CARS OF THE FUTURE: WHY THE LAW NEEDS TO CATCH UP

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Most people have heard of self-driving cars, and people are increasingly relying on semi-autonomous vehicle safety functions such as lane departure assist, blind spot monitoring, and adaptive cruise control. However, these features are only the tip of the iceberg. Once the subject of science fiction, the car of the future may not be such a distant reality. Firms aggressively investing in autonomous vehicle (AV) systems have teased the public with promising advancements, demonstrating how quickly we are approaching full automation in controlled testing environments. Aware of their benefits, state lawmakers have been busy trying to attract firms to test their AV systems in their states.[1] However, the current piecemeal regulatory framework has an unintended chilling effect on the nationwide rollout of self-driving cars, insofar as developers and carmakers struggle to comply with differing state regulations. Therefore, to fully realize the promise of AV technology, we must promote, rather than discourage, the introduction of self-driving cars in all fifty states by establishing a uniform federal standard.

THE PROMISE OF SELF-DRIVING CARS

Some benefits of self-driving cars are immediately apparent. In 2015, over 40,000 people died in motor vehicle accidents, and 94% of all motor vehicle accidents have been attributed to human error.[2] In particular, an overwhelming majority of accidents are due to driver inattention (such as sleeping, texting, and general distraction), speeding, misjudgment of others' speeds and actions, and illegal maneuvers.[3] By removing humans from the equation, self-driving cars are expected to greatly reduce or perhaps even eliminate accidents due to human error, thereby reducing the loss of life. Other benefits of autonomous vehicles include significantly improved traffic,[4] increased workplace productivity,[5] and increased

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[1] *See infra* "State Regulation of Self-Driving Cars."

[2] *Traffic Safety Facts*, NHTSA (Feb. 2015).

[3] *Id.*

[4] Since humans generally cause traffic congestion, self-driving cars would promote efficiency and productivity by reducing commute times and increasing the flow of vehicles.

[5] *See, e.g.*, *How Autonomous Vehicles Could Improve Productivity*, BUSINESS CHIEF (Nov. 15, 2016), https://www.businesschief.com/technology/5647/How-autonomous-vehicles-could-improve-human-productivity. *But see* Matthew DeBord, *Why Driverless Cars Probably Won't Make Us Any More Productive*, BUSINESS INSIDER (Sept. 14, 2016), https://www.businessinsider.com/driverless-

independence and mobility for the elderly and disabled,[6] to name just a few. In sum, these systems have countless benefits, the most promising of which we have yet to realize. In part because of the enormous promise AV systems offer, the race to achieve greater vehicle autonomy, towards the goal of fully autonomous vehicles, has significantly increased in the last several years.

SELF-DRIVING CARS EXPLAINED

Autonomous vehicle technology is not black and white—autonomous or not autonomous. There are varying degrees of automation, and the National Highway Traffic Safety Administration (NHTSA), one of the agencies under the U.S. Department of Transportation (USDOT), has adopted the Society of Automotive Engineers' (SAE) levels of automation:

Level 0: No Automation	The driver is in complete control of the vehicle.
Level 1: Driver Assistance	Automated functions are independent from one another (e.g., electronic stability control[7], adaptive cruise control, and automatic braking).
Level 2: Partial Automation	At least two control functions are designed to work together (e.g., adaptive cruise control[8] and active lane departure steering[9]).

cars-impact-productivity-2016-9 (describing a study claiming that, "at least during the initial arrival of fully autonomous vehicles," productivity is not likely to improve because 62% of participants expressed such apprehension about either riding it these vehicles at all or taking their eyes off the road).

[6] *See, e.g.*, Ashley Halsey III, *Driverless Cars Promise Far Greater Mobility for the Elderly and People with Disabilities*, WASH. POST (Nov. 23, 2017), https://www.washingtonpost.com/local/trafficandcommuting/driverless-cars-promise-far-greater-mobility-for-the-elderly-and-people-with-disabilities/2017/11/23/6994469c-c4a3-11e7-84bc-5e285c7f4512_story.html?utm_term=.d3351a7b8c2f.

[7] Electronic stability control (ESC) technology, more commonly known as traction control, detects when a vehicle has lost traction and automatically brakes to help the driver regain traction.

[8] Adaptive cruise control is a feature like cruise control but can automatically accelerate and brake, sometimes to a complete stop, depending on traffic conditions on a highway.

[9] Active lane departure steering automatically steers a vehicle back into its lane when it has drifted outside of its lane.

