Intelligent speed assistance in fleet management

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EXECUTIVE SUMMARY

This report presents lessons derived from the experiences of 13 fleets and six stakeholders in deploying active intelligent speed assistance (ISA) in commercial fleets. Largely, fleets with active ISA found that ISA can meaningfully reduce speeding and associated safety risks and even promote cost savings. The two main motivations cited by fleets engaged in this study were safety, for drivers and other road users, and financial considerations, such as reducing speeding violations and improving safety scores that can influence insurance costs.

Across fleets with active ISA, speeding and related violations declined, and most reported downstream safety benefits such as fewer hard-braking events or potentially longer following distances. Several fleets also noted improved scores from the Federal Motor Carrier Safety Administration's Compliance, Safety, Accountability program as speed violations diminished and roadside inspections decreased. Indirect financial benefits were reported through reduced incident and maintenance costs.

Overall, while most fleet managers reported that drivers were initially cautious towards ISA (due to concerns about loss of control, privacy, and driving safety), acceptance increased over time. Hands-on experience helped illustrate tangible benefits, such as reduced ticket risk and legal or disciplinary protections, and clarify ISA functionality.

Most of the fleets installed aftermarket ISA devices and found that installations were typically quick and straightforward. The main challenge fleets reported was geofencing accuracy, particularly at points of speed-limit transitions such as on-ramps and work zones. However, most fleets said discrepancies were resolved within as little as 15 minutes and no more than 24 hours. Some fleets customized ISA parameters by, for example, adding buffers around speed limits and/or a temporary ISA override, to meet their operational needs.

The best practices identified in this study can help additional fleets effectively implement active ISA. The recommended best practices include

- ▸ allowing drivers and fleet managers to experience ISA firsthand,
- ▸ developing baseline metrics when implementing ISA to quantify the benefits,
- ▸ providing training that clearly communicates the benefits of ISA and distinguishes it from other safety technologies, and
- ▸ starting small with a pilot.

INTRODUCTION

In 2023, 6.6% of large trucks in fatal crashes were engaged in "speeding of any kind" at the time of the crash, according to responding officers (National Highway Traffic Safety Administration [NHTSA], 2023a). While this proportion is lower than the 17.7% of passenger vehicles involved in fatal crashes that were reported to be speeding (NHTSA, 2023a), limiting speeding by drivers of large trucks could disproportionately reduce crashes, given factors such as longer stopping distance due to weight (Harwood et al., 1989). Beyond contributing to serious injuries, fatalities, and property damage, high-profile speeding-related crashes can negatively impact companies' reputations and result in settlements amounting to tens of millions of dollars (Stempel, 2017).

To limit safety, reputational, and monetary impacts, fleets invest considerable resources to reduce speeding and other dangerous behaviors by their drivers. Commonly used strategies to reduce speeding include behavioral interventions and training programs. Such programs can be costly and time-consuming and may have limited or short-lived effects. One 2024 study analyzed speeding events among 200 long-haul truck drivers over 37 weeks and found that speeding decreased significantly upon receiving real-time feedback and post hoc coaching from safety managers, in comparison to drivers who did not receive feedback (Pradhan et al., 2024). The impact was greatest among drivers who sped frequently and minimal among those who sped infrequently. However, drivers continued to speed, demonstrating that time-intensive individual coaching sessions failed to eliminate speeding entirely.

One avenue for reducing speeding behavior is to preempt the problem: Intelligent speed assistance (ISA) is an emerging technology that offers fleets the ability to limit a vehicle's speed based on local speed limits and company-defined parameters.

ISA defined

Active ISA limits the top speed of a vehicle by preventing the driver from accelerating beyond the local speed limit; active ISA does not brake to reduce vehicle speed. This curtailed acceleration may be paired with other feedback mechanisms such as haptic, auditory, or visual alerts. Active ISA derives local speed limits from either speed-limit sign-reading technology or GPS speed mapping. Exact parameters and capabilities may be customized by the ISA vendor and customer. For example, some fleets may install an override button that temporarily disengages the ISA. In addition, ISA customers can program the ISA to limit speeds exactly to the local speed limit or provide a buffer to allow the driver to travel slightly above the speed limit.

Importantly for the purposes of fleet deployment, ISA can be installed as an aftermarket device. Some active ISA systems have a physical display, while some do not. An example of an active system with a physical interface is shown below.

The display of an active ISA system installed on a vehicle belonging to the U.S. DOT Volpe Center as part of a demonstration in June 2025

Active ISA is distinct from other speed-limiting tools, such as static speed governors that apply a fixed maximum speed on all roads. Active ISA is also distinct from passive ISA; while passive ISA similarly uses local speed limit data, it does not restrict the speed of the vehicle and only alerts the driver with haptic, auditory, or visual cues when the local speed limit is exceeded. These alerts can be disabled or ignored by the driver.

Overview of speed-limiting technologies

Type	Active ISA	Passive ISA	Speed limiter/governor
Override capabilities	Limited time override option, either button or accelerator press	Advisory can be disabled or ignored by driver	None
Mechanism	Utilizes local speed limit based on geospatial or road-sign detection data	Utilizes local speed limit based on geospatial or road-sign detection data	Fixed maximum speed, regardless of local speed limit
Driver feedback	Curtailed acceleration; may have haptic, auditory, visual feedback in addition	Haptic, auditory, visual feedback	Curtailed acceleration

Active ISA has been extensively piloted in Europe since the early 2000s (Biding & Lind, 2002; Carsten et al., 2008). Over the past several years, it has gained traction in the United States as a tool to reduce speeding by drivers of both passenger and fleet vehicles. States and municipalities have been exploring ISA as a method to curb dangerous speeding behaviors by drivers with multiple or severe speeding citations (Zipper, 2025). In addition, research on active ISA in fleet vehicles has illustrated its effectiveness at reducing speeding. Specifically, the New York City Department of Citywide Administrative Services recently implemented an ISA pilot of 400 fleet vehicles (Yahoodik et al., 2024). Drivers of vehicles equipped with ISA showed a reduction in severe speeding (defined in the New York City program

as more than 11 mph over the speed limit). ISA resulted in greater reductions in the total time that drivers were traveling more than 11 mph over the limit on roads with higher speed limits, with an approximately 50% reduction on 25-mph roads and an 82% reduction on 50-mph roads.

