-and-Run and Accident Investigations

Traffic enforcement also includes responding to and investigating hit-and-run offenses and traffic accidents.¹⁰⁰ Sensory technology in autonomous vehicles should reduce hit-and-run incidents and motor vehicle accidents more generally. In turn, investigations surrounding hit-and-run offenses and motor vehicle accidents will decline, reducing opportunities for those investigations to escalate into violence against officers.

* * *

Autonomous vehicles and their included technologies hold promise to decrease possibilities for escalation during motor vehicle stops in ways that benefit officer as well as civilian safety. Illuminating these potential benefits illustrates the importance of considering officer safety as a vector in the growing scholarly and policy discourse on autonomous vehicles. These potential benefits regarding de-escalation, however, also have meaningful implications for policing laws, policies, and practices. The Essay now shifts gears to discuss these issues.

III. IMPLICATIONS OF DE-ESCALATION

This Part considers the implications of autonomous vehicles' potential to decrease possibilities for escalation on Fourth Amendment doctrine, officer training, and departmental policies.

A. Fourth Amendment

It is beyond the scope of this Essay to provide a truly comprehensive analysis of the various ways in which autonomous vehicles will test the bounds of Fourth Amendment protection. The technology, however, will challenge engrained assumptions about the dangerousness of motor vehicle stops to law enforcement officers in existing Fourth Amendment law. To illustrate this point, this Part focuses on one prime example: officers' use of deadly force during motor vehicle stops.¹⁰¹ Several courts, including the U.S.

⁹⁸ NAT'L TRANSP. COMM'N OF AUSTR., CHANGING DRIVING LAWS TO SUPPORT AUTOMATED VEHICLES: DISCUSSION PAPER 69–70 (2017), [http://www.ntc.gov.au/Media/Reports/\(E5695ACE-993C-618F-46E1-A876391B8CD9\).pdf](http://www.ntc.gov.au/Media/Reports/(E5695ACE-993C-618F-46E1-A876391B8CD9).pdf) [<https://perma.cc/FDR7-KAFT>].

⁹⁹ Gallagher, *supra* note 32.

¹⁰⁰ CORDNER, *supra* note 8, at 28.

¹⁰¹ For a more comprehensive critique of Fourth Amendment doctrine on the use of force see Brandon Garrett & Seth Stoughton, *A Tactical Fourth Amendment*, 103 VA. L. REV. 211 (2017); Rachel

Supreme Court, have rejected Fourth Amendment claims of excessive force and upheld officers' use of deadly force against suspects fleeing in motor vehicles.¹⁰² As explained below, their reasoning commonly turns on the belief that the vehicles' drivers posed a reasonable threat to officers and the public at large.

Consider the U.S. Supreme Court's decision in *Scott v. Harris*.¹⁰³ In this case, a Georgia county deputy tried to pull over a speeding driver.¹⁰⁴ The driver refused to pull over, sped away, and a high-speed chase began. The deputy radioed to report the pursuit and the driver's license plate number. Deputy Scott overheard the report and joined the pursuit with other officers. During the chase, the driver pulled into the parking lot of a shopping center and was nearly boxed in by various patrol cars. The driver evaded the trap by making a sharp turn, collided with Deputy Scott's patrol car, exited the parking lot, and sped off again down a two-lane highway. Deputy Scott then took over as the lead pursuit vehicle and decided to terminate the pursuit by using a precision immobilization technique (PIT)—which involves making contact with a fleeing suspect's car, and when effective, causes a loss of tire traction and the engine to shut down.¹⁰⁵ After receiving permission to execute the PIT maneuver, Deputy Scott applied his push bumper to the rear of the driver's vehicle.¹⁰⁶ The driver then lost control of his vehicle, which overturned and crashed. The driver was badly injured and was rendered a quadriplegic.

The driver filed a Section 1983 suit alleging that Deputy Scott used excessive force resulting in an unreasonable seizure under the Fourth Amendment.¹⁰⁷ The Court, however, held that Deputy Scott did not violate the Fourth Amendment because his decision to terminate the pursuit by bumping into the back of the driver's car was objectively reasonable.¹⁰⁸

A. Harmon, *When is Police Violence Justified?*, 102 NW. U. L. REV. 1119 (2008); Osagie K. Obasogie & Zachary Newman, *The Futile Fourth Amendment: Understanding Police Excessive Force Doctrine Through an Empirical Assessment of Graham v. Connor*, 112 NW. U. L. REV. 1465 (2018).