Level 3: Conditional Automation	The driver is still necessary but is not required to monitor the environment. The driver must be able to take control with notice.
Level 4: High Automation	Vehicle can assume control of all safety critical functions under certain traffic or environmental conditions; driver is expected to take control of the vehicle on occasion.[10]
Level 5: Full Automation	Vehicle can handle all safety-critical driving functions and will monitor road conditions for an entire trip. The driver has the option of controlling the vehicle.

Most vehicles on the road today fall within the first three levels, with only a select few—namely Tesla's Model 3 and General Motor's Cruise AV—achieving or approaching "high automation." Moving forward, these distinctions may evolve with the advancements in technology or may become less relevant as AV technology develops, but they are a useful way of understanding the current state of self-driving cars.

STATE REGULATION OF SELF-DRIVING CARS

As of January 2019, twenty-nine states (Alabama, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maine, Michigan, Mississippi, Nebraska, New York, Nevada, North Carolina, North Dakota, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia, Vermont, Washington and Wisconsin) and Washington D.C. have passed AV-related legislation, and eleven governors (Arizona, Delaware, Hawaii, Idaho, Illinois, Maine, Massachusetts, Minnesota, Ohio, Washington, and Wisconsin) have issued AV-related executive orders.[11] Some states have mandated studies on self-driving cars before passing any legislation.[12]

These state regulations differ in permissiveness and, perhaps more importantly, on basic details like what constitutes a "vehicle operator."[13] For example, in Tennessee, the operator is the AV

[10] Tesla's Autopilot feature appears to be at this level of automation.
[11] *Autonomous Vehicles | Self Driving Vehicles Enacted Legislation*, NCSL (Nov. 7, 2018) [hereinafter NCSL], http://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.
[12] *Id.*
[13] Jack Karsten and Darrell West, *The State of Self-Driving Car Laws Across the U.S.*, BROOKINGS (May 1, 2018),

system, whereas in Texas, the operator is a natural person.[14] Basic definitions such as who or what constitutes a vehicle operator has a significant impact on the kind of technology that can be tested and employed. A regulation requiring that a human be in the car at all times, for instance, may limit or discourage long-distance, interstate testing.[15]

The most recent state-level regulations have delineated in more concrete terms the bodies responsible for the oversight of AV testing and operation as well as the requirements for testing AVs on public roads.[16] Some states have gone even further. In April 2018, California began issuing permits to allow firms to test their self-driving cars on public roads without a human operator inside.[17] California is not alone in its progressive attitude toward AV technology. Governor Doug Ducey of Arizona issued a broad executive order that granted state agencies the authority to "undertake any necessary steps to support the testing and operation of self-driving cars."[18] This order is arguably the broadest state AV regulation to date, as it not only allows for AVs without human operators, but also—subject to NHTSA approval— for cars without steering wheels, acceleration and brake pedals, and rear and side-view mirrors.[19]

Although states have set the stage for the development of AV systems, the differences in state regulations pose very real challenges for testing and continued progress. With a country as large as the U.S., self-driving cars will inevitably travel across state lines, and interstate travel with self-driving cars ought to be thoroughly tested in all climates and regions. For example, testing self-driving cars in New York, where there is often heavy snowfall, is different than testing in Arizona, where it rarely snows. Since AV developers are attracted by states that are most welcoming, self-driving cars may not be sufficiently prepared to handle inclement weather such as heavy rain, sleet, or snow.[20] In fact, this is a known

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https://www.brookings.edu/blog/techtank/2018/05/01/the-state-of-self-driving-car-laws-across-the-u-s/.

[14] *Id*.

[15] *See id.*

[16] NCSL, *supra* note 8.

[17] Aarian Marshall, *California Welcomes Self-Driving Cars Without Humans Inside*, WIRED (Feb. 26, 2018, 7:10 PM), https://www.wired.com/story/california-self-driving-car-laws/.

[18] *Id*.

[19] Alex Davies, *Mobileye Joins Waymo and Uber in Testing Self-Driving Cars in Arizona*, WIRED (Aug. 8, 2018, 10:00 AM), https://www.wired.com/story/mobileye-self-driving-cars-arizona/.