Although active ISA is not available as standard equipment on most vehicles, findings suggest that a large proportion of drivers believe active ISA is an acceptable technology. In a survey study, approximately 50% of respondents who were provided a description of active ISA rated the technology as at least "acceptable" (Reagan & Cicchino, 2025). Factors such as a hypothetical high market penetration (i.e., if 60%–80% of other vehicles on the road had ISA) increased the proportion of respondents who rated ISA as acceptable.

While these findings on the acceptability of active ISA may also apply to fleets, literature on fleet driver acceptance of other vehicle technologies may also offer clues to how fleets are likely to respond to ISA deployment.

Technology acceptance in fleets

Acceptance of other, more common advanced driver assistance systems (ADAS) suggests that active ISA may be accepted too. While ADAS features are less common among truck fleets than in passenger and light-duty vehicles,[1] some manufacturers offer them in newer truck models, and they are becoming more common in commercial motor vehicle (CMV) fleets. Stakeholder and truck driver reactions to adopting these other driver assistance technologies may inform best practices when adopting active ISA.

As part of the wider FMCSA "Tech-Celerate Now" program to improve adoption of ADAS in CMVs, a stakeholder analysis revealed that carrier executives' top three incentives to purchase ADAS were the possibilities of lower insurance premiums, lower technology purchasing costs, and driver acceptance (Staples et al., 2024). Meanwhile, the top three disincentives to purchase ADAS were technology purchasing costs, lack of driver acceptance, and possible technology maintenance issues. Since technology purchasing costs were listed as *both* an incentive and a disincentive, it appeared that some carrier executives considered ADAS features to be affordable while others considered them to be too expensive. These stated reasons to purchase or not purchase ADAS (device cost, driver acceptance/unacceptance, maintenance, insurance premiums) may also relate to ISA. In other words, addressing these concerns or determining how to minimize the impact of these factors may facilitate leadership buy-in for ISA.

For surveyed truck drivers, the most cited concern about ADAS was the loss of driver control (Staples et al., 2024). This fear has been echoed in other research studies. In a review of literature on the acceptability of truck platooning (i.e., two or more automated trucks linked as a convoy), truck drivers expressed negative views toward platooning due to concerns regarding automation reliability and a reduction of driving enjoyment, along with concerns that platooning would lead to loss of jobs (Lourenço

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[1] Automatic emergency breaking will be federally required in passenger and light-duty vehicles starting in 2029 (NHTSA, 2024); currently, no such rule exists for heavy-duty vehicles (NHTSA, 2023b).

et al., 2024). On the other hand, some drivers noted that truck platooning could improve driver comfort. Other aspects that could influence ADAS perception and acceptance include the possibility of false alarms and a general mistrust of automation systems (Grove et al., 2020). Addressing these concerns may also be relevant to garnering driver buy-in.

Project goals

The overall goal of the project was to identify lessons learned from existing fleet deployments and to develop best-practice guidance on ISA implementation and use. This involved identifying operational and technical issues along with different strategies that fleets used to address these challenges and improve driver and leadership buy-in. By examining the experience of early adopters, this resource can serve as a guide to smaller fleets that may be interested in implementing ISA but lack the personnel, expertise, or tools to develop or test deployment strategies.

Project background

Report findings were based on communications with representatives from nine fleets. These included seven meetings and one email correspondence with fleets that had implemented or piloted active ISA, and one meeting with a fleet that was pursuing active ISA. In addition, researchers met with six stakeholders, such as ADAS providers and insurance firms, and with four fleets that had either deployed passive ISA or were interested in learning about active ISA but had not deployed it.

Most sections focus only on findings derived from communications with the nine fleets that had implemented, piloted, or were pursuing active ISA. Of these fleets, seven used heavy-duty trucks to transport general freight and two transported passengers, using both vehicles with fewer than 16 seats and vehicles with 16 or more seats. Fleets represented a wide range of industries and applications, including truck rentals/leasing, long-haul transportation, school buses, and the food industry. All discussions were semistructured, and representatives had the flexibility to skip or add topics of interest.

The job titles of the fleet representatives included vice president, director of safety, director of fleet management, and director of risk management. Given the range of roles and titles, representatives are referred to elsewhere in this report as "fleets" or "fleet managers."

FINDINGS

Motivation

Fleets cited several motivations for implementing an ISA program, which can be broadly categorized into two, often overlapping, rationales: improving safety and reducing costs.

