



DRIVERLESS DISRUPTION: THE FUTURE OF AUTONOMOUS HGVS

Autonomous trucks are no longer a futuristic idea—they're becoming part of real-world logistics. With trials already taking place in the UK and full legislative support expected by 2027, the push to adopt self-driving HGVs is speeding up. Promising round-the-clock efficiency, lower operating costs, and relief from driver shortages, autonomous technology could transform freight logistics.

By Trinity Francis

PHOTOGRAPHY BY VARIOUS



While everyone has their eye on alternative fuels, autonomous trucks are poised to be the next major disruptor in the logistics industry. Michael Boxwell, CEO of Voltempo, the company leading the eFREIGHT Autonomous consortium, said: "We're going to start seeing this stop being science fiction and start becoming science fact very quickly indeed."

"Autonomous vehicles are already in everyday use in parts of China and the

US, and trials here in the UK, such as self-driving shuttles in Birmingham and autonomous buses in Scotland, are paving the way for wider adoption by 2027 with the full implementation of the Automated Vehicles Act."

Broadly, most companies working towards autonomous vehicle development agree on a few key objectives: improving safety, optimising efficiency, offering better financial modelling for operators and alleviating driver shortages.

Guus Arts, project manager advanced

technology at DAF Trucks, said: "With the right applications, it brings prosperity to society and economic sustainability for the future. We should be open to this and embrace the opportunities automated trucks present."

On road applications

In the initial stages of autonomous truck deployments, safety drivers will be present to intervene if necessary. One of the first success stories is Volvo Autonomous Solutions' collaboration with DHL to implement autonomous

trucks on routes between Dallas and Houston, as well as between Fort Worth and El Paso.

"Of course, the customer wants to know when we will be able to remove the safety driver because that gives them more opportunity to scale. That's a very structured thing which we will take in a very step-by-step, data-driven process to work towards removing the safety

driver," Shahrukh Kazmi, Volvo Autonomous Solutions, chief product officer, explained.

Considering the safety implications of on road autonomous deployments, Arts said: "There will always be residual risk when putting a truck on the road, driving it at 90km/h at 40 tonnes, because physics doesn't allow a vehicle to stop it in 1m at that speed in case someone

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Off-road autonomy in action: Volvo's driverless trucks at work in a Norwegian quarry, demonstrating industrial-scale reliability



ABOVE: Industry and policy perspectives unite: Sir Vince Cable with Michael Boxwell, head of the eFREIGHT Autonomous consortium

should step in front of it, and this is no different than with any other conventional vehicle."

However, early modelling suggests there will be significant safety and financial benefits for operators who invest in autonomous technology. "The investment will be higher at the front end, but the price of transport will be much lower, especially combined with an electric truck, which has the same situation as a more expensive vehicle, but TCO can be much lower. Transport in general will be at a lower cost. Still, more sustainable and 24/7 operation, spreading road traffic and having an even more productive way of doing transport than today," Arts explained.

Based on initial analysis, Boxwell estimates that of the 120,000 articulated goods vehicles on the road in the UK, roughly 70,000 would be prime targets for autonomy as the driver is not responsible for anything other than driving. Looking ahead to when vehicles will be independently autonomous with no need for a safety driver, Boxwell said: ➤

What will autonomous trucks mean for other types of freight?

Whether anticipated or not, the majority of innovations have a knock-on effect on existing technology. In the case of autonomous trucks, Boxwell believes rail freight could be significantly impacted.

"One of the government's big things at the moment is they want to take freight off the road and put it on rail. Approximately eight million consignments are moved by rail each year. Rail is inflexible, slow, and about 20% more expensive than transporting goods by road. You can only take it from one rail head to another, and at the other end, it's doubtful it's got to its final destination, so you've then got to put it on a truck anyway and drive the final part of the journey.

"If autonomous vehicles are as cheap and flexible as I think they could be, it wipes out rail freight entirely. There will be no space in the market for it, so the unintended consequences are that we could end up with eight million more shipments

on the road every year.

"We've highlighted this already to the DfT to see if this is a concern. From a business point of view, it's brilliant for us, but in terms of whether it's a good thing for society, that's for the government to decide, and then we legislate and plan around it.

"If we take freight off the rail, we free up more capacity for passenger transport, so that could be a benefit because you could then create new opportunities for passenger transport that we don't have today. Rail passenger services can be costly, but what if you ended up with a Ryanrail or an easyRail instead of easyJet - low-cost rail services because you now have more capacity on the rail? It could change society for the better, but it needs to be planned and thought through, and that's for the government to work on."



