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Driving down costs, driving up safety: The economic benefits of universal ADAS servicing

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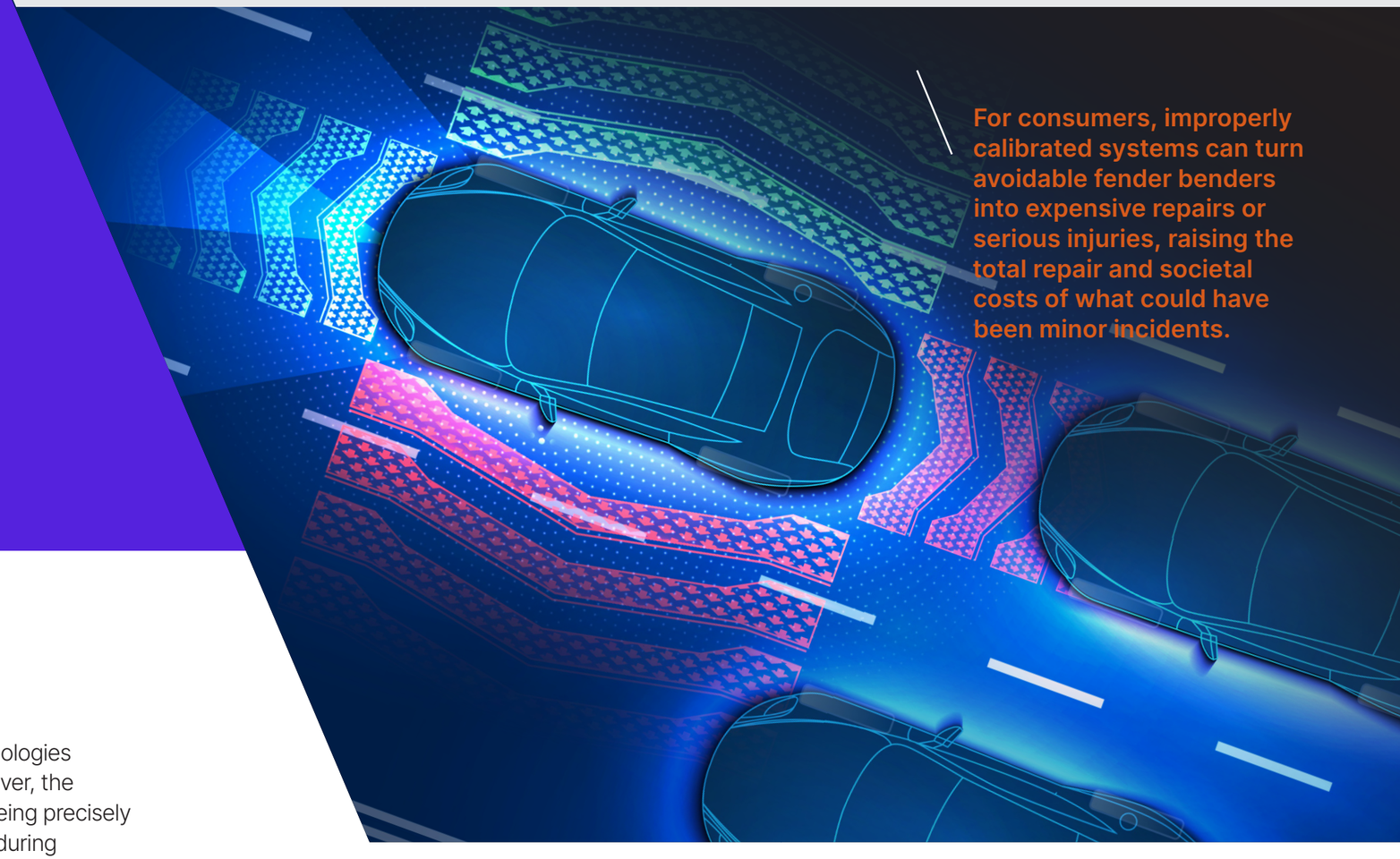

1. Executive summary

Advanced driver assistance systems (ADAS) are proven, life-saving technologies that can significantly reduce automobile crashes and their severity. However, the effectiveness of ADAS technologies is contingent on their components being precisely calibrated during production and properly recalibrated after a collision or during maintenance—something that is too often neglected. Despite becoming standard in nearly all modern vehicles, ADAS technologies are frequently left misaligned following repairs due to a lack of equipment, expertise, or standardized procedures in retail motor vehicle repair shops. This 'calibration gap' not only undermines road safety by potentially contributing to otherwise preventable injuries and fatalities, but also results in substantial financial losses to consumers, insurers, automakers, service providers, and society as a whole. Studies suggest that even slight misalignments in sensor systems can render ADAS functions ineffective, with systems failing to avoid impacts due to calibration errors as small as a fraction of a degree.