Safety improvement was a commonly stated reason for installing ISA (mentioned by five fleets), to benefit not only fleet drivers, but other vehicle occupants and pedestrians. A fleet manager phrased it succinctly:

Above all else, they wanted to "get drivers home safely." Another fleet noted that they started researching ISA implementation after a high-profile case where a driver struck and killed a pedestrian. This fleet wanted to ensure that they took definitive action after such an event. Fleets also expressed interest in avoiding second-order impacts of unsafe driving. Three fleets explicitly stated that they sought to reduce the number of speeding violations, and two of them connected the reduction in speeding violations with the ultimate goal of reducing their score under FMCSA's Compliance, Safety, Accountability (CSA) program. These scores reflect driver and carrier safety records, covering seven Behavior Analysis and Safety Improvement Categories (BASICs). The BASIC ratings influence carrier rankings.[2] Relatedly, three CMV fleets wanted to avoid involvement in high-profile events that could bring both multimillion-dollar lawsuits and negative publicity to the company. One public-sector fleet that had not yet piloted the technology but was interested in deploying it noted that part of their motivation was the large number of citizen complaints about their drivers speeding in city vehicles.

Reducing costs was a secondary yet still important rationale for ISA implementation. One fleet stated that the rollout of automatic speed enforcement cameras in their area had led to a dramatic uptick in speeding tickets. Their drivers had been issued so many tickets that it started to impact their bottom line. Four fleets cited a desire or expectation to counteract rising insurance premiums with a technology that could improve their safety scores. Another fleet manager of a CMV company highlighted the compounding benefits of ISA: The less time spent speeding, the fewer times a truck is pulled over, avoiding roadside inspections and saving time and money for the company.

Driver acceptance and response

In all but one fleet, managers reported that drivers had negative initial responses to ISA implementation. One manager even categorized driver complaints as "painful," while another noted that drivers would blame any vehicle malfunction on ISA. Two fleets reported that a very small number of drivers left the company due to the technology being installed.

Fleet managers cited several factors to explain the poor initial driver response to ISA. First, some drivers already considered themselves to be safe drivers and therefore felt that ISA was limiting and unnecessary. Second, some drivers in one fleet reported pressure (implicit or explicit) to maintain route schedules that were established based on speeding and were therefore unrealistic with the implementation of ISA. Third, some drivers reported to their management that they felt it was unsafe to travel the speed programmed by the ISA system, arguing that it might produce risky driving conditions. Some situations that drivers feared would be unsafe included inaccurate speed limits while merging into faster moving traffic and increased exposure to other drivers' aggressive behavior when driving slower

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[2] Carrier scores consider the total number of driver and vehicle safety violations, inspections, crash reports, and investigation results. Poor scores prioritize the carrier for interventions such as warning letters, monitoring, or targeted roadside inspections (FMCSA, 2016). Speeding 6–10 miles per hour over the speed limit was the most frequently cited driver-roadside-inspection violation from 2021 to 2025 (FMCSA, 2025). A speeding violation may cause an inspector to look for additional violations, leading to further increases in the CSA score.

than the flow of traffic. One fleet reported that certain drivers began to refuse driving ISA-enabled vehicles following instances of incorrect speed-limit programming.

Although most fleet managers reported initial negative reactions to ISA from drivers, the same managers reported a general trend toward acceptance over time. Although five fleet managers reported that their drivers initially accepted the technology somewhat reluctantly (e.g., stating their drivers "got over it" or became "resigned" to using ISA), many of the same fleets also reported that drivers eventually came to appreciate that ISA could prevent driver mistakes (i.e., speeding) that could jeopardize their position or that it could protect and exonerate them in court.

Two fleet managers observed a potential correlation between drivers' acceptance of ISA and their level of experience. The fleet managers specifically noted that they thought drivers were more accepting of ISA when they were new hires to the company or recruited directly from driver training programs and without operational truck-driving experience. Because these drivers were unfamiliar with trucks that lacked ISA, ISA became their default driving experience. In contrast, these fleet managers observed that older and more experienced drivers were more likely to be resistant to ISA.

Another factor that may have contributed to drivers' acceptance of the technology was understanding the rationale for ISA deployment. Two fleets noted that when managers clarified how ISA could help drivers (e.g., prevent them from getting a speeding ticket or reduce time spent being coached on speeding), acceptance increased and driver complaints decreased. Notably, these observations reflect findings in cognitive research that suggest that when users understand an automation feature's purpose (i.e., why it was designed) (Lee & See, 2004) and the perceived benefits (Hoff & Bashir, 2015), they are more likely to trust and use the automation.

ISA efficacy and risk reduction

All eight fleets that implemented an ISA program saw reductions in speeding and other unsafe driving behaviors. This included reductions in internal speeding violation alerts and reductions in speeding tickets received by the drivers. One fleet manager reported that their fleet saw the number of speed camera tickets drop from an average of 6–8 per week before ISA installation to 1 over the course of 9 weeks after ISA installation. Another fleet also saw reductions in hard braking and red-light violations and anecdotally observed an increase in safer following distances among their drivers. The mechanisms for these other improvements are not clear, nor were they specified by fleet managers, but it is possible that reduced speeding meant it was easier for drivers to slow and stop when traffic signals were yellow or a hazard entered their trajectory. In addition, if vehicles were traveling at speeds slower than the surrounding traffic, increased following distances may have been the new default.

Several fleets also described safety benefits related to crash prevention. One fleet estimated about a 30% reduction in preventable collisions after ISA installation. Another fleet reported integrating ISA with radar, cameras, and alerts to support layered crash-prevention strategies. Another fleet described a situation where ISA helped a driver experiencing a seizure by preventing acceleration, suggesting that speed-limiting can mitigate risks during medical emergencies.

