

DRIVING INTO THE UNKNOWN: EXAMINING THE CROSSROADS OF CRIMINAL LAW AND AUTONOMOUS VEHICLES

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I. INTRODUCTION

One Friday evening, Dan meets some of his friends for a night on the town. After indulging in his share of alcohol, Dan leaves. Rather than spending money on a taxi, Dan decides to use the autonomous mode on his vehicle to take him home. He enters his vehicle and pushes the “I’m drunk, take me home” button,¹ which disables his ability to control the vehicle and requires the vehicle to pull itself over in the event of a malfunction. The autonomous vehicle drives perfectly, but encounters a driver’s license checkpoint. The vehicle properly pulls up. The officer immediately smells beer, and asks Dan if he has had anything to drink. Dan nods his head, but informs the officer that his vehicle is driving in autonomous mode and he is not in control of the vehicle. Should Dan be criminally liable in such a situation?²

This Article discusses that question and examines the application of criminal law to scenarios relevant to autonomous

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1. Frank Douma & Sarah Aue Palodichuk, *Criminal Liability Issues Created by Autonomous Vehicles*, 52 SANTA CLARA L. REV. 1157, 1163 (2012).

2. See *infra* Section IV.A.ii. for an analysis of whether Dan would be liable for driving under the influence.

vehicles.³ Section II provides a background of autonomous vehicles. Section III examines criminal law and traffic law in general, extracting principles from each to examine autonomous vehicles. Section IV begins with a discussion of various criminal laws that are applicable to autonomous vehicles, and then analyzes the intersection between these laws and autonomous vehicles.

II. BACKGROUND ON AUTONOMOUS VEHICLES

A. *The Car Companies are Racing Towards the Finish Line*

Though automated technology has been utilized in vehicles for years,⁴ vehicles are becoming more automated.⁵ Tesla Motors founder, Elon Musk, announced that Tesla's Model S sedan is equipped with technology that enables the car to engage in what he calls "autopilot."⁶ The equipment includes an "array of sensors that include front-facing radar, a digital camera with

3. The term "autonomous vehicle" is used in this Article to refer to a vehicle that can operate on its own with very little or no human input. Under the National Highway Traffic Safety Administration levels of autonomous vehicles, these would be Level 3 and Level 4 vehicles. See James M. Anderson et al., *Autonomous Vehicle Technology: A Guide for Policymakers*, RAND CORP., 1, 2–3 (2014), available at http://www.rand.org/content/dam/rand/pubs/research_reports/RR400/RR443-1/RAND_RR443-1.pdf. At Level 3, the driver can engage in other activities, e.g., get distracted, and the vehicle will sufficiently function. *Id.* A fully autonomous vehicle that can operate without a human driver is considered Level 4. *Id.* These vehicles are not yet available, and current technology is between Level 2 and Level 3. Irving Wladawsky-Berger, *When Can We Expect Truly Autonomous Vehicles?*, WALL ST. J. (Oct. 31, 2014, 10:39 AM), <http://blogs.wsj.com/cio/2014/10/31/when-can-we-expect-truly-autonomous-vehicles>. A vehicle is considered Level 2 when more than one function is automated, but the driver must be constantly attentive. Anderson et al., *supra*. Automakers are increasingly making their vehicles more automated, leading us closer to Level 3 vehicles.

4. See, e.g., Julie Goodrich, Comment, *Driving Miss Daisy: An Autonomous Chauffeur System*, 51 HOUS. L. REV. 265, 268–75 (2013) (describing various automated technologies utilized in vehicles); Robert B. Kelly & Mark D. Johnson, *Defining a Stable, Protected and Secure Spectrum Environment for Autonomous Vehicles*, 52 SANTA CLARA L. REV. 1271, 1275–76 (2012).

5. Bryant W. Smith, *Proximity-Driven Liability*, 102 GEO. L.J. 1777, 1792 (2014) ("Vehicle automation is likely to increase dramatically over the coming decade."); *Self-Driving Cars: Are We Ready?*, KPMG 1, 7 (Oct. 10, 2013), available at <http://www.kpmg.com/US/en/IssuesAndInsights/ArticlesPublications/Documents/self-driving-cars-are-we-ready.pdf> ("The technology is evolving at a rapid clip.")

6. Dexter Ford, *Tesla Announces a Quicker Dual-Motor Model With All-Wheel Drive*, N.Y. TIMES (Oct. 10, 2014), http://www.nytimes.com/2014/10/11/automobiles/tesla-announces-a-quicker-dual-motor-model-with-all-wheel-drive.html?_r=0.

object recognition, 360-degree ultrasonic sonar, and input from GPS, [allowing] the Model S . . . to sense the environment and vehicles around it.”⁷ According to Musk, “[t]he car can do almost anything We’re able to do lane-keeping on freeways [and] active emergency braking. When you get home, you’ll be able to step out of the car and have it park itself in your garage.”⁸ General Motors announced that it plans to launch its 2016 Cadillacs with a feature called “super cruise,” which offers hands-free automated highway driving, and vehicle-to-vehicle communications.⁹ By the end of the decade, other automakers will also have the hands-free automated driving feature.¹⁰ Volkswagen and Ford currently produce vehicles that can park themselves.¹¹ Valeo, a French automotive supplier, is developing technology for driverless valet parking, where the vehicles communicate with parking monitor systems to find an available spot.¹² By 2016, many car companies will offer a “traffic jam assist” feature that “take[s] over braking, steering and acceleration for vehicles inching along in low-speed traffic.”¹³

Although the transition from human-driven cars to computer-driven cars is occurring incrementally,¹⁴ automakers

7. *Id.*

8. *Id.*

9. Jeff Bennett & Joseph B. White, *GM Expects to Offer Hands-Free Driving by 2016*, WALL ST. J. (Sept. 7, 2014, 5:15 PM), <http://www.wsj.com/articles/gm-expects-to-offer-hands-free-driving-by-2016-1410124540>. General Motors stated that the highways must have proper lane markings, and the system will require the drivers to remain attentive and prepared to retake control of the vehicles. *Id.*

10. See, e.g., Aaron M. Kessler, *Technology Takes the Wheel*, N.Y. TIMES (Oct. 5, 2014), <http://www.nytimes.com/2014/10/06/business/technology-takes-the-wheel.html>; Joseph B. White, *How Do You Insure a Driverless Car?*, WALL ST. J. (Aug. 7, 2014, 1:26 PM), <http://www.wsj.com/articles/driverless-cars-edge-onto-roadways-1407432414>.

11. Kessler, *supra* note 10.

12. *Id.*

13. White, *supra* note 10.

14. See, e.g., Mike Ramsey, *Ford Exec Sees Dangers of Adding Technology to Vehicles*, WALL ST. J. (Sept. 8, 2014, 1:10 PM), <http://www.wsj.com/articles/ford-exec-sees-dangers-of-adding-technology-to-vehicles-1410185974> (stating that the CEO of Ford, Bill Ford, expects that the “evolution to a self-driving vehicle will be so gradual that when it finally comes, few will notice it”); Smith, *supra* note 5, at 1792 (noting that the autonomous “technologies that emerge in the coming years will fall along a spectrum of automation”); Andrew P. Swanson, Comment, “*Somebody Grab the Wheel!*”: *State Autonomous Vehicle Legislation and the Road to a National Regime*, 97 MARQ. L. REV. 1085, 1091 (2014) (“It appears that the implementation of autonomous vehicles onto the roadways will proceed in certain ordered steps.”); White, *supra* note 10 (indicating that “quantum leaps” like autonomous vehicles “typically take place one mile at a time”); Stephen P. Wood et al.,

have already begun developing autonomous vehicles.¹⁵ All major car companies, and some non-automobile manufacturing companies, are working on developing such vehicles.¹⁶ Representatives of many car companies have set target dates for the release of their driverless cars. Nissan's chief executive, Carlos Ghosn, stated that his company will release autonomous vehicles by 2020.¹⁷ General Motors expects that semi-automatic vehicles will be available by the end of this decade, with fully autonomous vehicles coming next decade.¹⁸ Although Daimler has not provided a projected date, it is already testing an autonomous Mercedes¹⁹ and a self-driving truck in Germany.²⁰

Originally, Google intended to put its autonomous technology on other manufacturer's vehicles.²¹ Google has now changed its autonomous technology model and has started

The Potential Regulatory Challenges of Increasingly Autonomous Motor Vehicles, 52 SANTA CLARA L. REV. 1423, 1459 (2012) (“[T]he implementation of autonomous driving technologies will likely be implemented in stages, thus allowing the vehicle to assume progressively more driving tasks over time.”).

15. See, e.g., Henry Fountain, *Yes, Driverless Cars Know the Way to San Jose*, N.Y. TIMES (Oct. 26, 2012), <http://www.nytimes.com/2012/10/28/automobiles/yes-driverless-cars-know-the-way-to-san-jose.html?pagewanted=all> (“Most major automobile manufacturers are working on self-driving systems in one form or another.”); Tom Vanderbilt, *Let the Robot Drive: The Autonomous Car of the Future is Here*, WIRED (Jan. 20, 2012, 3:24 PM), http://www.wired.com/2012/01/ff_autonomoucars/all (“Google isn't the only company with driverless cars on the road. Indeed, just about every traditional automaker is developing its own self-driving model, peppering Silicon Valley with new R&D labs to work on the challenge.”); see also Rachael Roseman, *When Autonomous Vehicles Take Over the Road: Rethinking the Expansion of the Fourth Amendment in a Technology-Driven World*, 20 RICH. J.L. & TECH. 1, 9–11 (2014).

16. Google is a leader in autonomous vehicle innovation. In addition to Google, other non-car manufacturers are also developing such vehicles. For example, Continental Corporation, a German automotive supplier, has partnered with IBM to develop autonomous driving systems. See *Continental and IBM Enter Connected Vehicle Collaboration*, IBM (Sept. 10, 2013), <http://www-03.ibm.com/press/us/en/pressrelease/41922.wss>.

17. Paul Stenquist, *Nissan Announces Plans to Release Driverless Cars by 2020*, N.Y. TIMES (Aug. 29, 2013, 6:00 AM), <http://wheels.blogs.nytimes.com/2013/08/29/nissan-announces-plans-to-release-driverless-cars-by-2020>.

18. *Emerging Technology: Driving Safety, Efficiency and Independence*, GENERAL MOTORS, http://www.gm.com/vision/design_technology/emerging_technology.html (last visited Mar. 21, 2015).

19. Joseph B. White, *Mercedes Makes Driverless Ride*, WALL ST. J. (Sept. 10, 2013, 3:33 AM), <http://www.wsj.com/articles/SB10001424127887324549004579065541926070378>.

20. Melissa Eddy, *Daimler Demonstrates a Self-Driving Truck*, N.Y. TIMES (July 3, 2014), <http://www.nytimes.com/2014/07/04/business/daimler-demonstrates-a-self-driving-truck.html>.

21. See, e.g., Fountain, *supra* note 15 (“Google says it does not want to make cars, but instead work with suppliers and automakers to bring its technology to the marketplace.”).

creating its own vehicle.²² The prototype does not have a steering wheel, brake pedal, shifter, or an accelerator.²³ Therefore, while most car companies are easing autonomous technology into their vehicles, Google is in the process of developing an autonomous vehicle that does not require or even allow human input.

B. Technology Is Leaving Government in the Dust

While car companies are racing to develop autonomous vehicles, only a few states and the District of Columbia have enacted laws specifically addressing these vehicles.²⁴ Although many states have not enacted laws specifically addressing autonomous vehicles, such vehicles may still be legal in those states.²⁵ At this point, state autonomous vehicle laws primarily address the testing of autonomous vehicles,²⁶ but they also provide some helpful insight into what states will require in the future.²⁷

In the states that have passed autonomous vehicle laws, there are certain requirements that are pertinent to this analysis. The laws require that autonomous vehicles be programmed to

22. Douglas MacMillan & Rolfe Winkler, *Google's Prototype for Autonomous Driving Has No Steering Wheel*, WALL ST. J. (May 27, 2014, 11:55 PM), <http://blogs.wsj.com/digits/2014/05/27/googles-prototype-for-autonomous-driving-has-no-steering-wheel>.

23. Matthew Phenix, *Fascinating City Car of 2014: Google Self-Driving Car*, BBC (Dec. 10, 2014), <http://www.bbc.com/autos/story/20141210-fascinating-city-car-of-2014-google-self-driving-car>; see MacMillan & Winkler, *supra* note 22; see also Lee Gomes, *Hidden Obstacles for Google's Self-Driving Cars*, MIT TECH. REV. (Aug. 28, 2014), <http://www.technologyreview.com/news/530276/hidden-obstacles-for-googles-self-driving-cars/> (“Google announced that all its future cars would be totally driver-free, without even a steering wheel.”).

24. See Roseman, *supra* note 15, at 11 (“Currently, the law lags behind the development” of autonomous vehicles.). So far, autonomous vehicle laws have been passed in California, the District of Columbia, Florida, Michigan, and Nevada. CAL. VEH. CODE § 38750 (2012); D.C. CODE § 50-2351 (2013); FLA. STAT. § 316.85 (2012); MICH. COMP. LAWS § 257.663 (2013); NEV. REV. STAT. § 482A.010 (2012). In addition, the National Highway Traffic Safety Administration has released its preliminary statement of policy about autonomous vehicles. PRELIMINARY STATEMENT OF POLICY CONCERNING AUTOMATED VEHICLES, NAT’L HIGHWAY TRAFFIC SAFETY ADMIN. (2013), available at http://www.nhtsa.gov/staticfiles/rulemaking/pdf/Automated_Vehicles_Policy.pdf.

25. Bryant W. Smith, *Automated Vehicles Are Probably Legal in the United States*, 1 TEX. A&M L. REV. 411, 516 (2014).

26. *But see* NEV. ADMIN. CODE § 482A.190 (2012) (discussing sales to licensed vehicle dealers).

27. For thorough overviews of the autonomous vehicle laws that have been passed, see Kyle L. Barringer, Comment, *Code Bound and Down . . . A Long Way to Go and a Short Time to Get There: Autonomous Vehicle Legislation in Illinois*, 38 S. ILL. U. L.J. 121, 127–30 (2013); Smith, *supra* note 25, at 500–08; Swanson, *supra* note 14, at 1098–1100.

follow traffic laws.²⁸ Some laws mandate that a person with a license be seated behind the steering wheel,²⁹ while others indicate that an operator may not always need to be behind the wheel.³⁰ Moreover, the vehicle must have an easily accessible manual override feature.³¹ The vehicles must have visual indicators in the car that show when the autonomous technology is engaged.³² If the autonomous technology malfunctions during its

28. See D.C. CODE § 50-2352(3) (2013) (“An autonomous vehicle may operate on a public roadway; provided, that the vehicle . . . is capable of operating in compliance with the District’s applicable traffic laws and motor vehicle laws and traffic control devices.”); FLA. STAT. § 319.145(1)(d) (2012) (“The vehicle shall . . . [b]e capable of being operated in compliance with the applicable traffic and motor vehicle laws of this state.”); NEV. ADMIN. CODE §482A.190(2)(f) (2012) (requiring that a certificate of compliance certifies “that the autonomous technology installed on the autonomous vehicle . . . [i]s capable of being operated in compliance with the applicable traffic laws of this State”). Although the Michigan statute does not specifically require that the autonomous vehicle be capable of operating in compliance with its state’s traffic laws, that prohibition is presumed through its punishment scheme for violating laws. See MICH. COMP. LAWS § 257.666(2) (2013) (indicating that a person can be punished for violations of laws caused by the autonomous vehicle).