¹⁰² See, e.g., *Scott v. Harris*, 550 U.S. 372 (2007); *Waterman v. Batton*, 393 F.3d 471, 475–77 (4th Cir. 2005); *Cole v. Bone*, 993 F.2d 1328, 1330, 1333–34 (8th Cir. 1993); *Smith v. Freland*, 954 F.2d 343, 344 (6th Cir. 1992); *McGrath v. Tavares*, 889 F.Supp.2d 157, 164–65 (D. Mass. 2012).

¹⁰³ 550 U.S. 372 (2007).

¹⁰⁴ The following facts are found at *id.* at 374–75.

¹⁰⁵ GEOFFREY P. ALPERT & CYNTHIA LUM, *POLICE PURSUIT DRIVING: POLICY AND RESEARCH* 14 n.4 (2014).

¹⁰⁶ *Scott*, 550 U.S. at 375.

¹⁰⁷ *Id.* at 375–76.

¹⁰⁸ *Id.* at 381, 386.

In its analysis, the Court first distinguished the case from its prior decision in *Tennessee v. Garner*,¹⁰⁹ stressing that the threat posed by an unarmed suspect fleeing by foot is not “even remotely comparable to the extreme danger to human life” posed by the driver in the case at hand.¹¹⁰ In balancing the nature of the individual intrusion against the importance of the relevant governmental interests, the Government pointed to ensuring public safety, which the Court characterized as “paramount.”¹¹¹ The Court then stressed that the driver “posed an actual and imminent threat to the lives of any pedestrians who might have been present, to other civilian motorists, and to the officers involved in the chase.”¹¹² It concluded that Deputy Scott’s actions were reasonable under the Fourth Amendment because the driver intentionally put himself and the public in danger by refusing to stop during the high-speed pursuit, whereas the bystanders and officers who were at risk of harm during the pursuit were entirely innocent.¹¹³

More recently, the Court followed the logic in *Scott* to reach its unanimous decision in *Plumhoff v. Rickard*.¹¹⁴ In this case, an Arkansas police officer pulled over a car for only having one headlight.¹¹⁵ The officer asked the driver if he had been drinking and the driver responded that he had not. The driver failed to produce his driver’s license upon request and appeared nervous. The officer then asked the driver to exit the car. Rather than comply with the officer’s request, the driver sped away.

The officer chased the driver, and five other officers soon joined the pursuit on an interstate. The vehicles attained speeds of over 100 miles per hour and the officers passed more than two dozen other vehicles during the chase. The driver eventually exited the interstate and made a quick right turn, which caused his car to make contact with one of the patrol cars. The contact caused the driver’s car to spin out into a parking lot and collide with another officer’s police car. In danger of being cornered, the driver put his car into reverse. The two officers then exited their patrol cars, and one who had a gun in his hand pounded on the passenger’s window. The driver’s car then made

¹⁰⁹ 471 U.S. 1 (1985). In *Tennessee v. Garner*, the Court held that an officer’s use of deadly force against a suspect violates the Fourth Amendment “unless it is necessary to prevent the escape and the officer has probable cause to believe that the suspect poses a significant threat of death or serious physical injury to the officers or others.” *Id.* at 3. The facts of *Garner* involved an officer who fatally shot 15-year-old Edward Garner, a home burglary suspect, in the back as he was fleeing on foot. The officer used deadly force in spite of being “reasonably sure” that Garner was unarmed and not dangerous. *Id.* at 3–4.

¹¹⁰ *Scott*, 550 U.S. at 383.

¹¹¹ *Id.*

¹¹² *Id.* at 384.

¹¹³ *Id.* at 386.

¹¹⁴ 134 S. Ct. 2012 (2014).

¹¹⁵ The following summary of facts can be found at *id.* at 2017–18.

contact with another patrol car. The driver's tires were still spinning after contact, suggesting that his foot was on the accelerator. One of the officers then fired three shots into the driver's car. The driver then reversed the car and maneuvered onto another street, which forced one of the officers to step out of the way to avoid the vehicle. As the driver fled down the street, two other officers fired twelve shots towards the driver's car. The driver then lost control of the car and crashed into a building. Both the driver and the passenger died from some combination of the gunshot wounds and the crash that ended the chase.