In addition to reducing speeding violations and related crashes, fleet managers reported that ISA offered other indirect benefits to fleets. Two fleets stated that their carrier CSA scores had decreased since installing ISA, in one case from 65 to 20. Part of these CSA score decreases are likely directly attributable to fleet vehicles being issued fewer speed violations (a factor in CSA scores; FMCSA, 2024). Further, as mentioned above, one fleet manager pointed out that when trucks are pulled over for speeding violations, they can then be subject to vehicle inspections, which may in turn reveal additional violations that negatively impact the carrier's CSA score. Therefore, ISA may offer compounding benefits to fleets looking to improve their CSA score by avoiding both speeding violations and the resulting vehicle inspections.

Further, the impact and efficacy of ISA is apparent when comparing time spent coaching and disciplining drivers for fleets with and without active ISA. Only the two fleets with passive ISA noted any existing or proposed disciplinary practices. Both fleets explained similar protocols with progressively severe responses to repeated or sustained instances of speeding. On the other hand, none of the nine fleets with active ISA mentioned the need for disciplinary practices, and only one mentioned coaching within the context of time saved after ISA implementation. This fleet saw a 25% reduction in total time spent coaching, since coaching for speeding was now required only for downhill speeding events. The reduction in time spent coaching and disciplining drivers is likely because active ISA prevents speeding in most circumstances, eliminating the need for disciplinary action by preempting the problem.

Finally, one fleet manager hypothesized that deploying active ISA in a critical mass of vehicles may reduce speeding in all drivers, regardless of a given vehicle's use of active ISA, because the vehicles with ISA would then determine the flow of traffic. Therefore, the fleet manager expected that equipping even a small subset of vehicles on the road with active ISA would have the potential to reduce risk for all drivers.

Training and communication

Organizations described using several different strategies to inform and train drivers on ISA. Five fleets mentioned developing a training program or slide deck that specifically discussed ISA implementation. However, three of these fleets only provided this ISA training to new employees as part of the onboarding process. For existing employees, these fleets instead used quarterly safety meetings, newsletters, and one-pagers featuring a description of ISA along with frequently asked questions to communicate about the rollout.

Two fleets emphasized that within their training program, they differentiated ISA from other vehicle technologies such as speed governors, adaptive cruise control, and collision mitigation. According to these fleet managers, ISA is frequently conflated with these features, which may cause drivers to misattribute errors to the ISA. For example, one fleet reported that some drivers thought errors by the collision mitigation system (i.e., applying the brakes when it was not warranted) were a result of the ISA malfunctioning. Explaining in the training that ISA only prevents acceleration, and does not apply the brakes, helped to reduce confusion among drivers.

When planning training or internal communications about ISA, fleet managers identified two key factors for improving driver buy-in: continuing engagement and explicitly describing the purpose and benefits of ISA. In one case, even after ISA was installed, some drivers still had concerns about times when it might be unsafe or inconvenient to have one's speed limited (e.g., while merging or driving up a hill). By taking the time to individually engage with these employees and correct misconceptions, the manager was able to win over even initially skeptical drivers.

Technical challenges and accuracy

INSTALLATION

All but one of the studied fleets with active ISA used an aftermarket ISA device. While some of the fleets installed ISA in-house, others installed the device using the provider or another third party. Some fleets reported that installations were quick and simple, and completed within an hour, taking as little as 40 minutes per unit, or a couple of days for the whole fleet. Another fleet noted that newer ISA devices were easier to install than initial versions. Overall, fleets reported few, if any, installation issues, most of which were addressed by the end of the day.

While many fleets with active ISA used additional ADAS features, such as telematics or adaptive cruise control (ACC), only three fleets either had or were planning integrated systems. In one case, a truck fleet was planning to pilot a new, original equipment manufacturer ADAS system that included active ISA in the suite of features. In another instance, the fleet integrated multiple systems from different providers. In that fleet, if a driver used ACC, the truck could reach 70 mph in areas where the ISA detected a posted speed limit of 70 mph or greater, exceeding the "dumb" speed governor limit of 65 mph that was otherwise imposed on the vehicle in all areas. One fleet was planning a potential integration of ISA with the driver's electronic logging device—ISA would reduce the allowed speed if service hours were exceeded.

Fleet managers reported minimal, if any, driver-tampering with the installed ISA devices. One fleet responded to tampering by re-installing the ISA devices inside the dashboard, while two others preempted tampering by installing the devices in the dashboard from the start.

SPEED LIMIT ACCURACY

The most common issue, encountered by seven of the fleets, was geofencing inaccuracies. For example, the ISA might limit the vehicle on an on-ramp to the speed limit of a parallel surface street, fail to detect a speed limit related to new work zones or time-of-day school zones, or fail to have up-to-date speed limit data. (The following figure shows an example of how frontage roads can create challenging, though solvable, situations for ISA.) One fleet also noted the importance of an override button in speed limit transitions, as it sometimes took the ISA a few seconds to apply the next speed limit.

Although some ISA systems use cameras to look at speed limit signage, all the fleets in this study used systems that relied exclusively on GPS speed mapping. Each fleet had a different mechanism to report

