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# HIGHLY AUTOMATED VEHICLES & DISCRIMINATION AGAINST LOW-INCOME PERSONS

***William H. Widen****

*Law reform in the United States often reflects a structural bias that advances narrow business interests without addressing broader public interest concerns.[1] This bias may appear by omitting protective language in laws or regulations which address a subject matter area, such as permitting the testing of highly automated vehicles ("HAVs") on public roads, while omitting a requirement for a reasonable level of insurance as a condition to obtain a testing permit.[2] This Article explores certain social and economic justice implications of laws and regulations governing the design, testing, manufacture, and deployment of HAVs which might advance a business interest without taking account of the public interest. This Article contrasts the steps that might be taken to ensure the economic well-being of low-income persons with the current state of HAV regulation.[3] This Article recommends steps to correct some of this bias.*

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[1] *See* Richard A. Posner, *Economics, Politics, and the Reading of Statutes and the Constitution*, 49 UNIV. CHI. L. REV. 263, 265–268 (1982) (explaining interest group theory). *See also* Jonathan R. Macey, *Special Interest Groups Legislation and the Judicial Function: The Dilemma of Glass-Steagall*, 33 EMORY L. J. 1, 16–21 (1984).

[2] On insurance, *see infra* Section III.B.

[3] The Biden Administration's Justice40 Initiative has issued interim guidelines defining "disadvantaged" to include "[l]ow income, high and/or persistent poverty." Memorandum from Exec. Off. of the President, Off. of Mgmt. & Budget to the Heads of Dep'ts & Agencies 2 (July 20, 2021), https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf [https://perma.cc/6BMM-JHSK]. A municipality might use the defined term "disadvantaged" to identify communities that might need special consideration as a part of HAV regulation. *Id.* One consideration for developing a Justice40

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## I. INTRODUCTION

The engineering profession's prestigious Institute of Electrical and Electronics Engineers ("IEEE") has promulgated Standard Model 7000 ("IEEE 7000"), which, if followed, promotes the ethical development of technology.[4] It requires a process in which a product development team consists of multiple members, each designated to consider the interests of different identified stakeholders that new technology might adversely impact.[5] The process provides a

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implementation plan is to "[a]void potential burdens to disadvantaged communities." *Id.*

[4] *See IEEE Standard Model Process Addressing Ethical Concerns During System Design,* IEEE STANDARDS ASS'N (2021), https://standards.ieee.org/ieee/7000/6781/ [https://perma.cc/D989-6P79] [hereinafter *IEEE 7000*] (available via purchase or subscription, on file with the author). The IEEE Standards Association has an express global reach with the stated mission of "Raising the World's Standards." *Id.* at 9. *See also* IEEE STANDARDS ASS'N, https://standards.ieee.org/ [https://perma.cc/F2K8-AGN4] (last visited Jan. 14, 2022). The IEEE publishes many technical standards which set forth procedures and requirements. *Id.*

[5] Assigning a different person to represent each significant stakeholder group is ideal, but for convenience of administration, IEEE 7000 allows one person to

counterbalance to the general fiduciary duties of corporate management (i.e., officers and directors), which requires corporate decision-making to focus primarily on shareholders' financial interests and not on other stakeholders.[6]

IEEE 7000 does not, however, guarantee the development of technology, but does consider the interests of low-income and other disadvantaged persons as part of the process. From public disclosures and announcements, it does not appear that technology companies follow IEEE 7000.[7] Additionally, IEEE 7000 by its very terms does not purport to bind a company's management.[8] Thus, self-regulation by the engineering profession is structurally inadequate to protect the interests of all members of society, including the interests of low-income and other disadvantaged persons, during technology development. As a practical matter, it falls to law and regulation to protect society from the potentially harmful effects of new and emerging technologies.

Legislators and regulators ought to devote attention to the impact of HAV technology on society from at least two perspectives: (1) a technical product design, development, and manufacturing standpoint; and (2) the standpoint of laws and regulations which do not focus on the specifics of technology. The HAV industry actively promotes state-level preemption of municipal legislation which might address non-technical concerns

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consider different perspectives. *See IEEE 7000*, *supra* note 4. The goal of the model process is to identify all relevant stakeholders and their concerns, taking those concerns into account in the design process. *See id.*

[6] This viewpoint is well-established in U.S. corporate law and is sometimes called "shareholder primacy." Mark J. Loewenstein & Jay Geyer, *Shareholder Primacy and the Moral Obligation of Directors*, 26 FORDHAM J. CORP. & FIN. L. 105, 111 (2021) (noting that shareholder primacy "is considered, for the most part, the norm today"). This "shareholder wealth maximization norm" obligates directors "to make . . . decision[s] based solely on long term shareholder gain." Stephen M. Bainbridge, *Director v. Shareholder Primacy in the Convergence Debate*, 16 PAC. MCGEORGE GLOB. BUS. & DEV. L. J. 45, 45 (2002).

[7] In reviewing corporate filings, the author has been unable to uncover express adoption of IEEE 7000 as a policy.

[8] *IEEE 7000*, *supra* note 4, at 26.

raised by HAV technology.[9] The HAV industry will vigorously oppose any attempt to revise vehicle safety regulations.[10] Moreover, both federal and state legislatures appear unconcerned with any insurance or liability law reform which might proactively address the special problems raised by testing and deployment of HAV technology and may acutely affect low-income persons.[11]

This Article first outlines several salient technical issues for HAV technology, then uses a proposed Pennsylvania law to discusses the non-technical matters of concern that might be addressed by laws and regulations today. Initially introduced as Pennsylvania Senate Bill 965 ("S. 965"),[12] Pennsylvania's proposed

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[9] *See* William H. Widen & Philip Koopman, *Autonomous Vehicle Regulation & Trust: The Impact of Failures to Comply with Standards*, 27 UCLA J. L. & TECH. 169, 173 (2022).

[10] *See, e.g.*, Bill Canis, *Issues in Autonomous Vehicle Testing and Deployment*, CONG. RSCH. SERV. 8 (2021) ("Proponents of autonomous vehicles note that lengthy revisions to current vehicle safety regulations could impede innovation, as the rules could be obsolete by the time they take effect.").

[11] The general attitude of the HAV industry is to ignore insurance and liability reform, leaving issues to be sorted out by the common law and existing statutes. This attitude is reflected in proposed federal legislation, such as H.R. 3711, and in Pennsylvania's refusal to confront the issue. Leaving these problems to be sorted out under existing law will systematically disadvantage consumers and plaintiffs, while benefitting the HAV industry. *See infra* section II.A.

[12] S. 965, 2022 Gen. Assemb., Reg. Sess. (Pa. 2022) (as amended Jan. 26, 2022) [hereinafter S. 965] (being "[a]n Act amending Title 75 (Vehicles) of the Pennsylvania Consolidated Statutes"). Since its introduction in January 2022, S. 965 has undergone numerous revisions. As of this Article's publication, the Pennsylvania Senate Transportation Committee has approved H.B. 2398, the Pennsylvania House's version of the proposed law. *See* Robert Swift, *Pa. House-Passed Automated Vehicle Bill Clears Senate Committee*, PITTSBURGH POST-GAZETTE (Oct. 19, 2022, 8:02 AM), https://www.post-gazette.com/news/transportation/2022/10/18/pa-automated-vehicle-bill-state-senate-committee-vote-hb-2398-hav-testing/stories/202210180089 [https://perma.cc/X7QP-HFJP]. If the full Pennsylvania legislature approves an HAV bill, that bill will likely be an amended version of H.B. 2398. For ease of reference and to maintain consistency with an earlier iteration of this Article, this Article has retained original references to S. 965. The more recent incarnations of the proposed HAV statute, though different in many details, do not address the fundamental problems originally identified with S. 965, including state preemption of municipal legislation, failure to enact tort reform, and failure to

HAV legislation governs the testing and deployment of HAVs[13] within the state. The proposed law, both as originally introduced and in its current form as Pennsylvania House Bill 2398 ("H.B. 2398"), illustrates a nationwide failure to address certain non-technical problems created by HAVs which federal, state, and local governments should address.

## II. TECHNICAL LAW REFORM FOR HAVS

### *A. Product Design Issues Raised by HAV Technology*

In the United States, the primary regulator of automotive equipment[14] is the National Highway Traffic Safety Administration ("NHTSA").[15] Congress could give direction to NHTSA to regulate specific aspects of automotive components used in an automated driving system ("ADS"), for example, by passing a bill such as H.R. 3711, with appropriate amendments,[16] though NHTSA still has authority to regulate specifications for automotive equipment without further congressional authorization.[17] NHTSA has not yet

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adjust insurance laws. *See* H.B. 2398, 2022 Gen. Assemb., Reg. Sess. (Pa. 2022) (as amended Oct. 18, 2022).

[13] As defined in S. 965, an HAV is a motor vehicle equipped with an automated driving system ("ADS"). S. 965 § 102. *See also* H.B. 2398 § 102. ADS is the combination of hardware and software which allows the motor vehicle to drive itself (i.e., perform the entire dynamic driving task on a sustained basis). *Id.* ADS describes a level 3, 4, or 5 driving automation system according to terms promulgated by the Society of Automotive Engineers ("SAE"). *See Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles*, SAE INT'L (Apr. 30, 2021), https://www.sae.org/standards/content/j3016_202104/ [https://perma.cc/X3XV-7M7Z] [hereinafter *Taxonomy and Definitions*].

[14] 49 U.S.C. § 30101.

[15] National Traffic and Motor Vehicle Safety Act of 1966, Pub. L. No. 89-563, 80 Stat. 718 (codified as amended at 49 U.S.C. §§ 30101–30183) (forming the NHTSA).