The driver's surviving daughter brought a Section 1983 suit alleging that the officers used excessive force in violation of the Fourth Amendment.¹¹⁶ The Court, however, held that the officers' conduct did not violate the Fourth Amendment.¹¹⁷ It reasoned that the driver's reckless driving patterns during the chase posed "a grave public safety risk."¹¹⁸ It further stressed that at the moment the shots were fired, the driver was intent on resuming his flight, which would "pose a deadly threat for others on the road."¹¹⁹ The Court underscored that "it was beyond serious dispute" that the driver's flight posed a public safety risk, and therefore, as in *Scott*, the officers acted reasonably to end that risk.¹²⁰ It further reasoned that the firing of fifteen shots in total was reasonable because the driver never abandoned his attempt to flee while the shots were fired.¹²¹

Reimagine both U.S Supreme Court cases with autonomous vehicles. The facts and analysis of *Scott* and *Rickard* could look very different. Starting with *Scott*, the Georgia county deputy attempted to pull the driver over for speeding.¹²² If autonomous vehicles are designed to follow legal speed limits, then the underlying traffic violation would never have occurred. The officers then chased the fleeing vehicle, which they nearly boxed in with various patrol cars.¹²³ The driver evaded the trap by colliding with Deputy Scott's patrol car. If sensory technology prevents vehicles from colliding with other vehicles or persons, then the driver would not have been able to hit Deputy Scott's patrol car. In addition, if the driver's vehicle would have automatically shut down after it was boxed in by various patrol cars, then the officers could have apprehended the driver without using such force.

¹¹⁶ *Id.* at 2018.

¹¹⁷ *Id.* at 2016–17.

¹¹⁸ *Id.* at 2021.

¹¹⁹ *Id.* at 2022.

¹²⁰ *Id.*

¹²¹ *Id.*

¹²² *Scott v. Harris*, 550 U.S. 372, 374 (2007).

¹²³ *Id.* at 375.

Deputy Scott then terminated the pursuit by hitting the rear of the driver's vehicle.¹²⁴ The Court upheld Deputy Scott's use of deadly force by stressing that the driver posed an actual and imminent threat to the lives of other motorists, the officers involved in the chase, and pedestrians.¹²⁵ If sensory technology prevents vehicles from colliding with other vehicles or persons, then this assumption no longer holds. Thus, if the car in *Scott* was an autonomous vehicle, not only would the pursuit, the collision, and the use of deadly force likely not have occurred to begin with, but even if the events unfolded the same way, the Court would not have been able to rely on the same assumptions.

Now reimagine the facts in *Rickard*. In *Rickard*, the officer pulled over a vehicle for only having one headlight.¹²⁶ Unlike moving violations, equipment violations may still exist when autonomous vehicles are the norm.¹²⁷ The driver failed to produce his driver's license, refused the officer's order to exit the car, appeared nervous, and drove away.¹²⁸ Driver's licenses may be a relic of the past if autonomous vehicles do not require drivers to take control of the vehicles.¹²⁹ As a result, the officer might never have ordered the driver out of the car and the driver might not have gotten nervous or fled for not having a valid driver's license.

A high-speed pursuit then ensued, with the patrol and driver's vehicles reaching speeds of over 100 miles per hour.¹³⁰ If autonomous vehicles are programmed to follow legal speed limits, then the driver's vehicle would not have been able to attain such high speeds. The driver then made a quick right turn, which caused his car to spin out of control in a parking lot and collide with another officer's police car. Sensory technology in the vehicle could have prevented this impact. The officers then exited their patrol car, approached the driver's car, and the driver drove into another patrol car and appeared to keep his foot on the accelerator. Sensory technology could have also prevented this second contact and neutralized any threat the driver posed by keeping his foot on the accelerator. The driver then reversed the car and maneuvered his car onto another street, which forced another officer to step out of the way to avoid being hit. Sensory technology could have also neutralized any threat that the officer would have been hit.

¹²⁴ *Id.*

¹²⁵ *Id.* at 384.

¹²⁶ *Plumhoff v. Rickard*, 134 S. Ct. 2012, 2017 (2014).

¹²⁷ *See supra* Part I.A.

¹²⁸ *Rickard*, 134 S. Ct. at 2017.

¹²⁹ *See supra* Part II.C.

¹³⁰ *Rickard*, 134 S. Ct. at 2017.