geofencing discrepancies. One fleet allowed drivers to report discrepancies directly to the provider, while another fleet asked drivers to report discrepancies to their supervisors who would validate and forward the report to be fixed manually by an internal team member. Regardless of the mechanism, most fleets reported that these inaccuracies were straightforward and quick to resolve, with resolution taking as little as 15 minutes and no more than 24 hours. Many fleet managers also felt that the frequency of inaccuracies declined during the period of deployment, as inaccuracies along the trucking routes were identified and addressed. Only one fleet manager felt that the ISA provider could not adequately address the geofencing inaccuracies during their initial deployment period in 2024. This fleet began piloting active ISA again in 2025 with another provider.
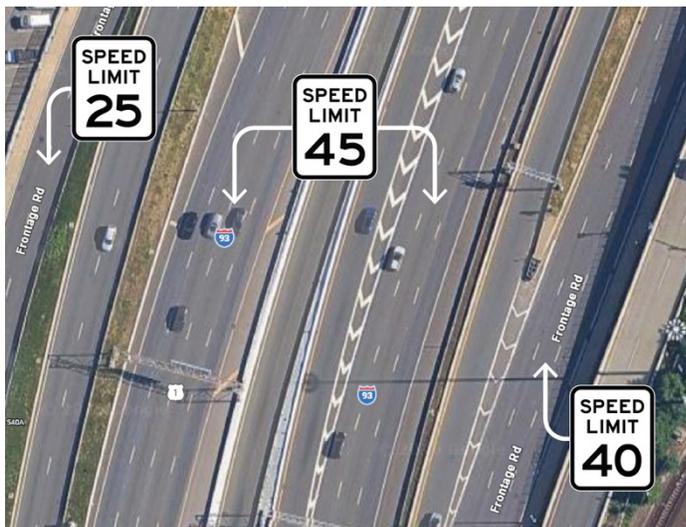
Example of speed limit differences on a highway versus a frontage road

Image source: Google Maps

Speed limit source: OpenStreetBrowser

TECHNICAL CHALLENGES AND MAINTENANCE

The majority of fleets with active ISA reported that technical issues were infrequent overall. One fleet encountered "growing pains," where the ISA servers would be overloaded when all the vehicles went online simultaneously. Two other fleets implemented regular device health reports to identify any potential tampering and to assist in maintenance. Most fleets reported that maintenance was largely straightforward, even though in one case, maintenance staff was initially resistant to maintaining another piece of technology, especially given initial quality issues. Also, one fleet reported that the ISA devices reported infrequent "phantom error codes" (three times over 8 months) when there were no issues.

Cost and business case

COST

Based on information from fleets, vendors appeared to offer several different cost structures for ISA technology. While some fleets paid a single fee for the ISA device, along with a monthly subscription fee for the GPS and mapping data, other fleets paid a yearly fee that covered both device rental and the mapping data subscription (see table below). Some fleets received a discount for being early adopters of ISA. One fleet's captive insurance company covered 50% of the cost of ISA, allowing for easier and quicker adoption.

ISA pricing structure by fleet

Pricing structure	Number of fleets
Monthly fee per unit + fixed hardware cost	1
Monthly fee per unit	2
Annual fee per unit	1
Pilot (pricing structure not set)	2
Shared cost with insurer	1

Note: One fleet did not specify pricing structure.

BUSINESS CASE

Fleets noted several competitive benefits from ISA. Four fleets used active ISA with geofencing and map-based controls to prevent asset damage and manage route-specific risks. One private fleet reported a roughly 90% reduction in bridge strikes after implementing automated speed and route controls. They were able to restrict areas with low bridges so that drivers were unable to reach them. Another fleet also described using ISA for low-bridge impact mitigation, including stopping vehicle operation on constrained corridors before the truck would make impact with the bridge. Another private sector fleet

combined geofencing with verbal alerts for low bridges and curves to reinforce safe routing and speeds for drivers. Two fleets used this same mechanism to track or halt stolen vehicles.

Some fleet managers also described maintenance and fuel-economy impacts. Several fleets noted anecdotal reductions in vehicle wear-and-tear and maintenance costs after ISA deployment—one fleet explicitly reported seeing lower maintenance costs that they attributed to ISA. Reported fuel-economy benefits ranged from neutral to positive. While some fleets reported that they did experience fuel savings, other fleets reported no clear fuel savings directly attributable solely to ISA, citing other factors including route profile, loads, auxiliary equipment, and driving practices that interact to influence fuel consumption.

There were also some reported business benefits from demonstrating ISA use. ISA and related safety measures were cited by one fleet manager as competitive advantages in bids (for example, with school districts) and two fleet managers mentioned that ISA could protect their brand or reputation as a company from speeding-related incidents.

INSURANCE AND FINANCIAL IMPACTS

As noted above, one of the motivations for installing ISA was cost savings. One manager stated that ISA was "not cheap," but he considered the results to be "outstanding." No fleets reported direct premium reductions from ISA installation; based on stakeholder observations, the insurance industry still seems unfamiliar with ISA and does not yet appear to offer discounts for installation. However, there were indirect financial benefits from reducing speeding behavior by drivers. At least three fleets experienced reduced or stable insurance costs, potentially due to improved CSA scores, which are factored into premiums. ISA also reduced the number of speeding tickets fleets received, while some ISA devices had the secondary benefit of mitigating bridge strikes (some estimates of the average cost of a bridge strike range between $6,000 and $30,000; Americal Journal of Transportation, 2024). Finally, one fleet also reported lower maintenance requirements in vehicles with ISA.

Fleet-specific customization

The fleets in this study customized active ISA installations based on their operating needs. There were two key customizations that allowed the driver greater flexibility: override functionality and ability to drive above the speed limit (see table below). Only one fleet was piloting active ISA with both types of customizations, while the rest implemented stricter policies: two fleets did not include either permissive option, two fleets set the ISA enforced speed at the speed limit but allowed drivers an override, and two fleets set the ISA enforced speed above the speed limit (up to an overall maximum speed) but without the option to override.

Fleet customization (override and maximum speed) for ISA

	Max speed = speed limit	Max speed > speed limit
No override	2	2 (with capped maximum speed)
Override allowed	2	1 (pilot)

Note. One fleet did not specify maximum speed or permission to override ISA.