[16] H.R. 3711, 117th Cong. (June 4, 2021). A bill such as this, which is intended to "clarify" the federal role in ensuring the safety of HAVs, could be amended to direct NHTSA to regulate the robustness of electrical components that appear in any ADS. The actual bill as currently drafted protects the HAV industry from regulation. In its current form, it is mostly a sham.

[17] In 1966, Congress unanimously passed the National Traffic and Motor Vehicle Safety Act with an aim to "reduce traffic accidents and deaths and injuries

attempted to specify requirements for electronic computing equipment in motor vehicles, which is why a specific direction from Congress to do so might prove useful despite existing regulatory power. NHTSA's hands-off approach needs to change as electronic computing equipment moves toward replacing human drivers.[18]

As a practical matter, the likelihood that elected officials attempt to address product design issues raised by HAV technology in the near term by law or regulation is remote.[19] Focus on technical aspects of HAV design has value. However, there is a current shortcoming of elected officials and regulatory agencies to anticipate and address the societal impact of HAV technology. Public grievance airing of these issues may motivate action. Two technical areas stand out as needing attention: (1) the expected useful life of electronic components used in HAVs; and (2) the arrangements in place to assure the continued useability of a particular ADS technology if an HAV manufacturer goes out of business.

### *B. Useful Life of Electronic Components*

One important technical specification NHTSA should consider is whether regulation ought to require that the components of an

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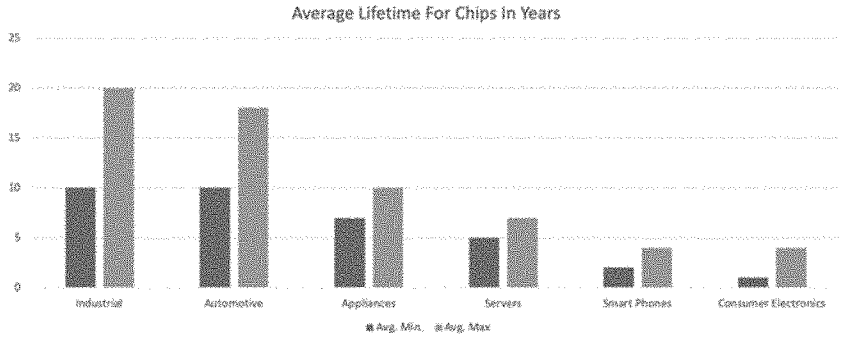
resulting from traffic accidents." The Act created a new agency, NHTSA, and gave it the power to set safety standards for motor vehicles and equipment. 49 U.S.C. §§ 30101, 30111(a). NHTSA was briefly known as the National Highway Transportation Safety Bureau. JERRY L. MASHAW & DAVID L. HARFST, THE STRUGGLE FOR AUTO SAFETY 6 (1990).

[18] The replacement of a human driver with electronic systems raises a larger issue for the future regulation of our highway transportation system. Historically, the federal government regulated automotive equipment, while the states regulated the operation of motor vehicles via licensing drivers, registering cars and, sometimes, mandating annual vehicle inspections. When the human operator is replaced by equipment, the regulatory role of the states is unclear, and may shrink, if the federal government regulates the machine driver by virtue of its mandate to regulate equipment safety.

[19] Ongoing research by Professor Matthew T. Wansley at the Cardozo School of Law explains how NHTSA regulates by announcing recalls rather than adopting proactive affirmative regulations. Matthew T. Wansley, *The Auto Safety Revolution* (Cardozo L. Stud. Rsch. Paper No. 689, Aug. 17, 2022), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4190688 [https://perma.cc/8UDQ-FHQW].

ADS have a minimum expected useful life. NHTSA might hold hearings to determine the appropriate robustness of the electrical components in an ADS, considering the expected average age of vehicles in use. Currently, the average age of vehicles in use in the United States is estimated at 12.1 years for 2021 (and this number has steadily increased since this data has been collected).[20] Microprocessors, microcontrollers, and similar electronic components start to degrade after different lengths of service depending on different classifications given to the component by its intended application.

Electronic components manufactured for automotive and industrial applications typically have a longer expected useful life than electronic components manufactured for consumer use.[21] Consideration ought to be given to whether the expected useful life of electronic components in an HAV specified for automotive use is long enough given the time during which a vehicle is expected to be in service. At a minimum, a regulation might specify all electrical components satisfy a specific minimum expected useful life.




[20] *Age of Automobiles and Trucks in Operation in the United States*, U.S. DEP'T OF TRANSP. BUREAU OF TRANSP. STAT., https://www.bts.gov/content/average-age-automobiles-and-trucks-operation-united-states [https://perma.cc/F36A-8YRG] (last visited July 24, 2022).

[21] *See, e.g.*, Ed Sperling, *Making Chips to Last Their Expected Lifetimes*, SEMICONDUCTOR ENGINEERING (Oct. 21, 2020), https://semiengineering.com/making-chips-to-last-their-lifetime/ [https://perma.cc/MX6Y-ES77] (noting that chip lifecycles can vary greatly depending on the market and the chip's application within that market).

Chips manufactured to military specifications can have an even longer expected useful life (perhaps 20 to 30 years).[22] Significantly, the average minimum expected lifetime for an automotive chip is estimated at 10 years, which is inside the average age of vehicles currently in use. This fact has financial relevance for purchasers of used motor vehicles.[23]

Low-income persons tend to purchase lower-priced, used motor vehicles.[24] The trends show that new car purchasers tend to replace their current vehicles with new vehicles after holding them for approximately 6 years before trade-in.[25] A technical design decision to use electronic components with an expected useful life that is shorter, rather than longer, could have significant adverse economic consequences for a low-income person if the minimum average lifetime of electronic components in an ADS extends only four years after the purchase of a used vehicle. The adverse economic impact is aggravated if the consumer purchased the motor vehicle using

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[22] Chip grades are based, at least in part, on the ambient temperature for use: standard commercial temperature range is 0°C to 85°C; modern industrial temperature range is -40°C to 100°C; automotive temperature range is -40°C to 125°C; and military temperature range is -55°C to 125°C. *See Military Applications*, INTEL, https://www.intel.com/content/www/us/en/government/products/programmable/applications.html [https://perma.cc/VRM8-NMJY] (last visited Aug. 16, 2022). Operation of a chip outside its specified temperature range degrades the life of the chip. Moreover, the same circuit design may result in different grades based on post-manufacture testing of a chip. *Id.*

[23] Some have speculated that by 2030, most consumer miles traveled will be on trips provided by on-demand electric cars, not privately owned motor vehicles. Should this prediction prove true, the economic impact on low-income consumers would be lessened, though fleet owners and operators would then be the beneficiaries of an increased minimum useful life.

[24] The average monthly payment on a new car is $700 per month, whereas the average monthly payment on a used car is $550 per month. *See* Ann Carrns, *Navigating Record-High Car Payments*, N.Y. TIMES (July 18, 2022), https://www.nytimes.com/2022/07/15/your-money/monthly-car-payments-interest.html [https://perma.cc/A6C2-HE29].

[25] Karen Gardner, *How Often Do People Trade in Cars?*, NEST (Apr. 25, 2019), https://budgeting.thenest.com/people-trade-cars-30494.html [https://perma.cc/FA3L-9MYG] (noting that motorists who buy a new car typically keep it for six years, up from four years in 2006).

fully recourse debt secured by the HAV.[26] Moreover, loss of transportation—because a vehicle purchased as a used AV can no longer function (or function safely)—could result in job loss if it prevents a commute.

At a minimum, legislators might consider passing laws addressing the robustness of HAVs by mandating technical requirements for the expected life of electronic components in the ADS of production HAVs. This is a problem that should, at a minimum, be studied rather than ignored. It has not yet become an important issue because HAVs have not been widely sold and deployed.

Though parts in used cars have worn out since the beginning of the auto industry, and occur more frequently in used cars rather than new vehicles, the issue is orders of magnitude more significant because an HAV may become completely unusable if the ADS fails. This is not the case with current advanced navigation systems, such as Tesla's AutoPilot and Full Self-Driving systems, which are not required for the operation of the vehicle.[27] The ADS in an HAV is safety/mission critical in a way that electronic components in existing vehicles are not. For this reason, the question of minimum expected useful life is important to consider now and not after 20

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[26] The most common loan term for a used car in the first quarter of 2022 was 72 months. Ronald Montoya, *How Long Should a Car Loan Be?*, EDMUNDS (Apr. 1, 2022), https://www.edmunds.com/car-loan/how-long-should-my-car-loan-be.html [permanent URL unavailable].

[27] Electric car technology raises similar issues because the cost to replace a battery can be well over $5,000. *See, e.g.*, Nicolle Monico, *What is the Expected Battery Life of My Electric Vehicle?*, VERIFIED (Mar. 10, 2022), https://www.verified.org/articles/guides/the-longevity-of-electric-vehicles-battery [https://perma.cc/2YAX-V2KF] (explaining the costs associated with replacing electric car batteries). Without a battery, an electric car cannot run, just as an HAV cannot operate without an up-to-date ADS. There is not sufficient data to project the lifespan of electric car batteries with any accuracy, but estimates indicate a battery life of between 10 and 20 years. *Id.* Car manufacturers often guarantee an electric car battery for 8 years or 100,000 miles. *See* Sean Tucker, *Warranty Coverage for Hybrid and EV Batteries*, KELLEY BLUE BOOK (May 13, 2022, 4:00 PM), https://www.kbb.com/car-advice/hybrid-ev-battery-warranty/ [https://perma.cc/ZHX8-V9N8]. An expected minimum useful life of electrical components in HAVs set at 20 years would eliminate many concerns.

million vehicles have been manufactured and deployed on our highways.[28] This is a technical issue that applies across a variety of system architectures. Requiring the use of robust electrical components does not dictate how the ADS system operates, merely how long it can be expected to last.