Critical safety consequences notwithstanding, the economic implications of this 'calibration gap' are significant. For consumers, improperly calibrated systems can turn avoidable fender benders into expensive repairs or serious injuries, raising the total repair and societal costs of what could have been minor incidents. Improperly calibrated systems can also reduce consumer trust in ADAS technologies as drivers grow frustrated with systems not functioning like they should. This could even lead to consumers disengaging their vehicle's ADAS, cutting them off from the technology's safety benefits altogether.

Insurers are forced to bear the burden of higher claims and legal fees, while automakers face reputational and legal risks from suboptimal ADAS performance in their vehicles. Meanwhile, service centers miss out on a lucrative and growing revenue stream while also incurring legal exposure for subpar service, and the broader ADAS calibration industry—which could grow to $50 billion by 2030—is stifled by inconsistent practices. Implementing universal calibration standards and best practices would help mitigate these harms, enhance public safety, reduce long-term costs, and fuel workforce development in a high-skill sector.

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2. Introduction

Advanced driver assistance systems (ADAS) are critical, life-saving motor vehicle safety technologies that assist human drivers in the driving task through partially automating some aspects of driving. ADAS technologies are quickly becoming standard across vehicles. In fact, 94% of vehicles manufactured in 2022 were equipped with at least one such technology,[1] and starting with Model Year (MY) 2029, certain ADAS technologies will be required for all passenger vehicles.[2] ADAS technologies include systems such as automatic emergency braking (AEB), pedestrian detection warning, blind spot warnings, adaptive cruise control, lane keeping assist, and other features that reduce collisions, mitigate accident severity, and promote safe driving. Properly implemented, these technologies can save thousands of lives every year by avoiding or reducing the severity of crashes.

However, the safety benefits of widespread ADAS deployment may only be fully realized if the technologies are properly calibrated. Collisions, post-collision service, regular repairs, and even normal wear and tear can at times bring ADAS technologies out of alignment, as these technologies rely on a suite of cameras and sensor systems that operate on a degree of precision in millimeters, fractions of degrees, and milliseconds. Too often, retail repair shops do not properly calibrate these

[1] *See* Partnership for Analytics Research in Traffic Safety, Parts: Market Penetration of Advanced Driver Assistance Systems (ADAS) 3 (2024), https://www.mitre.org/sites/default/files/2024-09/PR-24-2614-PARTS-Market-Penetration-Advanced-Driver-Assistance-Systems.pdf.

[2] See 49 C.F.R. § 571.127; *see also* Federal Motor Vehicle Safety Standards; Automatic Emergency Braking Systems for Light Vehicles, 89 Fed. Reg. 39686, 39686 (May 9, 2024) [hereinafter *AEB Rule*].

technologies during service, as they can lack not only the equipment and experience to manage ADAS calibration, but also face a lack of legally required or industry-agreed upon standards for ADAS calibration or recalibration. This can result in systems that are poorly recalibrated or fail to be recalibrated at all, and thus cannot perform their jobs, limiting the life-saving potential of the technology. Proper ADAS calibration is key to the safety of road users in the U.S., with the added benefit of potentially providing significant cost savings for consumers and related industries.

This white paper focuses on the life-saving reality of ADAS and its cost-saving function for a comprehensive array of stakeholders that include drivers, insurers, repair shops, and manufacturers. It will analyze the safety and economic benefits of properly servicing ADAS technologies, and the positive impact that standardizing ADAS recalibration can have on the motor vehicle ecosystem.

