magazine Logistics

TECHNOLOGY AND AUTONOMY

A LOGISTICS MAGAZINE SUPPLEMENT

A SELF-DRIVING FUTURE?
★ *UK government paves the way for autonomous vehicles by 2025*

AUTONOMOUS TRUCKS
★ *Logistics UK's engineering policy lead explains different levels of automation*

CREWLESS SHIPPING
★ *World's first autonomous electric container ship*

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Autumn **2022**

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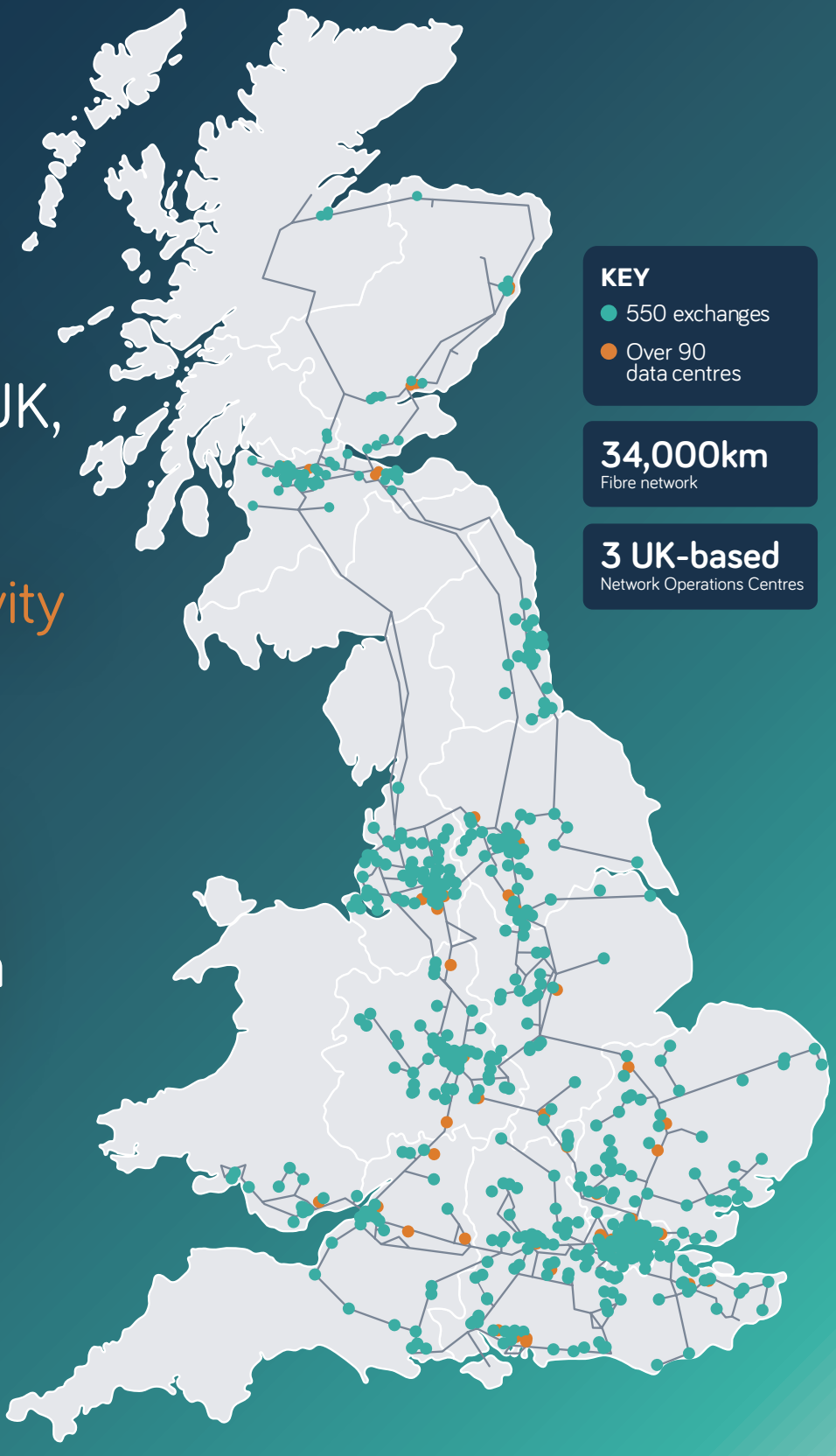

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TECHNOLOGY AND AUTONOMY

David Wells OBE

Chief Executive, Logistics UK

Welcome

Logistics is fast evolving, and all the indicators are that the industry will be comprehensively transformed within a generation.

Technology and innovation are playing a growing role in that evolution.

Key trends are accelerating this pace of change. Decarbonisation is one of the most pressing challenges facing the sector, and the need to transition away from fossil fuels at pace has led the transport industry to embrace new forms of alternative fuel technology, from battery electric vans to hydrogen-powered buses.

In the warehousing space, greater efficiencies have been realised using robotics and automated storage and retrieval systems, while AI is increasingly used for shipment scheduling and tracking.

But it is arguably the prospect of automating previously manned vehicles that could deliver the sector's biggest transformation. Within our lifetimes it is highly likely that we will see driverless trucks traversing our motorway network, pilotless freight planes taking to our skies and crewless container ships sailing across our oceans.

While the trend towards greater automation raises a host of questions about the workforce that the industry will require in the future, the direction of travel is clear. A report by McKinsey Global Institute in 2020 found that the transportation and warehouse industry possessed the third highest automation potential of any sector, and identified over 50 technologies that could further automate some part of the supply chain.

So autonomous vehicles, advanced robotics, big data and AI are here to stay, and the role they will play in our industry will only grow.

This supplement explores developments on the near and far horizon and seeks to determine whether automation will become a gamechanger for the logistics sector.