It is at this time that the officers fired twelve shots towards the driver's car.¹³¹ In upholding the officers' use of deadly force, the Court specifically emphasized that the driver's reckless driving posed "a grave public safety risk."¹³² It further stressed that this risk was "beyond serious dispute."¹³³ Reimagining the facts of the case with a fully autonomous vehicle suggests that the chase would not have unfolded as it did, the officers would not have fired the twelve shots, and that the Court would not have ruled that the driving posed a safety risk.

A skeptical reader could argue that the Court may move in the opposite direction and declare that any stop on an autonomous vehicle is reasonable under the Fourth Amendment. At the same time, autonomous vehicles could give rise to mass automated traffic stops that open new possibilities for the Court to rethink the bounds of Fourth Amendment reasonableness in traffic stop contexts.¹³⁴ Although these legal questions regarding the inception of traffic stops on autonomous vehicles are open to debate, the analysis above regarding the potential for the technology to reduce escalation prompts novel questions about the legitimacy of upholding invocations of police authority (for instance, use of force) during stops on autonomous vehicles based on officer safety grounds. Put another way, as the dangers that motor vehicles pose to officers during police encounters shift with autonomous vehicles, so must Fourth Amendment law that upholds police conduct during traffic stops based on these danger assumptions.

B. Law Enforcement Policies and Officer Training

This Section discusses how autonomous vehicles' potential to reduce possibilities for police escalation will challenge the underlying logic of standard departmental policies and common approaches to officer training on motor vehicle stops. Shifts in officer training are already unfolding in some jurisdictions. In 2017, Waymo (the company now leading Google's self-driving car project) started collaborating with law enforcement agencies in Arizona, California, Texas, and Washington to educate agencies on how to identify and access autonomous vehicles for the purpose of accident investigations.¹³⁵ These training initiatives, however, have yet to touch on traffic or criminal enforcement stops.

¹³¹ *Id.* at 2018.

¹³² *Id.* at 2021.

¹³³ *Id.* at 2022.

¹³⁴ Joh, *Automated Seizures*, *supra* note 5, at 26–28 (discussing this possibility).

¹³⁵ Timothy J. Seppala, *Waymo Is Training Cops How to Respond to Autonomous Car Crashes*, ENGADGET (Oct. 16, 2017), <https://www.engadget.com/2017/10/16/waymo-police-training> [<https://perma.cc/UN69-6KYY>].

1. *Pretextual Traffic Stops*

It is especially important to consider how autonomous vehicles could affect departmental policies and practices surrounding pretext stops given that the technology could have very significant consequences for society's most marginalized and over-policed communities. On one hand, there will be a transition period during which both autonomous and conventional vehicles share the road. Turning a blind eye towards policing issues could enable autonomous vehicles to become a new proxy to separate low-income and wealthier civilians,¹³⁶ and thus exacerbate pretextual stops against society's most marginalized groups based on race and class.

On the other hand, the rise of autonomous vehicles could create new space to reconsider law enforcement policies and practices involving pretextual traffic stops. If autonomous vehicles are programmed to follow traffic rules then there will be much fewer traffic violations for officers to use as pretexts for vehicle stops.¹³⁷ With this shift in traffic, law enforcement agencies could prohibit officers from conducting pretextual traffic stops in general, or on drivers who have access to the technology (which should increase as self-driving cars become more commonplace). In this regard, the spread of autonomous vehicles might force police practices on pretextual traffic stops to change even if the law on pretextual traffic stops does not.

Some law enforcement leaders, however, are advancing concerns that eliminating traffic stops will decrease opportunities for police to discover evidence of crime.¹³⁸ They further claim that traffic stops are visible reminders to society that the police has a public presence, and thus autonomous vehicles will eliminate a deterrent to crime. The analysis in the previous Part, however, illustrates that this critique misses a critical component of the cost-benefit analysis on autonomous vehicles and policing—namely, officer safety.¹³⁹

If autonomous vehicles pressure law enforcement agencies to stop conducting pretextual traffic stops, then officers will need to justify vehicle stops for unrelated crime based on independent, requisite suspicion. Departmental policies on pretextual traffic stops, however, do not always require officers to have this independent suspicion. Rather, many policies simply internalize the U.S. Supreme Court's decision in *Whren v. United*

¹³⁶ Powers, *supra* note 51 (noting that “[p]oor people will be the last to benefit from the impacts of self-driving technology”).