3. Proper ADAS calibration can save lives

Today, the U.S. is in the midst of what National Transportation Safety Board Chair Jennifer Homendy has described as "a growing public health crisis on our roads."[3] In 2024, an estimated 39,345 people died in motor vehicle traffic crashes, according to data collected by the National Highway Traffic Safety Administration (NHTSA).[4] Although this is a 3.8% decrease from 2023, 2024 will be the fifth year in a row with more than 39,000 roadway deaths, which remain stubbornly high in recent years despite having dropped below 30,000 as recently as 2011.[5]

ADAS technologies can help solve this crisis by significantly enhancing road safety through reductions in both the frequency and severity of motor vehicle crashes. According to studies by the Insurance Institute for Highway Safety (IIHS) and the Highway Loss Data Institute, the inclusion of ADAS technologies in passenger vehicles can significantly lower police-reported crashes and insurance claims, with AEB reducing front-to-rear crashes with injuries by 56%; AEB with pedestrian detection reducing pedestrian injury crashes by 30%; and rear automatic braking reducing backing crashes by 78%.[6] NHTSA has also calculated that mandating AEB in all light-duty vehicles starting with MY 2029 would "save at least 362 lives and mitigate 24,321 non-fatal injuries a year."[7] In the long run, the AAA Foundation for Traffic Safety estimates that current ADAS technology would prevent 37 million crashes, 14 million injuries, and 250,000 deaths over the next 30 years, resulting in roughly a 16% drop in crashes and a 22% drop in fatalities.[8]

However, to enjoy the safety benefits of ADAS technologies, those systems must be in proper working order, which requires proper calibration. Proper calibration ensures that the vehicle's sensors can accurately perceive its environment, allowing it to correctly detect obstacles and then safely maneuver to avoid or mitigate collisions. NHTSA has stated that "the impact that ADAS technologies have on fatality and injury rates is a direct function of their effectiveness in preventing crashes or reducing the severity of the crashes they are designed to mitigate."[9] Therefore, without ensuring that ADAS calibration and recalibration is consistently and properly completed, the technology cannot fully confront the ongoing public health crisis on America's roads.

[3] David Shepardson, US Faces Growing Crisis Over High Traffic Deaths, NTSB Chair Says, REUTERS (Nov. 19, 2024), https://www.reuters.com/business/healthcare-pharmaceuticals/us-faces-growing-public-health-crisis-over-traffic-deaths-ntsb-chair-says-2024-11-19/.

[4] Nat'l Highway Traffic Safety Admin., Dot Hs 813 710, Early Estimate of Motor Vehicle Traffic Fatalities of 2024 1 (Apr. 2025), https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813710.

[5] Nat'l Highway Traffic Safety Admin., *National Statistics,* NHTSA.gov, https://www-fars.nhtsa.dot.gov/Main/index.aspx (last visited May 23, 2025).

[6] Ins. Inst. for Highway Safety & Highway Loss Data Inst., Real-World Benefits of Crash Avoidance Technologies 1 (2023), https://www.iihs.org/media/290e24fd-a8ab-4f07-9d92-737b909a4b5e/HvQHjw/Topics/ADVANCED%20DRIVER%20ASSISTANCE/IIHS-HLDI-CA-benefits.pdf

[7] AEB Rule, *supra* note 2, at 39687.

[8] Rebecca Naumann et al., Examining the Safety Benefits of Partial Vehicle Automation Technologies in an Uncertain Future vii (2023), https://aaafoundation.org/wp-content/uploads/2023/07/AAAFTS-Safety-Benefits-of-ADAS.pdf.

[9] New Car Assessment Program Final Decision Notice–Advanced Driver Assistance Systems and Roadmap, 89 Fed. Reg. 95916, 96082 (Dec. 3, 2024) [hereinafter NCAP].

4. ADAS technologies are not always being properly calibrated

As of today, many ADAS technologies are not being properly calibrated, or even calibrated at all when they need to be. A 2020 study found that 88% of ADAS calibrations were missed by body shops,[10] with a second study finding that only about 12% of MY 2020 vehicles equipped with AEB were being recalibrated at all.[11] More alarmingly, another study found that in 2018, less than 10% of vehicles were even scanned to help diagnose electronic systems issues,[12] with that figure rising to a mere 15% in 2022.[13] And in 2024, more than half of survey respondents reported persisting issues with ADAS features after repairs, with post-repair issues more common if the repairs were performed at independent repair shops than dealership service centers.[14] These findings show a clear calibration gap for ADAS that threatens to become an urgent safety crisis.

Generally, ADAS recalibration is required if an ADAS sensor or a sensor mounting part was removed or replaced. However, the reasons why recalibration is not as widely conducted as necessary are often because either a repair shop does not have the necessary equipment and/or expertise to do so, or they may not have thought to recalibrate a vehicle's ADAS when simply removing a part that is not obviously supporting ADAS functionality. Repair shops are often left to personally identify the type of ADAS a vehicle is equipped with and then dig through repair procedures for each sensor, mounting parts, or calibration procedure, which can be time-consuming and costly.

