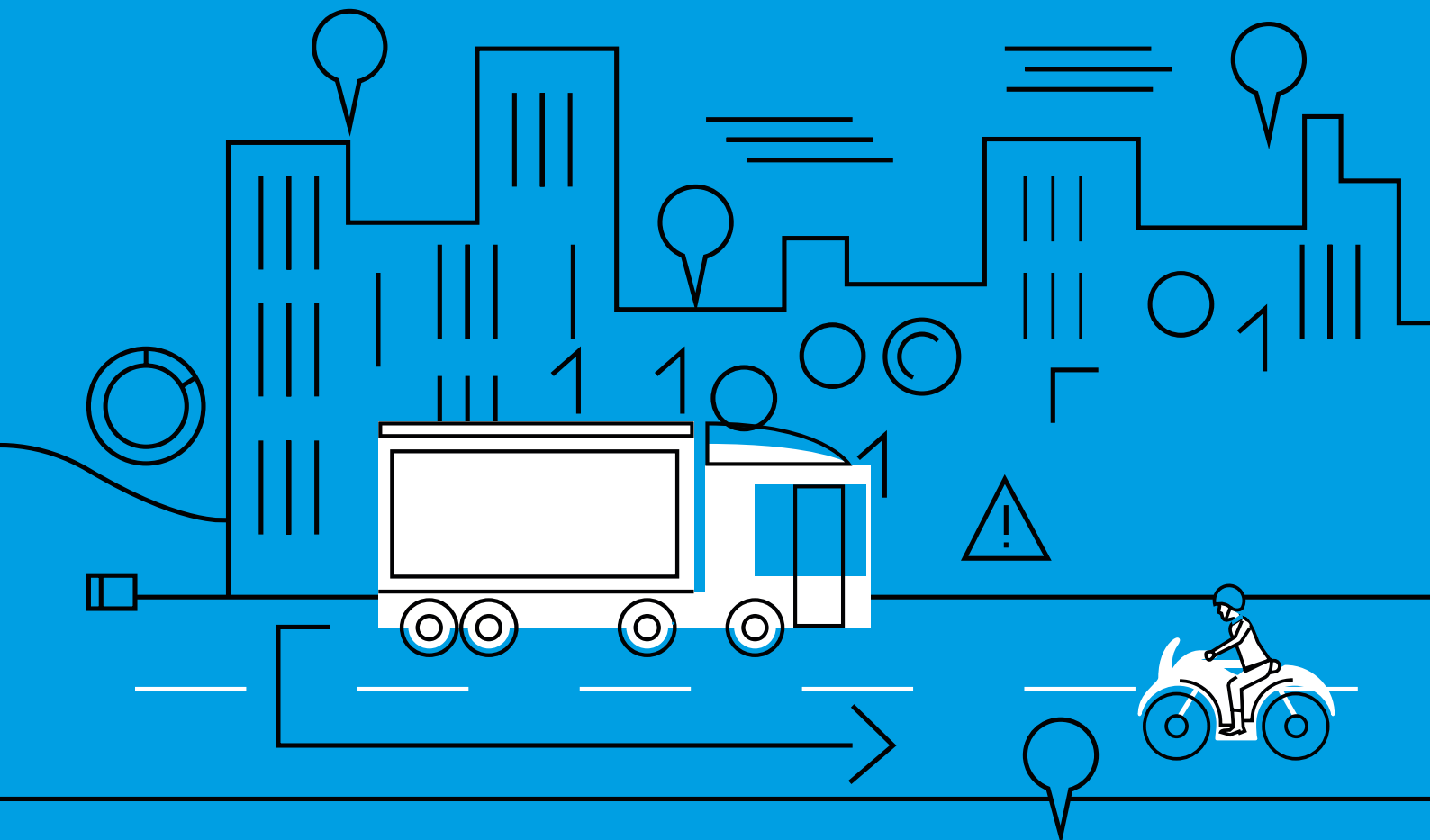




FORS Focus on Transport Trends

How technology is shaping the fleet safety landscape



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Welcome to the first edition of the FORS Focus on Transport Trends

Advancements in safety technology are transforming the way fleet operators manage their vehicles and drivers. Looking back over the last 20 years in the industry, it is striking just how far we have come.