29. D.C. CODE § 50-2352(2) (2013) (“An autonomous vehicle may operate on a public roadway; provided, that the vehicle . . . [h]as a driver seated in the control seat of the vehicle while in operation who is prepared to take control of the autonomous vehicle at any moment.”); MICH. COMP. LAWS § 257.665(2)(b) (2013) (Manufacturers must ensure that “[a]n individual is present in the vehicle while it is being operated on a highway or street of this state and that individual has the ability to monitor the vehicle’s performance and, if necessary, immediately take control of the vehicle’s movements.”).

30. CAL. VEH. CODE § 38750(a)(4) (2012) (“An ‘operator’ of an autonomous vehicle is the person who is seated in the driver’s seat, or if there is no person in the driver’s seat, causes the autonomous technology to engage.”); FLA. STAT. § 316.85 (2012); NEV. ADMIN. CODE § 482A.020 (2012) (“[A] person shall be deemed the operator of an autonomous vehicle which is operated in autonomous mode when the person causes the autonomous vehicle to engage, regardless of whether the person is physically present in the vehicle while it is engaged.”).

31. CAL. VEH. CODE §§ 38750(c)(1)(A), (D) (2012) (“A certification by the manufacturer that the autonomous technology satisfies all of the following requirements: (A) The autonomous vehicle has a mechanism to engage and disengage the autonomous technology that is easily accessible to the operator. . . . (D) The autonomous vehicle shall allow the operator to take control in multiple manners, including, without limitation, through the use of the brake, the accelerator pedal, or the steering wheel”); D.C. CODE § 50-2352(1) (2013) (requiring the vehicle to have a “manual override feature that allows a driver to assume control of the autonomous vehicle at any time”); FLA. STAT. § 319.145(1)(b) (2012) (The vehicle must “[h]ave a means, inside the vehicle, to visually indicate when the vehicle is operating in autonomous mode.”); NEV. ADMIN. CODE § 482A.190(2)(b) (mandating that the vehicle “[h]as a switch to engage and disengage the autonomous vehicle that is easily accessible to the operator of the autonomous vehicle and is not likely to distract the operator from focusing on the road while engaging or disengaging the autonomous vehicle”).

32. CAL. VEH. CODE § 38750(c)(1)(B) (2012) (requiring the vehicle to have “a visual indicator inside the cabin to indicate when the autonomous technology is engaged”); FLA.

use, the vehicle must be capable of informing the operator.³³ In such event, the vehicle must require the operator to take control of the vehicle, and if the operator does not or cannot take control, the vehicle must come to a complete stop.³⁴ The statutes in California and Nevada also require the vehicle to capture and store sensor data in “read me” format for at least thirty seconds prior to a collision.³⁵

C. Autonomous Car Functionality

This Section analyzes the functionality and the benefits of autonomous vehicles, with an eye toward providing a framework for examining the intersection of autonomous vehicles and criminal law.

i. Functionality

There are two broad types of autonomous vehicles: (1) self-contained and (2) interconnected.³⁶ Self-contained autonomous

STAT. § 319.145(1)(b) (2012) (“The vehicle shall . . . [h]ave a means, inside the vehicle, to visually indicate when the vehicle is operating in autonomous mode.”); NEV. ADMIN. CODE § 482A.190(2)(c) (2012) (requiring the vehicle to have a “visual indicator inside the autonomous vehicle which indicates when the autonomous vehicle is engaged in autonomous mode”).

33. CAL. VEH. CODE § 38750(c)(1)(C) (2012) (requiring the vehicle to have a “system to safely alert the operator if an autonomous technology failure is detected while the autonomous technology is engaged”); FLA. STAT. § 319.145(1)(c) (2012) (“The vehicle shall . . . [h]ave a means to alert the operator of the vehicle if a technology failure affecting the ability of the vehicle to safely operate autonomously is detected while the vehicle is operating autonomously in order to indicate to the operator to take control of the vehicle.”); NEV. ADMIN. CODE § 482A.190(2)(d) (2012) (The autonomous vehicle must have a “system to safely alert the operator of the autonomous vehicle if a technology failure is detected while the autonomous vehicle is engaged in autonomous mode”).

34. CAL. VEH. CODE § 38750(c)(1)(C) (2012) (When an alert for a system failure is given, “the system shall do either of the following: (i) Require the operator to take control of the autonomous vehicle. (ii) If the operator does not or is unable to take control of the autonomous vehicle, the autonomous vehicle shall be capable of coming to a complete stop.”); NEV. ADMIN. CODE § 482A.190(2)(d) (2012) (Upon a malfunction alert, the system must “either: (1) Require[] the operator to take control of the autonomous vehicle; or (2) If the operator is unable to take control of or is not physically present in the autonomous vehicle, [be] equipped with technology to cause the autonomous vehicle to safely move out of traffic and come to a stop.”).

35. CAL. VEH. CODE § 38750(c)(1)(C) (stating the requirements for operation of autonomous vehicles); NEV. ADMIN. CODE § 482A.190(2)(a) (2012) (stating the requirements for issuance of certification of compliance).

36. Dorothy J. Glancy, *Privacy in Autonomous Vehicles*, 52 SANTA CLARA L. REV. 1171, 1174 (2012).

vehicles rely solely on information already programmed into the vehicle.³⁷ Google's prototype is an example of a self-contained autonomous vehicle.³⁸ In contrast, an interconnected autonomous vehicle is wirelessly connected to a communication network or networks, and it can be controlled externally.³⁹ Not only does the interconnected vehicle receive information over networks, it also transmits its own information to the networks and other vehicles.⁴⁰ Regardless of the type of autonomous vehicle, the car will rely on sensors that collect and feed data.⁴¹

Automakers have indicated that their autonomous vehicle designs "need[] to be connected to an external system that feeds it information about surrounding vehicles, traffic conditions, road work, and the like."⁴² Because self-contained autonomous vehicles do not depend on such communication, automakers appear to be developing interconnected autonomous vehicles. For interconnected autonomous vehicles, two technological advances can make that communication a reality: Vehicle-to-Vehicle ("V2V") and Vehicle-to-Infrastructure ("V2I") capabilities.⁴³ V2V communication is the wireless exchange of data between nearby vehicles,⁴⁴ and it "enables a vehicle to: sense threats and hazards with a 360-degree awareness of the position of other vehicles and

37. *Id.*

38. *Id.* at 1777.

39. *Id.*

40. *Id.*

41. *Id.* at 1175.

42. See Dave Guilford, *Like EVs, Self-Guided Cars Need Infrastructure*, AUTOMOTIVE NEWS (Mar. 10, 2014, 12:01 AM), http://www.autonews.com/article/2014_0310/OEM06/303109959/like-evs-self-guided-cars-need-infrastructure. Barb Samardzich, vice president for Ford of Europe, stated that "[y]ou need an infrastructure that enables the cars not to just talk to each other, but to talk to what's going on around them—traffic jams, any kind of work stoppages where you have road work That infrastructure has to exist for fully autonomous vehicles to really take off." *Id.*; see also Ramsey, *supra* note 14 (Ford CEO Bill Ford envisions "a future where all forms of transportation were connected through the same network, speaking to one another, connecting each stage of transportation, from trains and buses to parking and personal vehicles.").

43. See, e.g., Wood et al., *supra* note 14, at 1434; see also Smith, *supra* note 5, at 1792–93 (indicating that V2V and V2I communication would significantly increase data transmission that is needed for autonomous vehicles). But see Anderson et. al, *supra* note 3, at xx.

44. *Vehicle-to-Vehicle (V2V) Communications for Safety*, U.S. DEP'T OF TRANSP., http://www.its.dot.gov/safety/v2v_comm_safety.htm (last updated Jan. 22, 2015, 2:59 PM) (stating that V2V "is the dynamic wireless exchange of data between nearby vehicles that offers the opportunity for significant safety improvements").

the threat or hazard they present; calculate risk; issue driver advisories or warnings; or take pre-emptive actions to avoid and mitigate crashes.”⁴⁵ For the full benefits of V2V communication to be realized, however, many vehicles must be equipped with the technology.⁴⁶ V2I communication “is the wireless exchange of critical safety and operational data between vehicles and roadway infrastructure.”⁴⁷ This would be “smart infrastructure” that communicates with vehicles.⁴⁸ The Department of Transportation has released a Notice of Intent to require light vehicles to have V2V technology in future years,⁴⁹ which will further increase the safety of interconnected autonomous vehicles because they will be able to communicate with a larger amount of vehicles.⁵⁰

Academic experts in robotics caution that it may take decades before autonomous vehicles “can perform as well as human drivers in all situations—if they ever do at all.”⁵¹ However, as autonomous technology progresses, the ability of these vehicles to safely maneuver will also increase.⁵²

45. Wood et al., *supra* note 14, at 1427 n.9.

46. Goodrich, *supra* note 4, at 274 (“The benefits of V2V communication, however, cannot be fully realized until a large number of vehicles are equipped with the software.”).

47. *Vehicle-to Infrastructure (V2I) Communications for Safety*, U.S. DEP’T OF TRANSP., http://www.its.dot.gov/factsheets/v2isafety_factsheet.htm (last updated Dec. 5, 2014, 1:55 PM).

48. Greg Davis, *V2I Safety Applications: An Overview of Concepts and Operational Scenarios*, U.S. DEP’T OF TRANSP. (Dec. 14, 2012), available at http://transportation.njit.edu/itsnj/2012_Symposium/Davis_NJITSA_20121214.pdf.

49. Federal Motor Vehicle Safety Standards: Vehicle-to-Vehicle (V2V) Communications, 79 Fed. Reg. 49,270 (Aug. 20, 2014) (to be codified at 49 C.F.R. pt. 571) (explaining that light vehicles are considered passenger cars and light truck vehicles).

50. See, e.g., Matthew Rocco, *Self-Driving Cadillac Brings Industry Closer to Autonomous Car*, FOX BUS. (Sept. 8, 2014), <http://www.foxbusiness.com/industries/2014/09/08/self-driving-cadillac-brings-industry-closer-to-autonomous-car> (“Kelley Blue Book senior analyst Karl Brauer said current technologies that provide some degree of autonomous driving will help the industry buy time until vehicle-to-vehicle, or V2V, communication becomes widely adopted. In other words, it wouldn’t do much good if only Cadillacs can talk to each other.”).

51. Lee Gomes, *Urban Jungle a Tough Challenge for Google’s Autonomous Cars*, MIT TECH. REV. (July 24, 2014), <http://www.technologyreview.com/news/529466/urban-jungle-a-tough-challenge-for-googles-autonomous-cars>; Gomes, *supra* note 23 (noting that Google’s prototype has yet to drive in snow, heavy rains, nor has it been programmed to park in open parking lots or parking garages. Likewise, the vehicle cannot recognize a police officer trying to direct traffic).

52. See Wood et al., *supra* note 14, at 1473–74 (“Given the current state of technology autonomous driving systems are generally not capable of correctly assessing and handling all driving scenarios”); KPMG, *supra* note 5, at 13 (“[T]he incubation

ii. Benefits of Autonomous Vehicles

The overriding benefit of autonomous vehicles is increased road safety. “Driver error is by far (95 [percent]) the most common factor implicated in vehicle accidents.”⁵³ In 2012, 33,561 people in the United States died due to car accidents, and an estimated 2.36 million people were injured in motor vehicle accidents.⁵⁴ Additionally, automobile accidents cost around 300 billion dollars annually measured in deaths, health care, and property loss in the United States.⁵⁵ Autonomous vehicles have the opportunity to greatly decrease those numbers because a computer does not drink alcohol, get drowsy, or fall prey to any of the other multitude of distractions available to human drivers.⁵⁶ Researchers have predicted that if 10 percent of vehicles in use were autonomous vehicles, 1,100 fewer people would die in car accidents.⁵⁷ “With 90 [percent] penetration, the U.S. would save 21,700 lives and have 4.2 million fewer crashes per year.”⁵⁸

Autonomous vehicles can also provide a means of transportation to those who cannot drive themselves safely.⁵⁹ Currently, people suffering from certain disabilities,⁶⁰ and the very

period provides time for developing the requisite supporting systems, including regulations, infrastructure and social networks.”).

53. Sven A. Beiker, *Legal Aspects of Autonomous Driving*, 52 SANTA CLARA L. REV. 1145, 1149 (2012).

54. NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP’T OF TRANSP., DOT HS 811856, 2012 MOTOR VEHICLE CRASHES: OVERVIEW (2013), available at <http://www.nrd.nhtsa.dot.gov/Pubs/811856.pdf>.

55. Dan Neil, *Who’s Behind the Wheel? Nobody.*, WALL ST. J. (Sept. 24, 2012), <http://www.wsj.com/articles/SB10000872396390443524904577651552635911824>.

56. See Press Release, Chairman Tom Petri, Opening Statement from Hearing on Autonomous Vehicles, SUBCOMM. ON HIGHWAYS & TRANSIT (Nov. 19, 2013), <http://transportation.house.gov/news/documentsingle.aspx?DocumentID=362052> (“These vehicles do not suffer from intoxicated or fatigued driving and are able to react to dangerous driving situations faster than a human driver.”); Bennett, *supra* note 9 (stating that autonomous vehicles will greatly reduce accidents because the overwhelming majority of accidents are caused by driver error).

57. Neal Katyal, *Disruptive Technologies and the Law*, 102 GEO. L.J. 1685, 1688 (2014).

58. *Id.*

59. See Beiker, *supra* note 53, at 1151 (“[A]utonomous driving technology can help elderly or disabled citizens keep an active lifestyle such as running daily errands and maintaining their social relationships.”); Bryant W. Smith, *Managing Autonomous Transportation Demand*, 52 SANTA CLARA L. REV. 1401, 1412 (2012) (“Self-driving cars that do not need human drivers or monitors may substantially increase mobility for those who cannot (legally) drive themselves because of youth, age, disability, or incapacitation.”).

60. See, e.g., Petri, *supra* note 56 (“Seniors and persons with disabilities could be afforded greater mobility options that aren’t available to them today.”).

young, cannot drive motor vehicles.⁶¹ For example, a self-driving car took a blind person to Taco Bell,⁶² showing the potential these vehicles have to provide greater liberty to those suffering from disabilities.⁶³

In addition, autonomous vehicles will allow people to increase productivity. Every day, Americans spend an average of fifty-one minutes commuting to work, with 8 percent of the work force having one-way commutes of over an hour.⁶⁴ Autonomous vehicles will allow commuters to perform other tasks during their commutes.

III. CRIMINAL AND TRAFFIC LAW OVERVIEW

With the above background of autonomous vehicles in mind, this Section begins by examining the foundations of criminal law and the five traditional theories of punishment. After outlining the broad objectives of criminal law and punishment, this Section then examines the application of criminal and traffic laws to automobiles.⁶⁵

A. Criminal Law

Although determining the purposes or basic principles to extract from criminal law can be a difficult task,⁶⁶ on a broad

61. See, e.g., Douma & Palodichuk, *supra* note 1, at 1164 (indicating that minors may be able to operate autonomous vehicles).