Override capabilities were generally limited in duration (e.g., 10 or 30 seconds) and in frequency (e.g., twice per trip or with a 2-minute cooldown between overrides). Enforced speeding thresholds, when not set at the speed limit, were set at 2–5 mph above the speed limit. Overall maximum speeds were capped at 65 or 70 mph, though this cap could sometimes be increased if the driver also used ACC.

Some fleets also customized their active ISA installations in other ways. One fleet reduced vehicles' speed to below the speed limit in the presence of specific roadway characteristics (e.g., S curves), while another fleet excluded school zone speed limits from the active ISA.

Legal considerations

When implementing an ISA or other driving safety program, fleets often consider how the change may impact compliance and liability. Two fleets that set their speed threshold at exactly the posted speed limit stated that they did so out of liability concerns. By operating, carriers run the risk of multimillion-dollar lawsuits. Any operation above the speed limit may suggest that the company tolerates speeding and may make the company liable for the crash. One fleet manager also cited liability concerns as the rationale for a rapid, company-wide rollout. Their justification was that, if they had embarked on a slow, phased implementation and a non-ISA equipped vehicle was involved in a serious crash, the plaintiff could argue that the company was negligent by not equipping all company vehicles with ISA.

While not directly a legal consideration, it is important to note that one municipal fleet initially met resistance from leadership, which was concerned that installing ISA and other ADAS would mean admitting that the organization had a safety problem. After "socializing the idea internally" and educating leaders and stakeholders, the concept of an ISA pilot received more buy-in.

Labor relations and union concerns

When implementing an ISA program, organizations with unionized drivers may require additional considerations. There was a perception among fleet managers that union drivers may be more skeptical about ISA specifically and advanced vehicle technology in general. One municipal fleet targeted nonunion school bus drivers for their initial pilot because they expected that it would be a more "friendly" testing environment.

In one case, ongoing labor negotiations in a municipal fleet were a factor in the delay of a pilot ISA deployment. The union opposed telematics data collection of any kind due to concerns regarding privacy

and possible disciplinary actions resulting from the collected data. The fleet has only recently been able to employ telematics and GPS tracking, with a limited number of measures collected. Except for one agency that had a separate agreement, speeding and other driver behavior measures were not collected.

Besides working with labor unions, private companies may need to consider the nuances of working with independent contractors when planning their ISA program. One fleet that occasionally works with contractors noted they needed consent from the contractors before ISA was installed on their vehicles, an extra step that is not required with the company's own fleet. However, the manager felt that navigating this extra step was worth it to ensure there was no double standard for company versus contractor vehicles. This consistent approach could be an advantage should a plaintiff bring action against the company in a speeding-related case.

Summary of ISA applications

As described above, fleet managers reported a range of use cases and fleet-specific applications of active ISA that extend beyond the core goals of speed reduction and CSA improvement. While not universal to all ISA users, these outcomes illustrate how the technology, when combined with other systems and operational changes, can support broader safety, compliance, maintenance, and business objectives. Below is a summary of use cases and applications described by fleets.

- Reduce traffic violations, such as:
  - Speeding violations,
  - Roadside inspections associated with speeding,
  - Red-light violations.

- Increase safe driving behaviors, including:
  - Preventing deliberate or inadvertent speeding,
  - Reducing or monitoring hard braking,
  - Potentially increasing following distances to safer ranges,
  - Reducing preventable collisions, potentially in conjunction with layered crash-prevention strategies (e.g., radar, cameras, alerts, etc.).

- Customize ISA settings with additional safety precautions that:
  - Prevent asset damage, such as bridge strikes, by stopping vehicles before they reach low bridges,
  - Encourage specific safer driving behaviors, such as limiting vehicles to speeds lower than the posted limit on S curves.

- Preempt disciplinary or legal action by precluding speeding, thereby:
  - Protecting the fleet from negligence claims for allowing drivers with speeding records to drive,
  - Protecting drivers from speeding-related disciplinary or legal action,
  - Saving time and resources spent coaching drivers for speeding.

- Slow and stop trucks in real time to:
  - Track and halt stolen vehicles,
  - Encourage compliance with hours-of-service limits,
  - Protect drivers who are experiencing medical emergencies while driving.

- Reduce maintenance and fuel burn costs.

BEST PRACTICES

Fleets noted a variety of important steps when considering or deploying ISA. These documented best practices and lessons learned may be useful for any fleet manager looking to pilot or deploy active ISA.

Show, don't tell. Fleets consistently recommended a "show, don't tell" approach that provides opportunities for both management and drivers to experience ISA firsthand. Driving a vehicle with ISA installed might immediately address some common concerns (e.g., increasing driver distractions) because it would demonstrate that ISA does not change the driver's working conditions.

Allocate enough time to work with leadership and clearly illustrate potential benefits to the organization. Implementing novel technologies, even in the form of a limited pilot, requires buy-in from leadership. To do so, fleet managers recommended reviewing and documenting baseline metrics, such as CSA scores, number and cost of physical damage claims, time spent coaching drivers, current insurance costs, current maintenance and damage costs (e.g., bridge strikes, vehicle wear-and-tear from speeding), frequency of speeding and collisions, and fuel burn rates. One fleet utilized FMCSA's Safety Measurement System to demonstrate the relationship between driver-controllable roadside inspections (e.g., those that result from speeding) and cost. Reviewing these baseline metrics can also help fleet managers determine if deploying active ISA meets the needs of the fleet. One fleet noted that active ISA can especially benefit over-the-road fleets with existing bridge-strike issues. These baseline metrics can also be used after deploying ISA to quantify the impact of ISA.