ADAS that have been miscalibrated, or even left uncalibrated after a repair, may effectively lose any potential safety benefit, resulting in otherwise avoidable collisions. In another IIHS study, a camera for automatic lane-keeping in a 2016 Honda Civic was intentionally misaligned by 0.4 degrees to the left but aimed ostensibly normally. That resulted in the vehicle misperceiving the distance to the lane line by six inches on one side and 15 inches on the other side. When the camera was misaligned by 0.6 degrees, that faulty distance increased to 27 inches. The same study also conducted a test for forward collision warning systems and AEB, which demonstrated that a 0.2-degree difference in camera alignment, for a vehicle traveling at 25 mph, was the difference between the timely and untimely deployment of the ADAS and ultimately an impact with a front obstacle or not.[15]

This need for precision extends not only to the correct alignment of the sensors, but also to the calibration environment. OEMs themselves require calibrations to be performed on a floor with a slope of less than one degree in any direction. According to a vehicle manufacturer's study, when a calibration was conducted on a floor with a 1.5 pitch, emergency braking systems would fail to timely deploy thereafter.[16] This makes proper calibration dependent on not only the expertise and equipment a repair shop may possess, but also on the facilities available.

[10] *See* adasThink, adasThink Report: 88% of ADAS Calibrations Missed By Body Shops 5 (2020), https://www.repairerdrivennews.com/wp-content/uploads/2020/10/20201026-ADASThink-Report-Final.pdf.

[11] *See CCC Reports on Most Common Calibration Line Items as Average Fees Rise,* Repairer Driven News (Aug. 19, 2021), https://www.repairerdrivennews.com/2021/08/19/ccc-reports-on-most-common-calibration-line-items-as-average-fees-rise/.

[12] *See* Ryan Mandel, *Cracking the Code: What DTCs Tell Us About Vehicle Repair Trends,* Mitchell (Sep. 11, 2020), https://www.mpower.mitchell.com/diagnostic-trouble-code-vehicle-repair/ (archived here).

[13] *See The ADAS Effect on Vehicle Diagnostics and Repair in 2023,* CCC (Jan. 10, 2023), https://www.cccis.com/news-and-insights/posts/the-ADAS-effect-on-vehicle-diagnostics-and-repair-in-2023.

[14] *See* Alexandra Mueller et al., *Consumer Experiences with Crash Avoidance Feature Repairs,* 88 J. of Safety Rsch. 8, (2024), https://www.iihs.org/topics/bibliography/ref/2274.

[15] John Huetter, *IIHS Research Shows Risk of Uncalibrated Front-Facing Cameras,* Repair Driven News (Apr. 16, 2018), https://www.repairerdrivennews.com/2018/04/16/iihs-research-shows-risk-of-uncalibrated-front-facing-cameras/.

[16] Airpro Diagnostics, Addressing Insurance Expectations With ADAS Calibration, https://airprodiagnostics.com/addressing-insurance-expectations-with-ADAS-calibration/ (last visited May 18, 2025).

While there has not been a targeted study on how many accidents are caused precisely by miscalibrated or uncalibrated ADAS technologies, it is notable that since 2021, ADAS-equipped vehicles have been involved in 2,477 reported crashes, including 51 fatalities, when ADAS technologies were active in the 30 seconds before the crash.[17] Greater study of those incidents and others could shed light on which of those crashes may have been avoided had the ADAS calibration gap been closed.

5. The ADAS calibration gap is costing consumers and industry

In addition to reducing ADAS's critical safety advantages, the lack of consistent ADAS recalibration raises significant financial costs for consumers and industry. Below, we explore the costs incurred to each set of stakeholders, including consumers, insurance providers, automakers, dealerships, service centers, and the ADAS calibration market.