Telematics has already been around for a generation. Tachographs have been digital since 2006, and in the past decade we have seen the emergence of digital services from the likes of the DVLA and indeed FORS. That's before we even start talking about self-driving vehicles, and advances in Artificial Intelligence (AI) and connected technologies.

We recognise the importance of harnessing these technologies to make our roads safer, but we know it can be a challenge for busy operators to keep abreast of new trends, and the challenges and opportunities they present.

This operator guide is not meant to be exhaustive. Nor is it a call to action for all fleets to embrace every technology solution they can get their hands on. After all, no two fleets are the same, and technology should be adopted at a pace that is appropriate for each business.

Our aim with this operator guide is simply to provide a useful overview of the current state of the market, with insight and advice from the FORS Community of operators, product manufacturers and other influential industry stakeholders on a range of technology-related topics, including:

- How Artificial Intelligence (AI) is changing the game when it comes to fleet safety
- How FORS Accredited Operators are harnessing new safety technology
- The latest technologies and systems causing a stir in the market
- Digital solutions for managing risk and improving safety
- The complex legal landscape around AI and autonomous technologies
- Advancements in driver training and remote learning

We hope this guide proves a useful resource for you.

Aimee Mitchell
FORS Head of Operations



Technology and the pursuit of Vision Zero

Data shows that the number of casualties in reported collisions involving HGVs in the UK is declining. However, in 2021 there were a reported 1,097 road users killed or seriously injured in HGV collisions¹. Fleet operators have a responsibility to keep driving these numbers down.

Technology is playing a crucial role in shaping operators' ability to mitigate risk, improve safety and propel the industry towards Vision Zero². The past decade has seen significant advancements in safety systems, but the rate of progress, especially in the field of systems based on Artificial Intelligence (AI), has exploded the past two years.

The current thinking in the transport industry in relation to AI technology is highly optimistic, particularly regarding its potential to enhance safety systems.

AI-powered safety systems can analyse vast amounts of real-time data from various sources, such as sensors, cameras and vehicle-to-vehicle communication, to identify potential hazards and take proactive measures. These systems can improve driver assistance technologies, including collision avoidance, lane-keeping assistance and adaptive cruise control – making vehicles safer and more reliable.

AI camera monitoring systems

Today's advanced camera systems can provide drivers with a real-time view of their vehicle's surroundings – eliminating blind spots and improving visibility. AI cameras can also be used to differentiate between vulnerable road users and street furniture, and warn the driver via audible alerts. This technology is particularly useful in large vehicles, where blind spots can be a significant safety hazard.

Another effective use of AI cameras is to measure driver fatigue by employing computer vision techniques and machine learning algorithms.



¹ <https://www.gov.uk/government/statistical-data-sets/reported-road-accidents-vehicles-and-casualties-tables-for-great-britain>

² A Vision Zero approach to road safety management is based on the belief that no death or serious injury is acceptable on roads. (<https://www.brake.org.uk/how-we-help/national-campaigns/the-change-we-want/vision-zero>)

Technology and the pursuit of Vision Zero



Measuring driver fatigue via AI

- High-resolution cameras are positioned inside the vehicle, typically facing the driver. These cameras capture real-time video footage of the driver's face and eye movements.
- AI algorithms analyse the captured video frames to identify and track the driver's face accurately. Facial recognition techniques are used to locate and track facial 'landmarks' and the driver's eye movements are tracked.
- The system extracts various metrics, including blink frequency, eye closure duration and changes in eye gaze patterns.
- Machine learning algorithms are trained using a large dataset of labelled examples. The dataset consists of instances where driver fatigue is known, such as from drivers who exhibited signs of fatigue, and those where it is not. The models learn to recognise patterns and correlations between the extracted features and the driver's fatigue state.
- Once trained, the AI model can classify the driver's fatigue level in real time. By continuously analysing the facial features and eye movement data, the system can determine whether the driver is alert, mildly fatigued or severely fatigued.
- Based on the detected fatigue level, the AI camera system can trigger appropriate alerts or interventions where necessary.
- The AI camera system can log the collected data, including video recordings and analysed features, for further analysis and evaluation.

