JUST THE FACTS: AV LEGISLATION IS NECESSARY, BUT IT CAN'T HAPPEN WITHOUT RESEARCH

BY Tod Northman and Zachary Adams

The unfortunate string of Boeing 737 Max 8 accidents underscore that the complexity arising from autonomy comes with profound risk. As suggested by the name of Tesla's Autopilot feature,[1] there are strong similarities between the way aircraft autopilot functions autonomously and how autonomous vehicles will operate, once the technology catches up.[2] Yet the aviation industry is regulated rigorously but the Department of Transportation has adopted a wait-and-see approach to regulated autonomous vehicles (AV).

In Ralph Nader's 1965 book *Unsafe at Any Speed*, the consumer advocate argued that the automobile industry's focus on style over safety was responsible for the unnecessary deaths of thousands of people each year. Nader's claims helped provoke Congress to create the National Highway Traffic Safety Administration (NHTSA), the federal agency charged with enforcing the Federal Motor Vehicle Safety Standards (FMVSS), a comprehensive set of regulations on vehicle design, construction, and performance.[3]

Now, more than 50 years after FMVSS became effective, the rise of AV technology has led Nader and other safety advocates to again voice concern about automotive safety regulations in the United States. In an article in the *Wall Street Journal*, Nader decried proposed driverless car legislation that he — along with various consumer and public-interest groups commenting on the topic — believes would go too far in exempting the AV industry from regulation.[4]

Safety advocates' concerns about the direction in which AV regulation is headed are understandable but ill-considered. Their premise is that manufacturers will soon roll out fully autonomous vehicles for purchase – thereby imperiling us – and that the federal government must put a stop to it. That misapprehends the most likely present danger from self-driving vehicle oversight: underpowered state regulation.

AV testing is conducted pursuant to state laws, which have widely varied levels of administrative oversight. For example, California has adopted rigorous oversight, requiring permits and annual reports.[5] By contrast, testing in Arizona is conducted under less rigorous supervision, pursuant to an executive order that was promulgated with the direction "to eliminate unnecessary regulations and hurdles to the new technology."[6]

More important, Nader's alarm ignores the looming problem of inadequate technical expertise by federal regulators. The federal-state regulatory collaboration reflects the traditional distinction between regulating automotive hardware — the province of NHTSA — and regulating driver behavior — the states' responsibility. As long as AV companies remain in the testing phase, retaining that structure makes sense. Manufacturers will continue to produce vehicles with increasingly robust safety equipment and will gradually introduce vehicles with higher levels of autonomy in geofenced areas. States can appropriately determine how best to regulate AV testing within their borders.

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[1]Incorrectly, ironically, since Tesla's autopilot is not autonomous in the industry's understanding of the term. *See, for example*, "Billions of miles needed to make Tesla autopilot feature work," News.com.au (March 11, 2019) https://www.news.com.au/technology/innovation/motoring/hitech/billions-of-miles-needed-to-make-tesla-autopilot-feature-work/news-story/7ade1e08c2ca1821bf52cd0113f695e1

[2]Grabar, Henry, "The Crash of the Boeing 737 Max Is a Warning to Drivers, Too", Slate (March 12, 2019), https://slate.com/technology/2019/03/boeing-737-max-crashes-automation-self-driving-cars-surprise.html

[3]The Volpe Report concluded that there are 12 equipment requirements that potentially conflict with the implementation of autonomous vehicles. "Review of Federal Motor Vehicle Safety Standards (FMVSS) for Automated Vehicles, Preliminary Report — March 2016," https://rosap.ntl.bts.gov/view/dot/12260; see also "The Ongoing Transformation of the Global Transportation System," DOT VNTSC-1804, February 2018, https://www.volpe.dot.gov/sites/volpe.dot.gov/files/docs/events/62316/transforming-transportation-series-final-report.pdf. For the time being, manufacturers are invited to apply for exemptions. See, for example, NHTSA's response to Waymo (then Google) at https://isearch.nhtsa.gov/files/Google%20--%20compiled%20response%20to%2012%20Nov%20%2015%20interp%20request%20--%204%20Feb%2016%20final.htm.