*C. HAV Company Bankruptcy and Substitute Servicers*

The robustness of an ADS is not limited to considerations related to the physical properties of the electronic components of the system. Legislators and regulators have so far failed to plan for a situation in which an HAV company goes out of business and can no longer maintain and update the ADS software to keep the operation of its vehicles safe. A reasonable expectation is that, in the absence of software updates, an ADS will become unsafe by then-current standards. If that happens, NHTSA presumably would prohibit the use of the ADS on public highways. An HAV that cannot be operated by a human driver as a backup to a non-functional ADS will be useless.

In both military procurements and the design of financial products, backup sourcing and alternative servicing arrangements are critical for a viable defense system or rating of a financial product, respectively. It should be no different with a mission/safety critical system like an ADS. The cessation of operations by an HAV company would affect all users of the HAV, but would pose a particular hardship on low-income persons.

The military takes steps to mitigate product support risk. The Department of Defense plans for obsolescence costs due to vendor dissolution by dual-sourcing components and identifying the perceived lowest-risk vendor.[29] It sometimes even stockpiles replacement parts.[30] Arguably, this is easier with components for which multiple sourcing is possible, and for which a failure does not

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[28] *See supra* note 27.

[29] *See Diminishing Manufacturing Sources and Materials Shortages: A Guidebook of Best Practices for Implementing a Robust DMSMS Management Program*, DEFENSE STANDARDIZATION PROGRAM OFFICE 3–8 (Jan. 2021), https://www.infodoc.it/wp-content/uploads/2021/04/SD-22_2021.pdf [https://perma.cc/R4KU-LE89].

[30] *See id.* at 121.

render an entire system inoperable. That does not appear to be the case for proprietary ADS systems, which are unique to each HAV company and go to the essence of motor vehicle navigation.

In private commercial contracts, a purchaser of a complex electronic system often requires, as a condition to the sale, that the manufacturer/supplier deposit source code with it so that, if needed, the purchaser would have some basis to engage in self-help to mitigate product support risk.[31] Given the complexity of an ADS system, it is far from clear that any user, even a commercial user with a fleet of HAVs, could engage in meaningful self-help. Even if performed, how would after-market fixes to a product be tested or validated if the original equipment manufacturer ("OEM") has failed? Who would perform that testing and validation? Unlike the situation for traditional automotive parts, in which after-market companies specialize in providing alternatives to OEM parts and parts for older motor vehicles, the complexity of the technology for an ADS might well be beyond the skill set of traditional after-market parts suppliers.

In the financial world, a similar problem arises with the securitization of financial assets. Typically, a "seller" of financial assets, such as credit card receivables or home mortgages, remains in the transaction as the ongoing servicer of the financial assets it sells. For example, Citibank continues to bill, monitor, collect, and service the receivables that it sells to one of its master trusts in a financing transaction.[32] However, to obtain a high credit rating, the transaction documents provide for increased servicing payments to be made to a substitute servicer if the original seller/servicer can no longer perform the service function. The expectation is that, for an increased servicing fee, another originator of similar financial assets would take over the administration of the failed seller/servicer—if only to wind down the transaction to pay out investors early.

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[31] *The What and Why of Source Code Escrow*, NAT'L SOFTWARE ESCROW (Dec. 10, 2021), https://nationalsoftwareescrow.com/the-what-and-why-of-source-code-escrow/ [https://perma.cc/325Z-B4C9].

[32] *See, e.g.*, Steven L. Schwarcz, *The Alchemy of Asset Securitization*, 1 STAN. J. L. BUS. & FIN. 133, 135 (1994) (explaining how securities sellers remain active in the transaction after it has been consummated).

This Article merely identifies this product support risk as a significant problem for HAV technology on which legislators and regulators need to focus. It seems likely that any planned antidote for an HAV company dissolution would include a system to allow for third parties to access and use the intellectual property of an HAV company needed to run its ADS. Perhaps the system would identify a backup servicer or servicers who might perform system updates, and address the financial consequences for a consumer who has purchased an HAV with borrowed money.

Creditors of a bankrupt HAV will seek to realize value from the HAV's intellectual property in any bankruptcy proceeding. At a minimum, an amendment to the Bankruptcy Code might identify the terms under which the needed intellectual property might be sold or transferred, and the rights of HAV owners to obtain access to that intellectual property following an HAV company failure.

## III. NON-TECHNICAL LAW REFORM FOR HAVS

Not all discrimination against low-income persons arises from technical considerations. First, the potential for concentrating the bulk of HAV testing in low-income neighborhoods creates a risk of disproportionate loss to an already disadvantaged class. Second, failing to clarify the rules relating to the scope of liability and recovery of damages for accidents involving HAVs imposes an additional burden that hits low-income persons particularly hard.

Though uncertainty about rules for liability and recovery affects all persons and needlessly increases the caseload of already crowded courts, the burden of uncertainty falls most heavily on low-income persons because they are the least likely to have the resources to pursue justice in court. Moreover, a delayed financial recovery for loss due to litigation in a complex case affects low-income persons most acutely because they often live paycheck to paycheck.[33]

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[33] Laws should be updated to protect the resources of low-income persons, keeping in mind that even financial burdens that appear "small" to persons of means can be extremely significant to low-income persons. *See* William H. Widen, *Social Justice and Deposit Return Calculations: A Study of Success and Failure in Commercial Law Reform*, 93 ST. JOHN'S L. REV. 365, 369 (2019).

Legislators who introduce the new complexity of HAVs into law have a responsibility to draft the related changes needed to make manageable the very complexity which they introduced. Clear liability and recovery rules act as a counterbalance to the increased complexity resulting from HAV laws. It is irresponsible to make rules that clearly permit the testing and deployment of HAVs to benefit HAV companies, while leaving it to litigants and courts to bring clarity to liability and recovery rules.[34] Such uncertainty only benefits HAV companies by creating a practical barrier to financial accountability for the harms they cause. Failure to clarify notable gaps in a proposed law makes HAV legislation particularly special-interest by protecting the industry from liability and subjecting the industry to lax regulation, thus pushing the public interest aside.

Promoting economic and social justice is a priority for the Biden Administration, as evidenced by the Justice40 Initiative.[35] The U.S. Department of Transportation is in the process of developing its approach to the Justice40 Initiative.[36] One advertised benefit of HAV technology is lowering emissions,[37] placing the testing and development of HAVs within the scope of concerns the Justice40 Initiative intends to address. One challenge federal, state, and local governments ought to meet is to effectively promote the development of HAV technology without discrimination.[38]

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[34] For example, the current draft of H.R. 3711 contemplates the use of the common law.

[35] *See* Shalanda Young et al., *The Path to Achieving Justice40*, THE WHITE HOUSE: BRIEFING ROOM (July 20, 2021), https://www.whitehouse.gov/omb/briefing-room/2021/07/20/the-path-to-achieving-justice40/ [https://perma.cc/MK2F-7PMN].

[36] *Justice40 Initiative*, U.S. DEP'T OF TRANSP., https://www.transportation.gov/equity-Justice40 [https://perma.cc/4YRQ-Z42H] (last visited Jan. 22, 2022).

[37] *See About*, PARTNERS FOR AUTOMATED VEHICLE EDUC., https://pavecampaign.org/about/ [https://perma.cc/RQ5E-2JNQ] (last visited Jan. 22, 2022) (describing the potential for HAVs to enhance sustainability).

[38] Even though this Article focuses on state and local regulation, the federal government might play an important role if both the U.S. Department of Transportation and the NHTSA refrain from endorsing any state or local HAV regulation which fails to address the discrimination that may occur in HAV testing.

Corporations facilitate the drafting of special interest legislation[39] that benefits their interests and then lobby for support from legislators. S. 965 began this way, though the bill also received input from some other interested parties, including the Pennsylvania Department of Transportation ("PennDOT") and the Pennsylvania State Police.[40] With modest drafting adjustments, any Pennsylvania HAV law might address the social and economic justice concerns identified in this Article without any material adverse impact on HAV testing or development activities. Indeed, by addressing the concerns raised in this Article, the HAV companies supporting HAV law reform might benefit from the increased public trust that such a step would earn.[41]

Unfortunately, once social-interest group legislation becomes law, the social welfare component of such legislation caters only to a narrow business interest without also addressing the public interest.[42] This phenomenon, however, simply reflects the pursuit of

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[39] Special interest legislation "represents an agreement between a special interest group and the legislature." *See* Macey, *supra* note 1, at 20.

[40] *Langerholc Introduces Legislation to Create a Roadmap for Highly Automated Vehicles*, SENATOR WAYNE LANGERHOLC, JR. (Jan. 5, 2022), https://www.senatorlangerholc.com/2022/01/05/langerholc-introduces-legislation-to-create-a-roadmap-for-highly-automated-vehicles/ [https://perma.cc/9Y66-JKWM] (identifying parties consulted during the drafting of S. 965). As of this Article's publication, HAV legislation in Pennsylvania continues to evolve. *See supra* note 12. The most recent amendment to H.B. 2398 appears to absolve any natural person of liability for HAV accidents because a "certificate holder" is considered the driver of an HAV, and H.B. 2398 is clear that a natural person may not be a certificate holder. *See* H.B. 2398 § 8510.1 (as amended Oct. 18, 2022).