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Joanne Green

Sales Director, Public Sector and Transport

At Neos Networks we believe in making complex connectivity challenges simple. We bring together the unparalleled expertise of dedicated teams with innovation and technical excellence to provide transport and logistics businesses, government organisations and our partners with a better network experience to power the UK's digital future.

We regularly talk to leaders in the transport sector about the challenges they face when it comes to decarbonisation. Smart tech, AI and real-time data are already being introduced by many to enable them to become more efficient. These are all important first steps on the road to achieving net zero.

The government has also recognised that greater use of AI and data tools are key to cutting freight emissions. We've seen that introducing new tools and systems is more successful when connectivity requirements are properly understood and budgeted for. Integrating smart technology and AI systems into operations is no different and requires sufficient investment and upfront planning for it to work.

★ ***https://neosnetworks.com/***

Innovation Working Group needs your input

Are you interested in shaping the future of technological innovations to meet the needs of the logistics industry?

If so, Logistics UK would like to invite you to attend its Innovation Working Group to look at connected and autonomous vehicles.

TESTBED FOR NEW IDEAS AND INSIGHTS

As connected and autonomous vehicle (CAV) trials progress, the government and other stakeholders in this area are looking for an industry focal point to test propositions and listen to what operators have to say about the potential challenges and opportunities ahead of wider consultations.

Set up in March 2021, the Innovation Working Group looks at progressing common themes which will benefit the whole industry, rather than focusing on specific commercial applications.

GROWING INTEREST IN CAV TECHNOLOGY

There is a growing interest in the application of CAV technology in logistics by government and developers. This is primarily for technical reasons, as the contained environment of logistics, the prevalence of repeatable routes, the acceptability of slower speeds for some types of movements and the lesser impact of damage, all lend themselves to the transport of goods. Government believes that autonomy has the potential to deliver safety, environmental and productivity benefits for the logistics sector too.

LED BY BUSINESS, ENABLED BY TECH

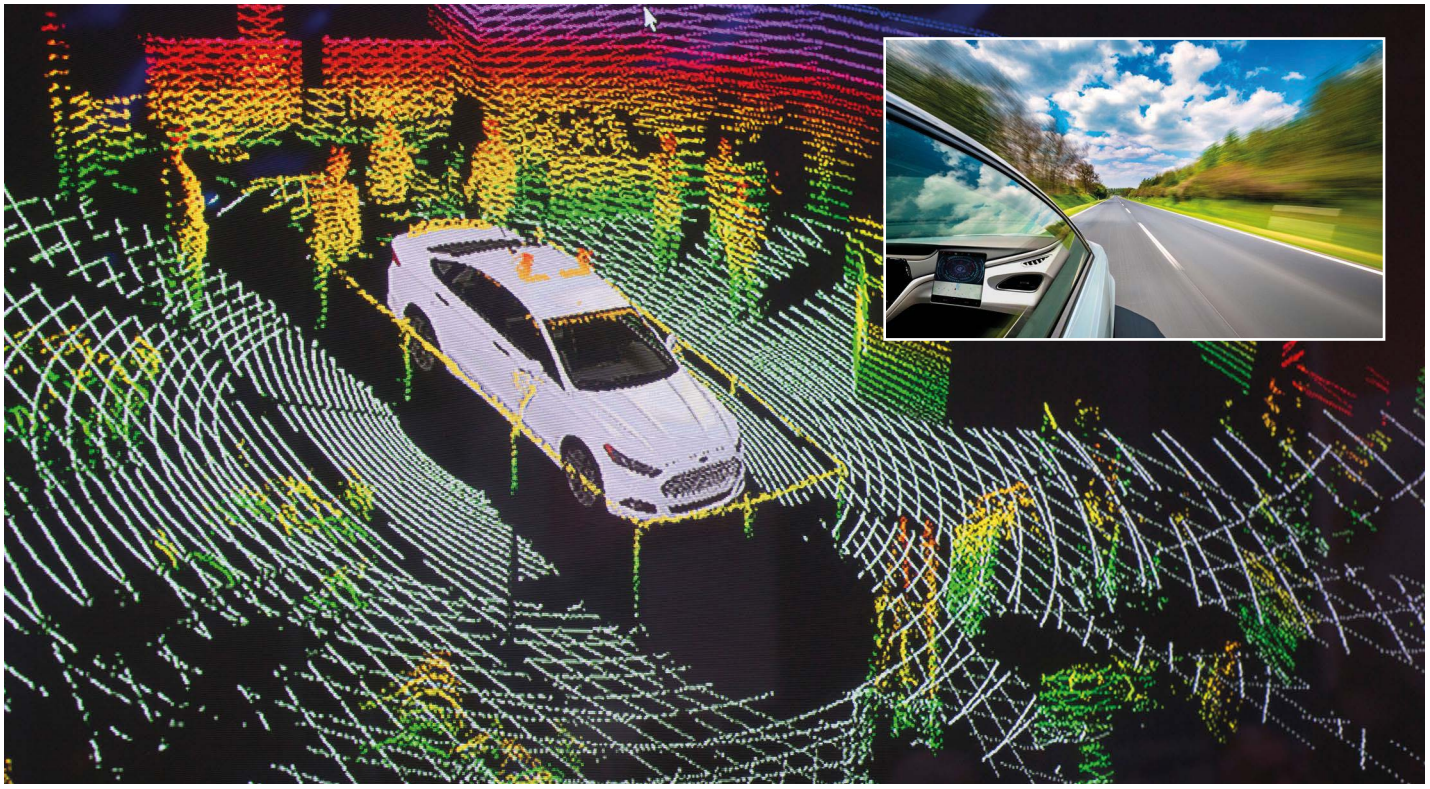
As a commercial industry operating on often low margins, investment in CAV technology in logistics needs to be business case led rather than technology led. The working group will identify the problems CAV could help the logistics industry solve, explore the most compelling cases for the technology to be used in the sector. It will also assess what government support is needed to allow commercially viable CAV solutions to be developed, from research and development to regulatory support for trialling and development.