[4]Nadar, Ralph, Driverless Car Legislation is Unsafe at this Speed, Aug. 22, 2018, https://wsj.com/articles/driverless-car-legislation-is-unsfat-at-this-speed-1534973755.

[6]https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/bkgd.

[7]https://azgovernor.gov/governor/news/2018/03/governor-ducey-updates-autonomous-vehicle-executive-order.

The AV industry understandably wants a unified system of rules and regulations so that they aren't burdened by local variations. There is also a risk of "rogue" states cutting safety corners in order to attract their share of the economic boom from the burgeoning AV industry; however, the desire for uniformity and protection against risk-tolerant states is not a regulatory hole best plugged by federal regulation.

NHTSA already has the authority to address safety issues arising from self-driving cars, notwithstanding the traditional federal-state division. "Motor Vehicle Safety" is defined in the Motor Vehicle Safety Act as "the performance of a motor vehicle or motor vehicle equipment in a way that protects the public against unreasonable risk of accidents occurring because of the design, construction, or performance of a motor vehicle, and against unreasonable risk of death or injury in an accident, and includes nonoperational safety of a motor vehicle."[7] In other words, NHTSA's authority is plenary where motor vehicle safety is at issue.

Preparing for necessary federal regulation once self-driving cars are commercially available is advisable. The AV industry has the urgently needed opportunity – which existing and proposed legislation misses – to gather information. As vehicles reach full autonomy, the "driver" will become the vehicle's processing unit; the sensors and cameras on AVs are already vacuuming up and sending information back to the car manufacturers. AV test vehicles and vehicles with enhanced safety features are a potential source of data, and with machine learning, data is gold. It can and should be used to better understand such questions as how self-driving cars best function, how they interact with other vehicles and the environment, what forms of AV training are best, and in which situations full autonomy is safe; the questions that could be investigated are endless.

Our proposal is simple: Instead of wringing our hands over the gradual proliferation of autonomous vehicles and expecting Congress to regulate the unknowable future of autonomous vehicles, Congress should require autonomous vehicle developers operating in the United States to share aggregated, anonymized information from high-tech driving systems (from automation levels 2 through 5 as defined by the Society of Automation Engineers). This data should be made available for study by NHTSA, academics, and industry professionals, and Congress should give NHTSA the authority and budget necessary to use those learnings to develop regulations that will tap the benefits of autonomy as effectively and safely as possible.

The Uncertain Status of Current AV Regulation

Since 1966, vehicle miles driven in the United States have increased from 51 billion to 322 billion. But while the number of miles driven has increased over sixfold, the number of traffic fatalities over that timespan has actually decreased — from approximately 51,000 in 1966 to just over 40,100 in 2017. Stated in other terms, fatalities per million vehicles driven have dropped from 5.50 fatalities to 1.18 fatalities.

Much of this decrease can likely be attributed to federal regulations, including FMVSS. When it comes to self-driving technology, however, NHTSA has taken a surprisingly hands-off approach to regulation, preferring instead to allow self-regulation at the state level. NHTSA has explained its perspective in various speeches to the industry,[10] as well as in its regulatory guidance, "Preparing for the Future of Transportation: Automated Vehicle 3.0"[10] and "Automated Driving Systems 2.0, A Vision for Safety," a set of guidelines developed to facilitate the integration of AV technology.[11]
In deciding to engage in a supervisory as opposed to a law-promulgating role, NHTSA explained its belief that (1) autonomous vehicle technology is changing too rapidly for NHTSA to effectively regulate self-driving cars, and (2) it needs to support industry innovators while working to safely introduce automation technologies. In short, NHTSA believes that its regulatory guidelines should encourage rather than hamper the safe development, testing, and deployment of AV technology.[12]