Ultrasonic obstacle detection

These systems use sensors to detect obstacles or vulnerable road users in a vehicle's path and alert the driver with an audible warning. This technology is particularly useful in tight spaces, such as loading docks and construction sites, where visibility can be limited.

AI is integrated into these systems to enhance their functionality and reliability, with AI algorithms employed to process the data received from the ultrasonic sensors in real-time.

Radar collision avoidance

This technology represents a step-change in the detection of potential collisions and is particularly useful where there is a high risk of collisions due to heavy traffic and driver error.

Radar systems seamlessly calculate the point of collision with vulnerable road users and warn drivers of any potential risks, giving them sufficient time to intervene. They do this by constantly gathering object detection data, such as the acceleration and turning rate of a vehicle, while also collating vital information from the cyclist or other vulnerable road user, such as distance from the vehicle and speed.

A prime example of a radar and AI-based system is FORS Associate, Brigade Electronics', state-of-the-art system, **Radar Predict**. Radar Predict can detect vulnerable road users up to five metres from the side of the vehicle, seven metres in front of the vehicle and up to 30 metres to the rear of the vehicle's cabin.



Technology and the pursuit of Vision Zero

The end of false alerts?

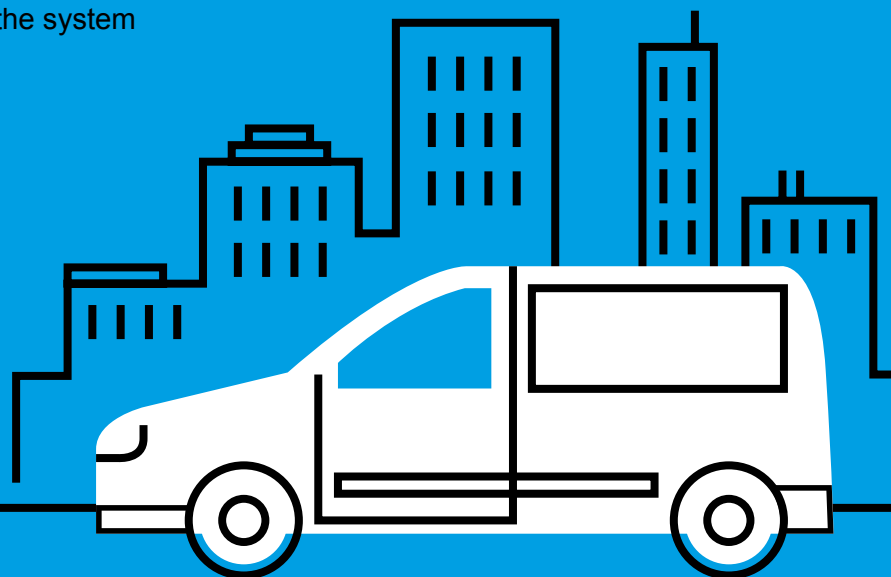
A 'false alert' refers to a situation where a system incorrectly identifies a potential collision or hazard and generates a warning or alarm to the driver, even though there is no danger present.

False alerts were common before the development of AI, as systems could not differentiate between moving and stationary objects.

False alerts can be hugely problematic, and if frequent or persistent, can reduce the effectiveness and reliability of the collision avoidance system, undermining its intended purpose of enhancing safety. So, product manufacturers are working hard to address the concerns of drivers and find new solutions.

A well-known criticism of collision avoidance systems is the number of false alerts triggered by vehicle trailers during turning manoeuvres. Radar Predict solves this problem by using learning capabilities to detect whether the vehicle has a trailer. Its learning and relearning capabilities also allow drivers to switch trailers without the system having to be recalibrated.

AI is seen as a transformative tool capable of revolutionising various aspects of transport operations, from accident prevention and risk mitigation to overall operational efficiency.



FORS Associate, Brigade Electronics

Brigade Electronics is a leading manufacturer of safety devices and technologies for the transport sector. The company specialises in developing innovative solutions to help prevent accidents, protect pedestrians and cyclists, and increase the safety and efficiency of vehicles.