INFORMED BY EXPERTS

The focus of the meetings, which take place three times a year, is on developing a common understanding in the group of the CAV landscape to date, an initial review of business cases, the types of trials in logistics abroad and what might be feasible in the UK. ■

FOR MORE INFORMATION

★ ***www.logistics.org.uk/innovationwg***



FEATURE

A self-driving future?

Michelle Gardner

Deputy Director – Public Policy, Logistics UK

Autonomous vehicles, more commonly known as self-driving, no longer live in the world of science fiction but are rapidly being developed and trialled, with the UK government carving a path for them to be deployed on our roads by 2025. Connected and automated commercial vehicles could drastically change the logistics industry by driving safety, environmental and efficiency gains. In this article, Logistics UK explores what this really means for its members and its engagement with policy makers to date.

GOVERNMENT'S VISION OF FUTURE MOBILITY

In August 2022, the government announced a further £20 million of funding to "help kick-start commercial self-driving services". Projects that win funding could be those that can deliver groceries to customers in self-driving vehicles, or shuttle pods assisting passengers when moving through airports. This funding was announced alongside the publication of *Connected & Automated Mobility 2025*, which outlines the government's approach to supporting the safe deployment of self-driving vehicles and commits to a new legislative framework.

Government describes its vision for connected and automated mobility by 2025 as "deployments of self-driving vehicles, improving ways in which people and goods are moved around the nation and creating an early commercial market for the technologies." For logistics specifically, the document notes that connected and automated mobility (CAM) could help to "improve the resilience of the supply chain and the reliability and cost efficiency of the freight and logistics sector."

THE IMPORTANCE OF CAM FOR LOGISTICS

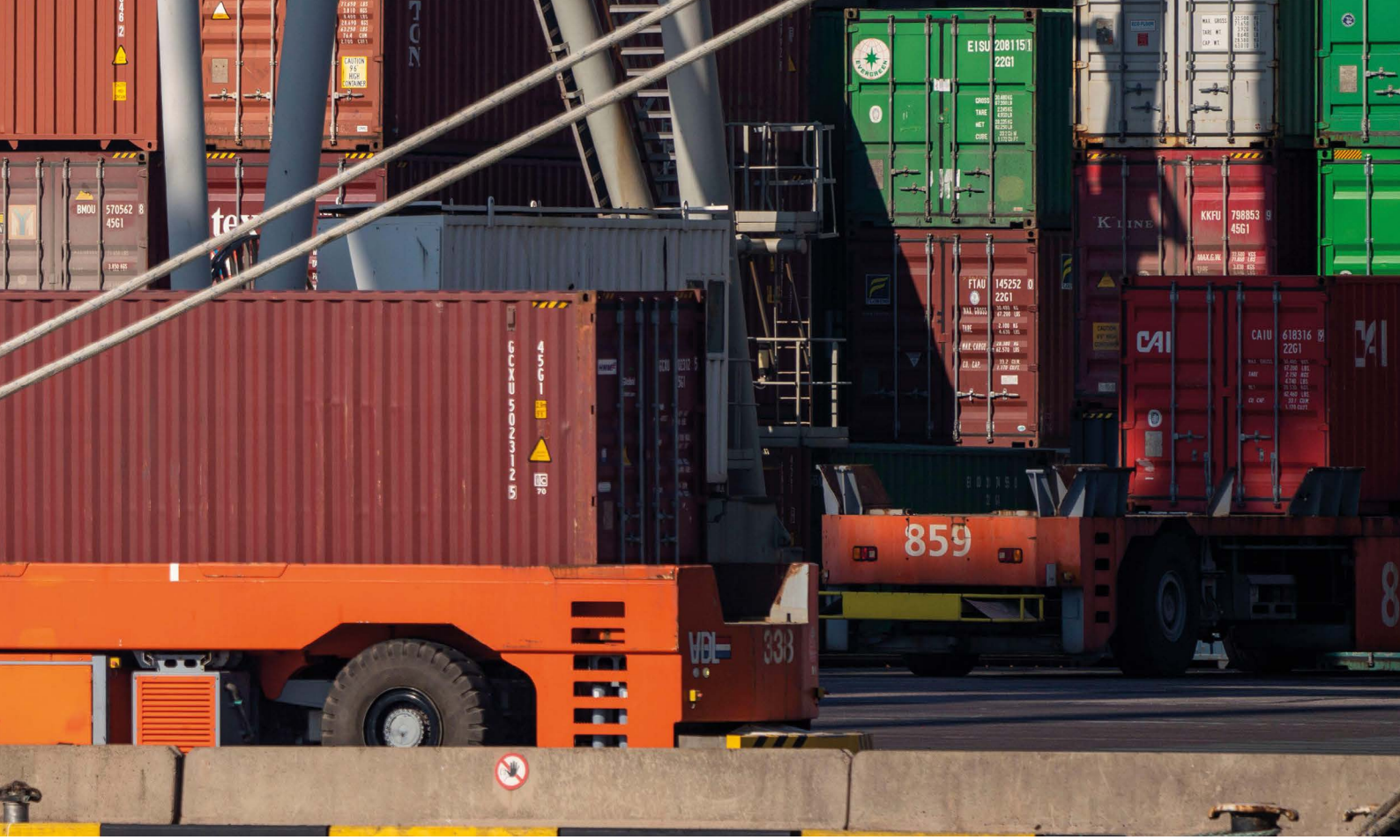
Logistics UK is pleased the benefits these technologies could bring to the logistics industry are being focussed on by government and stakeholders. The world of innovation is something Logistics UK has now worked on for many years, with our Innovation Working Group set up in 2021 to explore in more depth which connected and automated technologies offered the most potential to the sector.