[41] Though expected, given corporate fiduciary duties and economic incentives, promoting a bill that does not address broader social welfare concerns conflicts with the appeals for public trust that HAV companies often make. *See Aurora Innovation, Inc. Form S-1 Registration Statement*, SECS. & EXCH. COMM'N (Nov. 5, 2021), https://www.sec.gov/ix?doc=/Archives/edgar/data/1828108/000119312521321663/d230050ds1.htm#rom230050_4 [https://perma.cc/2HQQ-UM8T] [hereinafter *Aurora S-1*]. "The opportunity to revolutionize transportation is massive, but this opportunity depends on trust. Our technology needs to be trustworthy. Our company needs to be trustworthy. And so our task is to build trust, one step at a time." *Id.* at 83.

[42] One taxonomy of legislation distinguishes among special interest legislation, public interest legislation and public sentiment legislation. *See* Posner, *supra* note

the financial interest of investors by management. It should be unsurprising that a corporation expends resources on law reform for the benefit of its stockholders but not others. This does not, however, mean that the promoted business interests have no merit.

The stated business interests promoted by the proposed Pennsylvania HAV law reform are real and substantial concerns appropriately addressed by legislation. Pennsylvania is a major hub for the development of HAV technology, bringing jobs and economic growth. Moreover, the development of this technology is important for national security and the United States' world standing. To be sure, a law that allows for the testing of HAV technology and provides legal certainty fosters the growth and retention of HAV companies in Pennsylvania. This is because companies tend to favor jurisdictions which require limited regulatory compliance, which lowers the transaction costs of operations.

When evaluating the suitability of a bill, however, one must consider not only the upside benefits delivered by the law, but also the potential downside harms created by its passage. S. 965 and its successors fall short because they fail to account for significant potential downside harms.[43] As drafted, S. 965 and its successors do not prevent the concentration of HAV testing in low-income neighborhoods, thus exposing constituents in these neighborhoods to a potentially disproportionate risk of injury or death from HAV testing accidents.[44]

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1, at 270. Public interest legislation generally attempts to correct market failure by reducing public harms or increasing public goods. For example, a corporation which pollutes without paying compensation for the harm caused to third parties creates a negative externality which a public interest environmental law might correct by imposing fines or preventing certain types of activities. As discussed below, S. 965 and its successors create a negative externality by allowing HAV companies to expose persons, particularly low-income persons, to a risk of harm which may go uncompensated due to the structure of Pennsylvania laws governing motor vehicle insurance. This has the economic effect of redistributing wealth from a less powerful group to a more powerful group.

[43] *See* Macey, *supra* note 1, at 19 (describing the enactment of public interest legislation after an "objective weighing of demonstrable pros and cons").

[44] Not only does the text of S. 965 and its successors fail to prohibit concentrated testing in areas of concern, but broad preemption clauses also

Another way to evaluate the suitability of a proposed law is to consider how well the drafting of the bill integrates with existing law. S. 965 and its successors also have deficiencies in this regard. The bulk of the integration failures relates to the absence of several potential modifications to Pennsylvania law governing motor vehicle insurance policies[45] which would allow a person covered by a limited tort option insurance policy to seek non-economic damages in a wider range of circumstances, including losses arising from accidents involving HAVs. Limited tort option policies appeal to low-income persons because the premiums are lower than full tort option policies. But the lower premium comes at the price of giving up the right to seek non-monetary damages in many cases. If the current version of the Pennsylvania HAV bill becomes law, it will facilitate the redistribution of wealth from low-income persons in Pennsylvania to HAV companies.[46]

Lastly, S. 965 and its successors fail to make clear the rules for liability and financial accountability for HAV accidents. While S. 965 and later bills attempt to address financial responsibility during testing, they have a glaring hole by leaving liability and financial responsibility a complete muddle following deployment. Both situations need clarification.

This Article continues with a more detailed discussion of how proposed Pennsylvania HAV legislation might be amended to address these social and economic justice concerns in the public interest. This Article is not intended to be an exhaustive list of all problems with S. 965 and Pennsylvania's proposed HAV law reform. The focus is on addressing social and economic justice issues so that Pennsylvania and other states might better adapt their

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prevent a municipality from filling this void. *See* S. 965 § 8510 [hereinafter S. 965 Preemption Clause]. H.B. 2398 § 8510 purports to allow local exercise of police powers, but a local authority may not make a prohibition or regulation that is specific to or discriminates against an HAV.

[45] *See* 75 PA. CONS. STAT. § 1705 (2021) (covering election of tort options).

[46] Though the author focuses on the impact to low-income persons, a wealth transfer occurs anytime a tort claim arising from an AV accident is limited to economic damages only. A statistical transfer of wealth occurs from every person with a limited tort option policy to the AV companies the moment S. 965 is enacted.

laws governing the testing and deployment of HAVs to further the public interest.

*A. Harm from Blanket Preemption*

The current version of Pennsylvania's HAV bill, like S. 965, includes a broad preemption clause preempting municipalities from creating and enforcing ordinances that could limit operations and testing of HAVs.[47] S. 965 and its successors are not unique in proposing preemption.[48] This exclusion of local stakeholder involvement is likely to have negative consequences for the City of Pittsburgh (and elsewhere in Pennsylvania), just as it does in other states. The concern is acute when the law allows an HAV company to "test" its vehicle without a human backup safety driver, as permitted by the current Pennsylvania House version of S. 965.[49]

The word "test" is in quotation marks because there is no such thing as an uncrewed test despite any obfuscation by HAV companies on this point. As a matter of simple logic, "testing" without a safety driver provides no additional scientific information relevant to ensuring vehicle safety[50] unless one counts the contents of a National Transportation Safety Board ("NTSB") report after someone is killed.[51] The technical performance of the HAV leading

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[47] *See* S. 965 Preemption Clause, *supra* note 44.

[48] *See, e.g.*, FLA. STAT. § 316.85(6) (2021) (providing that "[a] local government may not impose any . . . requirement on automated driving systems or autonomous vehicles or on a person who operates an autonomous vehicle").

[49] S. 965 § 8504. Pennsylvania does not currently allow uncrewed testing of AVs. *Automated Vehicle Testing Guidance*, PA. DEP'T OF TRANSP. (July 23, 2018), https://www.penndot.gov/ProjectAndPrograms/ResearchandTesting/Autonomous%20_Vehicles/Documents/PennDOT%20HAV%20Testing%20Guidance.pdf# [https://perma.cc/WG4T-ZLPX] [hereinafter PennDOT Guidelines] (noting that "[u]nder existing law, unmanned and/or remote testing on trafficways is prohibited"). The current Pennsylvania House bill permits driverless operation. H.B. 2398 § 8509.

[50] If safety were completely assured, HAV companies might want to conduct uncrewed testing related to ride comfort and user experience. However, the clear scope of concern addressed by S. 965 and its successors is related to the safety of passengers and other road users.

[51] When a safety driver averts a crash, an ADS developer can use a computer simulation to project the nature and degree of harm avoided. This information would prove particularly useful if ADS technology ever matured to the point that

up to a potential crash is the same with or without a safety driver sitting in the driver's seat.[52] Using a properly-trained safety driver is simply safer because it provides a backup mechanism in the form of safety driver intervention to avoid a crash if the HAV automation fails. An uncrewed *demonstration* may, however, impress potential investors,[53] but that is the extent of the value of removing a safety driver from an HAV that still requires more safety testing (other than saving HAV companies costs on safety drivers). In truth, uncrewed testing is a limited *deployment*. Phased deployments which start small manage risk by presenting limited exposure, but ought not to occur until the ADS is shown to be safe.[54]

The Society of Automotive Engineers ("SAE") published safety standards describing how to conduct crewed testing with a safety

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an ADS could make utilitarian calculations to choose which path to take in an unavoidable accident situation. ADS technology is nowhere near powerful enough to make judgments to solve "trolley problem" questions such as this. *See* William H. Widen, *Autonomous Vehicles, Moral Hazards & the "AV Problem,"* NOTRE DAME J. ON EMERGING TECH. (forthcoming 2022), https://ssrn.com/abstract=3902217 [https://perma.cc/YM7K-FHDK] (describing the trolley problem and its relationship to AVs).

[52] *See Military Applications*, *supra* note 22. As an experiment, challenge any HAV developer proposing uncrewed safety-related testing to explain what useful additional information regarding HAV safety is obtained from an uncrewed test that is not also available from a crewed test. No coherent explanation will be forthcoming. You can then put that HAV developer firmly in the "do not trust" category. Any legislator who fails to pursue this question is not doing his or her job.

[53] *See, e.g.*, *Northern Genesis Acquisition Corp. II Amendment No. 1 to Form S-4*, SECS. & EXCH. COMM'N 78–79 (Aug. 30, 2021), https://www.sec.gov/ix?doc=/Archives/edgar/data/0001827980/000110465921111215/ngab-20210830xs4a.htm#INFORMATIONABOUTEMBARK_363644 [https://perma.cc/AZ3C-963R] (showing an example of an HAV test used to impress investors by disclosing a technology demonstration by Embark for its de-SPAC transaction).

