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The Future of Vision Zero: **Transportation Safety Technology & Autonomous Enforcement**

This past fall, I served on and/or moderated panels at three important conferences addressing the global movement to reduce the number of road traffic-related fatalities and serious injuries to zero – otherwise known as “*Vision Zero*.” These conferences were at *Comotion in Los Angeles*,¹ and two other conferences held in NYC hosted by *Transportation Alternatives* and New York City (NYC) government. At the Comotion event, I moderated an international panel on “*Maximizing Technology to Minimize Collisions*,” where we discussed how cities and companies are using data and new technologies to reduce inherent risks when various modes share the streets. At the *Vision Zero Cities 2022* event hosted by Transportation Alternatives I served on a similar panel which discussed “*Using Data and Design to Eliminate Traffic Fatalities*.”² Finally, at the *Fleet Safety Forum* hosted by the *New York City Department of Citywide Administrative Services (“DCAS”)*, I served on a panel with high level government officials and private stakeholders, discussing the “*Role of Automated Enforcement for Vision Zero*.”³ These experiences prompted me to reflect here on the status of the Vision Zero movement in general, with a spotlight on NYC and the passenger ground transportation industries.

At all conferences, there was no shortage of telematics hardware and software providers, as well as government officials and insurance experts. The vendors and government alike have the same goals of making our streets safer, but different methods of achieving or realizing that goal. At each conference, I emphasized lessons learned through my many years of involvement in this issue, and I solicited provocative ideas from the other panelists and the audience. The bottom line is that we still have a long way to go, especially since the pandemic has led to increased car usage and the return of traffic congestion, with sustainable transport modes such as bikes and scooters also increasing on our clogged roadways. There were many missed opportunities over the years to more widely and effectively deploy, or even mandate, telematics technology to help curb unsafe driving habits before crashes occur. Also, while the government has been slow to install red light and speeding cameras, these initiatives and other forms of automated enforcement are quickly catching-up and are proliferating. We are at a crossroads now as to how we can quickly and effectively realize the vision of zero fatalities, and I am hoping some of the thoughts and ideas in this article will inspire private industry, stakeholders, and government to make sound and fair policy.

Origins of the Vision Zero Movement

Vision Zero began as the Swedish national road policy in 1997, and it is built around the simple premise that traffic-related deaths and injuries are not “accidents”—they are unacceptable, preventable, and can be reduced to zero through strategic design of safe transportation systems.⁴ Vision Zero accepts that

¹ The CoMotion conference was November 15–17, 2002. CoMotion (<https://comotionla.com/program-2022>) is a global platform where the most innovative transportation and technology companies, as well as civic and business leaders from across the mobility ecosystem explore, collaborate, and interact to share ideas and make deals.

² The Transportation Alternatives conference was October 19–21, 2022. The mission of Transportation Alternatives (<https://www.transalt.org/>) is to reclaim New York City from cars, transforming our streets into safe, sustainable, and equitable places to walk, bike, take transit, gather, and thrive.

³ The DCAS Fleet Safety Forum was held on October 26, 2022. (<https://www.nyc.gov/site/dcas/index.page>) DCAS provides City agencies with the resources and support needed for their vehicle fleet programs, and oversees the greenest and largest municipal vehicle fleet in the country.

⁴ https://en.wikipedia.org/wiki/Vision_Zero

people are human and will make mistakes, so the road system and related policies must be designed to mitigate those mistakes that result in tragedy on the roadways. An effective Vision Zero strategy employs the “Safe System” approach, which shifts responsibility from the people using roads to the people designing them to create a safe mobility system that is forgiving of human error.⁵ In addition, enforcement against traffic violations remains a component of Vision Zero policy.