5.1 Consumers

It has often been publicized that ADAS technologies increase repair costs. According to AAA, incorporating ADAS repairs and calibration can add up to approximately 37% to the total repair bill following a crash.[18] For example, replacing and recalibrating sensors in a minor rear-end collision could add $685 in parts and/or labor, which was 40.9% of the total $1,698 repair from AAA's study. A separate Consumer Reports survey found that recalibration may add $250 to $600 in repair costs for front bumpers, when basic bumper repair can already cost between $700 and $1,800.[19]

However, despite these increased costs, that same Consumer Reports survey concluded that ADAS equipment should be recalibrated even after minor collisions, citing an IIHS study that showed that vehicles with AEB and forward collision warning have 50% fewer rear-end collisions.[20] Multiple studies also conclude that vehicles with properly functioning ADAS have significantly fewer crashes and lower insurance losses compared to vehicles without ADAS.[21] This means that a lack of calibration is cutting into those collision reductions, which could translate to significant, and otherwise avoidable, repair costs.

Of course, the cost of a collision is not simply limited to repair costs, as serious injuries and deaths also carry significant financial costs. According to NHTSA, the "economic and societal" cost per crash includes not only any insurance payout, but also lost workplace productivity and other factors,[22] with crash-related costs estimated to have reached $340 billion in 2019 alone.[23] Therefore, preventing one injury or death has outsized economic value, with NHTSA's economic analyses for rulemaking currently assigning $13.7 million as the statistical value of one human life.[24] Taking that figure into consideration, a lack of properly calibrated ADAS technologies leading to avoidable crashes that injure or kill one person or more could easily be costing society tens of millions of dollars in economic and social costs, in addition to any medical costs and legal fees incurred. Based on NHTSA's own numbers, if the deployment of properly calibrated ADAS leads to even a 10% reduction in crashes, that could save the economy $34 billion annually.

When it comes to ADAS, including calibration or recalibration services as part of regular service would only benefit consumers. First, recalibration costs are "always" or "most of the time" reimbursed by insurers,[25] reducing financial impact. Second, with reduced accident rates thanks to proper ADAS calibration, consumers' insurance payments may also be advantageously affected. In the short term, as insured drivers would be involved in fewer accidents, they would avoid any resulting increases in insurance rates. Eventually, as the frequency of insurance claims drops, further illustrating the value of properly calibrated ADAS, insurance carriers may pass on some of that savings to

[17] John Huetter, *IIHS Research Shows Risk of Uncalibrated Front-Facing Cameras,* Repair Driven News (Apr. 16, 2018), https://www.repairerdrivennews.com/2018/04/16/iihs-research-shows-risk-of-uncalibrated-front-facing-cameras/.

[18] AAA Newsroom, Cost of Advanced Driver Assistance Systems (ADAS) REPAIRS 1 (2023), https://newsroom.aaa.com/wp-content/uploads/2023/11/Report_Cost-of-ADAS-Repairs-FINAL-23.pdf

[19] *See* Benjamin Preston, *The Hidden Cost of Car Safety Features,* Consumer Reports (Jan. 30, 2020), https://www.consumerreports.org/car-repair/the-hidden-cost-of-car-safety-features/.

[20] *Id.* (citing *Front Crash Prevention Slashes Police-Reported Rear-End Crashes,* Ins. Inst. for Highway Safety (Jan. 28, 2016), https://www.iihs.org/news/detail/front-crash-prevention-slashes-police-reported-rear-end-crashes).

[21] *See* Qiang Chen et al., *Typical Pedestrian Accident Scenarios in China and Crash Severity Mitigation by Autonomous Emergency Braking Systems,* SAE TECHNICAL PAPER 2015-01-1464 (2015), https://doi.org/10.4271/2015-01-1464; Jessica Cicchino, *Effectiveness of Forward Collision Warning and Autonomous Emergency Braking Systems in Reducing Front-to-Rear Crash Rates,* 99 Accident Analysis & Prevention 142 (2017), https://doi.org/10.1016/j.aap.2016.11.009; Kristofer Kusano & Hampton Gabler, *Safety Benefits of Forward Collision Warning, Brake Assist, and Autonomous Braking Systems in Rear-End Collisions,* 13 IEEE Transactions On Intel. Transp. Sys. 1546 (2012), https://doi.org/10.1109/TITS.2012.2191542; Kristofer Kusano & Hampton Gabler, *Comparison of Expected Crash and Injury Reduction from Production Forward Collision and Lane Departure Warning Systems,* 16 Traffic Inj. Prevention S109 (2015), https://doi.org/10.1080/15389588.2015.1063619.

[22] Larry Blincoe et al., The Economic and Societal Impact of Motor Vehicle Crashes, 2019 (Revised) 1–2 (2023), https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813403.