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[7]49 U.S. code § 30102(a)(9).
[8]Cf. Urmson, Chris, "The Fuzzy Numbers for Tracking AV Progress," Sept. 21, 2018, https://www.axios.com/the-fuzzy-numbers-for-tracking-av-progress-8a06c0f6-027b-49bc-b82a-9622c77bf5ec.html.
[9]See, for example, the speech by Secretary of Transportation Elaine Chao on Aug. 8, 2018. Mulero, Eugene, "Transportation Secretary Elaine Chao Touts Department's Approach to Autonomous Policy," Transport Topics, https://www.ttnews.com/articles/transportation-secretary-elaine-chao-touts-departments-approach-autonomous-policy (last visited March 11, 2019).
[10]https://www.transportation.gov/av/3/preparing-future-transportation-automated-vehicles-3.
[11]https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf.
[12]Id.

But as the technology continues to develop, questions such as those posed by Nader challenge the federal government's laissez-faire approach. Once the computer becomes the driver, a different regulatory approach will be needed. Filling that gap will require deep knowledge about AV operations – knowledge that can be gained only through sustained study.

The current lack of federal oversight is not for lack of trying. On Sept. 7, 2017, the United States House of Representatives passed the Safely Ensuring Lives Future Deployment and Research in Vehicle Evolution Act (SELF DRIVE Act).[13] This bill encourages the testing and deployment of autonomous vehicles by preempting states from enacting laws related to the design, construction, or performance of highly automated vehicles or driving systems. And on Sept. 28, 2017, Senator John Thune, R-S.D., introduced the AV START Act. This bill allows federal preemption for AV design and safety.[14] Both bills, however, have faced strong opposition in their respective chambers due to safety concerns, and it does not appear that any resolution or the passing of either bill is on the near horizon.[15]

Unintended Consequences of NHTSA's Hands-Off Approach

Unless action is taken to give federal regulators the knowledge they will require to regulate the self-driving "driver," these objections will have the unintended consequence of leaving autonomous vehicles void of any federal regulatory framework for the foreseeable future. Self-driving vehicles are under regulated or unregulated in most states. Even where there is some semblance of state-level regulation, the rules are inconsistent.

Some states, such as New York[16] and California, have chosen to regulate the testing of self-driving vehicles. Many have elected not to. Either way, the difficulty is in determining what to regulate. Federal preemption precludes states from regulating the hardware of automobiles, except for limited instances when FMVSS establishes a minimum standard. FMVSS conflicts in a number of areas with anticipated features of autonomous vehicles, such as requiring a rear-view mirror or a steering wheel. For testing purposes, AV manufacturers have worked around such limitations through the exemption process.

Thus, while Nader is right to express concern over the speed with which AV technology is being integrated, his premise that lawmaking is moving too fast is flawed. The real issue is that lawmaking is not moving at all. As self-driving technology matures to the point of full autonomy, the federal government likewise needs to take more control – at least *some* level of control – over the regulatory framework.

What Should NHTSA Regulate?

When it comes to autonomous vehicles, NHTSA should vary its traditional approach to regulating automobiles. Instead of focusing on the hardware facilitating autonomy, NHTSA should focus its attention more generally on the ramifications of a computer having complete autonomy over vehicle operations. That is, NHTSA should focus its attention on regulating how the autonomous vehicle performs its driving function, instead of focusing on regulating the hardware components of the vehicle, such as sensors and steering and braking systems.