The company was formed in 1976 by Chris Hanson-Abbott, who was inspired when he heard a strange beeping sound from the rear of a small truck on a street in Tokyo. At the time, reversing safety had not been addressed outside of Japan, but with the Health & Safety at Work Act recently passed into UK law and vehicles already accounting for a vast number of fatalities, Chris felt it was time for change.

Since then, Brigade's products and technologies have been designed to address some of the most common causes of accidents in the transport sector, including blind spots, poor visibility and driver error.



Total employees:

271

Global turnover

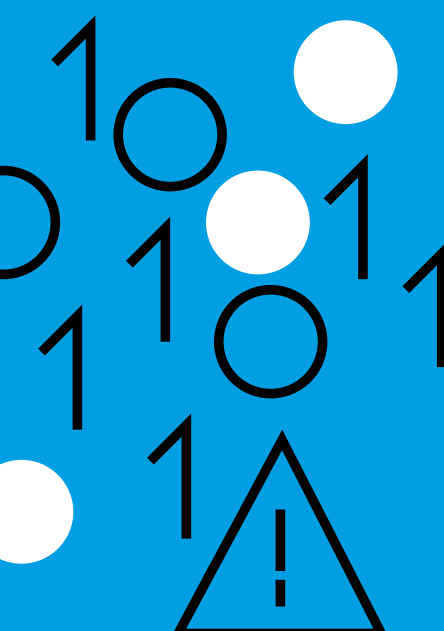
**£72.5
million**

Data remains critical

Industry experts are predicting that vehicle-to-vehicle and vehicle-to-infrastructure information exchange will begin to become the norm in the industry. This means that vehicles will be able to provide warnings to other vehicles, and sensor systems will detect danger and forewarn operators – a critical step on the path towards full autonomy.

Brigade Electronics foresees increased use of data pertaining to vehicles, surroundings and drivers to improve safety. Most telematics remotely monitor the lifeblood of a vehicle, providing information about things like fuel efficiency, harsh braking and oversteering, as well as data about predictive and preventative maintenance.

In the future, data collection has the potential to transform vehicle safety and allow commercial vehicle operators to understand and make safety improvements in new and unimaginable ways. The insight provided by such data will help eliminate gaps in the understanding of why collisions occur, enabling product manufacturers to design systems to truly fulfil Vision Zero.



Operator Focus: Speedy Services



Speedy Services' Group Fleet Compliance Manager **Gareth Jones** lifts the lid on how the company is harnessing technology to the benefit of its drivers and vulnerable road users.

"We're a FORS Accredited Operator with a track record for going above and beyond when it comes to safety. We've been FORS accredited since 2009 and hold Gold status across our entire fleet of HGVs and LCVs.

Safety is one of our core values and it's integral to everything that we do. Drivers make up 50 per cent of our workforce and the company strives to protect them in every way possible. But our drivers share the roads with a variety of vulnerable road users, so it's important that we educate and protect them too.

Technology is having a major impact on how we do that and we're not afraid to push the boat out by trialling new technologies. Two of our newest and most significant technology solutions are our high-definition, AI-based camera systems and a new FHOSS CAST intelligent projection system.

AI systems

We're using driver-facing AI fatigue monitoring cameras on all our vehicles that operate at night. These are a game changer in making sure night shift drivers are alert to danger, and the data it gives us is helping to improve the wellbeing and safety of our workforce.

In addition, we fit a forward, rear, left, and right driver-facing cameras on each HGV as standard, while on our smaller vehicles we fit front, rear and driver facing. Our HGVs are also fitted with a load camera, which we're finding useful for monitoring health and safety incidents that would have been difficult to assess. Based on their success over a longer period, we will be looking to adopt the load facing cameras on our smaller vehicles.

These systems and other collision avoidance systems are helping us to improve fleet safety, but there are still some limiting factors. There's the serious question of driver overload and at what point all this technology becomes a distraction.

We recognise the importance of not overburdening our drivers and a big part of this is training. Before deploying a new system, we ensure that every driver has had the requisite training and we run extensive trial periods before adopting a technology at scale.