THE FUTURE TRUCK > AUTONOMOUS TRUCKS

► “If you have a ‘no user in charge’ (NUIC) vehicle, you don’t have to worry about driver breaks and hours; you can run your vehicles 24 hours a day.

“Because you haven’t got the cab, you can put more stuff in the vehicle, potentially another 10 to 15 cubic metres of additional payload per vehicle. Space-wise, you end up with fewer vehicles, but each vehicle does more mileage to make up for that.”

Calculations from the eFREIGHT Autonomous project suggest that 70,000 articulated HGVs could be replaced with 50,000 electric NUIC trucks, which approximately 5,000 operators could oversee.

Boxwell added: “Savings across the

Sharing initial learnings

In a break from usual competitive practices, earlier this year MAN published a dataset detailing 747 scenes from the company’s autonomous truck development programme. The idea was to accelerate progress across the industry and encourage collaboration between universities, manufacturers and software developers to create the safest systems possible.

Dr Frederik Zohm, executive board member for research and development at MAN Truck & Bus, said: “Data sets such as MAN TruckScenes are an important resource for data-driven development. There are already numerous publicly available data sets for the passenger car sector. But not for the truck sector. With MAN TruckScenes, we are moving forward to fill this gap.”

While MAN has conducted autonomous trials in port environments, its recent on-road projects have focused on hub-to-hub logistics applications, with some local feeder routes also included. Since there are an infinite number of scenarios that could happen on the road, autonomous vehicle developers generally believe that working together and sharing information on anomalies can improve safety much faster than trying to test for every possible event.

Highway automation in action: MAN’s self-driving prototype undergoes trials to support next-generation freight networks



industry are huge, but the exciting thing is, from a fleet perspective, your OpEx cost per driven mile goes from £1.32 for a diesel vehicle today to 38p for an electric NUIC autonomous vehicle. That is game-changing, that changes the whole world in terms of fleet freight logistics.”

Echoing a similar sentiment, Arts added, “You need fewer vehicles to do the same amount of goods transport. There have been tests so far, which have concluded that the turnaround time is 25% shorter for relay logistics, and other cases show even larger figures. At times, you could use the opportunity to recharge the vehicle or even have an additional vehicle in the loop that is being recharged while the other is in use. You have a lower operating cost and a higher throughput. The criticality of success depends on the business case.”

Off road environments

Although off-road scenarios initially appear more challenging for autonomous trucks, environments such as ports,

quarries, or mines have far fewer variables than operating on public roads. At the Brønnøy Kalk quarry in Velfjord, Norway, Volvo Autonomous Solutions has supplied a truck which has clocked up more than 220,000km and moved one million tonnes of limestone. The vehicle has been working without a safety driver since 2023.

Kazmi said, “The confined segment is very much like a factory operating through repeatability and reliability. Because the confined area is limited, and the number of potential issues is limited compared to the infinite possibilities in an open road environment, we are selective about the type of backup and redundant systems we install on the vehicle. That’s how we bring this TCO model down for the customer, so that we make it the right fit for them.”

By removing the human element from the situation, Volvo Autonomous Solutions aims to collaborate with customers to enhance site safety, even in dynamic environments. A human is still



Part of the EU-funded MAGPIE initiative, this DAF truck demonstrates hands-free charging for future autonomous logistics