Importantly, our members will be buyers of connected and automated technologies, so our focus has been on highlighting the need for the development of the right technologies that can support logistics operations to become more flexible and resilient, optimising efficiency and helping logistics become recognised for its value, with minimal impact on the natural and built environment.

Through our discussions with members on connected and automated technologies, vehicle automation was identified as of most significant interest owing to the benefits that could be delivered: each degree of vehicle autonomy could offer a range of benefits for the logistics industry, which would increase and develop over time. These could include drivers being able to rest while a vehicle is in movement rather than stopping, reduced congestion and more efficient operations owing to fewer delays.

WIDER BENEFITS FOR SOCIETY

While there are clear potential benefits for industry, the Innovation Working Group explored the wider benefits for society that could result from investment in autonomous commercial vehicles. These include safer roads resulting in fewer people killed or seriously injured, reduced return journeys to accommodate driver rest periods, meaning less road damage and less congestion, reducing emissions and improving air quality.



USE CASES FOR COMMERCIAL VEHICLES

During our discussions with members, we explored possible use cases for autonomous commercial vehicles to understand how they could be trialled and deployed to maximum benefit. Some of the use cases identified were:

- Vehicles used for trunking or between distribution centres as longer journeys could provide optimum efficiency, with driver breaks not needed and other stops being at a minimum.
- Vehicles used for local and city deliveries as with more vulnerable road users in these localities, the high level of technological developments used in autonomous vehicles would aid detection and accident prevention for those other road users.
- Vehicles used in quarries as with geo-fencing in place, fully autonomous vehicle movements could eliminate the need for drivers, resulting in 24/7 operations.

It is important to note, while the job of a driver could be removed for some commercial vehicle types and use cases, for others the role of driver may change to being operatives employed in other activities related to the vehicle. This may particularly be the case for members involved in home deliveries, owing to the customer service this offers.

BARRIERS TO DEPLOYMENT

Logistics UK welcomes the government's forward thinking around the regulatory environment to support connected and automated technology, which should help support its development and adoption in the UK. The work of Zenzic and the UK testbeds is also helping to support innovation, testing and the development of connected and automated mobility.

However, the deployment of connected and automated technologies in logistics will be dependent on there being clear business cases that could be agreed at board level, to make the case for business investment. As connected and automated technologies are still developing, there may not be a strong enough case yet for this investment. Or these technologies could develop in ways which do not yield strong returns for businesses if they are not focussed on solving problems by helping them to become more efficient, while reducing costs.

The cost of new technologies was also flagged as a concern by members. Logistics operates on low margins, and this could be a barrier to investment and adoption. Large businesses will be able to invest earlier, and this can be of benefit to the wider industry as technology develops and lowers in cost as it becomes more widespread. Logistics UK has, therefore, been calling for government support to be aimed at helping early adopters to speed up the mass-market adoption of new technologies.

Logistics UK has also been highlighting land space and planning, as these issues already present a barrier for logistics businesses, particularly in urban areas. This may increase if connected and automated technologies demand land space, so planning regulations must be looked at by government to help overcome this challenge.

WHERE NEXT?

Logistics is a commercial industry and, though we accept the many benefits that autonomous vehicles can bring, we remain committed to ensuring that investment in it – as with any technology – be business-case led rather than technology led. We look forward to continuing to work with members of the Innovation Working Group, and with government and wider stakeholders as things move apace. ■

FOR MORE INFORMATION

★ ***www.logistics.org.uk/innovationwg***

FEATURE

Autonomous trucks – a future without drivers' hours?

Are you imagining a world where you can run your trucks on our road network 24/7/365 (apart from when it needs a safety inspection, service or repair)? Is this likely to be in the next few years? No, but running them off road, now that future is already with us, and is likely to be the proving ground upon which we will see trucks taking their place on an autonomous road network.

Phil Lloyd
Head of Engineering Policy, Logistics UK

Having fully autonomous vehicles (known as Level 5) running on our roads and operating like a 'normal' vehicle, is still many years away. Most experts appear to be suggesting that this will be somewhere between 2025-30 and then only if:

- They can get the technology operating effectively and safely;
- We have the road network infrastructure in place.
- The public's perception of autonomous vehicles is seen as one that is both safe and beneficial.

In the UK, all the development for autonomous vehicles is being concentrated on passenger carrying vehicles, with the focus being on improved mobility and economic benefits. However, perhaps the greater economic benefit would come from the haulage sector. With driver wages being a substantial cost to the industry and the limitations of a vehicle's use, in the main, being dictated by the number of hours it can be driven, then the opportunity which autonomous trucks would offer to the haulage sector, by reducing costs and increasing effective operation time, would be substantial.

In terms of getting a return on investment, then in numbers alone, passenger vehicles will always out-class trucks and as such we are likely to see autonomous passenger vehicles (buses, taxis and cars) in use quicker than trucks. We believe that the implementation of autonomous vehicles is likely to come in three tranches.

TRANCHE 1 – PASSENGER CARRYING VEHICLES

There are already a number of trials underway to test the concept, trial the technology and to understand the issues:

1 **Milton Keynes** – trialling the use of autonomous pods as an alternative mode of transport.
2 **Edinburgh to Fife** – Stagecoach has five autonomous single decker buses travelling across the Forth Road Bridge.
3 **Greenwich, London** – Addison Lee and Oxbotica will run 10 Ford Mondeo vehicles running on Level 4 autonomy.
4 **Stratford, London** – DRIVEN has conducted autonomous driving around the Elizabeth Olympic Park.