Operator Focus: Speedy Services



Intelligent projection

Another exciting new product that we fitted across all our HGVs last year is an intelligent projection system called FHOSS CAST. The system works by casting an illuminated visual alert on the road for vulnerable road users.

We use FHOSS CAST in two areas: on the near-side when our vehicles are turning left, and to the rear of a vehicle to indicate when the ramp or tail lift is going down. In the case of the former,

FHOSS illuminates a large yellow line on the road, one metre from the vehicle, giving vulnerable road users a very clear 'exclusion zone' to keep away from to ensure their safety.

At the rear, we have customised a visual warning that says 'Speedy caution' to clearly show where the vehicle ramp will come down. The feedback so far from our drivers has been extremely positive and we're excited to be exploring customised warnings for a variety of scenarios."



'Driver overload' and technology challenges

While emerging technologies and products offer significant opportunities to improve safety, they also present a unique set of challenges. Operators looking to enhance their fleet safety should consider the risks and potential issues before investing in a new technology or system.

Driver overload

One of the chief concerns is the increasing number of safety systems operating in a vehicle at any one time, potentially causing drivers to be overwhelmed or burdened by an excessive amount of information, alerts or tasks demanded by these systems.

Driver overload can occur for several reasons:

- 1. Information overload:** The driver may receive excessive information from multiple sources simultaneously, such as navigation instructions, traffic updates, real-time monitoring alerts and communications from the central office.
- 2. Alert fatigue:** Continuous or frequent alerts from various monitoring systems can desensitise the driver over time. If the alerts are too frequent, irrelevant or inadequately prioritised, the driver may start ignoring or becoming less responsive to them – potentially missing critical warnings.

- 3. User interface complexity:** The interaction with technology in the vehicle may require the driver to navigate complex menus, buttons or touchscreens. This can create frustration and cognitive load, diverting the driver's attention from the road.
- 4. Training and familiarity:** Lack of proper training or familiarity with the technology installed in the vehicle can contribute to driver overload.

Technology-driven training with FORS

FORS has always strived to deliver the most comprehensive training package to operators via the FORS Professional offering. In recent years, we have made full use of digital and technology solutions to enhance our offering and make it more accessible to operators.

During the 2019 pandemic, for example, we developed our virtual classroom platform, which allows us to deliver driver and manager training remotely. In addition, FORS offers immersive, online eLearning modules that provide challenging scenarios in a controlled and safe environment.

FORS has also pioneered innovative training techniques, such as 3D simulation to replicate real-life situations, helping to improve driver safety with less risk. The online training also gives drivers the opportunity to receive immediate feedback on driving performance and decision making, streamlining the process.

Finally, our training partners offer FORS Approved training, which includes the use of augmented reality (AR) to educate drivers on safe urban driving.

'Driver overload' and technology challenges

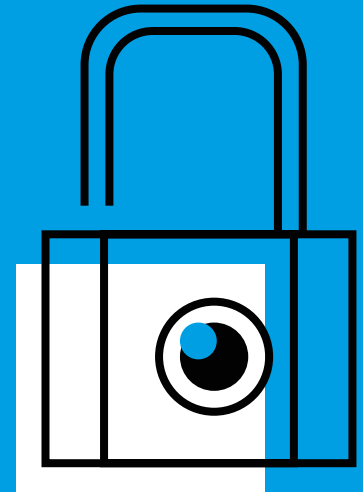
Cost

The implementation of new technology can be expensive, particularly for small to medium-sized businesses. Fleet operators must carefully consider the costs vs benefits when deciding whether to invest in new technology.



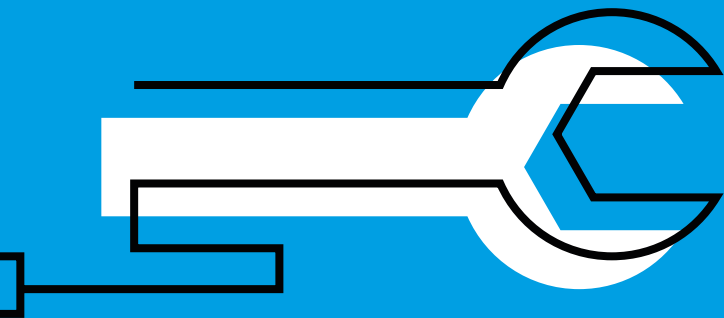
Privacy

Telematics and other monitoring technologies can raise concerns around privacy. Fleet operators must ensure that they are transparent about the data collected and how it will be used.