[54] HAV companies never clearly state their own standard for deployment, but vaguely suggest that no deployment will occur until the technology is "sufficiently safe." This is to preserve the option of deploying when the technology is less safe than an average human driver, in hopes that it will be safer in the future. This utilitarian justification for early deployment has been described as "harm now, gain later." *See* Widen, *supra* note 51, at 2. The public might well reject such a justification were it disclosed.

driver,[55] but SAE currently has no safety standard governing testing without a safety driver. Any uncrewed testing thus occurs without guidance from a professional standards organization. Moreover, the failure of the SAE to have promulgated such a standard creates an enormous legal loophole. Calling something a "test" might, however, be used to avoid existing regulations applicable to a *deployment*—a lawyer's category trick[56] that bears a family resemblance to a previously-identified "SAE Level 2" loophole.[57]

Understanding the true nature of a so-called "test" conducted "without a highly automated vehicle driver on board"[58] places the true HAV testing risk in context. Studies show that low-income neighborhoods tend to suffer disproportionately higher pedestrian fatality rates compared to other neighborhoods.[59] Moreover, less affluent citizens tend to find it more difficult to mount an effective court case to seek fair compensation if harmed by a motor vehicle.[60] Thus, municipalities might want to take steps to prevent urban HAV testing from exposing these neighborhoods to disproportionately high risk from HAV testing-related crashes.[61] This might occur if the

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[55] *Safety-Relevant Guidance for On-Road Testing of Prototype Automated Driving System (ADS)-Operated Vehicles*, SAE INT'L (Dec. 4, 2020), https://www.sae.org/standards/content/j3018_202012/ [https://perma.cc/583S-RFF6].

[56] *See generally* William H. Widen, *The Arbitrage of Truth: Combating Dissembling Disclosure, Derivatives, and the Ethic of Technical Compliance*, 66 U. MIAMI L. REV. 393 (2012) (describing the tools available for combatting ethical compliance).

[57] *See* Widen & Koopman, *supra* note 9.

[58] S. 965 § 8504.

[59] *See* Tanya Snyder, *Study: People in Low-Income Areas More Likely to Be Killed While Walking*, STREETSBLOG USA (Aug. 5, 2014), https://usa.streetsblog.org/2014/08/05/study-people-in-low-income-areas-more-likely-to-be-killed-while-walking/ [https://perma.cc/5ZLK-9UXJ].

[60] *See* Bryce Covert, *Poor People Don't Stand a Chance in Court*, THINK PROGRESS (May 11, 2016, 12:00 PM), https://archive.thinkprogress.org/poor-people-dont-stand-a-chance-in-court-7e46bd4e5719/ [https://perma.cc/HYZ6-RE54].

[61] This option of using municipal regulation to avoid discrimination is second-best. A more safety-conscious bill would recognize that an uncrewed test is not a test at all, applying different standards suitable for phased deployment activity. Every state that allows for uncrewed "testing" of HAVs is allowing roadway operation of motor vehicles that are not yet shown to be safe enough to

bulk of HAV testing took place in low-income neighborhoods or other communities of concern.[62]

If state preemption statutes do not prevent it, a local government might pass a law requiring an HAV company to submit a testing plan detailing the times, locations, and frequency of its testing activities. Local officials would review the plan for discriminatory allocation of increased risk to vulnerable communities, recommending adjustments as needed. A municipality may add other common-sense protections, such as prohibiting truck platoon testing[63] in residential neighborhoods or uncrewed vehicle testing within a specified distance from a school zone, public playground, or special event.[64] To be sure, a state might itself take on this regulatory burden, but local oversight would appear more efficient and effective based on knowledge of local conditions.

The process of an HAV company working with a municipality to guard against economic discrimination and take other safety measures tailored to local conditions would be a big step forward as HAV companies attempt to build trust in everything they do. Part of successful trust-building involves suspending the typically narrow

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deploy. The discussion in this Article starts with the disappointing reality that states seem determined to allow uncrewed testing. Thus, this Article focuses on how state law ought to account for the public interest, assuming the state has already committed the original sin of permitting uncrewed testing.

[62] There is a history of discrimination against at-risk communities resulting from the development of transportation infrastructure. *See, e.g.*, ROBERT D. BULLARD ET AL., HIGHWAY ROBBERY: TRANSPORTATION RACISM & NEW ROUTES TO EQUITY (2014).

[63] S. 965 and its successors permit truck platooning. *See* S. 965 § 3317; H.B. 2398 § 3317.

[64] This Article does not suggest that the law allow municipalities unfettered discretion to regulate HAVs. HAV companies are rightfully concerned that a change in local administration could seriously impair their ability to test HAV technology. Accordingly, the scope of permissible municipal regulation should be limited to protect against certain specified harms. Presumably, any targeted permission would at least require the regulation to bear a rational relationship to protecting against a specific type of harm identified in the statute as an exception to state preemption. For example, a municipality might consider allowing only crewed testing in low-income neighborhoods and other communities of concern.

focus on corporate profits and convenience by behaving in ways that recognize and value other persons and their concerns.[65]

The current version of Pennsylvania's proposed HAV bill, however, prevents a municipality from taking such trust-building steps when necessary (as does the January 2022 version of S. 965). Moreover, the bill does not mandate these protections at the state level, nor require a collaborative approach with relevant stakeholders, to ensure safe and community-appropriate testing operations. Expecting PennDOT to address these concerns by regulation without even a mandate in the bill to grant the department that authority seems sub-optimal (if, indeed, that is even contemplated). Given that S. 965 and its successors eliminate notice and comment for "temporary" regulations, as well as eliminate review by Pennsylvania state government attorneys,[66] PennDOT should reveal its initial temporary regulations for HAVs before any enactment. PennDOT might use its existing voluntary HAV guidance as a starting point.

As for building trust, the Pennsylvania HAV companies themselves likely initiated the drafting of the proposed bill which blocks municipalities from passing any law, rule, or regulation relating to HAVs. They certainly strongly support preemption in any event.[67]

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[65] HAV companies and public institutions have compelling reasons to actually be trustworthy, rather than merely appear to be trustworthy. *See* Mark Alfano & Nicole Huits, *Trust in Institutions and Governance*, *in* THE ROUTLEDGE HANDBOOK OF TRUST AND PHILOSOPHY 256 (Judith Simon ed., 2020). An industry strategy to self-proclaim one's own trustworthiness is unlikely to succeed. *Id.* at 264 (noting that "[d]irectly insisting on one's own good intentions when one is not already perceived as honest is thus not suitable for building and gaining trust"). Self-certification as to one's honesty nevertheless forms a component of current HAV industry attempts to earn the public's trust. *See, e.g.*, *Aurora S-1*, supra note 41, at 84 (describing a corporate culture that has "no jerks").

[66] S. 965 § 8510.1; H.B. 2398 § 8510.2.

[67] *See* An-Li Herring, *Self-Driving Tech Companies in Pittsburgh Push for Looser Rules on Vehicle Testing*, 90.5 WESA: PITTSBURGH'S NPR NEWS STATION (Jan. 20, 2022, 4:26 PM), https://www.wesa.fm/economy-business/2022-01-20/self-driving-tech-companies-in-pittsburgh-push-for-looser-rules-on-vehicle-testing [https://perma.cc/2BUY-BBBY] (describing support for

The embrace of blanket preemption can be attributed to an apparent failure of HAV companies to follow the engineering profession's own recommended practices covering the ethical development of new technologies found in IEEE 7000.[68] The Pennsylvania process for the initial draft of S. 965 included ethical considerations as part of the drafting deliberations, but it appears these efforts did not go far enough to take full account of the interests of low-income persons.

IEEE 7000 sets forth a process by which a company identifies all stakeholders who might be impacted by the development or use of technology. Then, the company formulates a plan to address the concerns of those stakeholders. IEEE 7000 provides a management mechanism to overcome the typical corporation's narrow focus on profits and convenience. If the industry had followed IEEE 7000 when making recommendations for the structure of S. 965, it is likely that S. 965 and its successors would not contain broad state preemption. The bill would at least have allowed for selective municipal action to address potential discrimination and select other safety issues.[69]

Despite industry efforts to test safely, some fatal accidents will almost certainly occur during testing. Municipal oversight might help prevent discriminatory exposure to any public road-testing risk. This is particularly important because the mere act of testing in

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S. 965). Supporting blanket preemption in consideration of the risks to vulnerable communities feels like a milder version of the practice of railroads in the late 1800s and early 1900s, who generally opposed safety measures. This only changed when the Pennsylvania Railroad hired Ivy Lee, the first corporate public relations specialist. *See* Mark Aldrich, *Public Relations and Technology: The "Standard Railroad of the World" and the Crisis in Railroad Safety, 1897–1916*, 74 PA. HIST.: J. MID-ATL. STUD. 74 (2007).

[68] *IEEE 7000*, *supra* note 4.

[69] The drafters and supporters of S. 965 likely considered ethical standards in Pennsylvania, such as the "Pittsburgh Principles" which define expectations and policies for HAV testing. *See* Exec. Order, Self-Driving Vehicle Testing and Operations in the City of Pittsburgh, https://apps.pittsburghpa.gov/redtail/images/5056_AV_Testing_EO.pdf [https://perma.cc/E6HT-UVUS]. This Order does not contain details for ethical technology development. The IEEE 7000 standard was created specifically to address this concern, but many in the engineering community may be unfamiliar with IEEE 7000 given its recent adoption in mid-2021.

urban areas already creates a concern due to low-income neighborhood concentrations in cities. The better course is to take affirmative steps so that discrimination does not play a role in explaining how some future accidents occurred. Our cities already have had too many calamities in which discrimination contributed to tragic events.

HAV technology is properly considered a transportation infrastructure of the future. In the past, the development of transportation infrastructure has adversely affected at-risk populations.[70] Even though HAV technology holds the long-term promise of improving transportation for low-income persons, future potential benefits ought not to come at the price of present discrimination.