TRANCHE 2 – CARS

Autonomous cars are more likely to operate on a car share or even a 'pay as you go' basis than be personally owned, it is suggested, and personal ownership of vehicles may become a thing of the past. As to what they will look like, well that

FIVE LEVELS OF VEHICLE AUTONOMY

LEVEL	CONTROL
0	**No automation** – Driver is in complete control at all times.
1	**Driver assistance** – Vehicle can assist or take control of the speed (cruise control) or lane position (lane guidance).
2	**Occasional self-driving** – Vehicle can take control of speed and lane position in some circumstances (eg limited-access motorways).
3	**Limited self-driving** – Vehicle in full control in some circumstances, monitors road/traffic. Informs driver when they should take control.
4	**Full self-driving – conditional** – Vehicle in full control under certain conditions (eg urban ride-sharing).
5	**Full self-driving – ALL conditions** – Vehicle operates with no human intervention.

will be at the designer's behest, but will probably be based on getting a balance between the competing factors below.

- Functionality (what it will be used for).
- Propulsion (the product that provides the best balance between emission levels, cost, product availability and the range it provides – electric/hydrogen).
- Price (what the consumer will be prepared to pay).

So perhaps your future autonomous vehicle will look similar to these, or more probably, something in between.

TRANCHE 3 – TRUCKS

As autonomous vehicle technology and its use, in the main, is transferable, we expect to see the uptake of autonomy in trucks to lag behind that of passenger vehicles on our roads, although we think the delay could be short. The main issues to overcome will be the characteristics and issues associated with towing trailers – accounting for the trailer's length and its characteristics when turning/reversing.

Where autonomous truck usage is more likely to be more quickly forthcoming is in its off-road function. Volvo is already trialling its 'Vera' autonomous and electric trucks at a port terminal in Gothenburg, Sweden and Scania has just started trialling its new AXL autonomous 8x4 tipper in mining environments. So development is happening, but the environment within which these autonomous vehicles are operating is somewhat more contained, simplistic and less risky than that of a public highway. But this should not detract from the benefits these vehicles could bring, even in these environments. Being able to operate a mine 24/7/356 with minimal staff will provide huge savings and the development of this technology, undertaken in far safer environments, will undoubtably have elements of reusability for truck use on highways.

AUTONOMOUS VEHICLE IMPLEMENTATION

Although there is a great desire to bring these vehicles to the market as early as possible, we think there is still a way to go before we're likely to see fully autonomous vehicles being let loose on our roads. Some of the main areas of concern are listed below.

SYSTEM FUNCTIONALITY, WITH SAFETY AS THE DEFAULT

Today's modern vehicles have a huge amount of technology embedded in them, with their functionality assisting drivers either fully-autonomous (engine control/emissions systems), semi-autonomous (Lane Departure and Assistance), or via assistance-warning (parking sensors). Although many of these functions are designed to aid driver/passenger comfort, the vast majority are focused on safety. With these systems becoming ever more complex, there can be a tendency for drivers to become more reliant upon those systems for safe driving, which in turn will necessitate those systems to be robust, and to operate with ever greater levels of fail-safe functionality. No system is infallible, so it is important that drivers heed warning signs, buzzers, etc and that those systems are regularly checked to ensure they are functioning correctly.

For HGV and PSV, the operator licensing scheme mandates that all vehicles operated have to have regular safety inspections, but guidance for the levels of such inspections (as laid out in DVSA's *Guide to maintaining roadworthiness*) suggests that it is those same items as are in the MOT test – which do not currently include ADAS (Advanced Driver Assistance Systems). So, if drivers become more reliant upon ADAS systems, but these systems are not checked for correct functionality, then this would be an area of concern. Having technology that has safety as its default is great, but if those systems are not maintained, then this could be an area of false comfort for HGV or PSV operators.

Fully autonomous vehicles will be required to be even more complex as these will be responsible for controlling all vehicle manoeuvres, in all environments and in all weather conditions, complying with road restrictions and having to take into account other influencing factors of potential dangers/obstacles. Scoping out all such scenarios and developing systems and programmes to take all these into account is a challenge that is currently being addressed. If autonomous vehicles are to gain both consumer and user confidence, then this will be a key area for the adoption of fully autonomous vehicles operating on our road network.

RADAR & LIDAR

To operate a vehicle safely, an autonomous vehicle will need to see what is going on around it. The visual perspective for autonomous vehicles is currently being developed around the use of Radar and LiDAR systems, which are able to digitally see around the vehicle in order to ensure that consideration is given to the environment within which it is operating. Ensuring that these systems are able to do this in all conditions, is one of the challenges that is being worked on and this will be imperative for autonomous vehicles to operate safely.

INTELLIGENT CONNECTIVITY V2V (VEHICLE TO VEHICLE), V2X (VEHICLE TO INFRASTRUCTURE)

In addition to seeing around the vehicle it will be important for improved road safety that these vehicles understand what others are/will be doing around them, so connectivity to others will be an extremely important part of their operation. Understanding if the vehicle in front is going to stop, or if an oncoming vehicle is potentially drifting on to your side of the road, are important factors to staying safe. Equally, letting others know the intention of your vehicle's movements, is also valid. V2V is seen as important, as information can be passed on from one vehicle to another, helping prevent potential incidents (warning others of potential dangers), and congestion (passing on traffic flow). Additionally, it will be important for autonomous vehicles to be connected with the infrastructure (V2X) around it, so the vehicle is able to comply with traffic lights and variable speed limits.

DATA CAPTURE, PROCESSING AND STORAGE

Just connecting vehicles digitally will come with its own challenges, but with the huge amount of data needed to flow to/from and within each vehicle, and doing so quickly, safely and efficiently will be an even bigger challenge. Data protection and criminal interference (hacking) is yet another area of great concern and a lot of work is ongoing to identify what needs to be in place to keep access to/from each vehicle safe and prevent unintentional entry (via connections of other devices). This is one of the main areas of concern and not one that will be solved quickly – and even once achieved, keeping it that way will always be a challenge.

THE FUTURE OF OUR ROADS?

Arguably the biggest challenge to implementing autonomous vehicles onto our roads safely will be their interaction with human drivers. Humans can be unpredictable, so where an autonomous vehicle will be programmed with logic in mind, their ability to predict unpredictable human behaviours may be a challenge. Additionally, current autonomous vehicles are reliant, to some degree, upon clear road marking and signage and this provision is not always evident across the network.