Since its European debut, Vision Zero has been implemented in numerous countries and cities around the world, including many cities throughout the U.S.⁶ In 2014, under Mayor Bill de Blasio who worked closely with Transportation Alternatives, New York City became the first U.S. city to implement Vision Zero. NYC’s plan included 63 initiatives to reduce fatalities on city streets, including pushing for changes in the state legislature to allow the city more local control in the administration of traffic safety measures, such as speed reduction. NYC’s Vision Zero Action Plan outlined actions that key NYC agencies—including the Taxi and Limousine Commission (“TLC”), the Department of Transportation (“DOT”), the Police Department (“NYPD”), and DCAS—can take to end traffic-related deaths and serious injuries in the Big Apple.⁷ These and other agencies are part of the Vision Zero Task Force that works together to identify trends and patterns in crashes, and then develop solutions to prevent severe crashes before they happen. 2022 marks year nine of Vision Zero in New York City, and the Vision Zero Task Force continues to implement new initiatives across the city.

DCAS’ Commissioner Dawn M. Pinnock and NYC’s first ever **Chief Fleet Officer, DCAS Deputy Commissioner Keith Kerman**, are responsible for overseeing the fleet of vehicles owned by NYC government. At DCAS, Vision Zero initiatives include training resources for drivers and fleet operators, codifying fleet safety best practices, operationalizing the updated Safe Fleet Transition Plan, and implementing new technology to increase the safety of city streets, among other actions. DCAS Fleet Management explores the use of safety technologies and their impact on preventing crashes and minimizing injury and loss of life.⁸ In addition, DCAS Fleet Management is working with the NYC Business Integrity Commission (“BIC”) to explore how technologies can be adopted in private fleets regulated by BIC. The Vision Zero Fleet Safety Forum, sponsored by NYC Fleet, brings together people representing private fleets, equipment suppliers, federal, state, and city agencies, non-profits, and universities for the common goals of vehicle safety. Through the fleet forum, New York City has conducted outreach within and outside of government to exchange best practices, promote vehicle safety technology, and to educate fleet managers about Vision Zero.⁹

Vision Zero Initiatives in Other U.S. Cities

There are 54 Vision Zero Communities in the United States.¹⁰ According to the Vision Zero Network, taxi and for-hire drivers play a key role in street safety and can be engaged in Vision Zero efforts through education, enforcement and other strategies. In San Francisco, the San Francisco Municipal Transportation Agency implemented Car-Free Market Street QuickBuild, becoming the city’s first street to remove private vehicles to improve safety for people walking, biking, taking transit and taxis on one of the

⁵ <https://visionzerochallenge.org/vision-zero?locale=en>

⁶ https://en.wikipedia.org/wiki/Vision_Zero

⁷ <https://www.nyc.gov/html/visionzero/pdf/nyc-vision-zero-action-plan.pdf>

⁸ <https://www.nyc.gov/site/dcas/agencies/vision-zero-and-nyc-fleet.page>

⁹ <https://www.nyc.gov/site/dcas/agencies/vision-zero-fleet-safety.page>

¹⁰ https://docs.google.com/spreadsheets/d/1-aN1-2gn0JNKZ_GacxehL62S4QofhFmEeySNr-X0AOg/edit#gid=0

city's busiest streets in 2020. Chicago has worked to educate taxi and rideshare drivers and passengers through a partnership with the Department of Business Affairs and Consumer Protection ("BACP"). The BACP has drafted content addressing driver behavior and passenger safety that is formatted and distributed using the City and other Task Force stakeholders' networks. In Cambridge, Massachusetts, the License Commission installed passenger side window "Watch for Bikes" decals on all taxis during their mandated inspections. Cambridge also worked with ride-hailing and car share companies such as Zipcar and Uber to improve cooperation and enhance education for drivers. In Washington, DC, the Department of For-Hire Vehicles ("DFHV") uses what it learns from enforcement efforts, public feedback, and driver records to engage drivers and provide training on key safety issues. DFHV primarily enforces moving and safety violations (and some parking violations) among its for-hire vehicle drivers, focusing on high-risk behaviors, as well as activity on the "High Injury network."