[23] *See id.*

[24] Departmental Guidance on Valuation of a Statistical Life in Economic Analysis, Dep't of Transp., https://www.transportation.gov/office-policy/transportation-policy/revised-departmental-guidance-on-valuation-of-a-statistical-life-in-economic-analysis (Apr. 28, 2025).

[25] *See generally* Collision Advice & Crash Network, 2024 Scanning & Calibration (2024), https://www.crashnetwork.com/collisionadvice/.

consumers in the form of lower premiums or discounts for vehicles with properly calibrated systems. This effectively returns money to consumers and businesses, potentially offsetting the costs of recalibration. While premium changes would depend on market dynamics, it has been observed that in a competitive market, reduced losses often lead to rate relief or at least slower rate increases, which is an economic benefit to policyholders.[26]

5.2 Insurance providers

The lack of consistent ADAS recalibration potentially costs millions to insurance providers. The Insurance Information Institute has reported that between 2013 and 2022, U.S. auto insurers experienced an increase from $96 billion to $105 billion in combined claim payouts for personal and commercial auto insurer liability.[27] Given these ballooning figures, the initially higher claim payouts for ADAS recalibration may not be a net negative, especially when average payment per damage claim for ADAS-equipped vehicles was only $117 higher than vehicles without those features in 2022.[28]

However, the proper functioning of ADAS can dramatically offset these upcharges. A compendium of more than 95 studies on collision avoidance technology demonstrated that ADAS systems across the board have led to double-digit decreases in insurance claims for collisions, property damage liability, bodily injury liability, medical payment coverage, and personal injury protection per vehicle year.[29] More specifically, amongst others, vehicles with rear AEB have 28.8% fewer claims for backing crashes involving other vehicles and 9% fewer backing claims for their own damage, while forward collision warnings have reduced medical payment coverages by 19.8% and bodily injury liability claims by 17.3%.[30]

A Martindale-Nolo Research survey calculated that between 2015 and 2020, the average settlement for car accidents involving physical injuries was $29,700.[31] This figure is very close to the Insurance Information Institute's separate finding that in 2022, the average bodily injury auto liability claim was $26,501.[32] With 2.38 million traffic accidents in 2022 alone,[33] properly calibrated ADAS could save insurers millions in liability claims by reducing collisions. Even when crashes occur, properly functioning ADAS can mitigate the impact and lower the severity of the accident, leading to lighter repairs being needed.

The lack of universal ADAS calibration and recalibration is also costing insurance companies in the form of legal fees. The Insurance Information Institute reported that in 2023, auto insurers on average have paid out more than $1.10 in legal defense fees for every $1 in premiums collected, citing opportunistic lawsuits as a driving force.[34] By helping prevent incidents before they occur, properly calibrated and recalibrated ADAS technologies can help cut legal defense fees for insurers, and limit the impact of "overzealous" litigants.[35]

5.3 Automakers and OEMs

While automakers may have to invest in the continued development of calibration procedures, technician training programs, and calibration equipment if demand for ADAS calibration rises, they would also be able to monetize calibration by selling more OEM-certified calibration equipment to independent shops, licensing software, or recommending that certain calibrations be done by their own dealers. Front bumper sensor and camera replacements alone have been estimated to cost between $500 and $1,900, which represents extra revenue for service centers

[26] *See, e.g.,* Reuters, *Global Insurance Rates Fall 0.9% in 2024, First Drop Since 2017,* Report Says, REUTERS (Jan. 2, 2025), https://www.reuters.com/business/finance/global-insurance-rates-fall-09-2024-first-drop-since-2017-report-says-2025-01-02/.

[27] Jim Lynch et al., Impact Of Increasing Inflation On Personal And Commercial Auto Liability Insurance 2 (2023), https://www.iii.org/sites/default/files/docs/pdf/triple-i_auto_inflation_trends_2023.pdf.

[28] *See* Nishant Parekh, *Fuel for Thought: Auto Safety Systems – Calibration Challenges and Opportunities,* S&P GLOBAL MOBILITY (May 31, 2023), https://www.spglobal.com/mobility/en/research-analysis/fuel-for-thought-auto-safety-systems-calibration-challenges-repair-modification.html.