62. *Driverless Cars: Look, No Hands*, ECONOMIST (Apr. 20, 2013), <http://www.economist.com/news/special-report/21576224-one-day-every-car-may-come-invisible-chauffeur-look-no-hands>.

63. Dana M. Mele, *The Quasi-Autonomous Car as an Assistive Device for Blind Drivers: Overcoming Liability and Regulatory Barriers*, 28 SYRACUSE J. SCI. & TECH. L. REP. 26, 63–64 (2013) (arguing that autonomous vehicles could benefit blind people).

64. Larry Copeland, *Americans' Commutes Aren't Getting Longer*, USA TODAY (Mar. 5, 2013, 12:57 PM), <http://www.usatoday.com/story/news/nation/2013/03/05/americans-commutes-not-getting-longer/1963409>.

65. This Section provides a simplistic overview of criminal law when examining punishment purposes and strict liability. This Article examines these concepts generally to provide a background for criminal law's intersection with autonomous vehicles. Many books and articles have been written discussing the purposes of criminal law and punishment. See generally GERTRUDE EZORSKY, *PHILOSOPHICAL PERSPECTIVES ON PUNISHMENT* (Univ. N.Y. Press 1972); H.L.A. HART, *PUNISHMENT AND RESPONSIBILITY: ESSAYS IN THE PHILOSOPHY OF LAW* (Oxford Univ. Press 1968); MICHAEL S. MOORE, *PLACING BLAME: A THEORY OF THE CRIMINAL LAW* (Oxford Univ. Press 1997).

66. Henry M. Hart, Jr., *The Aims of the Criminal Law*, 23 LAW & CONTEMP. PROBS. 401, 401 (1958).

theoretical level, the overriding objectives of criminal law are “to make people do what society regards as desirable and to prevent them from doing what society considers to be undesirable.”⁶⁷ In the United States, society polices itself by punishing the offender through imprisonment, fines, or both.

Scholars have put forth five traditional theories of punishment to support this objective.⁶⁸ The first theory of punishment is called “prevention” or “specific deterrence.” Under this theory, punishment serves the function of “dissuad[ing] potential criminals from offending.”⁶⁹ Prevention is concerned with the specific individual who is being punished and “deter[ring] him from committing similar crimes.”⁷⁰ The second theory, which is related to prevention or specific deterrence, is called “deterrence” or “general deterrence.” This theory is concerned with deterring other people from “committing future crimes, lest they suffer the same unfortunate fate.”⁷¹ Thus, while prevention or specific deterrence is concerned with dissuading the particular offender from committing future offenses, general deterrence focuses on discouraging society from committing offenses. The third theory of punishment is “restraint” or “incapacitation,” which is the belief that society can protect itself by isolating persons deemed dangerous to society.⁷² The fourth

67. WAYNE R. LAFAVE, *SUBSTANTIVE CRIMINAL LAW* § 1.5 (2d ed. last updated 2014).

68. See John B. Mitchell, *Crimes of Misery and Theories of Punishment*, 15 *NEW CRIM. L. REV.* 465, 474–75 (2012) (“[I]t is an unspoken assumption when criminalizing conduct that any resulting punishment meet at least one of the five traditional purposes of punishment.”). This Article only examines what are considered the five traditional justifications of punishment. Other theories have also been put forth. For instance, another theory of punishment is called the “Assurance Theory.” F. Patrick Hubbard et al., *A “Meaningful” Basis for the Death Penalty: The Practice, Constitutionality, and Justice of Capital Punishment in South Carolina*, 34 *S.C. L. REV.* 391, 526 (1982). Under this theory, punishment assures “law-abiding citizens that others will obey the law too.” ANTHONY ELLIS, *THE PHILOSOPHY OF PUNISHMENT* 33 (Imprint Acad., 2012) (“Without that assurance, they may suspect that the system is steeped in unfairness, and they will not respect it and will be correspondingly less likely to conform to its demands.”). For example, if a driver knows that everyone can speed and receive no punishment for violating the speed limit, why would she follow the speed limit? An assurance theorist would suggest that society should punish people for speeding so that others do not feel cheated for driving the speed limit.

69. Michele Cotton, *Back With a Vengeance: The Resilience of Retribution as an Articulated Purpose of Criminal Punishment*, 37 *AM. CRIM. L. REV.* 1313, 1316 (2000).

70. Hubbard et al., *supra* note 68, at 540.

71. LAFAVE, *supra* note 67, at § 1.5.

72. *Id.*

theory of punishment is “rehabilitation,” in which punishment is used to improve criminals so that they do not reoffend.⁷³ The fifth theory of punishment is “retribution.”⁷⁴ Retribution “is not a single concept,”⁷⁵ and it is usually “justified on the grounds that wrongdoing merits punishment.”⁷⁶ Retribution takes many forms: it can be based on vengeance, just desserts, or proportionality.⁷⁷

These theories provide a moral basis to the legitimacy of a punishment.⁷⁸ A punishment cannot be “conceptually legitimate” where:

[T]here is nothing that deserves denunciation or blame (retribution); no action we care to and/or can deter (general deterrence); no individual we want to and/or can deter (specific deterrence); nothing that can be gained by isolation and/or no individual we can isolate for more than a de minimis time (incapacitation); and we are not going to try to change the individual (rehabilitation).⁷⁹

At the heart of the theories is a sense of moral blameworthiness on the part of the offender.⁸⁰ The offender committed some act that needs punishment (retribution), that others engage in (general deterrence), that the offender may do again (specific deterrence), that can be prevented by removing

73. Cotton, *supra* note 69, at 1316–17.

74. LAFAVE, *supra* note 67, at § 1.5.

75. Mitchell, *supra* note 68, at 480.

76. John Rawls, *Two Concepts of Rules*, 64 PHIL. REV. 3, 4 (1958); see Hubbard et al., *supra* note 68, at 529 (“Retributive theories focus on the past, and punishment is imposed in accordance with the ‘badness’ of the criminal and of the crime he committed.”).

77. See Cotton, *supra* note 69, at 1315–16; Hubbard et al., *supra* note 68, at 529; Mitchell, *supra* note 68, at 480–86. The Supreme Court has stated that “retribution is an element of all punishments society imposes.” *Spaziano v. Florida*, 468 U.S. 447, 462 (1984).

78. See Mitchell, *supra* note 68, at 475. Here, “legitimacy” is used in the moral sense of the word and not the legal or constitutional sense. Many states, however, have enacted purposes of punishment in their state statutes. See also Cotton, *supra* note 69, at 1319 n.19 (collecting statutes).

79. Mitchell, *supra* note 68, at 474–75.

80. See, e.g., Hubbard et al., *supra* note 68, at 556 (“[T]he notion of ‘wrongdoing’ is crucial to the justification of punishment.”).

the individual (incapacitation), and that can be corrected (rehabilitation).

These theories are all present at the intersection of criminal law and automobiles. Fining a person for speeding serves the purpose of prevention by deterring the specific speeder from speeding.⁸¹ Also, by pulling the person off to the side of the road, the police officer deters other drivers by letting them know that if they speed in a particular area, or in general, they could get a speeding ticket.⁸² The punishment for speeding is also proportional, and it increases depending on the driver's speed and whether anyone was harmed.⁸³ Unless the speeder causes bodily harm to someone else, society generally does not consider the wrongdoer's "evil" bad enough to keep the wrongdoer isolated from society for an extended period.⁸⁴ But if a speeder causes someone's death, society isolates that speeder by sending her to jail.⁸⁵ If the driver was intoxicated when she killed someone, the driver must be kept out of society for a longer amount of time, even if the driver was not speeding.⁸⁶ And finally, if someone speeds frequently, society will isolate her from the roads by

81. See Mitchell, *supra* note 68, at 493 ("Speeding tickets . . . offer a good example of specific deterrence in action. Most of us who drive probably speed on a regular basis. If we get a speeding ticket, however, most of us think we've used up our quota of luck . . ."); *Strengthening the Citizen and Law Enforcement Partnership at the Traffic Stop*, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., <http://www.nhtsa.gov/people/injury/enforce/professionalism/part1.html> (last visited Fed. 28, 2015) (stating that a purpose of a traffic stop "is to change the driver's future driving behavior").

82. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 81 (stating that a purpose of a traffic stop "is to serve as a general deterrent to other drivers").

83. See, e.g., N.Y. VEH. & TRAF. LAW § 1180(h) (McKinney 2011). New York law provides for a fine of not more than one hundred fifty dollars if the speeder was exceeding the speed limit by ten miles per hour or less. § 1180(h)(1)(i). When the driver exceeds the speed limit by eleven miles per hour but not more than thirty miles per hour, the fine increases to no more than three hundred dollars and the driver can be imprisoned for no more than fifteen days. § 1180(h)(1)(ii). If the speeder exceeds the speed limit by more than thirty miles per hour, the person is subject to imprisonment not exceeding thirty days and a fine not exceeding six hundred dollars. § 1180(h)(1)(iii).

84. See, e.g., OHIO REV. CODE ANN. § 2903.08 (LexisNexis 2014).

85. See, e.g., *New Jersey v. Buckley*, 78 A.3d 958, 966 (N.J. 2013) (indicating that a finding of recklessness for vehicular homicide can "be premised upon excessive speed, among other factors" (citations omitted)). *But see infra* note 92 (providing an example of a state where speeding is not enough to convict a person for vehicular homicide when that speeding causes the death of another person).

86. See, e.g., NEB. REV. STAT. § 28-306(3)(b) (2008) (increasing the penalty from misdemeanor to felony and ordering that the person's license be suspended not less than one year nor more than fifteen years).

suspending her license,⁸⁷ and may send her back through drivers' education classes to receive further instruction on driving.⁸⁸

B. Traffic Laws

Although the previous subsection outlines the general purposes of criminal law, a closer look at traffic laws in particular reveals some additional purposes for such laws. First and foremost, traffic laws serve the purpose of increasing highway safety. Second, traffic laws also coordinate traffic to provide for an effective transportation system. Traffic laws are generally enforced through a traffic stop. These stops serve three main purposes: (1) to stop a violation of a traffic law, (2) to deter other drivers from committing the same violation, and (3) to change future driving behavior of the driver.⁸⁹

Criminal law generally requires an *actus reus*, the criminal act, and a *mens rea*, the criminal mindset, before someone can be convicted of a crime. Criminal laws applicable to automobile crimes and rules of the road have different *mens rea* requirements.⁹⁰ Some of the more serious criminal law violations committed by a driver of a vehicle require recklessness, or willful and wanton disregard for the safety of persons or property.⁹¹ New York requires serious "moral blameworthiness" on the part of an automobile driver before the driver can be criminally liable for vehicular homicide.⁹² Other statutes require gross negligence.⁹³

87. See *DMV Point System in New York*, DMV.ORG, <http://www.dmv.org/ny-new-york/point-system.php> (last visited Dec. 12, 2014) ("[I]f you are dinged 11 points for traffic convictions in a period of 18 months, the New York DMV may suspend or revoke your license.").

88. Under the New York system, a person can attend an accident-prevention course to remove four points from her record. *Id.*

89. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 81.

90. Douma & Palodichuk, *supra* note 1, at 1159.

91. See, e.g., S.C. CODE ANN. § 56-5-2910(A) (2006) ("When the death of a person ensues within three years as a proximate result of injury received by the driving of a vehicle in *reckless disregard of the safety of others*, the person operating the vehicle is guilty of reckless homicide." (emphasis added)).

92. See, e.g., *New York v. Cabrera*, 887 N.E.2d 1132, 1137 (N.Y. 2008) (noting that speeding down a tricky downhill curve "is certainly negligent, and unquestionably 'blameworthy.' But our decisions have uniformly looked for some kind of morally blameworthy component to excessive speed in determining criminal negligence"); *New York v. Boutin*, 555 N.E.2d 253, 254 (N.Y. 1990) ("Criminally negligent homicide requires not only a failure to perceive a risk of death, but also some serious blameworthiness in the conduct that caused it."). This heightened standard results in about only 5% of drivers

Although some criminal laws require both an *actus reus* and a *mens rea*, many traffic laws only require an *actus reus*.⁹⁴ Thus, most vehicular criminal offenses are strict liability offenses. Strict liability offenses refer to “crimes that authorize liability no matter what the evidence would show about the actor’s fault with regard to a particular material element of the offense.”⁹⁵ Therefore, “the actor’s culpability is irrelevant,” and the government only has to prove an *actus reus*.⁹⁶ Strict liability offenses are usually defended on two grounds.⁹⁷ First, strict liability offenses eliminate large administrative costs that come with enforcement, such as investigative, prosecutorial, and judicial costs.⁹⁸ With the frequency of traffic violations,⁹⁹ these costs would be insurmountable for government.¹⁰⁰ Moreover, the cost to prosecute some rules of the road violations may outweigh the fines.¹⁰¹ Second, strict liability offenses further the deterrent effect

who cause death being charged by prosecuting officials in New York. See Bill Sanderson, “Epidemic” of Fatal Crashes, WALL ST. J., Feb. 10, 2014, at A15.

93. Douma & Palodichuk, *supra* note 1, at 1159 (stating that criminal vehicular homicide “often is based in negligence”).

94. Traffic regulations are generally considered public welfare offenses. See, e.g., Louis A. Ambrose et al., *Survey—Developments in Maryland Law, 1990-91: V. Criminal Law*, 51 MD. L. REV. 612, 617 (1992) (“Traffic offenses are a classic example of statutory public welfare offenses.”); Catherine L. Carpenter, *On Statutory Rape, Strict Liability, and the Public Welfare Offense Model*, 53 AM. U. L. REV. 313, 327 (2003); see *Wisconsin v. Collova*, 255 N.W.2d 581, 586–89 (Wis. 1977) (discussing strict liability with regard to failing to comply with the state’s automobile financial responsibility law).

95. Alan C. Michaels, *Constitutional Innocence*, 112 HARV. L. REV. 828, 830 (1999).

96. *Id.*

97. Assaf Hamdani, *Mens Rea and the Cost of Ignorance*, 93 VA. L. REV. 415, 422 (2007).

98. *Id.*

99. In 2012, New York City issued 1,020,754 summonses for traffic violations. Brad Aaron, *There’s Still Nothing Special About a Million NYPD Traffic Summonses*, STREETS BLOG NYC (Mar. 7, 2013), <http://www.streetsblog.org/2013/03/07/theres-still-nothing-special-about-a-million-nypd-traffic-summonses> (providing information on recent summaries of traffic violations in New York); see also New York Police Department, *Traffic Archive 2013: Collisions and Summonses* (2013), http://www.nyc.gov/html/nypd/html/traffic_reports/traffic_report_archive_2013.shtml.

100. See Richard G. Singer, *The Resurgence of Mens Rea: The Rise and Fall of Strict Criminal Liability*, 30 B.C. L. REV. 337, 393 (1989) (“[P]roponents [of strict liability offenses] point to the overwhelming number of regulatory offenses, including traffic and parking offenses, that face the courts daily and in which there is rarely if ever time for a substantial concern with *mens rea*.”). However, Singer himself did not believe this was a proper justification for strict liability offenses. See *id.* at 394.