TLC Safety-Related Initiatives before Vision Zero

Even before Vision Zero was created as a movement, when I was serving as General Counsel and then Commissioner/Chair/CEO of the NYC Taxi & Limousine Commission (TLC), we raised regulatory safety standards and deployed law enforcement initiatives to keep unsafe drivers from getting behind the wheel of a taxi or for-hire vehicle ("FHV"). Many of these safety reforms started in 1998, prompted by increasing passenger complaints of driver misbehavior and reckless driving, as well as a high profile taxi crash in Manhattan that severed an adult pedestrian's leg and placed a child in a baby stroller into a coma. These reforms included more stringent traffic violation point systems for TLC licensed drivers than other motorists, mandatory defensive driving courses, institution of a probationary TLC license for inexperienced drivers, mandatory drug testing, increasing commercial liability and No-Fault insurance for most TLC licensed vehicles, and mandating license revocation for reckless driving, driving while intoxicated and while ability impaired (which previously carried small TLC fines with no real consequences).

In 1999, the TLC was the first government agency in the nation to ban TLC-licensed drivers from using cell phones while driving. I crafted these regulations when I was TLC General Counsel, even before the New York State cellphone ban was initiated. In 2001, New York became the first state in the nation to ban hand-held cell phone use while driving, with further legislation enacted in 2009 prohibiting texting while driving.¹¹ In 2009, when I was Chair of the TLC, we went further than the state law and strengthened the Distracted Driving Regulations to reflect changes in wireless technology and added a known as the "three-strikes and you're out" cell phone ban - with TLC driver's license revocation for three violations in a 15-month period.¹² Those rules were the first to ban the use of handheld, wired, or wireless electronic communication devices in or near the driver's ear, even if the driver was not actively using the device.

Right before and then after I left TLC in 2010, the efforts continued to make TLC drivers safer. In February 2009, NYC DOT and the MTA partnered with the TLC to begin video camera enforcement of the bus lanes on 34th Street to determine whether taxis were improperly using the lanes and violating TLC rules and traffic laws.¹³ Under the City traffic code, taxis are permitted to enter a bus lane only to make the next right turn or to expeditiously pick-up/drop-off passengers. Then years later, TLC promulgated Driver

¹¹ <https://trafficsafety.ny.gov/distracted-driving-1>

¹² https://www1.nyc.gov/assets/tlc/downloads/pdf/archived_industry_notices/industry_notice_10_02.pdf The rules were eventually made less stringent years later due to, among other things, passing an exception for FHV drivers to use mounted electronic devices or FCC licensed two-radio for brief communications with their base.

¹³ https://www.nyc.gov/html/dot/html/pr2009/pr09_013.shtml

Fatigue Rules (similar to the federal government’s rules for interstate trucks and buses) to ensure that drivers do not drive long consecutive hours, increasing the risk of crashes. Silicon Valley strenuously opposed the mandate that licensed bases supply data to TLC to aid with enforcement of these TLC hours of service rules, yet the TLC passed them anyway, limiting the number of hours that drivers may transport passengers to no more than 60 hours per seven day period, and no more than 10 hours per 24-hour period.¹⁴

TLC Vision Zero Initiatives

Across the country, taxi and for-hire drivers play a key role in street safety. What sets NYC apart from most other cities is that the NYC TLC has clear jurisdiction over all for-hire drivers, including Uber and Lyft.¹⁵ This puts NYC in a better position to leverage its position over – and engage – a sizable segment of city drivers to help achieve Vision Zero goals. The City has involved taxi and FHV drivers in Vision Zero efforts primarily through education and enforcement.