To ensure that autonomous vehicles are introduced safely onto our roads, we believe there needs to be two sets of provisions put in place, one for urban use and another for use of the strategic road network (motorways/main A roads).

Urban use requires:

- Clearly defined road markings/signs – to ensure vehicles understand the conditions and limitations.
- Priority lanes (akin to bus lanes) – to minimise their interaction with human controlled vehicles and allow others to identify them.
- Clearly identifiable vehicles – to manage their introduction to society, it may be necessary for them to be clearly identifiable.
- Specified parking bays/areas – in order for these vehicles to add value (reducing congestion and total vehicles in use), they will need to be able to drop passengers/goods off at a chosen location and move to a safe area whilst awaiting their next task.

Strategic road network use requires:

- Clearly defined road markings/signs – as above.
- Autonomous lanes which autonomous vehicles must use but can also be used by others – this will minimise the total upfront investment of the network. These lanes would increase in line with the uptake in autonomy.

Are we likely to see autonomous trucks on our roads any time soon? Unlikely, though you will find more autonomous technology in any new trucks you buy. Although these vehicles will have the capability for some degree of Level 2/3 driving (eg adaptive lane departure systems and adaptive/predictive cruise control), do you want to operate them this way? And if you do, are you prepared for the consequences should they go wrong? ■

FOR MORE INFORMATION

★ *www.logistics.org.uk/innovationwg*

Four ways core connectivity delivers competitive advantage for logistics companies

Technology plays a key role in how businesses in the logistics sector operate and succeed. With customer expectations continuously evolving and adapting to new ways of working, logistics companies need to have a robust digital transformation programme in place to embrace better ways to make smart supply chain decisions, in order to meet their customers' needs and to gain competitive advantage.

Amelia Streeter-Smith
Account Director, Transport, Neos Networks

When developing digital transformation plans, the capacity, quality and management of networks used by organisations is extremely important. Core connectivity and budgeting must be considered at the very start of their digital transformation programme planning. With a robust network, logistics companies can:

- **Integrate multiple platforms for communication methods to meet customer demands**

  Email, LiveChat and other communication forms are an expectation for customers and consumers. Companies need a high bandwidth infrastructure capable of supporting these types of applications.

- **Reduce cost through technology use**

  Applications, software and industry programmes enable consolidation of supply chain, enabling management, monitoring and tracking information. They can reduce risk of errors as well as increase efficiency and quality control. Infrastructure that supports an 'always on' network is critical for these types of applications. By investing in core connectivity, companies will acquire the capacity to collect and process the real-time data needed for smart technology and the integrated tech of the future. Both smart tech and findings from data will contribute to increased efficiency and decarbonisation.

- **Remove geographical boundaries**

  Historically, geography has been a major factor in logistics and supply chain. These boundaries are reducing with the use of technology, allowing instant communications with suppliers and customers and ensuring greater visibility and transparency of goods and services in transit.

- **Enhance security**

  Data security is key to businesses. There is an ever-increasing amount of data being share, stored and used for making key strategy decisions. This demand is set to increase as logistics companies strive to improve the efficiency, reliability, resilience and environmental sustainability in the sector. Core connectivity underpins and enables the secure movement of data by all parties, without compromising the speed and efficiencies of business practices.

  As outlined in our survey *Core connectivity: The key enabler of digital transformation eBook*, under-resourcing connectivity and networking is linked with less successful digital transformation projects. Conversely, organisations that budget for connectivity properly are much more likely to deliver highly successful digital transformation programmes.

FOR MORE INFORMATION...
★ *https://neosnetworks.com/*

Starship and Co-op roll out delivery robots to Bedford and Kempston

A fleet of grocery delivery robots headed to local neighbourhoods in Bedford in July thanks to an exciting pilot project between Bedford Borough Council and Starship Technologies, the world's leading provider of autonomous delivery services, in partnership with the Co-op.

The collaboration has seen up to 45,000 residents across 20,000 households in Bedford benefit from quick deliveries of products selected fresh from three local Co-op stores in Goldington, Queens Drive and Kempston, with customers receiving groceries to their doorsteps via a fleet of Starship's autonomous robots.

The project follows the success of Starship's operations in six countries around the world, including same-day grocery deliveries with Co-op in communities across Milton Keynes, Northampton and Cambridgeshire.

FOUR MILLION ROBOT MILES

Starship was created by the co-founders of Skype in 2014. Since launching commercial deliveries in 2018, Starship's robots have travelled more than 4 million miles and safely completed more than 3.5 million deliveries. Around the world, the robots make 140,000 road crossings every day, equivalent to three road crossings every second.

Mayor of Bedford Borough Dave Hodgson, said: "I'm delighted that the council and Starship are working together with Co-op for innovative solutions to grocery delivery – it is exciting to see the robots on our streets. It has the potential to make life easier for thousands of residents across Bedford and Kempston while also reducing congestion. Hopefully the trial will be a success, which would allow us to extend the benefits of quick and easy deliveries to more people across the Borough."

BRINGING AUTONOMOUS DELIVERY TO BEDFORD

Andrew Curtis, UK Operations Manager at Starship Technologies, said: "We are extremely excited to be bringing the Starship service to Bedford and Kempston, offering the benefits of on-demand, autonomous grocery delivery to local residents. Our robots have been very well received and integrated seamlessly as part of local communities across Milton Keynes, Northampton and Cambourne, and we are confident they will be similarly welcomed in Bedford and Kempston. We are thrilled to be working with Bedford Borough Council and Co-op on this and look forward to further collaboration in the near future to roll the service out further."

Chris Conway, eCommerce Director, Co-op, said: "Co-op is committed to exploring new and innovative ways to serve our members and customers, they lead busy lives and so ease, speed and convenience is at the heart of our approach. As a convenience retailer, the ability to come into stores will always be important to customers, but we also know that shoppers want flexible and convenient options online, and so we are focused on providing what our customers want and need, however and wherever they choose to shop with us."