¹³⁷ Glancy, *Autonomous and Automated*, *supra* note 50, at 663.

¹³⁸ See *supra* Part I.B.

¹³⁹ *Id.*

States, which upheld pretextual traffic stops under the Fourth Amendment so long as officers have probable cause of a traffic violation.¹⁴⁰

Consider the policy from a law enforcement agency in Tampa, Florida.¹⁴¹ The policy includes a firm statement against using “race, ethnic origin, gender, age, economic status, or sexual orientation of an individual” as an independent factor or reason for initiating a traffic stop and other enforcement efforts.¹⁴² The policy also includes a statement that traffic stops “should be based on a standard of reasonable suspicion or probable cause as required by the Fourth Amendment.”¹⁴³ It further states that officers must base a traffic stop on “reasonable and articulable facts. These facts, when viewed through the eyes of a trained and experienced law enforcement officer must be sufficient to cause him/her to believe that criminal activity or civil violations have occurred, or are about to occur, without regard” for the identity characteristics listed above.¹⁴⁴ Yet critically, the policy does not mandate a higher evidentiary bar that prohibits officers from conducting pretextual traffic stops for the purpose of investigating unrelated crimes.

In allowing officers to initiate pretextual traffic stops without adequate information about an unrelated crime, pretextual traffic stops distort and obfuscate the true dangers of vehicle stops in ways that undermine both officer and civilian safety.¹⁴⁵ Accordingly, autonomous vehicles could encourage departmental policies and police practices that require officers to gather more information about suspected non-traffic crime during vehicle encounters than they might gather in today’s driving regime when pretextual traffic stops are a fast and reliable tool at their disposal. Better information could enhance officers’ ability to accurately evaluate the risks of danger during the stops they conduct on autonomous vehicles and thus enhance officer safety and standards of criminal investigations.¹⁴⁶

2. *High-Speed Pursuits and Immobilization Techniques*

Autonomous vehicles will also challenge the logic of departmental policies and officer training on high-speed pursuits. Some researchers have

¹⁴⁰ 517 U.S. 806, 810 (1996).

¹⁴¹ PROF. STANDARDS BUREAU, TAMPA POLICE DEP’T, 536.1 BIAS-BASED PROFILING (2017), https://www.tampagov.net/sites/default/files/police/files/tpd_sop_536.1_bias_based_profiling.pdf [<https://perma.cc/CR6J-SKRC>].

¹⁴² *Id.* at 1.

¹⁴³ *Id.*

¹⁴⁴ *Id.* at 2.

¹⁴⁵ Woods, *Traffic Stops*, *supra* note 16, at 702–06.

¹⁴⁶ *Id.* at 704–05.

gone so far as to argue that “the car chase will be a thing of the past” when autonomous vehicles are the norm.¹⁴⁷

Calls for law enforcement agencies to adopt policy restrictions on high-speed vehicle chases go back decades¹⁴⁸ and persist today.¹⁴⁹ Geoffrey Alpert’s groundbreaking research in the 1980s called attention to the fact that most high-speed vehicle pursuits result from an observed traffic violation, not a serious crime.¹⁵⁰ In 1990, the U.S. Department of Justice described these pursuits as “the most dangerous of all ordinary police activities.”¹⁵¹ Since then, many law enforcement agencies have adopted policies that restrict when officers can engage in high-speed vehicle pursuits.¹⁵²

To illustrate how autonomous vehicles and related vehicle technologies might affect pursuit policies, consider the following example from the Florida Highway Patrol (FHP).¹⁵³ The FHP pursuit policy begins by stressing that its purpose is to balance the benefits of potentially apprehending suspects with the risks associated with the pursuit, and stresses that vehicular pursuits of fleeing suspects “present a danger to the public, officers and suspects involved in the pursuit.”¹⁵⁴ The policy then states that officers are only authorized to initiate pursuits of suspects whom they reasonably believe have committed a felony, reckless driving, or DUI.¹⁵⁵ It authorizes officers to exceed “maximum speed limits so long as life or property is not endangered.”¹⁵⁶ When deciding whether to initiate or continue a pursuit, the policy directs officers to weigh several factors including: “[t]he seriousness

¹⁴⁷ Christopher B. Kuch & David Griffith, *Policing in 2056*, POLICE MAG. (Oct. 11, 2016), <http://www.policemag.com/channel/technology/articles/2016/10/policing-in-2056.aspx> [<https://perma.cc/JVT7-KV3D>].