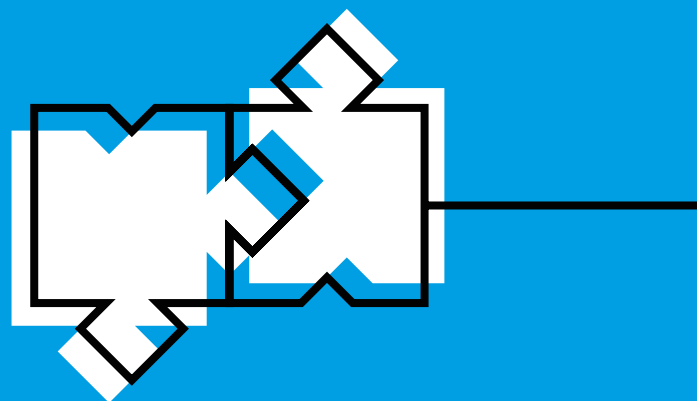
Maintenance

New technology requires maintenance and upkeep, adding to the workload of operators and workshop staff. Maintenance must be carefully planned to avoid downtime and ensure that the technology remains effective.



Integration

The integration of new technology with existing systems can be challenging, particularly if different technologies require different interfaces or software. Fleet operators therefore have to ensure that new technology integrates seamlessly with existing systems to maximise its potential benefits.



Digitalising driver communications – the FORS Driver Handbook

In any operation, there's a mountain of things that drivers need to know about. Historically, the primary way to communicate technical, operational and safety-critical information has been through printed material. The process of publishing and distributing printed materials is time-consuming, expensive and not eco-friendly.

With AI technology grabbing the headlines, it is easy to overlook how other digital services are making operators' lives easier and influencing the safety landscape. In a connected world, where the use of paper-based systems is often dismissed as costly and unreliable, digital solutions can provide efficiency, reliability, transparency, security, visibility, compliance and accountability.

A 'Platform as a Service' (PaaS) solution

The Driver Handbook was developed to help transport managers quickly and easily share information with drivers. The Driver Handbook's smartphone app, together with TDHConnect (a web-based content management system) enables fleet managers to distribute information and engage with drivers, no matter when or where.

Because The Driver Handbook is a Platform as a Service (PaaS) solution, it allows for complete transparency and speed of use. The digital approach offered by The Driver Handbook app means that information can be presented to drivers in a much more creative and engaging way. Presenting content via an app enables the addition of video, links to source material, imagery, quizzes and much more.

Managing risk and improving safety

The main feature of The Driver Handbook that helps operators to improve fleet safety is the content library. It has static content that rarely changes and dynamic content that is continuously updated to reflect current risks, recent incidents, new campaigns and changes in regulation.

TDHConnect's reporting feature allows for the identification of drivers who are not engaging with the content and those who might need additional information or support. This enables managers to target valuable time and resources to those who need it most.



The legal landscape



The legal landscape around AI and autonomous technology is complex. **James Backhouse**, director at law firm, [Backhouse Jones](#), answers some operator FAQs.

How developed is the law in respect of autonomous vehicles?

“The law has undergone some initial changes to structure the questions as to who is responsible for accidents involving autonomous vehicles. There are also some early test vehicles authorised and there will be a legal framework for this. It’s likely that the UK will work in conjunction with the EU and other key nations on regulatory structures. It’s also inevitable that the law will develop very significantly over the next decade as these vehicles become an increasing reality.

One unforeseen area is how the law for non-autonomous traditional vehicles might change to align with the AI controlled vehicles environment.

Plainly, it’s very difficult for those not directly involved in the development of autonomous and AI-based systems to understand exactly what the future is going to look like. However, there are some things that operators should already be thinking about. First, it’s important to be aware that, irrespective of your stance on autonomous and AI-based technologies, the market will develop and begin affecting the vehicles you buy, as well as other vehicles on the road, and indeed transport infrastructure.