101. For instance, under New York law, a ticket for use of a cell phone while driving for a first offense is between \$50 and \$150. N.Y. DEP’T OF MOTOR VEHICLES, *Cell Phone Use & Texting*, N.Y. GOV. (2015), <http://dmv.ny.gov/org/tickets/cell-phone-use-texting>.

of criminal law enforcement because these offenses remove the subjectiveness of *mens rea*.¹⁰²

For those reasons, most traffic or driving violations are strict liability offenses.¹⁰³ In recent years, however, more serious traffic crimes have also become strict liability offenses.¹⁰⁴ For example, in Delaware, causing the death of another while committing a traffic offense is a strict liability offense.¹⁰⁵ Michigan imposes strict liability on those whose violation of a traffic law results in the death of a construction worker.¹⁰⁶ Violation of that provision is a felony, which carries a punishment of up to fifteen years of imprisonment.¹⁰⁷ Illinois's aggravated driving under the influence ("DUI") law imposes strict liability on intoxicated drivers who cause the death of another individual, resulting in a felony.¹⁰⁸ Colorado's DUI homicide statute explicitly states that it is a strict liability offense.¹⁰⁹

Although strict liability offenses are not without opponents and are generally disfavored by scholars¹¹⁰ and courts,¹¹¹ a

102. Hamdani, *supra* note 97, at 422.

103. *Id.*

104. See, e.g., W. Robert Thomas, *On Strict Liability Crimes: Preserving a Moral Framework for Criminal Intent in an Intent-Free Moral World*, 110 MICH. L. REV. 648, 648–49 (2012).

105. DEL. CODE ANN. tit. 21, § 4176A(a) (2013) ("A person is guilty of operation of a vehicle causing death when, in the course of driving or operating a motor vehicle or OHV in violation of any provision of this chapter other than § 4177 of this title, the person's driving or operation of the vehicle or OHV causes the death of another person."). Though Delaware calls the crime a "misdemeanor," conviction for a first time offender leads to a sentence of up to 30 months. § 4167A(b), (c).

106. MICH. COMP. LAWS § 257.601c(2) (2010) ("A person who commits a moving violation that has criminal penalties and as a result causes death to a person operating an implement of husbandry on a highway in compliance with this act is guilty of a felony punishable by imprisonment for not more than 15 years or a fine of not more than \$7,500.00, or both."); see Thomas, *supra* note 104, at 649 (stating that Michigan's law "holds drivers strictly liable for a death in a work zone that occurs concurrently with a 'moving violation that has criminal penalties.'" (quoting MICH. COMP. LAWS § 257.601c(2) (2010))).

107. MICH. COMP. LAWS § 257.601c(2) (2010).

108. 625 ILL. COMP. STAT. 5/11–501(d) (2014); see Theodore A. Gottfried & Peter G. Baroni, *Presumptions, Inferences and Strict Liability in Illinois Criminal Law: Preempting the Presumption of Innocence?*, 41 J. MARSHALL L. REV. 715, 737–38 (2008).

109. COLO. REV. STAT. § 18-3-106(1)(b)(I) (2014) ("If a person operates or drives a motor vehicle while under the influence of alcohol or one or more drugs, or a combination of both alcohol and one or more drugs, and such conduct is the proximate cause of the death of another, such person commits vehicular homicide. This is a strict liability crime.").

110. See, e.g., Paul J. Larkin, Jr., *Strict Liability Offenses, Incarceration, and the Cruel and Unusual Punishments Clause*, 37 HARV. J.L. & PUB. POL'Y 1065, 1079 (2014) ("Legal

discussion of whether the benefits of strict liability offenses outweigh the detriments is beyond the scope of this Article. Instead, this Article will argue that the benefits of strict liability offenses for traditional vehicles do not extend to autonomous vehicles.

IV. THE APPLICATION OF CRIMINAL LAW TO AUTONOMOUS VEHICLES

No matter how perfectly an autonomous vehicle is programmed, it will violate traffic laws, drive recklessly at times, and cause fatal accidents.¹¹² Accordingly, autonomous vehicles will implicate criminal laws. This Section discusses a variety of criminal laws that are relevant to autonomous vehicles. First, there are the vehicle-related criminal law aspects; these are the laws under which a traditional vehicle driver could be convicted. This Section examines general traffic laws, driving under the influence, reckless driving, and vehicular homicide. The second broad category is laws that are not necessarily related to vehicles, but will intersect with autonomous vehicles because the technology is operated by a computer. This Article examines location specific criminal laws, for example, possession of an illicit substance in the proximity of a school, and physical and virtual (hacking) interference with the operation of an autonomous vehicle.

commentators have consistently denounced strict liability on a variety of grounds.”); Michaels, *supra* note 95, at 831 (“Strict liability has endured decades of unremitting academic condemnation.”).

111. See, e.g., *United States v. U.S. Gypsum Co.*, 438 U.S. 422, 437–38 (1978) (stating that strict liability offenses have a “generally disfavored status”); see also 21 AM. JUR. 2D, *Criminal Law* § 135 (2014) (“Criminal statutes requiring no *mens rea* are generally disfavored.”).

112. See Sophia H. Duffy & Jamie Patrick Hopkins, *Sit, Stay, Drive: The Future of Autonomous Car Liability*, 16 SMU SCI. & TECH. L. REV. 453, 456 (2013) (“Serious accidents could be caused by glitches, viruses, network failures, and programming errors that commonly afflict computer-run devices.”); ENO CTR. FOR TRANSP., *Preparing a Nation for Autonomous Vehicles: Opportunities, Barriers and Policy Recommendations* 12 (2013), available at <https://www.enotrans.org/wp-content/uploads/wpesc/downloadables/AV-paper.pdf> (“Even with near-perfect autonomous driving, there may be instances where a crash is unavoidable.”); see also F. Patrick Hubbard, “Sophisticated Robots”: *Balancing Liability, Regulation, and Innovation*, 66 FLA. L. REV. 1803, 1806 (2014) (indicating that sophisticated robots “will be sufficiently large and mobile enough to cause physical injury and death”).

A. Vehicle-Related Crimes

This Section examines four types of criminal laws that are implicated by autonomous vehicles: (1) general traffic laws, (2) DUI laws, (3) reckless driving and due care laws, and (4) vehicular manslaughter. As an initial point, this Section asserts that the laws should be amended for violations committed while a vehicle is in autonomous mode because the objectives of criminal law, discussed in Section III, are not necessarily furthered by punishing an operator of an autonomous vehicle in the same manner as a traditional driver for an “identical” violation of traffic laws. There is a difference in blameworthiness between someone who fails to stop at a red light and someone whose vehicle malfunctions, which causes the vehicle to fail to stop at a red light.¹¹³ In the latter situation, because the operator of an autonomous vehicle may be engaging in other activities, she may lack knowledge that her vehicle even ran the red light. Under such a situation, it seems clear that the traditional driver will have more blameworthiness than the autonomous vehicle operator. This becomes even more evident when the stakes are higher. In vehicular manslaughter prosecutions where the defendant was intoxicated while driving, the traditional driver’s decision to drive her vehicle while under the influence is usually the direct cause of the person’s death. On the other hand, because she is not in control, an intoxicated operator of an autonomous vehicle is not necessarily the proximate cause when an autonomous vehicle malfunctions and kills someone. Moreover, the operator of an autonomous vehicle does not appear to create a greater risk of accident by using her car while intoxicated, unlike that which the traditional driver creates. Accordingly, once again, there is more blameworthiness on the part of the traditional driver than the operator of an autonomous vehicle. As such, this Article recommends treating traditional drivers and autonomous vehicle operators differently. The rest of this Section focuses on situations where an autonomous vehicle violates a criminal law while in autonomous mode.

113. Even when that failure to stop is unintentional, usually the traditional driver could exercise more care to prevent future traffic infractions.

i. General Traffic Laws (Rules of the Road)

Although many laws applicable to autonomous vehicles mandate compliance with traffic laws,¹¹⁴ rules of the road compliance will necessarily be challenging for autonomous vehicle manufacturers due to the subjectivity written into the laws and subjective enforcement.¹¹⁵ Some seemingly bright line rules, such as speed limits,¹¹⁶ are not strictly enforced, or otherwise, follow unwritten rules. Further complicating matters is that some rules of the road require subjective input of the operator of the vehicle.¹¹⁷ For instance, under North Carolina law, “[n]o person shall drive a vehicle on a highway or in a public vehicular area at a speed greater than is reasonable and prudent under the conditions then existing.”¹¹⁸ A traditional driver will be aware of the conditions and know what speed is safe to operate the vehicle based on her experience behind the wheel. An algorithm writer for an autonomous vehicle, however, lacks the subjective knowledge of current weather, road, and traffic conditions, and how these might affect driving conditions at any given time. And if those challenges did not make the algorithm writer’s job difficult enough, drivers are sometimes required to follow directives of authorized individuals, even if such directives conflict with “bright line rules,” like following traffic lights.¹¹⁹ For instance, under Virginia law, “[l]aw-enforcement officers and uniformed school crossing guards may assume control of traffic otherwise controlled by lights, and in such event, signals by such officers and uniformed crossing guards

114. See D.C. CODE § 50-2352(3) (2013); FLA. STAT. § 319.145(1)(d) (2012); NEV. ADMIN. CODE § 482A.190(2)(f) (2012).

115. See Smith, *supra* note 25, at 498–500; see also Barringer, *supra* note 27, at 130 (“Autonomous vehicles present unique situations of automobile operation that differ from the traditional method of a human driver. Due to these differences, the current laws governing automobile operations are inadequate to govern the operation of autonomous vehicles.”).

116. See, e.g., ARIZ. REV. STAT. ANN. § 28-701.02 (1997) (“A person shall not: 1. Exceed thirty-five miles per hour approaching a school crossing. 2. Exceed the posted speed limit in a business or residential district by more than twenty miles per hour, or if no speed limit is posted, exceed forty-five miles per hour. 3. Exceed eighty-five miles per hour in other locations.”).

117. Smith, *supra* note 25, at 498–500.

118. N.C. GEN. STAT. § 20-141(a) (2013). Other states have similar laws. See, e.g., ARIZ. REV. STAT. ANN. § 28-701.A (2009); ARK. CODE ANN. § 27-51-201(a) (1963); GA. CODE ANN. § 40-6-180 (1990); OHIO REV. CODE ANN. § 4511.21 (2013); 75 PA. CONS. STAT. § 3361 (1977); S.C. CODE ANN. § 56-5-1520(A) (1976).

119. Smith, *supra* note 25, at 500.

shall take precedence over such traffic control devices.”¹²⁰ The first challenge in such a situation is programming the autonomous vehicle to recognize that the person directing traffic is authorized by law to do so.¹²¹ Once the vehicle realizes that the person directing traffic is, for instance, a police officer, the autonomous vehicle must then recognize that the officer is exercising her power to direct traffic and is not merely crossing the road. Once the vehicle makes those two observations, it must then be programmed to ignore the traffic light.¹²²

Because many traffic regulations are bright line rules (*e.g.*, stop at a stop sign), autonomous vehicles will greatly diminish traffic violations. So far, Google’s test cars have driven 700,000 miles without one citation.¹²³ These vehicles will be programmed to use their turn signals every time they turn.¹²⁴ They will be programmed to obey posted speed limits.¹²⁵ They will not run red lights or fail to stop at stop signs.¹²⁶ Therefore, once autonomous vehicles become prevalent, traffic law violations will be minimal.¹²⁷ Accordingly, this Section’s application is to the limited instance when an autonomous vehicle malfunctions and violates a traffic

120. VA. CODE ANN. § 46.2-834(B) (West 2013); *see* Smith, *supra* note 25, at 500 (collecting statutes).

121. *See* Gomes, *supra* note 23 (indicating that Google’s car cannot currently “spot a police officer at the side of the road frantically waving for traffic to stop”).

122. One solution to this problem would be to have the police officer or school crossing guard have an electronic signal that communicates with the vehicle to inform it of all of these observations. Another solution is to have the traffic light communicate to the vehicle that it is disabled.

123. *See* Gomes, *supra* note 23.

124. *See* Goodrich, *supra* note 4, at 281 (“Presumably, every autonomous vehicle will be programmed to follow the rules of the road and will not violate traffic laws.”). State laws have required autonomous vehicles to follow traffic laws. *See supra* Section II.B.

125. *See* Goodrich, *supra* note 4, at 281. Google, however, has indicated that it may program its vehicles to speed in some instances. Paul Ingrassia, *Look, No Hands! Test driving a Google Car*, REUTERS (Aug. 17, 2014, 6:18 AM), available at <http://uk.reuters.com/article/2014/08/17/us-google-driverless-idUKKBN0GH02P20140817> (stating that “Google’s engineers have determined that speeding actually is safer than going the speed limit in some circumstances”).

126. *See, e.g.*, Goodrich, *supra* note 4, at 281.

127. *See* Roseman, *supra* note 15, at 52–53 (“Since traffic violations should be rare, if ever, with an [autonomous vehicle], officers may not be able to stop as many [autonomous vehicles] as they might traditional vehicles.”). Also related to traffic law violations is the fact that traffic enforcement will also decrease. Local governments would be inefficiently allocating resources by dedicating the same amount of resources currently used to rules of the road violations once autonomous vehicles become prevalent because violations will occur so infrequently.

law. This Section first analyzes current law and statutes that specifically address autonomous vehicles, and then proposes that the rules of the road system be amended to accommodate autonomous vehicles.

Currently, the operator of a vehicle would probably be responsible for the traffic laws that the vehicle violates, regardless of whether the car is in autonomous mode.¹²⁸ Nevada's autonomous vehicle regulations make this clear:

For the purpose of enforcing the traffic laws and other laws applicable to drivers and motor vehicles operated in this State, the operator of an autonomous vehicle that is operated in autonomous mode shall be deemed the driver of the autonomous vehicle regardless of whether the person is physically present in the autonomous vehicle while it is engaged.¹²⁹

Continuing strict liability for traffic violations appears to be based on the belief that the person who presses the “start button” should accept the consequences of what that entails.¹³⁰ Thus, the captain should be responsible for her ship.

Strict liability has two advantages: it provides a bright line rule for officers to enforce, and it provides the benefit of alleviating some problems with the subjective nature of traffic regulations. Without this rule, operators of autonomous vehicles who are pulled over by police officers would argue that it was the autonomous technology, not themselves, that committed the traffic violation. There would need to be a method to determine whether the operator was actually driving the vehicle at the time the traffic violation was committed. This information would also

128. Current traffic laws are strict liability offenses. Douma & Palodichuk, *supra* note 1, at 1159; *see supra* Section III.B.

129. NEV. ADMIN. CODE § 482A.030(2) (2013); *see also* Goodrich, *supra* note 4, at 281–82 (“For strict liability offenses, such as speeding or failing to use a turn signal, Nevada law seems to hold the operator, and not the automator, liable.”). The State of Washington’s proposed autonomous vehicle statute also embraces this approach: “A licensed driver is legally responsible for the autonomous vehicle for traffic infractions and criminal offenses in the same manner as a driver of a nonautonomous vehicle.” H.B. 1439 (Wash. 2013).