Municipal anti-discrimination measures would supplement federal efforts to promote social and economic equity, such as Justice40, and state infrastructure investments in disadvantaged communities, ensuring that the efforts of all levels of government are aligned. Re-visiting S. 965 and its successors' preemption provisions to allow for targeted local participation in the regulatory process would be an excellent way for HAV companies to build trust in Pennsylvania's communities.[71]

### *B. Harm from Limited Tort Option Insurance Policies*

Pennsylvania has a type of motor vehicle insurance policy that many states do not have: the limited tort option insurance policy provided for in Section 1705 of Title 75, Chapter 17.[72] A limited tort

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[70] *See* BULLARD ET AL., *supra* note 62.

[71] The PennDOT Guidelines allow either PennDOT or the Pennsylvania Turnpike Commission to temporarily restrict testing statewide or on select trafficways during certain circumstances. PennDOT Guidelines, *supra* note 49, at 6–7. They also allow a local municipality, city, or operating agency to request a restriction for emergencies, special events, or safety concerns. *Id.* PennDOT determines whether the restriction is necessary and justified to address a safety concern. *Id.* It is difficult to understand why S. 965 and its successors apparently eliminate even the existing structure for municipal input. This feature should not depend on PennDOT drafting temporary regulations after the enactment of HAV legislation.

[72] *See generally* 75 PA. CON. STAT. § 1705 (permitting the election of limited tort option insurance policies).

option policy prevents a covered insured from recovering non-economic losses.[73] In Pennsylvania, non-economic losses include claims for pain and suffering and loss of consortium.[74] A limited tort option policy is attractive to persons of modest means because it offers lower premiums in exchange for second-class coverage.

To mitigate the impact of this lesser coverage, current Pennsylvania law provides for limited exceptions to the prohibition on recovery of non-economic losses.[75] The exceptions promote justice and fairness. A covered insured under a limited tort option policy may, for example, seek full damages from the defendant in the case of a drunk driving accident, from a motor vehicle designer or manufacturer in the case of a defect, and in case of an accident that caused serious injury or death.[76]

The introduction of S. 965 and its successors, which allow for the testing and deployment of HAVs, presents additional situations for exceptions that allow a covered insured under a limited tort option policy to seek full damages. Justice and fairness require that Pennsylvania's HAV legislation provide additional exceptions to reflect the brave new world of HAV testing and deployment.

*1. Cyclists, Pedestrians, and Bystanders*

First, the law should be amended to reflect the reasoning of a Pennsylvania Supreme Court case which allowed a pedestrian covered by a limited tort option policy to seek recovery of full damages. In *L.S. ex rel. A.S. v. Eschback*, the Court held that Section 1705 did not apply to a pedestrian who was a minor child and injured in an automobile accident after her mother had selected a limited tort option policy.[77] The reasoning in *Eschback* makes clear that the limitation on claims for non-economic damages should apply only when the named insured is driving, or a passenger in, a motor vehicle. Yet, as a technical matter, the decision's scope only applies to "pedestrians."

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[73] § 1705(d).
[74] *See* § 1702 (defining non-economic losses).
[75] § 1705(d)(1)–(3).
[76] *Id.*
[77] L.S. *ex rel.* A.S. v. Eschback, 583 Pa. 47 (2005).

The Court created ambiguity because it failed to refer to the definition of "pedestrians" in Title 75. Therefore, any Pennsylvania HAV legislation should cover not only pedestrians but also bystanders and cyclists to conform to the Court's reasoning. This is a necessary change regardless of looming HAV-specific legislation. It is particularly important in the context of proposed HAV legislation because low-income persons are more likely to travel by foot or on a bicycle.[78]

The language at issue in *Eschback* appears in Title 75 Section 1705(d):

> Unless the injury sustained is a serious injury, *each person* who is bound by the limited tort election shall be precluded from maintaining an action for any noneconomic loss, except that: [exceptions include an accident caused by a drunk driver].[79]

The appellate court in *Eschback* found the scope of the term "each person" did include a pedestrian if the pedestrian was bound by a limited tort election.[80] The Supreme Court of Pennsylvania reversed the appellate court, construing the term "each person" to exclude "pedestrians" from its scope.[81] The existing definition of "pedestrian" in Title 75 is insufficiently broad to cover bystanders and cyclists (and the definition of "pedalcycle" is insufficiently broad as a basis to cover a wide range of people who are neither driving nor riding in a motor vehicle).

The existing Title 75 definition of pedestrian includes any of the following:

> (1) An individual afoot.
>
> (2) An individual with a mobility-related disability on a self-propelled wheelchair or an electrical mobility device operated by and designated for the exclusive use of an individual with a mobility-related disability.

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[78] *See, e.g.*, Elaine Murakami & Jennifer Young, Daily Travel by Persons with Low Income (Oct. 26, 1997) (unpublished manuscript), https://nhts.ornl.gov/1995/Doc/LowInc.pdf [https://perma.cc/FVY4-XPMV] (noting that over a quarter of low-income households do not have a car, as compared with four percent of other households).

[79] 75 PA. CONS. STAT. § 1705(d) (1990) (emphasis added).

[80] *Eschback*, 583 Pa. at 55.

[81] *Id.* The author is not aware of a case in which the Pennsylvania Supreme Court has expounded further on the scope of the word "pedestrian" as applied in *Eschback* or addressed the status of bystanders and cyclists.

(3) A personal delivery device.[82]

The existing definition of pedestrian does not appear to cover certain persons who ought not to be subject to a damage limitation from a limited tort option policy. This problem arises because the word "afoot" might be limited to an individual "traveling by foot" or "walking." A similar problem arises with the defined term "pedalcyclist" because it does not include a child on a tricycle.[83] Therefore, Section 1705(d) (i.e., the Title 75 definitions section) should be modified as follows in italics:

> Unless the injury sustained is a serious injury, each person *(other than a cyclist, pedestrian, or bystander)* who is bound by the limited tort election shall be precluded from maintaining an action for any noneconomic loss.

Section 1705(d) should also be modified to include the following definitions for "Pedestrians and Bystanders" and "Cyclist":

> "Pedestrians and Bystanders" shall include within its scope "pedestrians" as defined in Title 75, Section 102. For the avoidance of doubt, the term "pedestrian and bystander" is to be interpreted broadly and shall not be limited to persons on a Sidewalk or on a Roadway, and shall include, without limitation, any person who is:
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> (i) In the process of entering or exiting any vehicle (including a motor vehicle) or structure (including, without limitation, structures devoted to business, industry, or dwelling houses);

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[82] 75 PA. CONS. STAT. § 102 (2021).

[83] Yet another definition might be used to include golf carts, horseback riders, cross-country skiers on the side of a road, farm vehicles, riding lawn mowers, hoverboards, throttle only e-bikes without pedals, three and four wheeled adult bikes, and more. The reason to consider using these detailed and cumbersome definitions is to avoid arguments over the scope of the language "driving, or a passenger in, a motor vehicle." One might craft a very short clarification by inserting a qualification after "each person," such as "who is driving, or riding in, a motor vehicle (and not cyclists, pedestrians, bystanders, and similarly situated persons)." That said, this clarification leaves the ambiguities at issue in *Eschback*—where the plaintiff unsuccessfully claimed that the girl in the crosswalk should be considered a person riding in a bus—unresolved. *Eschback*, *supra* note 77. The plaintiff made this argument because it was unclear whether the Court would interpret "each person" to exclude pedestrians, and § 1705(e) provides: "An individual otherwise bound by the limited tort election shall retain full tort rights if injured while an occupant of a motor vehicle other than a private passenger motor vehicle." 75 PA. CONS. STAT. § 1705(d)(3) (1990).

(ii) Stationary in a standing or sitting position on a bench or other object, at a bus stop, ride hailing, or other pick-up zone;

(iii) At outdoor seating for a restaurant, café, or other establishment;

(iv) A street vendor;

(v) A runner or jogger;

(vi) A person who is attending to a stationary vehicle (including, without limitation, a person changing a tire, inspecting an engine or otherwise performing work on or inspecting a Vehicle, and any Emergency Service Responder, or other person rendering roadside assistance or Wrecker (as defined in Title 75, ch. 1, § 102));

(vii) A cyclist standing with or walking a pedalcycle;

(viii) A person using an electric personal assistive mobility device ("EPAMD");

(ix) A person in a Work Zone (including without limitation an Active Work Zone);

(x) A person using a self-propelled wheelchair or an electrical mobility device operated by and designed for the exclusive use of a person with a mobility-related disability.

"Cyclist" shall include within its scope persons using Pedalcycles as defined in Title 75, Section 102. For the avoidance of doubt, the term "cyclist" is to be interpreted broadly and shall include, without limitation, any person using or riding on a Pedalcycle (including a Pedalcycle with Electric Assist) or a Motorized Pedalcycle, and any person using a skateboard or a three-wheeled human-powered pedal-driven vehicle with a main driving wheel 20 inches in diameter or under and primarily designed for children six years of age or younger (as defined in Title 75, Section 102).

An amendment to solidify the status of pedestrians under Section 1705 is needed for multiple reasons. First, the statutory interpretation question determining the scope of the term "each person" was a close one (and might be revisited). Second, the scope of "pedestrian" in *Eschback* is unclear. Finally, the logic of *Eschback* suggests many other classes of persons with a limited tort option policy should not be within the ambit of "each person." Moreover, a future court might limit the ruling in *Eschback* to its particular facts, which involved an innocent minor.