¹⁴⁸ See, e.g., HUGH NUGENT ET AL., U.S. DEP’T. OF JUSTICE, NAT’L INST. OF JUSTICE, RESTRICTIVE POLICIES FOR HIGH-SPEED POLICE PURSUITS (1990), <https://www.ncjrs.gov/pdffiles1/Digitization/122025NCJRS.pdf> [<https://perma.cc/GV2Z-SJ3L>].

¹⁴⁹ See, e.g., Sharon Ko, *Bexar County Sheriff’s Office Changing Pursuit Policy to Protect Citizens*, KENS5 (San Antonio) (July 19, 2017, 11:27 PM), <http://www.kens5.com/news/local/bexar-county-sheriffs-office-pursuit-policy-changes-da-reviewing-draft/458079966> [<https://perma.cc/ZC3G-S7XN>]; Jacob Tierney, *Allegheny County Police Departments Revisit High-Speed Chase Policies*, TRIBLIVE (Pittsburgh) (Jan. 11, 2017, 12:16 AM), <http://triblive.com/local/valleynewsdispatch/11757116-74/police-pursuit-policy> [<https://perma.cc/2FRG-4PA3>].

¹⁵⁰ See, e.g., Geoffrey P. Alpert & Patrick R. Anderson, *The Most Deadly Force: Police Pursuits*, JUST. Q., March 1986, at 1, 10.

¹⁵¹ Patrick Oliver & Samuel Kirchhoff, *Managing High-Speed Pursuits*, POLICE MAG (June 15, 2017), <http://www.policemag.com/channel/vehicles/articles/2017/06/managing-high-speed-pursuits.aspx> [<https://perma.cc/E8KS-3WAZ>].

¹⁵² *Id.*

¹⁵³ FLA. HIGHWAY PATROL, POLICY MANUAL: EMERGENCY RESPONSE AND PURSUITS § 17.05 (2015), <https://www.flhsmv.gov/fhp/Manuals/1705.pdf> [<https://perma.cc/B8RF-MDR9>].

¹⁵⁴ *Id.* at 1.

¹⁵⁵ *Id.*

¹⁵⁶ *Id.* at 5.

of the violator’s original offense”; “the immediate threat to the safety of law enforcement or the public”; “[t]he likelihood of apprehension”; “the time, day, and location of the pursuit”; “weather and roadway condition[s]”; “[p]resence and volume of other vehicular or pedestrian traffic”; “[f]amiliarity with the roadways and the area”; pursuit speeds; and evasive tactics by the violator.¹⁵⁷ In addition, the policy authorizes officers to deploy pursuit termination devices (PTDs) when a driver refuses to stop¹⁵⁸ as well as use precision immobilization techniques (PITs) to terminate the pursuit.¹⁵⁹

The extent to which this pursuit policy aligns with the nature of driving with autonomous vehicles is questionable. If vehicles are programmed to follow traffic rules and sensory technology prevents impact with other vehicles and persons, then fleeing vehicle suspects may not present as great a danger to the public or law enforcement as they do today. The basis upon which officers are authorized to initiate pursuits may also shift. For instance, the policy above authorizes vehicle pursuits on DUI suspects, but DUI laws could shift if autonomous vehicles can safely transport intoxicated occupants without requiring them to take control of the vehicle.¹⁶⁰

The factors that the policy directs officers to weigh before initiating or continuing pursuits may also become irrelevant. If it is possible to track autonomous vehicles while they are moving,¹⁶¹ then it might be much more difficult for violators to evade the police, which increases the likelihood of their apprehension. Or, if autonomous vehicles are programmed to follow traffic rules and include effective anti-collision sensors, then the time, day, or location of the pursuit; pursuit speeds; weather and roadway conditions; and the presence and volume of other vehicular traffic become irrelevant.

Relatedly, autonomous vehicles may also call policies surrounding PIT maneuvers into question. Researchers and law enforcement leaders have characterized PIT maneuvers as an extremely dangerous tactic.¹⁶² If sensors built into autonomous vehicles prevent contact with other vehicles, then merely boxing in a fleeing autonomous vehicle could be sufficient to stop it without requiring officers to assume the risk of ramming patrol cars into the vehicle. Alternatively, researchers are already testing the possibility of using unoccupied autonomous police cars to conduct PIT maneuvers on fleeing

¹⁵⁷ *Id.*

¹⁵⁸ *Id.* at 9.