The driving infractions and behaviors that are most likely to seriously injure or kill road users (referred to as “Vision Zero Violations”) include speeding, failure to yield to pedestrians, using a cellphone or texting while driving, violating red lights, making improper turns, and disobeying signs.¹⁶ NYC’s 2014 Vision Zero Action Plan’s TLC-specific proposals to target Vision Zero violations include: increasing sanctions for dangerous TLC driver behavior; increasing the TLC use of speed guns; allowing TLC to use speed cameras to sanction law-breaking drivers; additional driver education; and pilots for new technologies.¹⁷

While I was at TLC, I also created a Recognition Ceremony to celebrate TLC-Licensed Drivers’ excellence and their achievements.¹⁸ This recognition ceremony has been enhanced and continued with awards for safe drivers every year, now as part of the Vision Zero program, with awards for drivers with exemplary driving and safety records.¹⁹

Vision Zero Education

Dangerous driver choices—such as inattention, speeding, failure to yield—are the main causes of crashes involving pedestrian fatalities. As part of the Vision Zero Action Plan, TLC enhanced driver outreach and education to promote safe driving choices by taxi and FHV drivers, who transport more than one million people each day throughout the city. Working with NYC DOT, TLC created a more comprehensive, industry-specific Vision Zero training program for new TLC drivers. The new curriculum has updated materials that show newer street designs, and explains how to handle high crash intersections. The required course covers topics such as the leading causes of serious crashes, dangerous driving behaviors (*e.g.*, distracted driving, speeding, fatigued driving), and safe driving tips.²⁰

¹⁴ 35 RCNY § 80-14(f)

¹⁵ <https://visionzeronetwork.org/resource/how-can-we-engage-taxi-and-for-hire-drivers-in-vision-zero/>

¹⁶ <https://www.nyc.gov/content/visionzero/pages/enforcement>

¹⁷ <https://www.nyc.gov/html/visionzero/pdf/nyc-vision-zero-action-plan.pdf>

¹⁸ <https://www.nyc.gov/site/tlc/about/tlc-safety-honor-roll.page>

¹⁹ https://tlc-mag.com/archive_issues/commiss_may07.html

²⁰ 35 RCNY § 80-07(g)

While the TLC continues to communicate street safety messages to TLC licensees, it also attempts to educate passengers. When I was TLC Chair we added stickers in taxis reminding passengers to look before they open their doors to avoid dooring cyclists.²¹ Through the Taxi TV program created during my tenure, TLC, NYC DOT, and NYC Media have produced PSAs on drunk driving, seat belt usage, and to encourage safe driving and passenger behaviors.²²

Vision Zero Law Enforcement

The 2014 Vision Zero Action Plan increased the number of speed guns available to TLC and created a TLC safety enforcement squad with special speed and safety-specific training to crack down on those drivers who the City entrusts with taxi and for-hire licenses. The TLC focuses enforcement deployment on priority dangerous driving behaviors that are most likely to seriously injure or kill road users (Vision Zero Violations), such as speeding, failure to yield to pedestrians, using a cellphone or texting while driving, violating red lights, making improper turns, and disobeying signs.²³ Joint efforts with the NYPD and DOT include automated enforcement cameras and reporting of serious crashes involving taxi and FHV drivers. While ordinary motorists (vehicle owners) are fined for speed and red light camera violations, and do not accrue license points that could lead to suspension or revocation, the TLC is much more stringent in assessing penalties resulting from these automated violations by not only imposing additional fines, but also applying progressive points to TLC driver licenses. Under TLC rules, drivers face suspension after accumulating 6–9 points on their TLC license in a 15-month period, and they will lose their license if they rack up 10 or more points during that time – including through automated enforcement summonses. These and other significant shifts in regulatory changes, as well as enforcement programs and priorities, are discussed below.