130. *See* White, *supra* note 10 (“Whoever put the [autonomous] car in motion either from inside the vehicle or from a remote location” would likely be “responsible for a car driving on autopilot.”).

need to be immediately communicated to the police officer.¹³¹ The second major benefit would be to ensure compliance with the subjective aspects of general traffic laws. This system would combine the best features of the computer driver—the inability to get distracted—with the best feature of the human driver—the ability to make subjective and moral decisions. For instance, the problem of programming a vehicle not to drive too fast under conditions could be remedied if the operator could slow the car down or retake control of the vehicle. Or if a power outage in an area shut off a stop light, the human operator would be able to retake control and follow directions from a police officer directing traffic or, if there is no one directing traffic, realize that more caution is needed while navigating that area.¹³²

The big disadvantage of making the captain responsible for her ship is that autonomous vehicles lose much of their utility because a major benefit of autonomous vehicles would be defeated.¹³³ As stated in Section II.c.2., car companies are marketing these vehicles and discussing them, in part, as a means to become more productive. To increase productivity, the operator must be able to engage in other activities. Perhaps, while some drivers may trust the technology enough so they are able to engage in other activities, others would be more reluctant to do so if they know they are responsible for traffic violations. If the reluctance outweighs the ability of someone to engage in another activity, the loss in utility may outweigh the benefit of the person watching the road. This is especially true if the vehicles are safely operating. In other words, if the vehicles are safely operating and obeying traffic laws, requiring someone to pay attention to the traffic laws would be inefficient.

131. Autonomous vehicle statutes that have been enacted require the vehicle to visually indicate when it is in autonomous mode, and require the vehicle to maintain data thirty seconds prior to a collision. See *supra* Section II.B. The statutes do not currently require autonomous vehicles to record this information prior to a traffic stop. However, because collisions are unpredictable, for the information to be available in the event of a collision, the autonomous vehicle must continuously be recording the data.

132. See Wood et al., *supra* note 14, at 1474.

133. See Alexander Hevelke & Julian Nida-Rümelin, *Responsibility for Crashes of Autonomous Vehicles: An Ethical Analysis*, SCI. ENG. ETHICS (June 11, 2014), <http://link.springer.com/article/10.1007/s11948-014-9565-5> (examining the ethical issues with autonomous vehicles and noting that requiring a duty to intervene would cause autonomous vehicles to “lose much of their utility”); White, *supra* note 10 (“‘Why buy an autonomous vehicle if you have to maintain control?’ asks Adrian Lund, president of the Insurance Institute for Highway Safety . . .”).

The other disadvantage is that it may not necessarily increase safety, defeating another major benefit of autonomous vehicles. Would society want someone subject to distraction and making mistakes driving when conditions require a slower speed limit?¹³⁴ That is not to say that all drivers would do a worse job, but it is to say that the computer does not struggle seeing through a rainstorm, nor is it subject to human distractions.

Even with the disadvantages, this approach may be preferred during the introductory phase of the technology.¹³⁵ As autonomous technology becomes prevalent, the vehicles will be able to operate more effectively and thus become safer.¹³⁶ Accordingly, during the introductory period, it should be expected that accidents and mishaps will be more frequent than when the infrastructure is fully in place.¹³⁷ Thus, it would be reasonable to expect more of the operator of an autonomous vehicle and to hold the captain responsible for her ship.

During the introductory period, however, states should amend their general traffic laws to facilitate autonomous vehicles because the current statutes were written with human subjectivity in mind. The law should remove the subjective elements with regard to autonomous vehicles, or at least provide certainty so that the vehicles can be programmed to follow the rules of the road of each respective jurisdiction. Setting actual bright line rules for autonomous vehicles will ensure that the vehicles can safely operate, and will permit society to realize the full value of autonomous vehicles.

Autonomous vehicles will increase society's well-being and efficiency because people will be able to engage in other activities rather than paying attention to the road. To further this goal,

134. See *supra* Section II.C.ii., for a discussion on the benefits of autonomous vehicles.

135. See Wood et al., *supra* note 14, at 1473 (“As the vehicle increasingly assists or takes over for the human driver (particularly for the performance of safety critical functions) ensuring safety will likely require that a human be ready and able to step in and assume control of vehicle direction and speed with little or even no advance notice.”).

136. See KPMG, *supra* note 5, at 13 (“[T]he incubation period provides time for developing the requisite supporting systems, including regulations, infrastructure and social networks.”); Wood et al., *supra* note 14, at 1473–74 (“Given the current state of technology autonomous driving systems are generally not capable of correctly assessing and handling all driving scenarios . . .”).

137. There will always be accidents, but there will probably be more during the introductory period of autonomous vehicles.

traffic laws should not mandate that people pay attention to the road, and, thus, general traffic violations should no longer be strict liability offenses for the operator of the vehicle.¹³⁸ In addition, although ticketing a traditional driver of a vehicle serves some of the purposes of criminal law,¹³⁹ ticketing the operator of an autonomous vehicle serves little to no purpose and may actually deter people from using autonomous mode. For instance, when an autonomous vehicle fails to stop at a stop sign, in most instances, there would be no way for the operator of such vehicle to prevent her vehicle from driving through stop sign. By the time the operator realizes that the autonomous vehicle is not stopping, it would be too late to regain control over the vehicle. It will not even necessarily deter the operator, except that the operator might want to retake control over the autonomous vehicle at every stop sign, greatly diminishing the vehicle's utility. Likewise, it will not deter other autonomous vehicle operators from violating traffic laws if they see an autonomous vehicle pulled over, unless they were concerned that their specific autonomous vehicles were also prone to malfunction. Therefore, there seems to be little to no benefit for ticketing an operator of a vehicle for speeding, other than punishing that individual for her choice to own an autonomous vehicle.

With an autonomous vehicle like Google's prototype, certainly no objectives of punishment are served by holding the operator criminally liable for traffic violations. As stated in Section II.a., the vehicle lacks a steering wheel, accelerator, and brake pedal. Therefore, the operator does not cause, nor has any opportunity to prevent, the violation. In such a case, the person does not have any blameworthiness to punish; no one—the operator or society—is deterred because owners of a vehicle like Google's prototype can do nothing to prevent the violation; isolating the person will not provide any benefit to society; and no additional instruction could prevent the offense in the future. Ticketing the operator of such vehicle would only serve as a chilling effect on the sale of those vehicles. If the state believes such vehicles to be dangerous, there are better regulatory mechanisms to address that concern.

138. See Smith, *supra* note 25, at 516 (suggesting negligence on behalf of the operator).

139. See *supra*, Section III.A.

Given the safety benefits these vehicles will provide to society, the use of autonomous vehicles should be furthered, not deterred. Accordingly, operators of autonomous vehicles should not be ticketed without some blameworthiness that punishing the individual could rectify, such as negligence or recklessness on the part of the operator.¹⁴⁰ Moreover, because traffic violations when a vehicle is in autonomous mode will be rare, requiring some level of blameworthiness on the part of the operator will not lead to significant administrative costs that currently justify strict liability for traffic violations.¹⁴¹

Another option would be ticketing the car company, but criminal liability to manufacturers would deter innovation and create large administrative burdens. Instead of ticketing the car company, there should be a notification system where a vehicle or a car manufacturer has the capability to receive notifications when its vehicles malfunction so that whatever error occurred could be corrected. Thus, the error would not recur. In addition, tort law's imposition of liability for accidents caused in autonomous mode should provide a strong enough incentive for autonomous vehicle manufacturers to update the algorithm,¹⁴² especially if the

140. See Smith, *supra* note 25, at 516 (suggesting negligence).

141. See *supra* Section III.B., for a discussion of strict liability offenses.

142. See George P. Fletcher, *The Nature and Function of Criminal Theory*, 88 CAL. L. REV. 687, 700 (2000) (indicating that criminal law problems may be resolved by tort liability); Richard A. Posner, *An Economic Theory of the Criminal Law*, 85 COLUMBIA L. REV. 1193, 1195 (1985) (suggesting the purposes of criminal law for some violations can be enforced through imposition of tort liability). Tort liability of accidents caused by autonomous vehicles has been thoroughly discussed. See Kyle Colonna, *Autonomous Cars and Tort Liability*, 4 CASE W. RES. J.L. TECH. & INTERNET 81 (2012); Duffy & Hopkins, *supra* note 112, at 453; Kevin Funkhouser, Note, *Paving the Road Ahead: Autonomous Vehicles, Products Liability, and the Need for a New Approach*, 2013 UTAH L. REV. 437 (2013); Andrew P. Garza, Note, "Look Ma, No Hands!": *Wrinkles in the Age of Autonomous Vehicles*, 46 NEW ENG. L. REV. 581 (2012); Kyle Graham, *Of Frightened Horses and Autonomous Vehicles: Tort Law and Its Assimilation of Innovations*, 52 SANTA CLARA L. REV. 1241 (2012); Dorothy J. Glancy, *Sharing The Road: Smart Transportation Infrastructure*, 41 FORDHAM URB. L.J. 1617 (2014); Jeffrey K. Gurney, *Sue My Car Not Me: Products Liability and Accidents Involving Autonomous Vehicles*, 2013 U. ILL. J.L. TECH. & POL'Y 247 (2013); Hubbard, *supra* note 112; Dylan LeValley, Comment, *Autonomous Vehicle Liability—Application of Common Carrier Liability*, 36 SEATTLE U. L. REV. SUPRA 5 (2013), <http://seattleuniversitylawreview.com/e-supp/2013/autonomous-vehicle-liability-application-of-common-carrier-liability>; Gary E. Marchant & Rachel A. Lindor, *The Coming Collision Between Autonomous Vehicles and the Liability System*, 52 SANTA CLARA L. REV. 1321 (2012); David C. Vladeck, *Machines Without Principals: Liability Rules and Artificial Intelligence*, 89 WASH. L. REV. 117 (2014).

previous malfunctions are reported and can be used in a subsequent tort lawsuit because of an unfixed malfunction.¹⁴³

To utilize such a system, the vehicle would need to be capable of providing information to police officers about who was operating the vehicle at the time in question. Nevada and California require autonomous vehicles to capture this type of data in read me format thirty seconds prior to an accident.¹⁴⁴ To be able to provide such data would require continuous recording of the data such that it will always be available in the case of an accident. Accordingly, the vehicles would already be equipped with the technology to notify police officers. Upon realizing that the vehicle was in autonomous mode during the traffic violations, there should either be an internal or external system that allows the malfunction to be communicated to the car manufacturer.

ii. DUI Laws

Autonomous vehicles will greatly affect drinking and driving. In 2012, alcohol-impaired driving crashes killed 10,322 people, accounting for about one-third of all traffic-related deaths.¹⁴⁵ Non-alcohol drug use account for about 18 percent of vehicle related deaths.¹⁴⁶ The annual costs of crashes while the operator is intoxicated exceed 59 billion dollars annually.¹⁴⁷ Autonomous vehicles have the potential to greatly curtail under-the-influence driving. Indeed, “[t]he possibility of removing drunk drivers from the road is one of the most prominent benefits autonomous vehicles might provide.”¹⁴⁸

143. See, e.g., *Am. Motors Corp. v. Ellis*, 403 So.2d 459, 468 (Fla. Dist. Ct. App. 1981) (holding that punitive damages are available when the company was aware of a known danger and failed to remedy it).

144. CAL. VEH. CODE § 38750(c)(1)(C) (2012); NEV. ADMIN. CODE § 482A.190(2)(a) (2012).

145. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *Traffic Safety Facts: 2012 Data*, U.S. DEP'T OF TRANSP. at 1 (Dec. 2013), available at <http://www-nrd.nhtsa.dot.gov/Pubs/811870.pdf>.

146. *Impaired Driving: Get the Facts*, CTRS. FOR DISEASE CONTROL & PREV., http://www.cdc.gov/motorvehiclesafety/impaired_driving/impaired-driv_factsheet.html (citing R. K. Jones et al., *State of Knowledge of Drug-Impaired Driving*, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. (Sept. 2003), <http://www.nhtsa.gov/people/injury/research/stateofknwlegedrugs/stateofknwlegedrugs>) (last visited Dec. 12, 2014).

147. Lawrence Blincoe et al., *The Economic and Societal Impact of Motor Vehicle Crashes, 2010*, NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. 1, 3 (May 2014), available at <http://www-nrd.nhtsa.dot.gov/Pubs/812013.pdf>.

148. Douma & Palodichuk, *supra* note 1, at 1163.

Nonetheless, the Director of Nevada's Department of Motor Vehicles has already stated: "There is no exemption for drinking and driving."¹⁴⁹ Under current law, he is right; there is no exemption for drinking and driving an autonomous vehicle. So long as autonomous vehicles have an override feature, the operator of the vehicle could be criminally liable for driving under the influence, even if the autonomous technology was in control of the vehicle at the time of the accident.¹⁵⁰ Some have suggested that the outcome may be different if the vehicle does not have an override feature.¹⁵¹ Some authors have proposed that an "I'm drunk, take me home" button could be installed in these vehicles, which would turn the car into a personal taxi.¹⁵² Once the button is pressed, the operator would be unable to override the autonomous technology.¹⁵³

Currently, however, due to the broad court interpretations of the word "operate" in drinking and driving laws,¹⁵⁴ the operator could still be convicted for driving under the influence. For example, in New York:

[T]he definition of operation is broader than that of driving '[A] person operates a motor vehicle within the meaning of the statute when, in the vehicle, he intentionally does any act or makes use of any mechanical or electrical agency which alone

149. Sarah Jacobsson Purewal, *Nevada Approves Self-Driving Cars After Google Lobbying Push*, PC WORLD (Feb. 17, 2012, 5:38 AM), http://www.techhive.com/article/250179/nevada_approves_self_driving_cars_after_google_lobbying_push.html.

150. See notes 154–55 and the accompanying text for the broad definitions of "operate" under state law.

151. Douma & Palodichuk, *supra* note 1, at 1163.

152. *Id.*

153. *Id.*

154. See, e.g., *Jacobson v. State*, 551 P.2d 935, 937 (Alaska 1976) ("As a general proposition, it appears that 'to operate' includes a larger class of activities than 'to drive.' While one who drives a vehicle must necessarily in that process operate it, the reverse is not necessarily so."); *McDuell v. State*, 231 A.2d 265, 267 (Del. 1967) ("[T]he term 'driving' is encompassed within the term 'operating'; but the reverse is not necessarily so. One may not drive a vehicle without operating it; but one may operate the engine or devices of a vehicle without driving it."); *Thomas v. State*, 353 A.2d 256, 258–59 (Md. Ct. App. 1976) (stating that "driving" has a "more strict and limited meaning" than "operating").

or in sequence will set in motion the motive power of the vehicle.¹⁵⁵

Likewise in Michigan, the law is that “once a person using a motor vehicle as a motor vehicle has put the vehicle in motion, or in a position posing a significant risk of causing a collision, such a person continues to operate it until the vehicle is returned to a position posing no such risk.”¹⁵⁶ Pressing an “I’m drunk, take me home” button would still subject the operator of the vehicle to a driving under the influence conviction under these standards because the operator would have put the car into motion. For the same reason, these statutes would also apply to an autonomous vehicle like Google’s prototype, which lacks a steering wheel, brakes, and accelerator,¹⁵⁷ because the operator is still putting the vehicle into motion. Thus, the operator could be found liable for driving under the influence.

Accordingly, to remove driving under the influence liability for the operator of an autonomous vehicle would require states to amend their statutes. The question is whether the statutes should be amended.