¹⁵⁹ *Id.* at 11.

¹⁶⁰ *See supra* Part II.D.

¹⁶¹ Glancy, *Privacy*, *supra* note 61, at 1196.

¹⁶² Becky Lewis, *Studying How to Maneuver Suspects to a Stop*, TECHBEAT, Spring 2013, at 1, <https://www.justnet.org/pdf/Pit-Maneuver-508.pdf> [<https://perma.cc/7QEV-CXND>]; David D.L. Mascareñas et al., *Autonomous Execution of the Precision Immobilization Technique*, 87 MECH. SYS. & SIGNAL PROCESSING 153, 154 (2017).

vehicles, removing the dangers of conducting PIT maneuvers to law enforcement officers entirely.¹⁶³ Or, if officers can legally override the control system of an autonomous vehicle on their own or by communicating with a third party agent,¹⁶⁴ then officers would no longer have to use PIT maneuvers to stop the vehicle. Accordingly, the technology could open a need to revamp departmental policies surrounding PIT maneuvers and may even render these policies obsolete.

3. *The Use of Violent Examples of Traffic Stops in Officer Training*

Today, police academies regularly show officer trainees videos of the most extreme cases of violence during traffic stops in order to stress that everyday police work can quickly turn deadly if the officers become complacent on the scene and hesitate to use force.¹⁶⁵ These extreme cases usually involve officers who are unexpectedly shot during traffic stops that at first seemed entirely unremarkable and routine.¹⁶⁶

In previous work, I have argued that the very low proportion of violence involving the use of guns or knives against officers during routine traffic stops calls into question the use of these violent examples during officer training.¹⁶⁷ If autonomous vehicles can be programmed to follow traffic rules and routine traffic enforcement no longer has the same place in police work as it does now, then the reasons for using these extreme cases during officer training become even more dubious.

Importantly, danger narratives surrounding traffic stops often focus on the moment the officer approaches the stopped vehicle.¹⁶⁸ Consistent with this idea, many law enforcement agencies have departmental policies surrounding traffic stops that include specific guidance on approaching the vehicle. Consider an example from Florida's highway patrol department.¹⁶⁹ The guidance begins by stressing that "[a]pproach to the vehicle should be made in a manner that affords the member maximum protection."¹⁷⁰ It then

¹⁶³ See generally Mascareñas et al., *supra* note 162.

¹⁶⁴ As noted previously, whether officers should have such legal authority has received industry pushback and raises novel Fourth Amendment questions. See *supra* Part II.B; see generally Joh, *Automated Seizures*, *supra* note 5.

¹⁶⁵ See sources cited *supra* note 17 and accompanying text.

¹⁶⁶ Stoughton, *supra* note 16, at 1397–98; Woods, *Traffic Stops*, *supra* note 16, at 695.

¹⁶⁷ Woods, *Traffic Stops*, *supra* note 16, at 694–95.

¹⁶⁸ See, e.g., Dean Scoville, *The Hazards of Traffic Stops*, POLICE MAG (Oct. 19, 2010), <https://www.policemag.com/340410/the-hazards-of-traffic-stops> [<https://perma.cc/5NZ8-P2DE>] (“Your most vulnerable moment during any traffic stop is when you get out of your car and walk up to the violator’s vehicle.”).

¹⁶⁹ FLA. HIGHWAY PATROL, POLICY MANUAL: TRAFFIC STOPS § 17.21 (2015), <https://www.flhsmv.gov/fhp/Manuals/1721.pdf> [<https://perma.cc/56S6-7CWX>].