Distracted Driving Rules

Personal electronic devices, such as cell phones and tablets, are one of the greatest contributors to driver distraction, which kills thousands and injures hundreds of thousands in the United States every year.²⁴ New York State law still bans only hand-held mobile telephone or portable electronic device while driving. But the TLC goes further.²⁵ As part of the Universal License Rule Package passed in 2016, the TLC updated its distracted driving rules to reflect changes in technology.²⁶ The updated rules broadened the prohibited uses of portable or hands-free electronic devices to cover anything that could possibly be distracting, such as talking, texting, typing, viewing images, and playing audio, video, or games.²⁷ GPS use is allowed, but drivers may only input data while the vehicle is legally standing or parked. TLC also added a 911 exception to report emergencies. For violations, the TLC removed the three strikes rule and replaced it with an escalated penalty of four points for three violations in 15 months. Drivers face suspension after accumulating 6–9 points in a 15-month period, and 10 or more points during that time will result in license revocation. Offenders who fail to complete a “Distracted Driving Portable Electronic Device” course will have their license suspended until they do so.

²¹ 35 RCNY § 59A-29(j)(1) and (2)

²² <https://visionzeronetWORK.org/resource/how-can-we-engage-taxi-and-for-hire-drivers-in-vision-zero/>

²³ <https://www.nyc.gov/content/visionzero/pages/enforcement>

²⁴ https://www.cdc.gov/transportationsafety/distracted_driving/index.html

²⁵ <https://trafficsafety.ny.gov/distracted-driving-1>

²⁶ https://www1.nyc.gov/assets/tlc/downloads/pdf/newly_passed_rule_universal_license_rule.pdf

²⁷ 35 RCNY § 80-14(g)

Serious Crashes & Cooper's Law

Vision Zero legislation has given TLC the power to suspend the licenses of drivers involved in a fatal crash. Cooper's Law (Local Law 27 of 2014) requires that, following any collision involving a TLC-licensed driver that resulted in death or critical injury, the TLC must review the results of the NYPD's investigation, review the driver's fitness to operate a vehicle, and take appropriate enforcement action. The law is named after Cooper Stock, a 9-year-old who was struck and killed by a taxi driver in January 2014. Under the law, NYPD notifies the TLC of crashes that involved a TLC-licensed driver or vehicle, and TLC may take enforcement action which could include revoking the driver's TLC license.²⁸ If a driver has been issued a summons for, or charged with, one or more traffic-related violations or crimes in a serious crash, then the driver's TLC license will be summarily suspended pending further review by the TLC.²⁹

Automated Enforcement – Cameras

Automated enforcement using traffic cameras to detect moving violations is an accelerating trend in NYC and other parts of the country and world. New York City has the largest automated enforcement program in the U.S., and one of the largest in the world.³⁰ The vast network of cameras help enforce speed, red light, and bus lane violations in the city. While red light and bus lane cameras are located all over the city, speed cameras are located in school zones only.³¹ When a driver runs a red light or speeds past a camera, the enforcement technology reads the vehicle's license plate, and a notice of liability (ticket) is sent to the vehicle's registered owner. Those who receive 15 or more school speed camera violations or 5 or more red light camera violations within a 12-month period will have their vehicle seized and impounded by the city unless they complete a safe vehicle operation course.³² These are the rules for everyone, not just TLC drivers.

Traffic cameras have significantly lowered the incidence of speeding and red light running in NYC.³³ Red light cameras have been in use since 1994, and NYC DOT reported an 85% drop in red light running at intersections with a camera.³⁴ In addition, right angle collisions causing injury—the crashes that red light cameras seek to prevent—declined at camera locations by about 58 percent.³⁵ Since the first speed cameras were introduced in 2013, speeding at fixed camera locations fell an average of 72% through December 2020.³⁶ According to NYC DOT, the cameras also deter repeat violations, as most drivers receive no more than one or two violations.³⁷

The leadership now at the NYC DOT under new *Commissioner Ydanis Rodriguez*, is seeking to continue to expand red light and speed camera programs in NYC. Before his appointment by NYC Mayor

²⁸ 35 RCNY § 80-14(h)

²⁹ 35 RCNY § 80-14(h)

³⁰ <https://www.nyc.gov/content/visionzero/pages/enforcement>

³¹ <https://portal.311.nyc.gov/article/?kanumber=KA-02324>

³² <https://www.nyc.gov/html/dot/html/motorist/vision-zero-safe-driving.shtml#dvap>