[29] *See* Highway Loss Data Inst., *Compendium of HLDI Collision Avoidance Research,* 40 HLDI Bulletin 1, 15, 18 (2023), https://www.iihs.org/media/d391f0fa-2c92-4308-a27f-c93d60757e55/3Velsw/HLDI%20Research/Collisions%20avoidance%20features/40-04-compendium.pdf.

[30] *See id.* at 8.

[31] Martindale-Nolo Rsch., *Car Accident: How Much Can I Expect in Compensation?,* Lawyers.com (Jan. 21, 2025), https://legal-info.lawyers.com/personal-injury/experiences-and-outcomes-in-car-accident-cases/car-accident-how-much-can-i-expect-in-compensation.html.

[32] *See Facts + Statistics: Auto Insurance,* Ins. Info. Inst., https://www.iii.org/fact-statistic/facts-statistics-auto-insurance (last visited May 20, 2025).

[33] Nat'l Highway Traffic Safety Admin., DOT HS 813 560, Overview of Motor Vehicle Traffic Crashes in 2022 1 (June 2024), https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813560.

[34] *Legal System Abuse Adding to Increasing Auto Insurance Costs, Creating a New Asset Class of Investors Betting on Litigation,* Ins. Info. Inst. (Feb. 27, 2024), https://www.iii.org/press-release/legal-system-abuse-adding-to-increasing-auto-insurance-costs-creating-a-new-asset-class-of-investors-betting-on-litigation-022724.

[35] *See id.*

and automakers alike that is lost each time a calibration service is skipped. With ADAS quickly becoming standard in millions of vehicles across the U.S., the potential profit from servicing vehicles with ADAS parts could be in the hundreds of millions.

Moreover, the calibration gap is allowing potential reputational benefits to automakers, and subsequent boosts to sales, slip through the cracks. Ensuring that their ADAS-equipped vehicles are as safe as possible and experience fewer accidents will boost automakers' reputation, which can in turn translate into higher sales. Safety is a high priority for most consumers when selecting a motor vehicle to purchase, and as an OEM's vehicles are proven to be safer, their reputation and brand will improve, resulting in greater customer satisfaction and loyalty.[36] Properly calibrated ADAS will improve a vehicle's safety performance and the overall safety reputation of the vehicle's OEM. This is in addition to potentially being subject to fewer investigations and/or recalls by the U.S. Department of Transportation, fending off further potential reputational harms. This also enables OEMs to take advantage of being able to certify their safety ratings under the New Car Assessment Program (NCAP), which has recently been updated to include four new ADAS technologies.[37] Accordingly, the lack of regular ADAS calibration and recalibration can lead to automakers losing out on an array of potential new sales and reputational upgrades.

Lastly, without rendering ADAS recalibration the industry norm, automakers are bearing unnecessary legal responsibility that could be shifted to repair shops in the event of 'faulty' ADAS leading to a crash. Automakers have begun to experience legal exposure related to ADAS, though the nature of these risks is not consistent nationwide. For example, the Arizona Supreme Court has ruled that an automaker can be sued for failing to equip its vehicles with available forward collision warnings or AEB, despite the fact that there is no federal mandate to do so.[38] However, at the same time, a New Jersey appellate court has ruled that an automaker did not violate the state's product liability law for failing to equip its vehicle with lane departure warning or lane keeping assist.[39] These cases are likely to only be the beginning, with liability issues stemming from the safety and presence of ADAS technologies likely to bleed into liability issues around properly calibrated ADAS. Requiring ADAS recalibration across the board could help limit automaker's legal exposure, which in turn would limit the reputational harm that can arise from litigation and lower legal expenses.

[36] *See* Felix Richter, *The Most Important Factors When Buying a Car,* Statista (May 15, 2025), https://www.statista.com/chart/13075/most-important-factors-when-buying-a-car/.

[37] *See generally* NCAP, *supra* note 8.

[38] *See Varela v. FCA US LLC,* 249 Ariz. 89 (2020).

[39] *See Berkoski v. Honda Motor Co.,* Docket No. A-2887-22 (N.J. Super. Ct. App. Div. Jan. 2, 2025).

5.4 Dealerships and service centers

ADAS calibration may also represent a significant new revenue opportunity for repair shops, dealerships, and service centers. Since calibration can be billed as a separate line item, with charges averaging a few hundred dollars, the current calibration gap could translate to thousands of dollars in potential daily revenue. Moreover, offering calibration as part of routine maintenance could bring customers back more regularly in between collision events, increasing service lane traffic.