LOW ENERGY, ZERO CARBON

Starship's robots are powered by zero carbon electricity, with an average delivery for a Starship robot consuming as little energy as boiling a kettle to make just one cup of tea. Orders are made through the Starship food delivery app, which is available for download on iOS and Android, with groceries picked fresh in local Co-op stores and delivered quickly and conveniently in as little as one hour or less.

Bedford and Kempston residents will be able to choose from a range of grocery items, schedule their delivery, then drop a pin where they want their delivery to be sent. They can watch in real-time via an interactive map as the robot makes its journey to them. Once the robot arrives they receive an alert and can meet and unlock it through the app.

The robots are lightweight and travel at the speed of a pedestrian (no faster than 4mph). They use a combination of sensors, artificial intelligence and machine learning to travel on pavements and navigate around any obstacles, while computer vision-based navigation helps them map their environment to the nearest inch. ■

FOR MORE INFORMATION
★ *starship.xyz*

The world's first autonomous electric container ship

Last November, the world's first electric and self-propelled container ship – Yara Birkeland – departed for its maiden voyage in the Oslo fjord in Norway. What is so remarkable about this ship is not just that it does not emit any carbon, but also the fact that it has the capacity to be completely crewless.

The ship's record on emissions is impressive in its own right, with Svein Tore Holsether, the CEO of its owner, global crop company Yara, claiming that it will cut 1,000 tonnes of CO_2 and replace 40,000 trips by diesel-powered trucks a year. The electric ship will be used to transport fertiliser from Yara's factory at Herøya to ports at Breivik and Larvik.

But what really sets this ship apart is that it does not require a single crew member to operate it. Stretching 80 metres, with a deadweight of approximately 3,200 tonnes, Yara Birkeland contains sensors and computers that will allow it to operate autonomously or via remote control.

The ship is powered by battery technology – provided by Swiss Lithium-ion cells and energy storage solutions company, LeClanche – providing the ship with a capacity close to 7MWh. Its situational awareness, meanwhile, comes from sensor technology – a combination of radar, infrared cameras and automotive integrated solutions cameras which give the ship the ability to discover obstacles in its path and avoid them. The ship even has automatic mooring arms so that it can dock and moor at quays without human assistance.

Cloud solutions provide the remote operation centre on the shore with data from the voyage. Although this technology will allow the vessel to be controlled remotely from the shore, the system has been designed so that the vessel is able to carry out the voyage itself without human intervention. A takeover by remote control will only happen if an event requiring human input occurs.

BENEFITS OF AUTONOMY

The absence of crew on board an autonomous ship creates more space for cargo on deck as well as reduced staffing costs, although some people will still be needed to staff the remote control centre.

There is also the promise that as the algorithms are refined, autonomous shipping has the potential to improve safety for the overall voyage as most maritime accidents can be attributed to human error or fatigue. Plus, as no crew are present on board the autonomous vessels, they are not subjected to the usual dangers of being at sea.

CHALLENGES OF REMAINING CREWLESS

While it is generally held that autonomous ships lead to improved safety, there are also threats to safety in the form of cyberattacks. If an autonomous vessel fell victim to a cyberattack, its control could be taken over by the cyberattacker. Plus, as the technology is in its early stages of development, limited regulation means that these vessels are only capable of coastal and river routes, rather than ocean crossings.

Jostein Braaten, project lead of the Yara Birkeland, said that generally safety should improve aboard autonomous ships as crew members are not subjected to danger at sea and there will be fewer incidents attributed to fatigue or human error.

"For selected purposes, autonomy can clearly provide improved economy, safety, regularity, and efficiency – for example at harbour control," he said, "It can also improve the competitiveness for shipping compared to road transport in short-distance routes. Unmanned maritime operations can also be a great alternative to alleviate the situation with a shortage of truck drivers and congested cities. ■

Matt Harrington

Editor

FOR MORE INFORMATION

★ ***www.logistics.org.uk/water***

Four AI challenges businesses face in the supply chain

Technology has made significant advancements and has already solved many of the supply chain challenges affecting companies today. However, not all of the challenges have been addressed.

FOR MORE INFORMATION
★ *www.flowlity.com*

CHALLENGE 1

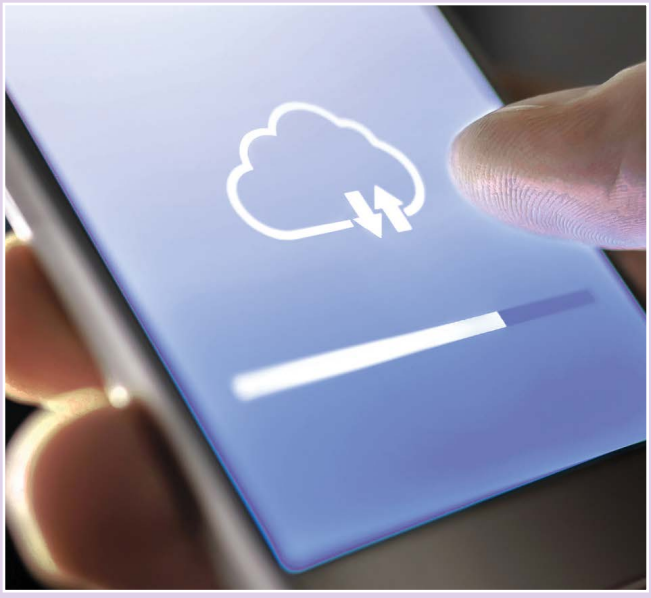
Data restrictions

AI requires large amounts of precise data in order to work effectively, but a lot of businesses lack this in terms of quality and quantity. In order to train algorithms and prediction models, machine learning needs excellent data.