³³ <https://www.nyc.gov/content/visionzero/pages/enforcement>

³⁴ <https://www.nyc.gov/html/dot/html/motorist/vision-zero-safe-driving.shtml#dvap>

³⁵ <https://www.nyc.gov/html/dot/html/motorist/vision-zero-safe-driving.shtml#dvap>

³⁶ <https://www.nyc.gov/html/dot/downloads/pdf/speed-cameras-vision-zero-case-for-speed-cameras-24-7.pdf>

³⁷ <https://www.nyc.gov/html/dot/downloads/pdf/speed-cameras-vision-zero-case-for-speed-cameras-24-7.pdf>

Eric Adams as DOT Commissioner, as former Chair of the NYC Council Transportation Committee, Ydanis Rodriguez was a staunch supporter of Vision Zero in its formative stages, and in May 2002 managed to convince the state legislature to expand speed cameras in school zones for 24/7 coverage. Under DOT leadership we can expect more efforts for NYC to control and expand these automated enforcement programs, and there are likely to be more and more cameras installed in the coming years.

Black Boxes, Telematics Systems & Data Platforms

Telematics—technology that captures data on driver behavior and driving conditions—can provide useful information toward Vision Zero’s safety goals. In-vehicle cameras and event data recorders (“EDRs”) and other “sensing and diagnostic modules,” monitor and record all human interactions with the vehicle, similar to “black boxes” used in aircraft. The purpose of EDR devices is to record technical information during a brief period of time before, during, and after a collision of a vehicle. Telematics can also be used to monitor drivers for unsafe driving behavior in real time and guide driver behavior. These devices can detect when a driver’s eyes leave the road, speeding, swerving, harsh braking, aggressive driving, or when a driver has been driving continuously for too long.³⁸ Armed with this information, FHV bases and/or the TLC could take corrective action.

When I was TLC Chair, in 2002, we announced the first-ever voluntary pilot program to test EDRs that would record certain critical information in the event of a crash.³⁹ The primary benefit of the pilot program was the provision of insurance premium discounts for the installation of black box devices. Despite the incentive, few took advantage of the program because of objections by drivers to participating agents/fleet owners of being monitored, and also because of labor issues. If a transportation company requires a driver to install and use black boxes, telematics systems, or data recording platforms to which it has access and control (and ownership of the data recorded), then that could be considered a factor that might lead to independent contractor drivers being classified as employees in the courts or at labor enforcement agencies. The only way transportation companies can avert these labor law issues would be for the government to mandate the installation and use of telematics. So without proper incentives and due to worker classification concerns, for many years voluntary installation of black boxes never significantly increased.

One example of proper voluntary incentives is when in August 2021, the *Black Car Fund (BCF)*, under the leadership of *Ira Goldstein*, partnered with Nexar, an AI computer vision company, to place cameras in thousands of cars to protect their members in the event of a crash or an assault.⁴⁰ The dash cams enable vision-based applications for better driving, and the AI-powered dual-camera dash cams detect collisions, and then generate a detailed reenactment of the crash within minutes. Nexar also provides discounts to Uber and Lyft drivers who install their cameras, as well as an insurance discount; yet the driving force behind many drivers in recent years purchasing thousands of cameras is the desire to record incidents with passengers inside the vehicle (in the event a driver’s smartphone ride hail app performance rating was challenged by a passenger complaint).