¹⁷⁰ *Id.* at 3.

offers guidance on how officers should approach the vehicle, where the officers should stand, what officers should say to the drivers and passengers when standing next to the stopped vehicle, and how to obtain necessary documents from the vehicle occupants to complete the stop.¹⁷¹

Consider how this policy applies to autonomous vehicles. Sensory technology will make it much more difficult for drivers to use their cars to intentionally hit officers who approach.¹⁷² In addition, sensory technology could prevent officers from being struck by oncoming traffic while approaching stopped vehicles. These advancements could reduce fears and anxieties surrounding the motor vehicle as a source of danger to officers during traffic stops, which shape officer training and best practices today on how officers should approach stopped vehicles.¹⁷³

In fact, officers may not even need to approach stopped vehicles in order to complete traffic stops if autonomous police cars become the norm.¹⁷⁴ For instance, in January 2018, Ford filed a patent application for an autonomous police car, which could remotely issue traffic citations and pursue vehicles without face-to-face interaction between officers and stopped motorists.¹⁷⁵ The autonomous police car could wirelessly connect to the stopped car and communicate with the driver, verify the identity of the driver, and issue a citation.¹⁷⁶ It could also pursue a fleeing vehicle, track its location, and capture photos and video that could later be used as evidence.¹⁷⁷ The autonomous police car would be able to keep a record of what transpired during an encounter and wirelessly transmit that record to relevant

¹⁷¹ *Id.* at 3–4.

¹⁷² Surden & Williams, *supra* note 25, at 137–38; Zagorsky, *supra* note 25.

¹⁷³ See, e.g., ARK. ASS'N OF CHIEFS OF POLICE, TRAINING MODULE: SAFE AND EFFECTIVE TRAFFIC STOPS 2 (2017), <http://arkchiefs.org/wp-content/uploads/2017/08/Safe-and-Effective-Traffic-Stops-Instructor-Guide.pdf> [<https://perma.cc/3WJB-DKGD>] (providing a training module on safe and effective traffic stops and stressing that “[o]fficers struck and killed by motor vehicles is a major cause of law enforcement deaths”).

¹⁷⁴ To reduce possibilities for escalation, manufacturers are also developing robots that allow officers to conduct traffic stops without leaving their patrol cars. See Peter Holley, *One Solution for Keeping Traffic Stops from Turning Violent: A Robot that Separates Police Officers from Drivers*, WASH. POST (May 14, 2019), https://www.washingtonpost.com/technology/2019/05/14/one-solution-keeping-traffic-stops-turning-violent-robot-that-separates-police-officers-drivers/?noredirect=on&utm_term=.500e7e72fd34 [<https://perma.cc/4G3W-GAGW>].

¹⁷⁵ U.S. Patent App. No. 15/208500 (filed Jan. 18, 2018).

¹⁷⁶ *Id.*; Peter Holley, *Ford Wants to Patent a Driverless Police Car That Ambushes Lawbreakers Using Artificial Intelligence*, WASH. POST (Jan. 31, 2018), https://www.washingtonpost.com/news/innovations/wp/2018/01/30/ford-submitted-a-patent-for-an-autonomous-police-car-the-u-s-government-just-approved-it/?utm_term=.35d30be163b9 [<https://perma.cc/P3XZ-FFTC>].

¹⁷⁷ U.S. Patent App. No. 15/208500, *supra* note 175, at cl. 1.

government agencies.¹⁷⁸ Ford's patent application states that the autonomous police car could perform tasks with or without human officers inside the vehicle.¹⁷⁹

Imagine if police agencies deployed autonomous police cars like the one described in Ford's patent application. Any communication between an officer and a stopped driver could occur through wireless communications between the autonomous police car and the stopped autonomous vehicle.¹⁸⁰ The autonomous police car would be able to identify traffic violators, receive images of required documents (including driver's licenses to the extent that they are still required), and tell stopped occupants through vehicle-to-vehicle communication when they are free to leave.¹⁸¹ Thus, autonomous vehicles will neutralize dangers at the moment officers approach a stopped vehicle—the most dangerous moment, as portrayed in officer training. This may result in less extreme examples of violence used in training, potentially leading to police officers generally feeling safer on patrol, and a decrease in escalated situations.

CONCLUSION

The research in this Essay helps to fill the gap in the scholarly and policy discourse on autonomous vehicles and policing by introducing de-escalation and officer safety as a new vector in the conversation. Of course, there are many open questions about the direction of autonomous vehicles and the various legal dilemmas that the technology could pose. Nevertheless, policymakers and scholars must consider how autonomous vehicles will affect police work so that the technology can develop in ways that mutually benefit officers and civilians during police encounters. This Essay illustrates the need to explore and embrace the potential of autonomous vehicles as tools of police de-escalation to enhance both officer and civilian safety during police encounters.

¹⁷⁸ *Id.*

¹⁷⁹ *Id.*

¹⁸⁰ *Id.* at cl. 2.

¹⁸¹ *Id.*