Fleet managers also recommended spotlighting to leadership how speeding and related crashes can harm business prospects by increasing negative brand exposure, or by leading to negligence claims in court. This is especially relevant if the fleet already tracks vehicle speeds with telematics and therefore has data on current speeding issues.

Engage with drivers on the how and why of ISA. To improve driver buy-in, several fleet managers recommended engaging with drivers on the function and purpose of ISA before piloting or installing the technology, such as establishing the difference between active ISA, passive ISA, and speed governors. This includes providing opportunities for drivers to ask questions (such as quarterly group safety meetings) and emphasizing that the driver remains in control of the vehicle, except when traveling above the speed limit. Demonstrating how ISA directly benefits the driver can be an effective strategy for building buy-in, emphasizing benefits such as decelerating a vehicle if the driver experiences a medical emergency (e.g., seizure), or protection from legal consequences in court or from disciplinary action at work. In addition, it is critical to engage with drivers after ISA installation, by responding in a timely manner to drivers' questions and concerns or reports of inaccuracies. These actions can increase acceptance by demonstrating that fleet management takes driver concerns about ISA seriously.

Start small, in a friendly testing environment. Fleets can pave the way for ISA by launching a small-scale pilot and properly customizing ISA to the needs of the fleet before implementing it across the entire fleet. Depending on an individual fleet's liability risk tolerance, piloting may not be an option, but when it

is, successfully piloting ISA in a "friendly" environment first (e.g., starting with drivers who are more open to technology or prioritizing safety-critical uses), it may be easier to convince ISA skeptics to use the technology.

Explain potential benefits of ISA to the public. When explaining the benefits of ISA, consider reminding stakeholders and drivers of the true cost of speeding in terms of severe injuries and fatalities. Speeding does not only impact the driver or the company. Depending on the context (e.g., public versus private, competing for contracts), fleets may wish to advertise their ISA deployment to the public to demonstrate their organization's commitment to safety on the road, whether through decals on their vehicles or through media channels. This may even serve as a recruitment tool for drivers who are more open to the use of advanced vehicle technology, such as recent graduates from driver training programs.

LIMITATIONS

This project aimed to identify lessons learned from existing fleet deployments and to develop best-practice guidance on ISA implementation via conversations with fleets that had already implemented the technology. There are two key limitations due to this methodology. First, findings were qualitative and relied on the perspectives and opinions of fleet representatives. The perspectives of individual fleets might not be representative of their peers' perspectives. Second, because fleet representatives self-selected into conversations, the documented findings may not be representative of all fleets that have deployed or chose not to deploy active ISA.

NEXT STEPS AND RESEARCH OPPORTUNITIES

The current project and the resulting findings revealed several avenues for future research and applications including examining real-time decisions and progress with fleets that were pursuing or piloting ISA, quantitatively comparing training across fleets that have deployed ISA, evaluating ISA efficacy in fleets with established baseline metrics, examining the impact of ISA parameters on driver buy-in and safety outcomes, and developing educational materials for fleet managers and ISA providers.

First, researchers may follow up with fleets that were pursuing or piloting ISA during the data collection phase of this report to understand real-time decision making and strategies. This could include examining the decision-making process of fleets that piloted ISA but chose not to deploy it. These fleets may have additional lessons learned that could be relevant to other organizations considering ISA or could be addressed by ISA providers to make ISA available to a wider audience.

Second, this report demonstrates that the fleets that have deployed active ISA have used a variety of driver training methods (e.g., presentations, verbal training, newsletters). While most fleets recommended training as a best practice, researchers were unable to quantitatively compare the efficacy of the different

training methods. Researchers could review the details and structure of the training programs, implement a controlled study, and identify more specific, quantitative impacts on the drivers. Such analysis might help fleet managers identify the best training for their fleet when considering ISA.

Third, to corroborate the qualitative findings in this report, researchers could design and conduct quantitative analysis that compares fleets' baseline measures of safety, maintenance, fuel efficiency, and speeding before, during, and after full deployment of ISA. Such analysis could quantify the findings in this report, support accurate benefit and cost estimation at the fleet or societal level, and help managers understand the potential impacts on their own fleets when considering ISA.

Fourth, although some fleets opted to customize ISA parameters (e.g., adding a buffer to the local speed limit, allowing drivers to temporarily override the ISA), the effect that these customizations have on both driver acceptance and safety outcomes is unclear. For example, while adding a speed buffer may improve driver acceptance of the technology, it is possible that there would be a tradeoff in safety or liability. This tradeoff could be particularly pronounced in fleets that have an absolute (e.g., 10 mph above the speed limit) as opposed to relative (e.g., 10% of the speed limit) buffer, due to the potential for unsafe speeding on lower speed roads (Yahoodik et al., 2024). Quantifying the optimal parameters to enhance both buy-in and safety could allow fleet managers to make more informed decisions when programming their own devices.

Finally, this report could be distributed among fleet managers who are considering ISA to share the best practices and lessons learned. In addition, this report is intended to serve as a foundation for additional educational materials, such as memos, job aids, and visual graphics that could be easily shared with a wider audience.

REFERENCES

Americal Journal of Transportation. (2024, March 26). *E-SMART bridge strike mitigation proves effectiveness*. https://www.ajot.com/news/e-smart-bridge-strike-mitigation-proves-effectiveness

Biding, T., & Lind, G. (2002). *Intelligent speed adaptation (ISA). Results of large-scale trials in Borlaenge, Linkoeping, Lund and Umeaa during the period 1999-2002* (Publication No. 2002:89E). Veägverket: The Swedish National Road Administration.