³⁸ <https://visionzeronetwerk.org/telematics-as-a-vision-zero-tool/>

³⁹ https://www.nyc.gov/assets/tlc/downloads/pdf/archived_industry_notices/industry_notice_03_05.pdf

⁴⁰ <https://www.prnewswire.com/news-releases/nexar-partners-with-the-black-car-fund-to-protect-new-york-rideshare-drivers-with-thousands-of-cameras-in-cars-301354264.html>

Yet, the reality is that black boxes are already here, and the telemetry hardware is already being incorporated into the manufacturing process for current and future vehicle models by OEMs. There is a tremendous amount of data being captured by each car's computer system anyway right now – which may be tapped into more in the future by third parties. In the U.S., EDRs are installed in nearly all light vehicles.⁴¹ Field studies have shown that EDRs, video recording devices, and other devices that record commercial vehicle and driver behavior can increase driver safety by helping modify driver behavior, and commercial fleets have seen crash reductions of as much as 50% in vehicles equipped with these devices.⁴² In personal injury and accident claims, EDR data has been admitted as evidence and expert testimony regarding EDR data is also allowed.⁴³ It reduces litigation fees because, when the videos capture the evidence, there is little to argue about in court and most cases settle.

Takeaways & the Future of Vision Zero: “No One Size Fits All Solution”

Despite NYC's Vision Zero efforts, approximately 3,000 New Yorkers are seriously injured and more than 200 are killed each year in traffic crashes.⁴⁴ According to Transportation Alternatives, the first quarter of 2022 was the deadliest start to any year since before New York City implemented Vision Zero in 2014, and traffic fatalities are on track to rise for the fourth year in a row.⁴⁵ Clearly, more needs to be done. Based on my experience and feedback from experts in the field, including the latest developments and takeaways from these three important conferences, there is no one-size-fits-all solution. We need a multi-faceted approach leveraging technology, incentives, education, street design (traffic calming measures), and coordinated governance.

First, on the issue of telematics, the concept of mandating such equipment was debated, and many prefer incentives to these requirements. While a mandate might be well received by mobility companies who use independent contractor drivers to offset potential worker classification liability, being monitored is not something that many drivers embrace – until they understand the benefits. Educating drivers by promoting the incentives and benefits of telematics systems with operational cameras, such as insurance discounts and using the cameras to deter robberies by passengers and record passenger/driver incidents inside the vehicle, has already led to many cameras being installed voluntarily by TLC licensed drivers in NYC. Also, DCAS has outfitted most of the NYC vehicle fleet of 30,000 vehicles with telematics equipment to hold employees accountable for changing their driving behavior. Likewise, every industry, including trucking/freight, public and private buses/motor coaches, school buses and even personal motor vehicles should be encouraged to use such systems to obtain direct insurance premium reductions in exchange for monitored behavior.

One big issue from all the conferences and products being developed to work with Vision Zero cities is the aggregated data that platforms interacting with telematics systems collect. This data is being used by city and state officials to identify hot spots for unsafe conditions so that changes can be made to

⁴¹ <https://www.reuters.com/article/us-usa-autos-regulations/u-s-will-not-seek-to-require-event-data-recorders-in-cars-trucks-idUSKCN1PU2GK>

⁴² <https://www.truckinginfo.com/313449/ntsb-explains-how-video-recorders-could-have-a-major-impact-on-safety;>
<https://www.consumerreports.org/cro/2012/10/black-box-101-understanding-event-data-recorders/index.htm>

⁴³ <https://www.devaughnjames.com/blog/can-your-cars-event-data-recorder-black-box-help-your-accident-claim/>

⁴⁴ <https://vzv.nyc/>

⁴⁵ www.transalt.org/press-releases/new-data-shows-44-percent-increase-in-traffic-fatalities-during-first-three-months-of-2022-deadliest-start-to-any-year-since-vision-zero-began-in-2014

roadways and infrastructure to calm traffic and mitigate safety issues. Every city can expand its integrated network of public and private cameras to capture more data, of course, with appropriate legal and privacy protections, using these software products and platforms to aggregate safety data, and real-time auto-enforcement.