As it currently stands, NHTSA permits AV manufacturers to assess the safety of their own vehicles and make decisions on recall when they deem it appropriate. Such a framework may work in a mature industry where changes are iterative and generally well understood. But in the fast-evolving field of self-driving cars, such a deliberative process does not adequately protect the public.[17]

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[13]See The Library of Congress, H.R.3388-SELF DRIVE Act, https://www.congrress.gov/bill/115th-cogress/senate-bill/3388.
[14]See The Library of Congress, S.1885-AV START Act, https://www.congress.gov/bill/115th-congress/senate-bill/1885 (last visited March 11, 2019).
[15]See, e.g., Kulisch, Eric, "Lobbying Push Targets Holdouts on Autonomous Vehicle Bill," March 16, 2018, http://www.autonews.com/article/20180316/MOBILITY/180319765/lobbying-senate-holdouts-av-start-act; John McKinnon, Self-Driving Car Safety Legislation Stalls in the Senate, Feb. 12, 2018, https://www.wsj.com/articles/self-driving-car-safety-legislation-stalls-in-the-senate-1518436800.
[16]New York has the most restrictive regulations. In fact, the regulations are so burdensome that GM Cruise's announced plans to begin testing have been delayed more than eight months with no end in sight. "What Happened to GM Testing Self-Driving Cars in New York City?," Sept. 13, 2018, https://transportationvoice.com/what-happened-to-gm-testing-self-driving-cars-in-new-york-city/ (GM Cruise officials stated that its AV testing application process is ongoing and noted the "complex regulatory environment").
[17]A Tesla accident resulted in an NHTSA investigation, which took eight months and cleared Tesla of responsibility for the accident, because the vehicle's manual had instructed drivers not to rely on the autopilot and to remain in command of the vehicle. https://static.nhtsa.gov/odi/inv/2016/INCLA-PE16007-7876.PDF.

Autonomous vehicles are equipped with high-tech sensors, computer vision, sophisticated onboard computers, artificial neural networks containing advanced decision-making algorithms, and black boxes that relay information back to a central processing center. Regulating AV technology and its public integration requires the kind of expertise and resources that are available only at the federal governing level.

Beyond the typical safety concerns associated with human-operated passenger vehicles, AV technology raises nontraditional safety issues that require federal standardization. For instance, given their complex and evolving computer systems, autonomous vehicles are subject to cybersecurity concerns. One can only imagine the potential terror wrought by computer hackers taking over control of an autonomous vehicle's operating system, let alone an entire fleet of autonomous vehicles traveling on public roadways. While NHTSA emphasized the importance of the issue in its "Automated Driving Systems 2.0," it offered no solutions. The AV industry would no doubt benefit from a comprehensive regulatory approach that mandated, at minimum, a system designed to immediately communicate threats and the implementation of a set of agreed-upon best industry practices.

In 2017, continuing its pattern of recognizing potential issues, NHTSA called for industry participants to submit voluntary safety self-assessments. But without legal weight behind this request, many companies have yet to follow through. For instance, of the 62 companies[18] in California that hold a permit to test autonomous vehicles, only 13 have voluntarily filed reports.[19] Moreover, with no concrete guidance on what information must be provided, the 13 reports are of limited value.[20] Thus, our proposal: As the AV industry is learning, its would-be regulators must remain abreast of the technology's limits and capabilities in order to promulgate effective rules.

Conclusion

Autonomous vehicles offer exciting and welcomed changes to the way passenger vehicle transportation occurs in the United States. Along with affording a new structure of personal transportation to groups of consumers currently devoid of such fundamental mobility, the safety advances associated with AV technology cannot be ignored. But without prompt and adequate federal regulation aimed at empowering NHTSA to collect and analyze the myriad data generated by this evolving technology, the promise of autonomous vehicles may never be fully realized.

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[18] As of January 28, 2019, permit holders. https://www.dmv.ca.gov/portal/dmv/detail/vr/autonomous/permit.

[19] https://www.nhtsa.gov/automated-driving-systems/voluntary-safety-self-assessment. (The number represents a significant increase from years prior; when only four companies had filed.)

[20] Keith Laing, "Few carmakers submit self-driving car safety reports," Sept. 10, 2018, https://www.detroitnews.com/story/business/autos/mobility/2018/09/10/few-carmakers-submit-self-driving-safety-assessments/1076691002/ ("The result of that is the three we have seen are much more like slick marketing brochures than anything that shows what kinds of tests have been passed or what these things can do").