Without properly calibrating ADAS during a customer's first visit, repair shops are opening themselves up to liability, as repair entities are also beginning to face legal exposure for improper repairs that lead to injury. For example, in *Lommatzsch v. Tesla*,[40] a driver was injured during a collision when her Tesla's Autopilot mode was engaged. The car had been serviced, including the replacement of a sensor, shortly before the crash. The driver reported that she assumed the car would deploy forward collision braking automatically to prevent a collision, but it did not. Both Tesla and the repair shop were sued, a situation that could become much more common as ADAS-equipped vehicles further penetrate the market. Accordingly, repair shops and other players in the ADAS ecosystem should be wary of the potential liability risks of repairs that do not properly maintain ADAS performance, a risk that can be mitigated by instituting universal ADAS recalibration requirements.

5.5 ADAS calibration service industry

The rise of ADAS has also given birth to a new sub-industry for companies focusing on calibration equipment and services. This includes tool and equipment manufacturers, software developers, and calibration training providers. One trade association predicted that the ADAS calibration market may top $50 billion by 2030, with the calibration equipment market alone rising to $1 billion in value by 2033.[41] The economic opportunity for this sector over the next five to 10 years is sizable, and for good reason. The calibration industry will need more equipment, which requires manufacturers, developers, and more trained technicians who are skilled in sensor alignment and software calibration, potentially creating thousands of new manufacturing and technician jobs. Even though the Bureau of Labor Statistics currently forecasts a modest growth of 3% in auto service jobs to 2032,[42] ADAS could spur higher growth in these specialized roles. In terms of net economic

[40] *See Lommatzsch v. Tesla,* Case No. 2:18-cv-00775 (D. Utah Oct. 4, 2018).

[41] *See* MEMA, MEMA Report: ADAS Growth Leads to Safety Concerns 23 (2024), https://www.mema.org/news/mema-report-ADAS-growth-leads-safety-concerns.

[42] *See* Bureau of Lab. Stat., *Occupational Handbook: Automotive Service Technicians and Mechanics,* U.S. Dep't of Lab., https://www.bls.gov/ooh/installation-maintenance-and-repair/automotive-service-technicians-and-mechanics.htm (Apr. 18, 2025).

impact, the growth of the calibration industry will keep more of the value-added from automotive innovation within the automotive service economy.

Creating nationwide recalibration requirements and best practices would help sustain the growth of the ADAS calibration service industry and encourage the development of more advanced calibration technologies to improve performance and ensure greater safety. This is especially true if those requirements or standards are performance-based, rather than overly proscriptive. Performance-based standards, when validated to ensure system accuracy and safety consistent with OEM specifications, allow for the creation of innovative technologies that exceed traditional procedural steps while preserving ADAS performance and safety. This could include the development of advanced, automated calibration systems that can enhance precision, reduce human error, and ensure reproducible outcomes, improving both safety and efficiency beyond traditional manual methods. These new technologies, when combined with increased demand for ADAS calibration, will help support a thriving ADAS calibration service industry for decades to come.

6. Conclusion: Society as a whole may benefit from ADAS recalibration standards

Universal ADAS calibration is more than a safety measure. It is an economically sound investment in public well-being, industry sustainability, and long-term cost reduction. The upfront costs for consumers and insurers paying for calibration, and the investment costs to automakers and service centers for setting up their facilities to manage calibration, pale in comparison to the lives saved and potential economic benefits of a rapidly growing ADAS market. By ensuring that vehicles operate with fully functional driver assistance systems, road users are not only saved from injuries and fatalities but also avoid the cascade of financial burdens tied to crashes, from medical expenses to insurance payouts to lost productivity. Establishing nationwide calibration requirements or standards would also accelerate the evolution of the automotive service workforce, creating high-skill, non-exportable jobs and stimulating innovation in calibration tools and training.

The policy case is clear: calibrating ADAS post-service is not just a technical necessity. It is a strategic imperative for a safer, more cost-efficient, and economically resilient transportation ecosystem.

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About Ascential Technologies

Ascential Technologies solves the most challenging problems where the cost of failure is high.

We design, develop, and automate complex diagnostics, inspection, and test processes across medical & life science, transportation, and specialty industrial end markets.

With 70+ years of experience, 2,300+ experts, and over 40 locations across the globe, Ascential Technologies leverages the power of science and technology to accelerate innovation and improve health and safety.

Impossible? Done.

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