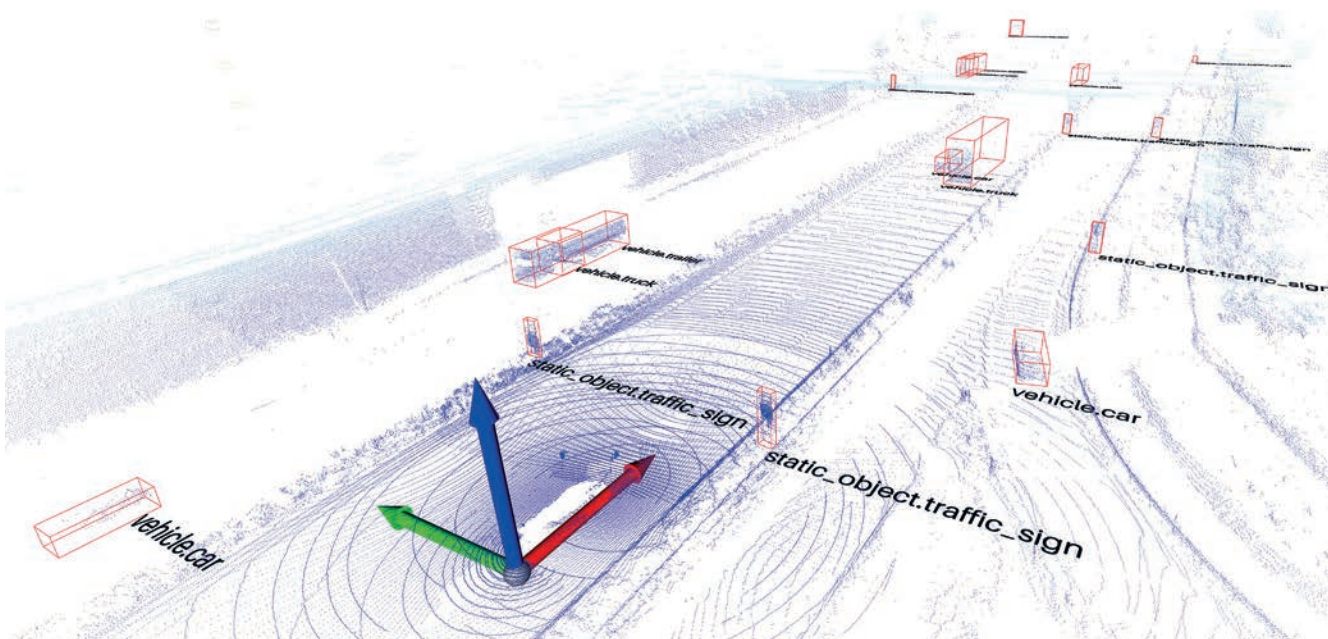
“The OpEx cost per driven mile goes from £1.32 for a diesel to 38p for an electric autonomous vehicle. That is game-changing.”

assigned to oversee the vehicle, but doesn't need to pilot it directly. Kazmi believes that autonomy will be a key enabler in bringing electrification into the off-road segment.

As part of the European MAGPIE project, DAF has been working with APM Terminals to trial automated trucks in port environments combined with robotic charging infrastructure. This

system enables the vehicle to charge independently, eliminating the need for an operator to attach the charging cable.

“The MAGPIE project is collaborative with 43 other partners because collaboration is essential; you cannot do this alone,” Arts said. “For the infrastructure, we don't want to have different requirements across the industry, so the project will come up with standards which can be put into place



ABOVE: Lidar-based perception: annotated scene from an autonomous HGV's training dataset, identifying trucks, cars, and road signage



ABOVE: Guus Arts of DAF Trucks in front of a MODI project vehicle, part of a pan-European push for autonomous freight innovation

► depending on the context of the intended use case. There are a lot of building blocks, but the question is how to put all those blocks together to make something useful out of them?"

DAF is also working within the MODI project, another European collaborative effort focusing on infrastructure requirements, logistic integration and building business models for automated freight logistics

USA vs European development

Despite good progress in Europe, manufacturers in the US are reaching



ABOVE: Built for America's interstate freight corridors, this Volvo driverless truck is part of real-world testing across Texas and beyond

real-world demonstrations far sooner. Arts explained: "Europe is ahead with the thinking, but not with the doing." Part of this is due to differing legislation, with the US adopting a test-then-prove approach in contrast to Europe's prove-then-test philosophy.

Detailing the key differences in testing so far, Boxwell said: "The trials in Europe have been around platooning, so you have a driven truck and it's

followed by some autonomous lorries going down the motorway, effectively creating a road train. We've tried platooning in the UK, and it doesn't work because we don't tend to have enough freight going from the exact start location to the same end location to make it worthwhile.

"In the States, they are using autonomous trucks for long-distance journeys. If you've got a route starting

Where Does the Driver Fit In a Driverless Future?

As the freight industry embraces the potential of autonomous HGVs, one uncomfortable question remains: what will happen to the drivers?

The driver shortage is often cited as a main reason for automation, but the reality is more complicated. Tens of thousands of UK drivers earn their living from long-distance routes—which are the very paths targeted for early autonomous vehicles. While proponents argue that new roles will develop in control centres and vehicle oversight, the potential for displacement could be substantial.