Assuming for purposes of this Section that an autonomous vehicle has an “I’m drunk, take me home” button, punishing the operator of an autonomous vehicle for driving under the influence of alcohol may still serve punishment purposes in a limited circumstance. If the vehicle malfunctions and causes an accident that could have been prevented with due care by the

155. *People v. Prescott*, 745 N.E.2d 1000, 1004 (N.Y. 2001) (citing *People v. Alamo*, 315 N.E.2d 446, 459 (N.Y. 1974)). New York’s driving-while-under-the-influence statute states: “No person shall operate a motor vehicle while the person’s ability to operate such motor vehicle is impaired by the consumption of alcohol.” N.Y. VEH. & TRAFFIC LAW § 1192(1) (2009). Many other state courts have defined “operate” in a similar fashion. *See, e.g., Com v. Plowman*, 548 N.E.2d 1278, 1280 (Mass. Ct. App. 1990) (citing *Massachusetts v. Uski*, 160 N.E.2d 305, 306 (Mass. 1928)); *Connecticut v. Ducatt*, 575 A.2d 708, 710 (Conn. Ct. App. 1990) (citing *Connecticut v. Swift*, 6 A.2d 359, 361 (1939)); *Flournoy v. Georgia*, 128 S.E.2d 528, 530 (Ga. Ct. App. 1962) (citations omitted).

156. *Michigan v. Wood*, 538 N.W.2d 351, 353 (Mich. 1995). Michigan’s prohibition against driving under the influence states: “[A] person, whether licensed or not, shall not operate a vehicle upon a highway or other place open to the general public or generally accessible to motor vehicles, including an area designated for the parking of vehicles, within this state if the person is operating while intoxicated.” MICH. COMP. LAWS § 257.625 (2014).

157. *See supra* Section II.A. for a discussion of Google’s prototype autonomous vehicle.

operator, the operator's decision to utilize the button suspends her ability to take control over the vehicle. In that sense, her decision may be a proximate cause of the accident, making the operator potentially blameworthy for the accident.¹⁵⁸ With a vehicle like Google's prototype, however, no punishment purposes are served by ticketing the operator for driving under the influence of alcohol.

Therefore, in the introductory phase of autonomous vehicles, states should be reluctant to change their driving under the influence laws. Autonomous vehicle safety will increase as the vehicles become more prevalent.¹⁵⁹ Once autonomous vehicles reach a point where they safely operate, drinking and driving laws should be amended because it would be inefficient not to allow a vehicle to take an intoxicated person home. Although leaving DUI laws as they are would not impact those who already make the foolish decision to drink and drive, it would impact those who responsibly refuse to drive drunk, and instead, find a designated driver, call a taxi, or take public transportation. Thus, the question becomes: when autonomous vehicles eventually have a proven track record of safely maneuvering on their own, does it make much sense to require someone to pay for transportation when her car can safely drive her home?

More importantly, depending on how responsible intoxicated people return to their homes, it may be safer to permit them to be chauffeured home in an autonomous vehicle than to ride in a human operated vehicle, such as a taxi or a friend's non-autonomous vehicle. The taxi driver or the friend, though sober, is still subject to the human tendency to get distracted. Furthermore, the sober driver's vehicle (perhaps) would not make the same choices that an autonomous vehicle would make. For instance, a world of autonomous vehicles could be programmed to assume a vehicle fully stops when it comes to a stop sign, while the designated driver may not fully stop. Although the autonomous vehicle would presumably adjust accordingly, why would society

158. This is a broad theoretical view of causation, one that should not be used in laws. Either society should permit people to use an "I'm drunk, take me home" button in an autonomous vehicle, or it should not. If they are permitted, which this Article recommends, then a person who complies with the requirement should not be criminally responsible for accidents caused by malfunctions that a person able to take control over the vehicle might have been able to prevent.

159. See *supra* Section II.C.

want to incentivize such a rogue variable into the computerized system?¹⁶⁰ Therefore, if the autonomous vehicle could operate safely without human input, it might be safer to permit the person to ride in her autonomous vehicle than to ride in a friend's non-autonomous vehicle.

This Article neither suggests a certain timeline when drinking and driving laws should be amended, nor does it suggest that people should be permitted to drink while behind the steering wheel. This Article simply suggests that at a certain point it will be inefficient for society to prohibit people from using their autonomous vehicles to chauffeur them. For this system to work, these autonomous vehicles will need the capability of an "I'm drunk, take me home" button, so that an operator would be unable to override the autonomous technology.¹⁶¹ While in this mode, if the vehicle was to malfunction, it would need to have the capability to pull itself over and park because the operator would be incapable of driving the vehicle. If stopped at a DUI checkpoint, the operator would also need to be capable of showing that the autonomous technology had been operating the car, otherwise a savvy driver could press "autonomous mode" when he sees a checkpoint.

In sum, autonomous vehicles will greatly diminish drunk driving, and thus, reduce accidents caused by driver intoxication. Once the technology is capable of permitting intoxicated people to be chauffeured by their autonomous vehicles, regulators should keep an open mind about whether it makes sense to amend their laws.

iii. Reckless Driving and Due Care Statutes

Laws across the country have different standards for what constitutes reckless driving.¹⁶² For instance, North Carolina's reckless driving statute provides:

160. The reality is that eventually it could become unreasonable for someone to operate her vehicle when autonomous vehicles are the norm. This would occur because the autonomous vehicles will be interconnected and able to operate with precision, while the unconnected driver will insert an unnecessary and unpredictable variable into the system, perhaps an unreasonable risk. The author can hear it now: "I'll give you my steering wheel when you pry it from my cold, dead hands."

161. Douma & Palodichuk, *supra* note 1, at 1163 (suggesting an "I'm drunk, take me home" button that turns the autonomous vehicle into a personal taxi).

162. Smith, *supra* note 25, at 487-94.

(a) Any person who drives any vehicle upon a highway or any public vehicular area carelessly and heedlessly in willful or wanton disregard of the rights or safety of others shall be guilty of reckless driving. (b) Any person who drives any vehicle upon a highway or any public vehicular area without due caution and circumspection and at a speed or in a manner so as to endanger or be likely to endanger any person or property shall be guilty of reckless driving.¹⁶³

Under that statute, “[m]ere failure to keep a reasonable lookout does not constitute reckless driving. To this must be added dangerous speed or perilous operation.”¹⁶⁴

Other states, however, explicitly mandate the driver to pay attention to the road, the so-called “due care statutes.” In Georgia, “[a] driver shall exercise due care in operating a motor vehicle on the highways of this state and shall not engage in any actions which shall distract such driver from the safe operation of such vehicle”¹⁶⁵ Variations of this include Tennessee’s due care statute, which requires:

Every driver of a vehicle [to] exercise due care by operating the vehicle at a safe speed, by maintaining a safe look out, by keeping the vehicle under proper control and by devoting full time and attention to operating the vehicle, under the existing circumstances as necessary in order to be able to see and avoid[hitting anything or anyone].¹⁶⁶

163. N.C. GEN. STAT. § 20-140 (2013).

164. *Bunlap v. Lee*, 257 N.C. 447, 450 (1962). *But see* *Stewart v. Combs*, 206 F. Supp. 19, 22 (D.S.C. 1962) (“The defendant was heedless and reckless in failing to maintain a proper lookout and in failing to have his car under proper control so as to be able to avoid leaving the road and turning over and in continuing to drive after having previously dozed off and in disregard of other premonitions, warnings and other manifestations of approaching sleep.”).

165. GA. CODE ANN. § 40-6-241 (2014).

166. TENN. CODE ANN. § 55-8-136 (2012).

In light of these statutes, the question becomes whether operating an autonomous vehicle, while not paying attention to the road, constitutes a per se violation of a reckless driving or duty of care statute.¹⁶⁷ Under North Carolina's statute, or other comparable statutes, operating an autonomous vehicle while distracted would not be reckless because the statute does not mandate a reasonable lookout. It also does not appear that it would be a violation under Georgia's statute because it requires the person not to engage in any activities that distract the driver from the safe operation of the vehicle. Since the autonomous vehicle's ability to drive safely is not dependent on the human operator, the failure to pay attention to the road is not a per se violation. Likewise, being distracted is not illegal per se under the Tennessee due care statute because of its use of the language "as necessary;" thus, it is not necessary that the operator pay attention to the road.

Because operating an autonomous vehicle while distracted is not a per se violation of these statutes, the question is what, if anything, constitutes reckless driving with an autonomous vehicle. An operator of an autonomous vehicle is able to act with willful and wanton disregard for the safety of others. First, the owner of an autonomous vehicle should be guilty of reckless driving if she alters the vehicle in a manner that affects its ability to safely operate.¹⁶⁸ That is not to say that all alterations should be reckless driving, but there will need to be a system where owners of autonomous vehicles notify the manufacturer of certain alterations made to the vehicle to ensure that the technology is properly programmed to the new alterations. In such a situation, criminalizing the owner of the autonomous vehicle for the alteration would serve punishment purposes. It would deter the person from future alterations to her autonomous vehicle, deter others contemplating alterations to their vehicles, and punish the individual for causing harm to others or property.

Second, if the vehicle informs the operator that she needs to regain control over the vehicle due to a malfunction, and the person continues to permit the vehicle to operate in autonomous mode, depending on the situation, such failure to take control

167. Smith, *supra* note 25, at 492 ("[U]sing a widely accepted technology in a manner intended is unlikely to be considered reckless or even negligent.").

168. *See id.* at 515.

could be reckless driving, or it could be simple negligence.¹⁶⁹ Punishing someone for refusing to take control of a malfunctioning autonomous vehicle would deter others from making the same decision, punish the individual for causing harm to other people, and deter her from making the same decision in the future.¹⁷⁰

It may be preferable for jurisdictions to pass specific reckless driving or due care statutes for autonomous vehicle operation. Those laws should prohibit alterations to the vehicle that affect its ability to safely operate. Moreover, it should prescribe the punishment for failure to retake control of an autonomous vehicle when instructed to do so, and if the failure is found to be willful or wanton, the person should be convicted of reckless driving.

iv. Vehicular Manslaughter

Because most vehicular manslaughter statutes are not strict liability offenses,¹⁷¹ vehicular manslaughter prosecutions will become rare due to the inability of the government to prove the requisite *mens rea*. Every state has a law criminally punishing the traditional driver for “vehicular homicide” or “vehicular manslaughter.”¹⁷² South Carolina’s statute reads: “When the death of a person ensues . . . as a proximate result of injury received by the driving of a vehicle in reckless disregard for the safety of others, the person operating the vehicle is guilty of reckless homicide.”¹⁷³ Accordingly, to convict a defendant of reckless homicide, the state needs to prove that the defendant “(1) operated an automobile (2) in reckless disregard for the safety of others; (3) the defendant’s conduct proximately caused injury to the victim, and (4) . . . the victim died as a result of these injuries.”¹⁷⁴ “Reckless disregard for the safety of others signifies an indifference to the consequences of one’s acts. It denotes a

169. See *id.* at 516 (proscribing this under a “due care” statute).

170. However, fear of an accident should be a sufficient personal deterrent.

171. See *supra* Section III.B. for an overview of *mens rea* requirements for vehicular manslaughter.

172. See, e.g., FLA. STAT. § 782.071 (2015); LA. REV. STAT. ANN. § 14:32.1 (2014); S.C. CODE ANN. § 56-5-2910 (2014); S.D. CODIFIED LAWS § 22-16-41 (2014).

173. S.C. CODE ANN. § 56-5-2910 (2012).

174. *State v. Watson*, 563 S.E.2d 336 (S.C. 2002).

conscious failure to exercise due care or ordinary care or a conscious indifference to the rights and safety of others or a reckless disregard thereof.”¹⁷⁵

If the operator of the autonomous vehicle is not in control of the vehicle when an accident occurs, it will be difficult to prove that the operator acted in “reckless disregard” for the safety of others.¹⁷⁶ Under New York’s serious blameworthiness standard,¹⁷⁷ it is hard to see how the operator of an autonomous vehicle could ever be convicted of vehicular homicide. To have the requisite intent under one of these statutes, the operator would need to do something more than taking her attention away from the road. For example, if the vehicle stated it was malfunctioning and the operator completely disregarded her duty to retake control of the vehicle, then perhaps the requisite intent could be inferred. But note that in a vehicle like Google’s prototype, the operator does nothing except start the vehicle and input the destination. Therefore, that person could practically never have the requisite *mens rea* to commit vehicular homicide. In addition, criminalizing vehicular manslaughter for an operator of an autonomous vehicle that kills someone would not serve any punishment purposes without requiring some level of culpability on the part of the operator, such as negligence.

Vehicular manslaughter statutes where the operator of the vehicle is intoxicated, unlike other vehicular manslaughter statutes, do not necessarily require a specific *mens rea*.¹⁷⁸ Assume, for instance, that Dan, in the example at the beginning of this Article, does not get stopped at a checkpoint. Instead, his vehicle malfunctions without warning him or properly pulling itself over, and crosses into the oncoming lane of traffic, tragically and fatally striking a vehicle going the opposite direction.

The question becomes whether Dan is criminally responsible for vehicular homicide while intoxicated. The short answer is maybe. For example, California’s statute reads:

175. State v. Rowell, 487 S.E.2d 185, 186 (S.C. 1997).

176. See Douma & Palodichuk, *supra* note 1, at 1160 (“[A]s long as the operator was merely acting as a passenger, negligence could not be found in the traditional sense.”).

177. See *supra* Section III.B.

178. See, e.g., CAL. PENAL CODE § 191.5 (2014); COLO. REV. STAT. § 18-3-106(1)(b)(I) (2014).

Gross vehicular manslaughter while intoxicated is the unlawful killing of a human being without malice aforethought, in the driving of a vehicle, where the driving was in violation [of the state's DUI statute], and the killing was either the proximate result of the commission of an unlawful act, not amounting to a felony, and with gross negligence, or the proximate result of the commission of a lawful act that might produce death, in an unlawful manner, and with gross negligence.¹⁷⁹

Under such a statute,¹⁸⁰ an operator of an autonomous vehicle would probably not be convicted under the gross negligence provision. That statutory provision requires the operator to commit some unlawful act with gross negligence;¹⁸¹ it seems unlikely that an operator of an autonomous vehicle would have the necessary *mens rea*. But California also prescribes vehicular manslaughter when a person is intoxicated without requiring proof of gross negligence.¹⁸² Under that statute, an intoxicated person could be convicted because the vehicle would have violated a traffic law when it struck the person.

This would lead to an absurd result, especially in a situation with a vehicle like Google's prototype because the operator—no matter what—cannot control the vehicle.¹⁸³ In such a situation, no criminal law purposes are furthered by punishing the operator of an autonomous vehicle that she cannot control. Accordingly, these statutes should be amended so that a person could not be convicted when her intoxication is not, at least, the proximate cause of the traffic related death.

Under Colorado's strict liability DUI homicide statute, the result may not be the same. Colorado's statute states:

179. CAL. PENAL CODE § 191.5(a) (2014).

180. See *supra* Section IV.A.ii. for a discussion as to why an operator of an autonomous vehicle could be convicted of driving under the influence even if the vehicle is in autonomous mode.

181. *People v. Wilson*, 219 Cal. App. 4th 500, 509 (Ct. App. 2013).