*2. Damages from HAV Testing Activity*

Second, persons covered by a limited tort option policy should not be exposed to uncompensated losses from either HAV testing

activity or from the operation of an HAV by a remote driver. Section 1705(d) should be amended as follows in italics:

> (1) An individual otherwise bound by the limited tort election who sustains damages in a motor vehicle accident as the consequence of *any testing of a highly autonomous vehicle, the operation of a vehicle by a remote driver, or* the fault of another person may recover damages as if the individual damaged had elected the full tort alternative*, in any case of damage resulting from highly automated vehicle testing or the operation of a vehicle by a remote driver, and in the case of fault of a person (other than from testing by a person or in the case of a remote driver),* whenever the person at fault.

This change eliminates the limits on damages in two cases. It provides an exception for damages from testing activities—but not on deployments—on the assumption that, on or after deployment, the HAV's operation will be demonstrably safer than the average unimpaired human driver.

The justification for eliminating the limit in the case of HAV testing activity is much the same as for eliminating the limit on accidents caused by drunk driving. During testing, an HAV company may be operating a motor vehicle that performs at a lower level of safety than an average unimpaired human driver. This is because once the HAV performs at an increased level of safety, as compared with an unimpaired human driver, it will be time for deployment.

If a lesser deployment standard is used, then the suggested modification should remain in place until the HAV has achieved substantially better-than-a-human driving performance as determined by sound methods. This also eliminates the limits on damages from the operation of a vehicle by a remote driver. As a matter of justice and fairness, current Pennsylvania law lists an exception to the limit on damages in a case in which the defendant, as the person at fault, "is convicted or accepts Accelerated Rehabilitative Disposition ('ARD') for driving under the influence of alcohol or a controlled substance in that accident."[84]

S. 965 contemplates that a "highly automated vehicle driver" might operate the HAV from a remote location.[85] There is no

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[84] 75 PA. CONS. STAT. § 1705(d)(1)(i).

[85] *See* S. 965 § 102.

practical way to test a remote HAV driver for substance abuse in real-time. Accordingly, Title 75 ought to be amended to allow a named insured with a limited tort option policy to collect for non-economic damages anytime an HAV involved in an accident is operated by a remote safety driver. This additional exception would place the limited tort option policyholder on the same footing as the full tort option policyholder, avoiding discrimination in protection against losses from "drunk driving." This discrimination was unavoidably created by S. 965, and remains in the current version of Pennsylvania's proposed HAV law, by allowing for remote HAV drivers. Allowing for remote drivers creates conditions that place limited tort option policyholders at greater risk of loss caused by impaired driving. Though there might be nothing wrong with using remote drivers *per se*, the law ought to adjust for these changed conditions.

The justification for eliminating the limit in the case of a remote driver is simply that it is not practical to test a remote driver immediately following an accident to determine whether the remote driver is impaired from drinking or other substance abuse.

*3. Damages from Defects*

Third, proposed HAV legislation fails to update the liability status of HAV companies under limited tort option policies for ADS defects. Current Pennsylvania law makes clear that a limited tort option policy does not prohibit a covered insured from recovering non-economic losses from a person who is:

> in the business of designing, manufacturing, repairing, servicing or otherwise maintaining *motor vehicles* arising out of a defect in such *motor vehicle* which is caused by or not corrected by an act or omission in the course of such business, other than a defect in a *motor vehicle* which is operated by such business.[86]

Under current Pennsylvania law (which was adopted far too early to account for HAVs, in many cases an HAV company will not perform its technology and development activities as either the designer or manufacturer of a "motor vehicle."[87] For example, an HAV company might be in the business of designing and

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[86] 75 PA. CONS. STAT. § 1705(d)(2) (1990) (emphasis added).

[87] *See* § 102 (defining "motor vehicle" and "manufacturer").

manufacturing an ADS but not in the business of designing and manufacturing a motor vehicle. Additionally, an HAV company might be a so-called "upfitter" who takes an ordinary production motor vehicle and, following production, modifies it by adding an ADS. Recovery against an HAV company ought not to be artificially limited by the narrow scope of the existing definition of "motor vehicle." In any event, the scope of an HAV company's liability for ADS defects ought to be clear. If the intention is to exempt HAV companies from full liability, that should be made clear as well. The resolution of this issue should not be left for litigants and the courts to battle out the scope of coverage of the term "motor vehicle" in the existing statute.

## IV. THE HARMFULLY UNCLEAR BASIS AND SCOPE OF TORT LIABILITY

The failure of proposed Pennsylvania HAV legislation to properly specify the basis and scope of liability for an HAV accident is best considered against the backdrop of a fatal crash involving a Tesla using its Auto Pilot system. *The Los Angeles Times* recently reported on the filing of felony charges for two deaths in that accident.[88] Importantly, the AutoPilot system in this case is a partially automated driver-assist system that has Level 2 capability under the SAE guidelines' terminology, which is used to describe levels of vehicle automation.[89] As such, this accident did not involve an HAV as defined under proposed legislation. The basis for liability might differ between a driver of a Level 2 motor vehicle and the owner/occupant of an HAV.

As a general matter, to obtain a manslaughter conviction, the prosecution must show that the defendant was at fault, meaning the defendant acted with gross negligence or reckless disregard.[90] This is easily proven in the case of drunk driving. "Gross negligence" is the conscious, willful disregard for the importance of using

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[88] Hayley Smith & Russ Mitchell, *A Tesla on Autopilot Killed Two People in Gardena. Is the Driver Guilty of Manslaughter?*, L.A. TIMES (Jan. 18, 2022), https://www.latimes.com/california/story/2022-01-18/felony-charges-are-first-in-fatal-crash-involving-teslas-autopilot# [https://perma.cc/LH4C-BALW].

[89] *See Taxonomy and Definitions*, *supra* note 13.

[90] *See* MODEL PENAL CODE § 210.3 (AM. L. INST. 2021).

reasonable care in scenarios that may cause serious bodily injury or death to another person.[91] A driver of a Level 2 motor vehicle can act with gross negligence or reckless disregard because that driver is responsible for completing the Object and Event Detection and Response ("OEDR") sub-task portion of the dynamic driving task, and must intervene as necessary when the vehicle encounters a situation it is not designed to handle.[92]

If a driver were not paying attention because they were drunk, reading a book, playing a video game, or occupied with some other activity while the Level 2 system was engaged, the driver's inattention might amount to gross negligence because it prevented the vigilance required to take over control. Thus, a driver of a Level 2 vehicle with an automation feature engaged might have criminal liability or, if merely negligent, perhaps civil liability in tort.

Compare this situation with that of an owner/occupant of a deployed production HAV which, by definition, can perform the entire dynamic driving task on a sustained basis. How is this owner/occupant at fault for any crash? One example of the benefits of HAV technology is that it would allow the owner/occupant to go to sleep in the back seat during a trip. Liability only seems possible if the owner/occupant failed properly to maintain the HAV or found a way to intentionally misuse it.

Separate from the question of owner/occupant liability is the question of liability for a designer or manufacturer of an ADS or an ADS-equipped motor vehicle (i.e., an HAV), or an upfitter who installs ADS systems in production-complete motor vehicles. Are these parties liable for a defect, or some installation, repair, service, or other maintenance mishap?

Taking the above background into account, there are two different scenarios that the law must clearly address: (1) the basis and scope of liability for a tester; and (2) the basis and scope of liability for an owner/occupant. As drafted, the proposed Pennsylvania HAV law appears to allow the operation of an HAV both during testing and after deployment. For clarity, any HAV legislation should bifurcate the treatment of each situation and

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[91] *Id.*

[92] *Taxonomy and Definitions*, *supra* note 13, at 9.

explicitly state how liability is assigned both during testing and after deployment.

Even though the ADS is considered the "driver" for some purposes of S. 965,[93] the owner (or the "certificate holder" in H.B. 2398) is the party who must maintain insurance[94] and who receives traffic citations.[95] This level of liability suggests that the owner/tester has responsibility for testing, but that is not clear enough. Any HAV law should include a general statement that the owner is the party financially responsible for any accidents involving the HAV during testing (except, perhaps, for accidents in which another party to the accident is more than 50% at fault).[96]

These clarifications to proposed HAV legislation would place a type of strict liability for loss on HAV companies and educational institutions who own and operate HAVs during testing without a showing of traditional fault by the tester. It is the "fault" of the tester simply because operating a pre-production test vehicle on a public street is inherently dangerous. That is why the tester ought to have some form of strict liability. It might make sense to have an exception for accidents in which the plaintiff engaged in unreasonably risky activities, such as intentionally jumping in front of an HAV at the last moment.[97]

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[93] *See* S. 965 § 8508.

[94] *See* § 8509.

[95] *See* § 8508.

[96] It is odd to use a comparative negligence standard when the functioning of the ADS in the vehicle is "responsible" for all or a portion of the damage (but no person is at fault), whereas the plaintiff might be at fault, and thus responsible for a portion of the damage. It may be appropriate to draft a new legal category to account for this situation, unless the only recovery in such cases may be made for a defect and not against the tester's insurance policy. It seems unlikely S. 965 or its successors intend this result because the insurance policy would be of little use if it may not be called upon to pay a damage claim.

[97] In Pennsylvania, a pedestrian shall yield the right-of-way to vehicles on the roadway. 75 PA. CONS. STAT. § 3543 (describing the rule for pedestrians crossing a road but not in a crosswalk). Nevertheless, any formulation of a qualification must have a high standard of proof to demonstrate fault by a plaintiff. In an Uber accident in Arizona, for example, an attempt was made to blame the victim. *See* Ryan Randazzo, *Victim of Self-Driving Uber Accident Could Be to Blame, Expert Says*, USA TODAY (Mar. 23, 2018), https://www.usatoday.com/story/tech/nation-now/2018/03/23/self-driving-uber-pedestrian-accident/453319002/

The clear default rule ought to be that the tester assumes responsibility for testing accidents, allowing a plaintiff to access the testing owner's insurance policy or self-insurance. Without this clarity, a plaintiff's options may be limited to making a defect claim against a motor vehicle manufacturer or similar party who might have had no involvement with (and possibly no knowledge of) the ADS or the testing. Without an amendment, there is a significant risk of confusion, which only worsens in the case of an owner/occupant after deployment.