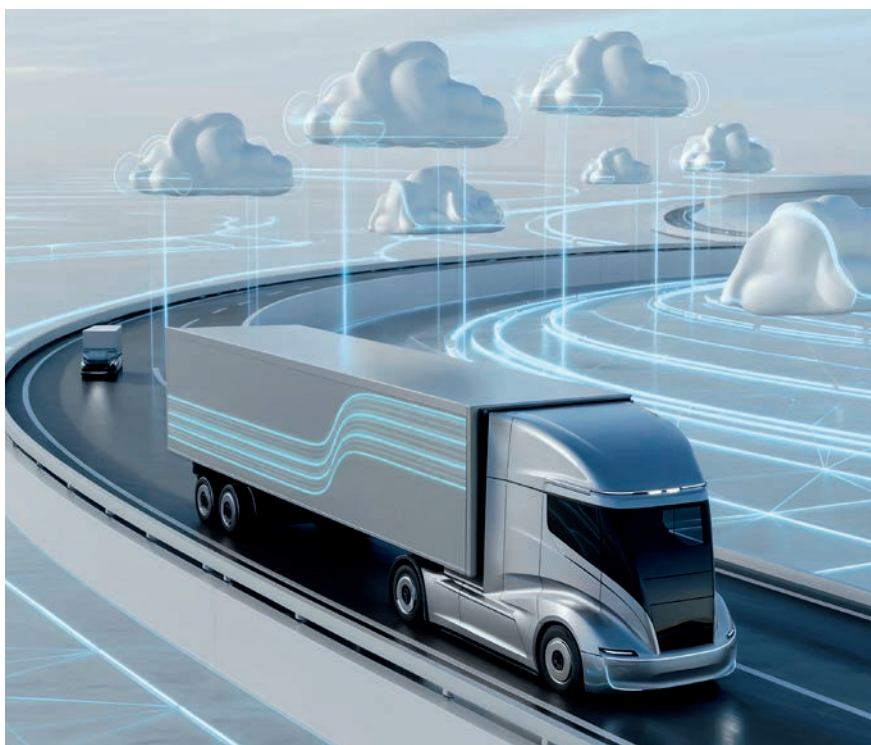
Furthermore, it's not just about employment—it's about identity. Driving isn't merely a task; for many, it's a profession rooted in independence, skill, and routine. Replacing that with remote supervision or automated scheduling prompts questions regarding job satisfaction, training, and long-term

career development.

There's also the danger of excluding those lacking the digital skills or adaptability to make the transition. Autonomous vehicle advocates highlight efficiency improvements and cost reductions, but these come with a social cost that has not yet been fully addressed.

The industry must get ahead of this. That involves retraining programmes, meaningful consultation with unions, and a national strategy for workforce transition. Otherwise, the move towards autonomy risks alienating the very individuals who have kept freight moving through pandemics, fuel crises, and Brexit backlogs.

As a seasoned driver recently remarked: "The robots might be arriving, but we're still the ones who know the roads."



“You haven’t got the cab so that you can put more stuff in the vehicle... potentially another 10 to 15 cubic metres.”

in California and going through to Texas, for instance, a driver will drive it out to the interstate, they’ll get out of the vehicle, and the truck will run all the way to Texas. There will be another

driver at the other end to pick it up and drive it into town.”

The US offers a unique combination of factors that make it an ideal testbed for autonomous trucking. “America is like a

Venn diagram with three sides overlapping to give the ideal first step,” Kazmi explained. “The first is the legislative environment, which opens up for these kinds of applications. That is overlaid with heavy logistical routes, which are optimised for the introduction of this technology and build good value for both the customer and the business case.

“The third factor is the environment, it’s a very flat surface where we’re starting from in Texas. It’s a sunbelt, so the operational design domain is very structured and clear. Once you overlay these three principles, the US becomes a prime position to launch and prove the value of this business case. I see opportunities coming in other parts of the world as well, but that’s why most of our competition, or even partners, all focus on the US, because the Venn diagram aligns and gives us that opportunity to prove.”

Considering the potential for autonomous trucks in the future, Arts suggests that we should consider them as a new modality of vehicle. “Next to conventional trucks, you might also have the automated truck for certain applications. It’s like having a TV and a tablet at the same time; they serve different purposes, and you didn’t throw away your TV when you bought a tablet. They do two different things but with a similar reason: moving goods from A to B.” **T**

Mining with autonomy: Volvo’s self-driving truck navigates a quarry tunnel in Norway as part of real-world freight operations