182. CAL. PENAL CODE § 191.5(b) (2014).

183. This is also another reason why an operator of an autonomous vehicle should not be responsible for traffic violations of her autonomous vehicle. See *supra* Section III.B. for a discussion on traffic violations.

If a person operates or drives a motor vehicle while under the influence of alcohol or one or more drugs, or a combination of both alcohol and one or more drugs, and such conduct is the proximate cause of the death of another, such person commits vehicular homicide. This is a strict liability crime.¹⁸⁴

Unlike the California statute which requires the breaking of the traffic law be the proximate cause of the death,¹⁸⁵ this statute requires the intoxication be the proximate cause of the death of another. Thus, in the Google prototype car the operator's intoxication has no effect on the situation; even if the operator were sober, there is nothing the operator could do to prevent the accident. In an autonomous vehicle with an "I'm drunk, take me home" button, however, the operator's intoxication may be the proximate cause of the death. In this situation, if a sober operator could have regained control of the vehicle to prevent the accident, the operator's intoxication could be considered the proximate cause of the death, leading to a conviction. As stated earlier, the law should either permit people to use an "I'm drunk, take me home" button or not. If the law permits its use, a person should not be convicted of vehicular manslaughter while intoxicated when her autonomous vehicle malfunctions and causes the death of another person.

Although vehicular homicide will be tough to prove for the operator of an autonomous vehicle, it would not be so difficult for someone who causes death by hacking into the autonomous vehicle.¹⁸⁶ The hacker will have the requisite intent, and should be prosecuted for vehicular homicide for deaths caused due to her intrusion into the vehicle. A hacker could also, depending on the situation, have the requisite malice to be convicted of murder and not just vehicular manslaughter.

184. COLO. REV. STAT. § 18-3-106(1)(b)(I) (2013).

185. CAL. PENAL CODE § 191.5(a) (2013).

186. See *infra* Section IV.B.iii. for a discussion on hacking.

B. Non-Vehicle Related Crimes

Non-vehicle related crimes, as used in this Article, are those crimes that have applicability outside the context of vehicles. This Section will examine two of those laws: (1) location-specific crimes and (2) intentional—physical and virtual—interference with autonomous vehicle operation.

i. Location-Specific Laws

Some criminal statutes carry an additional punishment or prohibit certain acts in the vicinity of an area, or prohibit a person from being in the proximity of an individual or area. A common example of this type of law is possession of an illicit substance within a school zone. These laws differ drastically throughout the country.¹⁸⁷

Let us assume that Tammy, while in possession of three ounces of marijuana, instructs her autonomous vehicle to take her to a house for a delivery of her “goods.”¹⁸⁸ The autonomous vehicle receives notification that an accident occurred on the best route. Realizing the delay, the autonomous vehicle reroutes itself to drive on a road in front of a school while school is ending for the day. While driving pass the school, the autonomous vehicle malfunctions and fails to follow the school zone speed limit. An officer immediately pulls Tammy over within 300 feet of the school grounds. He smells an interesting odor in the vehicle, searches the vehicle, and finds the three ounces of marijuana.

The question is whether Tammy can be convicted for the increased penalty of possession or possession with intent to distribute¹⁸⁹ within proximity of a school. The answer will depend on the statute. Under South Carolina law, for instance, she could not be convicted for two reasons: first, the statute requires the person to have actual knowledge that she is within a school zone; second, the person must “actually distribute, sell, purchase, manufacture, or unlawfully possess with intent to distribute.”¹⁹⁰ In

187. *Drug-Free Zone Laws: An Overview of State Policies*, THE SENTENCING PROJECT, http://sentencingproject.org/doc/publications/sen_Drug-Free%20Zone%20Laws.pdf.

188. The situation becomes even more complicated when an unmanned autonomous vehicle that drives through a school zone.

189. Many state laws create a presumption of intent to distribute when a person possesses a certain quantity of drugs. *See, e.g.*, KAN. STAT. ANN. § 21-5705(e) (2011).

190. S.C. CODE ANN. § 44-53-445 (2014).

the hypothetical, Tammy does not realize that she is within a school zone, and she does not “actually” distribute, sell, purchase, manufacture, or unlawfully possess with intent to distribute in a school zone. Under other state laws, it will be a closer call. For instance, in Arkansas, a person is subject to an enhanced additional term of ten years’ imprisonment if the person possesses a controlled substance classified as a Class C felony or greater, or possesses with the purpose to deliver, delivers, manufactures, or traffics a controlled substance within one thousand feet of a variety of different locations, such as schools, parks, skating rinks, video arcades, community centers, and churches.¹⁹¹ This statute lacks the knowledge requirement that the South Carolina statute contains, and does not require the person to actually distribute, thus potentially permitting conviction based on the quantity of drugs and not actual intent.¹⁹²

Other laws within this category are location-specific and person-specific restrictions, such as probation restrictions, restraining orders, and sex offender restrictions.¹⁹³ More should be expected of people with such obligations to ensure that they

(A) It is a separate criminal offense for a person to distribute, sell, purchase, manufacture, or to unlawfully possess with intent to distribute, a controlled substance while in, on, or within a one-half mile radius of the grounds of a public or private elementary, middle, or secondary school; a public playground or park; a public vocational or trade school or technical educational center; or a public or private college or university. (B) For a person to be convicted of an offense pursuant to subsection (A), the person must: (1) have knowledge that he is in, on, or within a one-half mile radius of the grounds of a public or private elementary, middle, or secondary school; a public playground or park; a public vocational or trade school or technical educational center; or a public or private college or university; and (2) actually distribute, sell, purchase, manufacture, or unlawfully possess with intent to distribute, the controlled substance within a one-half mile radius of the grounds of a public or private elementary, middle, or secondary school; a public playground or park; a public vocational or trade school or technical educational center; or a public or private college or university.

Id.

191. ARK. CODE ANN. § 5-64-411 (2011).

192. Compare *id.*, with S.C. CODE ANN. § 44-53-445.

193. See Patrick Lin, *What If Your Autonomous Car Keeps Routing You Past Krispy Kreme?*, ATLANTIC (Jan. 22, 2014, 8:08 AM), <http://www.theatlantic.com/technology/archive/2014/01/what-if-your-autonomous-car-keeps-routing-you-past-krispy-kreme/283221> (asking who is to blame when an autonomous vehicle drives a “registered sex offender right by a school when he isn’t supposed to be within 2,000 feet of them”).

comply with their restrictions. For instance, if a man obtains a restraining order due to domestic abuse from his ex-girlfriend, she should ensure that her autonomous vehicle does not drive past his house. Nonetheless, regulators will want to address these situations to make it clear as to whether such people will be responsible to keep a lookout.

ii. Physical Interference with the Operation of an Autonomous Vehicle

Two types of physical interference with an autonomous vehicle can occur. First, a person could interfere with a physical component of an autonomous vehicle, such as by removing a component or sending signals to jam the technology.¹⁹⁴ If the person takes a component of an autonomous vehicle, she could be charged under current law much like a person who steals a part from a traditional car.¹⁹⁵ If the person alters the technology, she could be prosecuted for tampering with a vehicle. North Carolina's anti-tampering statute provides: "Any person who either individually or in association with one or more other persons willfully injures or tampers with any vehicle . . . without the consent of the owner is guilty of a Class 2 misdemeanor."¹⁹⁶ "An accepted definition of 'tamper' is to 'interfere with.'"¹⁹⁷ "Interference includes conduct which is broader in scope than merely damaging a vehicle, for it encompasses any act inconsistent with the ownership thereof."¹⁹⁸ Another type of a tampering statute reads: "A person commits the crime of tampering in the first degree if: . . . [h]e or she knowingly receives, possesses, sells, alters, defaces, destroys or unlawfully operates an automobile . . .

194. See Anderson et al., *supra* note 3, at 71 ("Vandals or criminals may use GPS jammers or send other interference signals to disrupt [autonomous vehicle] sensors or transmit false sensor readings to a vehicle's sensors.").

195. See, e.g., S.C. CODE ANN. § 16-13-30 (2010).

196. N.C. GEN. STAT. § 20-107 (1994); see also CAL. VEH. CODE § 10852 (1959); R.I. GEN. LAWS § 31-9-3 (1956).

197. California v. Anderson, 543 P.2d 603, 606 (Cal. 1975) (citing WEBSTER'S NEW WORLD DICTIONARY (2d College ed. 1974)). California has the same anti-tampering statute as North Carolina. See CAL. VEH. CODE 10852 (1959) ("No person shall either individually or in association with one or more other persons, willfully injure or tamper with any vehicle or the contents thereof or break or remove any part of a vehicle without the consent of the owner.").

198. Anderson, 543 P.2d at 606.

without the consent of the owner.”¹⁹⁹ Under either of these statutes, interfering with the technology that operates the vehicle could lead to prosecution for tampering with a vehicle.

The second type of physical interference will involve people interfering with driving—the so-called “pranksters.” Autonomous vehicles will be capable of adapting to what is occurring on the street.²⁰⁰ For instance, Google has already tested its autonomous vehicle to show that it can stop at a “construction area” for a person holding a stop sign.²⁰¹ As such, how is an autonomous vehicle to know that the person holding the stop sign is a construction worker, someone authorized under law, or just a prankster? Perhaps, under a broad prohibition against tampering, the prankster could be prosecuted because she could technically fit the definition of “operating” the autonomous vehicle by controlling its driving. Nonetheless, state governments will want to address these scenarios to ensure that those who interfere with the safe operation of an autonomous vehicle can be appropriately prosecuted.

iii. Virtual Interference with the Operation of an Autonomous Vehicle

In addition to physically interfering with an autonomous vehicle, people will be able to virtually interfere with the operation of an autonomous vehicle, also known as hacking.²⁰² “Hacking is defined as ‘gaining unauthorized access to a computer system, programs or data.’”²⁰³ Vehicles on the road today with their dependence on computers are already subject to hacking.²⁰⁴ “The

199. MISS. CODE ANN. § 569.080 (2005).

200. Gomes, *supra* note 51 (“[Chris] Urmson [of Google] showed video of a prototype Google car navigating through a real-life construction zone marked by flashing yellow arrow signs, and even stopping when a ‘construction worker’—actually a Google employee—waved a hand-held stop sign.”).

201. *See id.* (“[A] fully autonomous vehicle would need to understand that someone waving his arms by the side of the road is actually a policeman trying to stop traffic.”).

202. *See, e.g.,* Douma & Palodichuk, *supra* note 1, at 1164–66; Anderson et al., *supra* note 3, at 70–71.

203. Fernando M. Pinguelo & Bradford W. Muller, *Virtual Crimes, Real Damages: A Primer on Cybercrimes in the United States and Efforts to Combat Cybercriminals*, 16 VA. J.L. & TECH. 116, 132 (2011) (quoting Marc D. Goodman & Susan W. Brenner, *The Emerging Consensus on Criminal Conduct in Cyberspace*, 6 UCLA J.L. & TECH. 3, 12 (2002)).

204. Cheryl Dancey Balough & Richard C. Balough, *Cyberterrorism on Wheels: Are Today’s Cars Vulnerable to Attack?*, ABA BUS. LAW TODAY (Nov. 2013), <http://www.american>

potential vulnerability of cars to hacking will increase as V2V and self-driving cars become available.”²⁰⁵ Providing solutions to protect an autonomous vehicle from hackers is beyond the scope of the Article. Therefore, this inquiry will be limited to the application of criminal law to hacking.

Initially, the operator of an autonomous vehicle should not be liable for her vehicle’s criminal violations resulting from hacking. A person generally can only be convicted for voluntary acts.²⁰⁶ The operator of a hacked autonomous vehicle is not acting voluntarily when someone else takes control over her vehicle. Therefore, the operator should not be criminally liable for criminal law violations when her vehicle has been hacked.

The rest of this Section will examine the criminal liability of the hacker. The hacker of an autonomous vehicle could be prosecuted under state law, federal law, or both. Although a hacker could implicate a variety of criminal laws under both state and federal laws, this Section will provide an overview of the major laws that may be relevant.

“Most states have a [computer] trespass (‘hacking’) statute which makes it a crime to purposely access a computer, computer system or network without authorization.”²⁰⁷ Computer and computer network are broadly defined under these statutes and

bar.org/publications/blt/2013/11/02_balough.html; Andy Greenberg, *How Hackable is Your Car? Consult this Handy Chart*, WIRED (Aug. 6, 2014, 6:30 AM), <http://www.wired.com/2014/08/car-hacking-chart>; Kevin Poulsen, *Hacker Disables More than 100 Cars Remotely*, WIRED (Mar. 17, 2010, 1:52 PM), <http://www.wired.com/2010/03/hacker-bricks-cars>; see also Charlie Miller & Chris Valasek, *A Survey of Remote Automotive Attack Surfaces*, BLACK HAT SECURITY CONF. 1, 1 (Aug. 2014), available at <http://blog.hackthecar.com/wp-content/uploads/2014/08/236073361-Survey-of-Remote-Attack-Surfaces.pdf> (exploring the ability to hack twenty-four different vehicles).

205. Balough & Balough, *supra* note 204.

206. See, e.g., TEX. PENAL CODE ANN. § 6.01(a) (West 1994) (“A person commits an offense only if he voluntarily engages in conduct, including an act, an omission, or possession.”); Ian P. Farrell & Justin F. Marceau, *Taking Voluntariness Seriously*, 54 B.C. L. REV. 1545, 1545 (2013) (“As any first-year law student can explain, the ‘voluntary act requirement’ is a foundational component of criminal law.” (citations omitted)); A.P. Simester, *On the So-Called Requirement for Voluntary Action*, 1 BUFF. CRIM. L. REV. 403, 404–05 (1998) (A person can be “blamed for the occurrence of an outcome only when one is morally responsible for that outcome—and that one cannot be morally responsible for bringing anything about unless it is brought about voluntarily.”).

207. Susan W. Brenner, *State Cybercrime Legislation in the United States of America: A Survey*, 7 RICH. J.L. & TECH. 28 ¶ 15 (2001) (collecting statutes). See, e.g., ALA. CODE §§ 13A-8-112, 13A-8-113 (2012); ALASKA STAT. § 11.46.740 (2011); ARIZ. REV. STAT. ANN. § 13-2316(A) (2011); ARK. CODE ANN. § 5-41-104 (1987); CAL. PENAL CODE § 502 (2011); N.Y. PENAL LAW § 156.05 (McKinney 2006).

encompass more than the traditional computer or computer system.²⁰⁸ Iowa's criminal trespass statute states:

A person who knowingly and without authorization accesses a computer, computer system, or computer network commits the following: (a) An aggravated misdemeanor if computer data is accessed that contains a confidential record . . . , operational or support data of a public utility . . . , operational or support data of a rural water district . . . , operational or support data of a municipal utility . . . , operational or support data of a public airport or a trade secret (b) A serious misdemeanor if computer data is copied, altered, or deleted. (c) A simple misdemeanor for any access which is not an aggravated or serious misdemeanor.²⁰⁹

An autonomous vehicle is not a public utility, rural water district, municipal data, or a public airport, and it would not necessarily contain a confidential record or trade secrets. Therefore, a hacker could not be convicted under this statute for an aggravated misdemeanor. The person, however, could be said to have altered the computer data by changing the vehicle's route. Therefore, the hacker could be convicted of a serious misdemeanor under Iowa state law, which carries a punishment of

208. See Steven Damian Impart, *Validity, Construction, and Application of State Computer Crime and Fraud Laws*, 87 A.L.R. 6TH 1 (2013) ("State laws addressing computer fraud or crime often encompass actions beyond those one may normally associate with a personal computer."). For instance, under Colorado law, "computer" is defined as:

an electronic, magnetic, optical, electromagnetic, or other data processing device which performs logical, arithmetic, memory, or storage functions by the manipulations of electronic, magnetic, radio wave, or light wave impulses, and includes all input, output, processing, storage, software, or communication facilities which are connected or related to or operating in conjunction with such a device.