Liability of private HAV owners/occupants of an HAV after deployment is unclear. If liability is to remain fault-based and an owner/occupant's HAV has an accident while the ADS is properly engaged, the owner/occupant would be without fault (unless the HAV had not been properly maintained and serviced). Any HAV legislation needs to expressly address how liability for loss is assigned in this case. Either a plaintiff will only have a defect claim against an HAV company, part manufacturer, designer, or upfitter, or a plaintiff will be entitled to make a claim against the owner/occupant and her insurance policy. Answering this question is critical. Pennsylvania's HAV law should therefore assume the responsibility of clarifying the basis and scope of liability to fill gaps in the law that must otherwise be filled by courts and litigants. This places an extremely heavy and unfair burden on persons with limited means. Moreover, the complexity of litigation will postpone the time at which a plaintiff receives any recovery.[98] HAV legislation

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[https://perma.cc/8CCE-E4RQ]. Any rule should make blaming the victim difficult, given the general responsibility of drivers to look out for pedestrians even if not in a crosswalk. In Pennsylvania, it is not contributory negligence as a matter of law to cross a street at a place other than an intersection. Liposchock v. Puc, 119 Pittsburgh Legal J. 180 (1971). A pedestrian crossing in the middle of a block in full view of an oncoming car cannot legally be declared guilty of contributory negligence if he reasonably assumes that the motorist, having ample time within which to stop his car or alter his course to avoid hitting him, will not run him down. Jackson v. Feather, 112 Pittsburgh Legal J. 27 (1963).

[98] An additional discriminatory effect will be that injured parties of limited means will experience severe pressure to accept a low-ball settlement. They might feel they have little choice but to do so because any co-pay for medical bills, rehabilitative expenses, loss of income, and other costs needs to be met immediately, whereas litigation might take years. Moreover, they may rightfully

might also address the practical reality that Pennsylvania is a comparative negligence state,[99] thus choice of law rules for selecting an applicable liability law can be complex and uncertain.

To give a low-income plaintiff a better chance of understanding the applicable liability attribution rules and obtaining a full recovery, Pennsylvania might consider supplementing existing tort law in its HAV legislation to clearly provide that, for claims in all accidents involving HAVs, a plaintiff may obtain a full recovery from one defendant (whether in negligence or for a defect or strict liability), which places the burden on that defendant to seek contribution from the other responsible parties.[100] The goal is to address any legal complexity that might arise in a future case against an ADS designer or manufacturer, who is also a tester, where a plaintiff has claims against that tester that sound in both negligence and products liability (there may also be some claims against other defendants that sound only in products liability).[101] Similarly, claims against an upfitter may sound in negligence as well as products liability, while claims against others are based on a defect in some part of an ADS system.

Further, Pennsylvania might amend its choice of law rules to provide that, for any HAV accident occurring in Pennsylvania, the proper choice of law for determining liability shall be the internal laws of Pennsylvania, without giving effect to *renvoi* or choice of law principles. The idea is to create a single location in Pennsylvania law to determine HAV liability. This would provide a low-income Pennsylvania plaintiff with a streamlined and simpler process to obtain a recovery. Other steps of this sort may be appropriate. In justice and fairness, the law ought to account for various possible courses of litigation and create a streamlined process for a plaintiff

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be concerned about their chances for adequate recovery, if any, from expensive litigation that must resolve an intentionally ambiguous area of law.

[99] *See* 42 PA. CONS. STAT. § 7102. Proposed legislation does not affect Pennsylvania's choice of comparative negligence. *See* H.B. 1572, 2021 Gen. Assemb., Reg. Sess. (Pa. 2022).

[100] Pennsylvania recognizes contribution. *See* 42 PA. CONS. STAT. § 8324. Contribution exists between joint tortfeasors. *Id.*

[101] To make such a unified provision work, it may be necessary to expand the ability to seek contribution which is not limited to joint tortfeasors.

to collect compensation for loss caused by an HAV. This is particularly important given the unusual circumstance of opening the highways to experimentation with a complex emerging technology and components sourced from many suppliers, developers, and manufacturers.

Low-income persons should not be denied access to justice based on these sorts of structural and financial concerns which are predictable and avoidable.

## V. CONCLUSION

This Article shows how legislators and regulators could consider the interests of low-income persons affected by HAV technology. These interests might be protected both by regulation of technical matters (such as the minimum expected useful life of electronic components in an ADS), and either eliminating or providing exceptions to preemption of municipal regulation of HAV testing and deployment. It has also shown, using Pennsylvania Senate Bill 965 and its successors, the types of detailed reforms that might be made to insurance and tort laws to account for the disruptive nature of HAV technology.

Pennsylvania's long history of quality law reform—as the birthplace of the United States Constitution, the home of the American Law Institute, and the first adopter of the Uniform Commercial Code—makes both the January 2022 version of S. 965 and the October 2022 version of H.B. 2398 somewhat disappointing in their failure to consider the interests of all stakeholders.[102] Passage of an HAV bill presents Pennsylvania an opportunity to lead in HAV law and regulation, just as it leads in HAV technology. As it stands, the proposed Pennsylvania HAV legislation contains too many ambiguities and gaps in statutory coverage to be the basis for a model HAV law.[103] There is irony in the ambiguities present in a bill

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[102] The Pennsylvania legislature has continued to work on the structure and content of S. 965, but the problems identified in this Article continue in subsequent drafts of the bill as of this Article's publication. *See* H.B. 2398.

[103] A complete model law would need to address many other issues not covered in this Article, such as provision for recording and retention of forensic crash data, which might be used to diagnose the cause of an accident and attribute

supported by HAV companies, because HAV companies are often the parties clamoring for legal and regulatory certainty. There is not even a clear mandate detailing what is expected of PennDOT. The author attributes many of the shortcomings reflected in the proposed HAV legislation to a failure by Pennsylvania HAV companies to follow the IEEE 7000's recommended procedures during the preparation of the draft legislation.[104]

Karl Llewellyn, legal scholar reporter for the Uniform Commercial Code, observed that problems such a those found in proposed HAV legislation often arise when the lawyers for a powerful party "draft to the edge of the possible."[105] When lawyers draft legal materials for a client, one often sees a tendency to toss in every "nice to have" provision that they can imagine and omit any provision favorable to the other side. This results in a one-sided document that contains many provisions that the businesspeople do not care about, and omits other provisions to which a businessperson would not object. Llewellyn specifically addressed the problem of "form contracting," in which lawyers drafting to the edge of the possible create a risk that a court would find the entire document presented to a consumer or small business unconscionable.[106] This risk of unconscionability does not align with true business interests. Ultimately, the true business interests of HAV companies do not require that legislators and regulators ignore the supervision of the technical specifications of electronic components in an ADS. Nor is it in the best interest of HAV companies to support an HAV bill that is light on protections for the public. The author believes that such a bill is not in the interest of the citizens of Pennsylvania (but that, of

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responsibility for damages. It is odd that S. 965 and its successors omit such a provision, because it appears in the Pennsylvania Department of Transportation's regulatory guidelines. PennDOT Guidelines, *supra* note 49, at 3 (discussing operational data recording).

[104] Legislators might ask HAV company representatives why IEEE 7000 procedures have not been followed so far.

[105] These comments appear in testimony given by Llewellyn, in his capacity as the reporter for Article 2 of the Uniform Commercial Code, before the New York Law Revision Commission in 1954. *See* STATE OF N.Y., REPORT OF THE LAW REVISION COMMISSION FOR 1954, Leg. Doc. 65 (1954).

[106] *Id. See also* KARL N. LLEWELLYN, THE COMMON LAW TRADITION: DECIDING APPEALS 362–70 (1960).

course, is for Pennsylvania to decide). Other states have made the mistake Pennsylvania is about to make.[107]

HAV companies should consider the implications of their technical decisions about the robustness of electrical components on low-income persons. HAV companies from Pennsylvania involved in drafting S. 965 and its successors ought to take a second look at the bill through the lens recommended by IEEE 7000—i.e., asking which provisions and omissions are truly necessary and which might be modified. This exercise will likely produce a more balanced bill that ultimately benefits both HAV companies and the public by eliminating discrimination against low-income persons in the process of HAV testing and deployment.

So far, the regulatory process in Pennsylvania seems to be business as usual for the development of state law—that is to say, typical special interest legislation without regard for the public interest. This deficient process provides a sound basis to withhold trust from the HAV companies who support the bill. The author hopes the observations in this Article will help change course, with Pennsylvania taking an uncommon leadership role in showing other states how responsible regulation of HAVs might be accomplished. This starts with taking steps to address social and economic justice issues. There is still time to pivot in a positive direction for all stakeholders, and there is always the possibility of a corrective amendment if any adopted legislation proves deficient.

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[107] *See, e.g.*, *Autonomous Vehicles*, GOVERNORS HIGHWAY SAFETY ASS'N, https://www.ghsa.org/state-laws/issues/Autonomous%20Vehicles [https://perma.cc/3VA3-V6BE] (last visited Oct. 17, 2022) (listing 38 states with laws and executive orders related to autonomous vehicles).