What this means is that operators can’t afford to ignore it, and it’s critical that they remain up to date on guidance for drivers. The Highway Code underwent significant change last year in terms of the ‘culture’ it’s seeking to create, so operators need to make sure that when they buy a vehicle equipped with autonomous technologies, they fully understand how it affects the requirements of their drivers – and implement the necessary training.”

How does autonomy and AI affect liability in the event of an incident?

“In the case of AI technology systems such as cameras and sensors, liability for an incident still lies with the driver. However, given the advances in these systems, it seems likely that there will come a point where the augmentation will reach such a level that the liability in some cases could be transferred to the product manufacturer. It will ultimately depend on the degree to which the driver could have influenced the outcome.

In the hypothetical scenario of an autonomous truck causing an accident, it’s very difficult to know what the legal position will be on this. Applying the law as it stands today, the liability would lie with the product manufacturer.

This also gives rise to a separate issue of how the market is regulated. If it’s possible to sue a product manufacturer but they’re not based in the UK, what happens? This is still yet to be developed. Currently, the law states that some products manufactured abroad must have a UK ‘producer’ associated with them – often the importer – who becomes the equivalent of the manufacturer for the purposes of enforcing action. This may well be the case with autonomous trucks from abroad, but the picture is still emerging.

Looking to where there is no driver in the vehicle, liability for an accident may likely fall somewhere between the operator and the product manufacturer.

The key point is this: as the market develops and liability becomes more complex, it will be even more important that businesses implement all the necessary driver training and support to ensure their vehicles and technology are operated safely.”

The legal landscape



How is data protection law affected by AI and autonomous systems?

“The law is already well developed in this area. There is a very high degree of protection for individuals’ information stored on any system because of GDPR, and these regulations are always being updated to reflect changes in how data is obtained, processed and stored.

According to the regulations today, if data is collected by an AI or autonomous system, the operator is still the controller and/or processor of that data and so they will still be liable for breaching the regulations if there’s a failure in the security of that system.

Operators should definitely be taking this into account when considering a new product or system that processes data. How well designed is it in respect of data protection? Where and how will the data be stored? The fines for getting these things wrong can be enormous. It’s reasonable to assume, however, that the vehicle manufacturers and product developers are engaged very closely with this as the stakes are so high.”

FORS Legal, powered by Backhouse Jones

Backhouse Jones is an award-winning road transport law firm. The company has an unrivalled reputation for representing the logistics and transport industries and is well known for its innovative BACKup retainer product, which provides 24/7 advice and representation on road regulatory and employment matters for a modest fixed monthly fee.

FORS Accredited Operators can join the BACKup scheme for a fixed monthly fee and receive:

- HR advice, defence and representation at hearings
- Road regulatory (O-Licence compliance, undertakings, DVSA intervention) advice, defence and representation at hearings (public inquiries, preliminary hearings, DVSA interviews and similar)
- 24/7 telephone access to specialist road transport lawyers
- Affordable price based on fleet and staff size
- Discounts on Backhouse Jones’ other legal advice, compliance reviews and training products



How much further can AI technology go?

The development of AI in the transport industry is ongoing, with continuous advancements in machine learning, computer vision and natural language processing. However, the current industry consensus is that, as Bill Gates once put it, 'technology is just a tool'.

Brigade Electronics cautions that, despite the growing capabilities of AI, active and passive safety systems are not a replacement for driver best practice. Removing the human element of driver best practice requires technology to be failsafe, and while new safety technologies are saving lives, there are still limitations. Ongoing driver training and a commitment to safety best practice will remain a priority for a while yet.

While there is still progress to be made, the integration of AI technology holds great promise for enhancing safety in the transport industry. Continued research and development, along with the refinement of AI algorithms, will likely lead to even more sophisticated safety systems to address complex challenges and improve overall transportation safety. In the next five to ten years, Brigade expects that safety technology and detection systems will be able to predict collisions with even higher levels of accuracy, ultimately supporting vehicles becoming truly autonomous.





SAFETY EFFICIENCY ENVIRONMENT

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