[20] *See, e.g.*, Daniel Piatkowski, *Self-Driving Cars Could Be Bad for Walkable Cities*, CITYLAB (Oct. 4, 2018),

problem in the field of AV development, and it highlights the need for a uniform, federal standard.[21]

THE NEED FOR A FEDERAL REGULATORY SCHEME

The current federal regulatory scheme for motor vehicles, also known as the Federal Motor Vehicle Safety Standards (FMVSS), requires that automakers include certain human-driver-based components, such as steering wheels and brake and acceleration pedals.[22] Under the FMVSS, automakers can submit petitions to NHTSA for exceptions, which would allow them to deploy, for instance, self-driving cars without steering wheels.[23] By design, the FMVSS assume vehicle operators are human, but in order to encourage innovation in AV technology, the federal government must amend these standards to be consistent with its development. Specifically, we should exclude requirements or provide broader exceptions that impede AV progress (such as steering wheels and driver orientation and position) and include requirements that make driving safer, such as driver assist technology. Europe has already taken steps to amend regulations to not only accommodate AV technology, but to require its use.[24] In March 2018, the European Commission mandated that all vehicles be equipped with autonomous emergency-braking systems and forward-collision warning systems.[25] In July 2018, the U.K. enacted the Automated and Electric Vehicles Act (AEVA), which roughly resembles the efforts in Congress to regulate self-driving cars.[26]

In 2017, the Self-Drive Act gained bipartisan support in the House, but its progress stalled in the Senate. The Self-Drive Act would have provided a system of federal oversight for self-driving cars and an advisory council to assess the various impacts of AV

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https://www.citylab.com/transportation/2018/10/self-driving-cars-vs-walkable-cities/572149/; Kyle Stock, *Self-Driving Cars Can Handle Neither Rain nor Sleet nor Snow*, BLOOMBERG BUSINESSWEEK (Sept. 17, 2018), https://www.bloomberg.com/news/articles/2018-09-17/self-driving-cars-still-can-t-handle-bad-weather. ;

[21] *See* Piatkowski, *supra* note 21; Stock, *supra* note 21.

[22] Johana Bhuiyan, *General Motors is Asking the U.S. Government to Let it Test Cars Without Steering Wheels in 2019*, RECODE (Jan. 12, 2018, 12:01 AM), https://www.recode.net/2018/1/12/16880570/general-motors-self-driving-cars-cruise-steering-wheel-nhtsa-fmvss.

[23] *Id*.

[24] Michaela Herron, *New UK Law Lays the Groundwork for Driverless Cars*, LAW 360 (Oct. 29, 2018, 4:05 PM).

[25] *Id*.

[26] *Id*.

technology.[27] The Senate drafted its own version of an AV bill: the American Vision for Safer Transportation through Advancement of Revolutionary Technology Act (AV START Act).[28] Unfortunately, that bill has also stalled over safety concerns and general apprehension toward AV technology.[29] Considering these recent setbacks, it is unclear whether Congress will be able to pass an AV statute any time soon.[30] Aside from greater uniformity and certainty, a federal statute would send a message to developers of AV systems that the federal government is not only acknowledging them, but that it is ready to work with them.[31]

While AV specific legislation has stalled, the executive branch has taken a laissez-faire approach to AV regulation at a time when federal guidance is arguably most needed. The USDOT recently published a report titled *Automated Vehicles 3.0: Preparing for the Future of Transportation*, which echoes the Trump Administration's attitude toward federal regulation.[32] That is, the view that legal mandates and rules will impede, rather than promote, innovation in AV technology.[33] In other words, this approach believes the free market, not the USDOT, is in the best position to determine the best solutions and technologies. However, it is debatable whether the free market can choose the best technologies when the lack of regulatory uniformity arguably stifles the progress required for such market determinations.

Nonetheless, there is an alternative: increase the number of exemptions from the current FMVSS. Doing so will allow carmakers to implement design changes in their vehicles that would otherwise be prohibited, such as removing side-view mirrors or the driver's seat.[34] Allowing such exemptions could be an adequate, temporary measure in the absence of a federal statute and would avoid the concern of government over-regulation.

In sum, although some state governments have sought to proactively address the rapid development of AV technology, the

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[27] Bob Latta & Jan Schakowsky, *US Needs to Pass Self-Driving Car Legislation Now*, CNBC (June 5, 2018, 11:13 AM), https://www.cnbc.com/2018/06/05/us-needs-to-pass-self-driving-car-legislation-now.html.
[28] *Id.*
[29] *Id.*
[30] *Id.*
[31] *See id.*
[32] *Automated Vehicles 3.0: Preparing for the Future of Transportation*, USDOT (2018).
[33] Andrew Hawkins, *Self-Driving Cars Continue to Face Little Resistance from the Federal Government*, THE VERGE (Mar. 5, 2018, 4:14 PM), https://www.theverge.com/2018/3/5/17080824/dot-autonomous-vehicle-listening-session-washington.
[34] *Id.*

current federal regulatory scheme for motor vehicles is simply inadequate. It fails to consider the impact of AV technology on automotive design and safety. If the U.S. wishes to remain a pioneer of AV technology and reap its many benefits, then it must devise a federal regulatory scheme that encourages the development and introduction of self-driving cars.