COLO. REV. STAT. § 18-5-101(2) (2000). This definition would encompass the computer system of an autonomous vehicle. See *supra* Section IV.B.iii. The definition of computer network "means the interconnection of communication lines (including microwave or other means of electronic communication) with a computer through remote terminals, or a complex consisting of two or more interconnected computers." COLO. REV. STAT. § 18-5-101(3) (2000). V2I and V2V systems would be computer networks under this statute.

209. IOWA CODE § 716.6B(1) (2004).

at least a \$315 fine not to exceed \$1,875, and up to one year in prison.²¹⁰ In New Hampshire, computer trespassing becomes a felony when damage to property exceeds \$1,000 or, and more importantly, when the hacker causes no bodily harm or property damage, the intrusion “creates a risk of serious injury to another person.”²¹¹

States also have vandalism hacking statutes.²¹² Unlike the trespassing statutes, the vandalism statutes “typically make it a more serious crime to purposely access a computer without authorization and alter, damage or disrupt the operation of the computer and/or the data it contains.”²¹³

Some states’ anti-hacking regimes cover more than just trespassing and vandalism, and provide increased punishments depending on the amount of damage.²¹⁴ New York sets out computer tampering by degree. Computer tampering in the fourth degree occurs when a person “uses, causes to be used, or accesses a computer, computer service, or computer network without authorization and she intentionally alters in any manner or destroys computer data or a computer program of another person.”²¹⁵ The third degree computer tampering statute states:

A person is guilty of computer tampering in the third degree when he commits the crime of computer tampering in the fourth degree and:

1. he does so with an intent to commit or attempt to commit or further the commission of any felony; or
2. he has been previously convicted of any crime under this article or [the theft of services statute] of this chapter; or
3. he intentionally alters in any manner or destroys computer material; or
4. he intentionally alters in any manner or destroys computer data or a computer program so as to

210. IOWA CODE § 903.1 (2014).

211. N.H. REV. STAT. ANN. § 638.18 (2010).

212. Brenner, *supra* note 207, ¶ 15 (collecting statutes).

213. *Id.*

214. *See, e.g.*, N.Y. PENAL LAW § 156.00 (2006), *et. seq.*; CONN. GEN. STAT. § 53a-250 (1984), *et. seq.*

215. N.Y. PENAL LAW § 156.20.

cause damages in an aggregate amount exceeding one thousand dollars.²¹⁶

Violation of the third degree statute is a class E felony.²¹⁷ If the intrusion causes at least \$3,000 in damage, it is considered computer tampering in the second degree and a class D felony.²¹⁸ Tampering in the first degree occurs when the damage exceeds \$50,000, and is a class C felony.²¹⁹

With regard to non-computer laws, the hacker could be charged with tampering vehicles,²²⁰ especially under a statute like Missouri's discussed earlier that includes "operating" a vehicle without the consent of the owner.²²¹ Because a hacker would be interfering with the operation of the vehicle, she could be prosecuted under an anti-tampering statute.

Depending on the situation, a hacker could also be charged with kidnapping. South Carolina's kidnapping statute states: "Whoever shall unlawfully seize, confine, inveigle, decoy, kidnap, abduct or carry away any other person by any means whatsoever without authority of law . . . is guilty of a felony."²²² "Kidnapping is a continuous offense that commences when one is wrongfully deprived of freedom and continues until freedom is restored."²²³ Under this broad definition, if the hacker changed the route of an occupied autonomous vehicle, she could potentially be convicted of kidnapping the occupants of the vehicle.

Furthermore, a hacker could be charged with joyriding. South Carolina's joyriding statute states: "It is unlawful for a person not entitled to possession of a vehicle to take, use, or drive a vehicle, without the consent of the owner and with intent to deprive him, temporarily or otherwise, of the vehicle or its

216. N.Y. PENAL LAW § 156.25 (2006).

217. *Id.*

218. *Id.* § 156.26(1).

219. *Id.* § 156.27.

220. Smith, *supra* note 25, at 496.

221. *See supra* Part IV.B.ii.

222. S.C. CODE ANN. § 16-3-910 (1976). Every state criminalizes kidnapping. *See, e.g.*, MISS. CODE ANN. § 97-3-53 (2011); N.C. GEN. STAT. § 14-39 (2006).

223. *State v. Porter*, 698 S.E.2d 237, 243 (S.C. Ct. App. 2010) (citing *State v. Tucker*, 512 S.E.2d 99, 105 (S.C. 1999)).

possession.”²²⁴ Hacking into an unoccupied autonomous vehicle to operate it would be a taking or using, which would fall within the joyriding statute. Certainly, if the car is occupied when the hacking occurred, it would not be joyriding; it would be a more severe crime such as kidnapping. If, however, someone hacked an unoccupied vehicle, that person could be guilty of joyriding.

Hackers could also be prosecuted under other criminal laws. For instance, if the hacker uses the vehicle to kill the occupants of the autonomous vehicle or another person, she could be prosecuted for murder. Moreover, a hacker could be convicted of grand larceny if the government could prove intent to permanently deprive the owner of possession.²²⁵ In addition, the hacker may be liable for traffic violations, such as speeding.

The federal government would also be able to prosecute the hacker,²²⁶ though it would not be able to prosecute under the federal carjacking statute. The federal carjacking statute provides: “Whoever, with the intent to cause death or serious bodily harm, takes a motor vehicle that has been transported, shipped, or received in interstate or foreign commerce from the person or presence of another by force and violence or by intimidation, or attempts to do so” is guilty of carjacking.²²⁷ It is unlikely that hacking into a car would be covered by this statute because it would be nearly impossible to prove that the taking was by force and violence or by intimidation because the hacking would presumably occur remotely without knowledge of the occupants.

Instead, the federal government would want to prosecute hackers under the Computer Fraud and Abuse Act (“CFAA”).²²⁸ The CFAA “is the primary federal anti-hacking statute providing both criminal penalties and (limited) rights of private action for certain unauthorized activities using computers and similar

224. S.C. CODE ANN. § 16-21-60(A) (1993). Other states have similar prohibitions against joyriding. *See, e.g.*, MICH. COMP. LAWS § 750.414 (2003); OHIO REV. CODE ANN. § 2913.03 (2011); TENN. CODE ANN. § 39-14-106 (1989); W. VA. CODE § 17A-8-4 (1999).

225. *See, e.g.*, S.C. CODE ANN. § 16-13-30 (1993).

226. The federal government also has other avenues to prosecute hackers. Another potential avenue, not discussed by this Article, is the Electronic Communications Privacy Act (“ECPA”). The ECPA prohibits unlawful interception and disclosure of wire, oral, and electronic communications. 18 U.S.C. § 2511 (2012).

227. 18 U.S.C. § 2119 (2012).

228. *See* Balough & Balough, *supra* note 204 (discussing the application of CFAA to hacking of computerized vehicles).

information systems.”²²⁹ “The CFAA is a computer security statute aimed at protecting the computers operated by the federal government and banking institutions, and computers linked to the internet.”²³⁰ “It is not a comprehensive provision, but instead it fills cracks and gaps in the protection afforded by other state and federal criminal laws.”²³¹ The CFAA, in relevant part, prohibits anyone from “intentionally access[ing] a computer without authorization or exceed[ing] authorized access, and thereby obtains . . . information from any protected computer.”²³² Moreover, the CFAA proscribes anyone from “intentionally access[ing] a protected computer without authorization, and as a result of such conduct, causes damage and loss.”²³³ Damage is defined as “any impairment to the integrity or availability of data, a program, a system, or information.”²³⁴ Loss is “any reasonable cost to any victim.”²³⁵ Computer is defined as “an electronic, magnetic, optical, electrochemical, or other high speed data processing device performing logical, arithmetic, or storage functions, and includes any data storage facility or communications facility directly related to or operating in conjunction with such device.”²³⁶ A protected computer is a computer that is used in or affects interstate commerce.²³⁷

An autonomous vehicle’s computer system would qualify as a computer under the CFAA because it is an electronic device that performs logical functions. Moreover, due to the fact that computer system is the main operator of the vehicles, and vehicles affect interstate commerce,²³⁸ it would affect interstate commerce.

229. David Thaw, *Criminalizing Hacking, Not Dating: Reconstructing the CFAA Intent Requirement*, 103 J. CRIM. L. & CRIMINOLOGY 907, 909 (2013).

230. Pinguelo & Muller, *supra* note 203, at 139 (citing Charles Doyle, *Cybercrime: An Overview of the Federal Computer Fraud and Abuse Statute and Related Federal Criminal Laws*, CONG. RESEARCH. SERV. at 1 (Oct. 15, 2014), available at <http://www.fas.org/sgp/crs/misc/97-1025.pdf>).

231. Doyle, *supra* note 230, at 1.

232. 18 U.S.C. § 1030(a)(2)(C) (2012).

233. *Id.* § 1030(a)(5)(C).

234. *Id.* § 1030(e)(8).

235. *Id.* § 1030(e)(11).

236. *Id.* § 1030(e)(2).

237. *Id.*

238. Doyle, *supra* note 230, at 34 (noting that to establish the interstate commerce element, “no more is required than that the computer or computer system have some slight impact on interstate or foreign commerce” (citations omitted)); see *Wickard v.*

Therefore, the federal government would be able to prosecute hackers under the CFAA for unauthorized access to an autonomous vehicle.

Federal law also has a “Destruction of motor vehicles or motor vehicle facilities” statute, which provides:

Whoever willfully, with intent to endanger the safety of any person on board or anyone who he believes will board the same, or with a reckless disregard for the safety of human life, damages, disables, destroys, tampers with . . . any motor vehicle which is used, operated, or employed in interstate or foreign commerce . . . shall be fined under this title or imprisoned not more than twenty years, or both.²³⁹

The statute likewise proscribes committing the same act on “any garage, terminal, structure, supply, or facility” used by motor vehicles in interstate commerce.²⁴⁰

A hacker could potentially be prosecuted under this statute for either taking control of an autonomous vehicle or for disrupting the traffic control system.²⁴¹ The hacker acts willfully when she overtakes the computer system, and it would appear that in most situations it would be with the intent to endanger the safety of the occupants or with reckless disregard for their lives. The issue would be the interstate commerce provision in this statute, which does not employ the “affect interstate commerce” language that the CFAA used; instead, it requires that the motor vehicles are “used, operated, or employed in interstate commerce.”²⁴² The Supreme Court, in construing Section 7 of the

Filburn, 317 U.S. 111, 126–29 (1942) (allowing Congress to control a farmer’s personal wheat consumption).

239. 18 U.S.C. § 33(a) (2012).

240. *Id.*

241. Doyle, *supra* note 2, at 48 (examining the traffic control portion of the statute and stating “[c]omputer abuse that damages or destroys motor traffic control systems in a manner threatening to human safety would seem to fall within the reach of Section 33”).

242. See *United States v. Lowe*, 65 F.3d 1137, 1149–50 (4th Cir. 1995) (Motz, J., dissenting). In addition, the statute does not use the interstate commerce language employed in the carjacking statute, which covers vehicles “transported, shipped, or received in interstate commerce.” 18 U.S.C. § 2119 (2012). That language has been

Clayton Act, stated the language “‘in commerce’ . . . appears to denote only persons or activities within the flow of interstate commerce—the practical, economic continuity in the generation of goods and services for interstate markets and their transport and distribution to the consumer.”²⁴³ Commercial autonomous vehicles would be covered by this interstate commerce language.²⁴⁴ The question would be whether purely intrastate personal use vehicles would be covered by this statute. Based on Congress’s decision, when enacting 18 U.S.C. § 33, not to use the full extent of its powers under the Commerce Clause, defendants to an action for hacking a purely personal vehicle will raise the question as to whether the vehicle was “used, operated, or employed in interstate commerce.”²⁴⁵

In sum, even though state and federal governments are not without remedy for prosecuting hackers of autonomous vehicles, they each should pass laws directly addressing hacking of such vehicles, or at least increase the punishments of the current anti-hacking statutes. These statutes were enacted for the purposes of protecting computers and data from intrusion. In those instances, the usual loss would be economic. With autonomous vehicles, drones, and other robots that are subject to hacking, the loss will be serious bodily harm, property damage, or both. Therefore, although the punishment may be proportional to hacking that causes economic loss, the punishment is not proportional to hacking that creates serious bodily injury and property damage.

Moreover, as with most interstate crimes, the federal government may be in the best position to prosecute hackers. A person is capable of hacking a vehicle across state boundaries, or international borders,²⁴⁶ which makes it difficult for the state where the accident occurred to investigate and find the hacker. Or a single hacker could compromise the security of autonomous

broadly construed to include vehicles manufactured in a different state than it is used in. *See, e.g.,* *United States v. Johnson*, 22 F.3d 106, 108–09 (6th Cir. 1994).

243. *United States v. Am. Bldg. Maint. Inds.*, 422 U.S. 271, 277 (1975) (quoting *Gulf Oil Corp. v. Copp Paving Co.*, 419 U.S. 186, 195 (1974)) (internal quotation marks omitted).

244. *See, e.g.,* *Lowe*, 65 F.3d at 1143; *United States v. Heightland*, 865 F.2d 94, 96–97 (6th Cir. 1989); *United States v. Heightland*, 678 F. Supp. 159, 161–63 (E.D. Ky. 1987).

245. 18 U.S.C. § 33 (2012).

246. *See* Marc D. Goodman & Susan W. Brenner, *The Emerging Consensus on Criminal Conduct in Cyberspace*, 10 INT’L J.L. & INFO. TECH. 139, 143 (2002) (“Unlike traditional crime, cybercrime is global crime.”).

vehicles in multiple states, again putting the federal government in the best position to investigate and prosecute the hacker.

Therefore, the federal government should enact statutes addressing hacking of autonomous vehicles. Much like many other crimes that are prohibited under both federal and state law,²⁴⁷ states should also enact anti-hacking laws that directly address the crime of hacking into autonomous vehicles so that their citizens are more protected.

V. CONCLUSION

“America is at a historic turning point for automotive travel.”²⁴⁸ Although the government typically lags behind technology when it passes laws, the current application of criminal and traffic laws to autonomous vehicles will make programming the vehicles challenging. It will make the enforcement of the laws difficult, and it creates anomalous results. Therefore, as this technology advances, federal and state regulators should amend criminal laws to make for a smooth introduction of autonomous vehicles into the marketplace.

247. An example is bank robbery, which is prohibited under both federal and state law. 18 U.S.C. § 2113 (2012); ME. REV. STAT. ANN. tit. 17-A, § 651 (2006 & Supp. 2014); S.C. CODE ANN. § 16-11-380 (2003 & Supp. 2014).

248. NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., *supra* note 24, at 1.