An idea to deter bad driving behavior, would be requiring drivers who engage in unsafe behavior to take a safe driving course with escalating penalties for subsequent infractions. Automated speed enforcement does not need to be limited to fines for every violation. Currently, DOT violations are capped at \$50 per violation, which is probably not enough to deter the more than 44,000 vehicles that received ten or more speed camera violations.⁴⁶ Similar to the TLC's red light camera enforcement rules, TLC-regulated drivers who are caught on camera speeding through school zones should receive training or counselling for unsafe driving, with escalating repercussions for continued violations.

Despite the TLC's and NYC's efforts, some argue that no amount of education or enforcement will achieve Vision Zero. That is because, as the initiative recognizes, people are human and will make mistakes. Research shows 90% of car crashes are caused by human error.⁴⁷ Human drivers must be eliminated from the chain of events that can lead to a crash. Automated driving systems will do just that. Advances in automotive technology, including driver assistance technologies and automated driving systems, provide crash detection and avoidance warnings and controls and are paving the way for partially- and fully-automated safety features and autonomous vehicles ("AVs").

Short of fully automated driving systems – which may be years away from mass adoption and implementation – there are driver assistance technologies and other devices and equipment that are available now that can help make streets safer. According to the National Highway Traffic Safety Administration (NHTSA), driver assistance technologies hold the potential to reduce traffic crashes and save thousands of lives each year.⁴⁸ These include systems that provide collision warning, collision intervention, and driving control assistance. Collision warning includes blind spot detection, lane departure warnings, and forward collision warnings. Collision intervention technologies include automatic emergency braking, pedestrian automatic emergency braking, rear automatic braking, and blind spot intervention. Blind Spot Detection (BSD) provides alerts to the driver when the presence of another vehicle, cyclist, or pedestrian is detected alongside them. BSD systems can also be supplemented with surround view systems that offer a full 360° view of the vehicle and its immediate surroundings.⁴⁹ Other technologies include adaptive cruise control that automatically adjusts the vehicle's speed to keep a pre-set distance from the vehicle in front of it. And back-up cameras provides a clear view directly behind the vehicle when in reverse. There are also low or no tech solutions like truck side-guards that prevent pedestrians and other vulnerable road users from falling into the space between the front and rear wheels of a truck. In some circumstances, automated technologies may be able to detect the threat of a crash and act faster than drivers.⁵⁰ Automated vehicle technology may be the only true path forward to achieving Vision Zero goals.

⁴⁶ <https://www.nyc.gov/html/dot/downloads/pdf/speed-cameras-vision-zero-case-for-speed-cameras-24-7.pdf>

⁴⁷ <https://progresschamber.org/autonomous-vehicles-are-a-game-changer-for-mobility-safety-and-the-environment/>

⁴⁸ <https://www.nhtsa.gov/equipment/driver-assistance-technologies>

⁴⁹ <https://brownbeat.medium.com/eliminating-blind-spots-on-buses-and-coaches-af1b7bd8731c>

<https://www.viatech.com/en/products/ai-systems/mobile360-m800-video-telematics-system/>

<https://www.viatech.com/en/products/ai-systems/mobile360-d700-ai-dash-cam/>

⁵⁰ <https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety>

Coordinated efforts among multiple government agencies involved in the Vision Zero Action Plan, with initiatives aligned with the strengths of their respective agency, should be continued. NYC is a perfect example of diverse agencies working together effectively to implement a comprehensive Vision Zero plan, primarily due to the leadership of Mayor Adams, *TLC Commissioner/Chair David Do*, DOT Commissioner Rodriguez and DCAS Commissioner Pinnock. However, there is room always room for improvement, and the key to making Vision Zero a reality is technology.

In sum, the future of Vision Zero must be focused mostly on technology and data. In the interim period, before we have more advanced collision avoidance systems and AVs, more automated (but fair) enforcement, education, and financial or other incentives to use telematics, could help for sure. But ultimately, until there is significant connectivity, data collection and scaling of telematics, paving the way for partial or complete automation, we may never be able to take Vision Zero gains to the next sustainable level. Proper deployment and advancement of safety technology is the answer, and should be pursued vigorously, alongside the other measures already underway.