Data constraints should be minimised before AI is introduced into the supply chain so that it is easily accessible and integrates as much 'real-time' data as possible into processes and systems.

Corporations need to improve the quality of their data by implementing good data management and integrating real-time data wherever possible into processes and systems. When a continuous syncing of data occurs, it means that digital business networks can maintain a "single version of the truth" and ensure that businesses operate on the most available information.

When the most current data can be accessed, meaningful analysis and actionable insights can occur.



CHALLENGE 2

Lack of trust in the technology

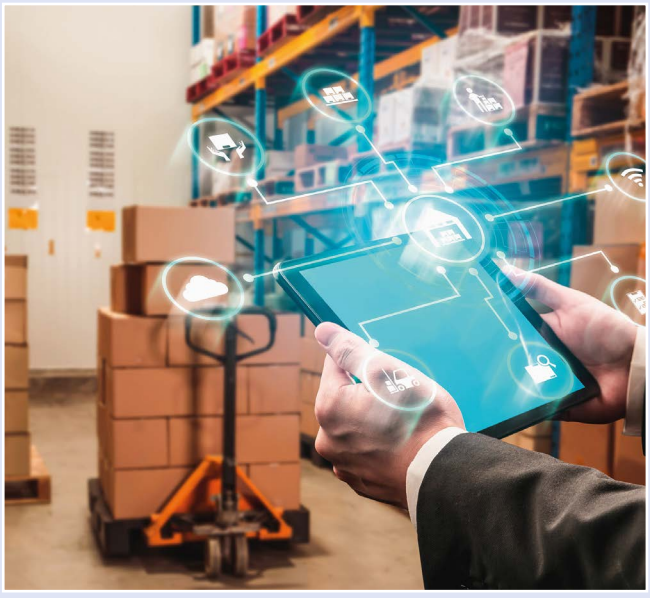
Artificial intelligence is still a relatively new technology which is still driving investment from innovators across the industry. However, it does mean that there are still hesitations from businesses and from people to use them.

Implementing new systems, such as in warehouses, can mean moving from real people with years of experience to a computer system that seemingly doesn't have the same skill set.

Humans are resistant to change but using AI systems across the supply chain can make significant improvements. They help improve and streamline planning processes and provide real cost and time-saving measures.

Combining data, algorithms and new processes with practised human expertise is complex and people often need to see it in practice to trust the abilities of AI. This is where a system like Flowlity can come in. It has been created by a team of experts in their field to create the best system possible.

Without this trust and the context of how AI can transform the supply chain, businesses won't adopt the technology.



Globalisation, trade sanctions, Brexit, an e-commerce revolution and finally a global pandemic are just some of the factors that are challenging an overcomplicated supply chain – especially for companies that might lack the resources of bigger corporations.

Developments in AI have assisted in the planning and development of operations across the supply chain. And if the pandemic has taught us one thing, it is the importance of forward planning and anticipating supply chain challenges. Artificial intelligence can be used to evaluate risk and identify any possible pressure points across the chain.

Supply chain management has become increasingly difficult in recent years, as the physical flows are becoming more interconnected as sophistication increases across product portfolios. And the increase in market volatility means more demand for agility and adaptability.

Below, Jean-Baptiste Clouard, CEO at Flowlity, shares four AI supply chain challenges businesses face and how they can tackle them. ■

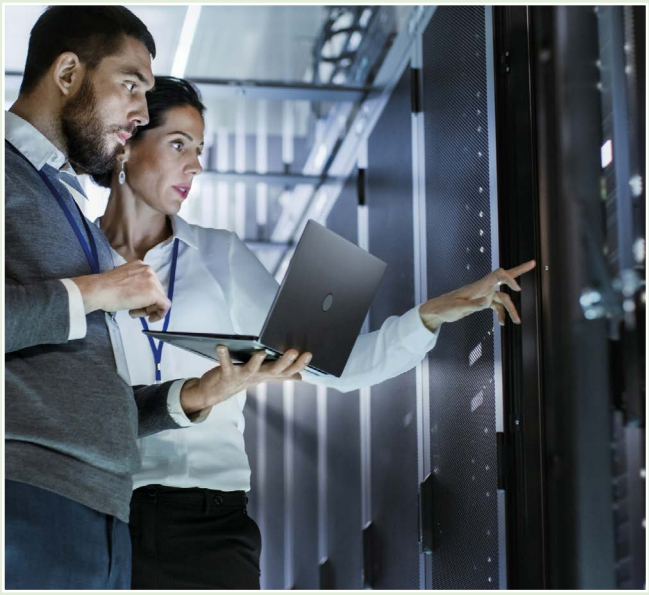
CHALLENGE 3

Technology constraints

As impressive as AI is, it still has some barriers and restrictions that it hasn't quite yet overcome in terms of the technology itself. In fast-moving production businesses, decisions need to be made within moments – which is where a solution that combines real-world factors/predictions can benefit businesses.

Cloud-based AI systems needs a large amount of bandwidth to power them. Businesses and operators might also need specialised hardware to access the AI capabilities and this can come with an associated cost.

Businesses need a solution where they can manage stock levels and procurement more efficiently so that it automates the planning and sends alerts to any potential issues.



CHALLENGE 4

Operational costs

The cost of introducing AI into supply chain processes can be a challenge most businesses face. The initial upfront cost in terms of investing and integrating the technology can be expensive, but so can the operating costs. But choosing a SAAS solution can be more cost-effective than developing in-house solutions. AI is designed to make human work easier – by automating manual tasks or supporting a better decision-making process.

AI machines have complicated processes that require regular maintenance and even replacement. That said, with the right solution that is correctly optimised, over time it will prove cost-effective and will save businesses money by optimising inventories, planning and forecasting.

A sustainable supply chain is not a new concept but is still evolving for retailers and manufacturers. By overcoming AI challenges, businesses can implement a cost-effective solution that will streamline the supply chain.

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