Carsten, O., Fowkes, M., Lai, F., Chorlton, K., Jamson, S., Tate, F., & Simpkin, B. (2008). *isa-UK, intelligent speed adaptation: Executive summary of project results.* The University of Leeds and MIRA Ltd.

Federal Motor Carrier Safety Administration. (2016). *What is CSA—and how does it affect me?* https://csa.fmcsa.dot.gov/documents/what-is-csa-factsheet.pdf

Federal Motor Carrier Safety Administration. (2024). *The motor carrier safety planner: 3.6.2 Factors that affect the safety rating (385.7).* https://csa.fmcsa.dot.gov/safetyplanner/MyFiles/SubSections.aspx?ch=20&sec=58&sub=101

Federal Motor Carrier Safety Administration. (2025). *Roadside inspection violations: FMCSA Motor Carrier Management Information System data snapshot, 9/26/2025.* https://ai.fmcsa.dot.gov/EnforcementPrograms/Inspections?type=AllViolations&time_period_id=2&report_date=0&vehicle_type=1&acute_critical=0&state=NAT&domicile=US

Grove, K., Camden, M. C., Krum, A., & Hanowski, R. J. (2020). *Research and testing to accelerate voluntary adoption of automatic emergency braking (AEB) on commercial vehicles* (No. FMCSA-RRT-18-013). U.S. Department of Transportation, Federal Motor Carrier Safety Administration.

Harwood, D. W., Glauz, W. D., & Mason, J. M. (1989). Stopping sight distance design for large trucks. *Transportation Research Record*, *1208*, 36–46.

Hoff, K. A., & Bashir, M. (2015). Trust in automation: Integrating empirical evidence on factors that influence trust. *Human Factors*, *57*(3), 407–434. https://doi.org/10.1177/0018720814547570

Lee, J. D., & See, K. A. (2004). Trust in automation: Designing for appropriate reliance. *Human Factors*, *46*(1), 50–80. https://doi.org/10.1518/hfes.46.1.50_30392

Lourenço, V., Duarte, S. P., Lobo, A., Ferreira, S., & Cunha, L. (2024). Representations of truck platooning acceptance of truck drivers, decision-makers, and general public: A systematic review. *Transportation Research Part F: Traffic Psychology and Behaviour*, *104*, 359–373. https://doi.org/10.1016/j.trf.2024.06.008

National Highway Traffic Safety Administration. (2023a). *Fatality Analysis Reporting System (FARS)*. https://www.nhtsa.gov/crash-data-systems/fatality-analysis-reporting-system

National Highway Traffic Safety Administration. (2023b, June 22). *NHTSA and FMCSA propose new safety standard requiring automatic emergency braking systems in heavy vehicles*. https://www.nhtsa.gov/press-releases/heavy-vehicles-automatic-emergency-braking-proposed-rule

National Highway Traffic Safety Administration. (2024, April 29). *NHTSA finalizes key safety rule to reduce crashes and save lives*. https://www.nhtsa.gov/press-releases/nhtsa-fmvss-127-automatic-emergency-braking-reduce-crashes

Pradhan, A. K., Lin, B. T., Wege, C., & Babel, F. (2024). Effects of behavior-based driver feedback systems on the speeding violations of commercial long-haul truck drivers. *Safety*, *10*(1), 24. https://doi.org/10.3390/safety10010024

Reagan, I. J., & Cicchino, J. B. (2025). ISA in the USA? The likelihood of US drivers accepting and using intelligent speed assistance. *Transportation Research Part F: Traffic Psychology and Behaviour*, *109*, 242–254. https://doi.org/10.1016/j.trf.2024.12.004

Staples, B., Chang, J., Schweikert, N., Murray, D., Evans, C., Leslie, A., Camden, M., Braswell, R., Grove, K., Weakley, T., & King, A. (2024). *Accelerating the adoption of advanced driver assistance systems (ADAS): "Tech-Celerate Now" Phase 1* (Report No. FMCSA-RRT-22-004). U.S. Department of Transportation, Federal Motor Carrier Safety Administration, Office of Analysis, Research, and Technology.

Stempel, J. (August 2017). *Wal-Mart, insurers settle lawsuits over 2014 Tracy Morgan crash*. Reuters. https://www.reuters.com/article/lifestyle/wal-mart-insurers-settle-lawsuits-over-2014-tracy-morgan-crash-idUSKBN1AN2IQ/

Yahoodik, S., Epstein, A. K., Brodeur, A., Drake, J. & Landsman, T. (2024). *New York City intelligent speed assistance pilot evaluation* (Report No. DOT-VNTSC-NYC-24-02). U.S. Department of Transportation.

Zipper, D. (2025, April). *Virginia will use technology to slow chronic speeders' cars—and other states are rushing to join in*. Fast Company. https://www.fastcompany.com/91323835/virginia-will-use-technology-to-slow-chronic-speeders-cars-and-other-states-are-rushing-to-join-in

APPENDIX

Volpe emailed or spoke with a total of 13 fleets and six other stakeholders, including providers of ISA and ADAS and one insurance firm. Of the 13 fleets, eight fleets had implemented or piloted active ISA. The tables below show the distribution of fleets and stakeholders.

Communications with fleets with active ISA, with passive ISA, or without ISA

Private or public fleet	Number with active ISA	Number with passive ISA	Number with no ISA	Total
Private fleets	7	2	1	10
Public fleets	1	0	2	3
Total	8	2	3	13

Communications with other active ISA stakeholders

Stakeholder type	Number
Active ISA providers	2
ADAS providers	2
Insurance firms	1
Advocacy organizations	1