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The International Connected and Automated Mobility Landscape 2026

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United Kingdom

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Glossary /

Abbreviation	Definition
ACE	Automotive Centre of Excellence (Canada)
ADS	Automated Driving System
AI	Artificial Intelligence
ARTS	Automated Road Transport Systems
ASDE	Authorised Self-Driving Entity
ATLAS-L4	Automatisierter Transport zwischen Logistikzentren auf Schnellstraßen im Level 4 (Automated Transport between Logistics Centres on Expressways at Level 4)
AV	Autonomous/Automated Vehicle
AVA	Automated Vehicles Act
AViTOMS	Autonomous Vehicles Integrated Testing, Operations and Management System (Dubai)
CAM	Connected and Automated Mobility
CCAM	Commercialising CAM
CCAV	Centre for Connected and Autonomous Vehicles
C-ITS	Cooperative Intelligent Transport Systems

Abbreviation	Definition
DIVP	Driving Intelligence Validation Platform
DSSAD	Data Storage System for Automated Driving
HGV	Heavy Goods Vehicle
ICV	Intelligent Connected Vehicle
ITS	Intelligent Transport Systems
KAUST	King Abdullah University of Science and Technology (Kingdom of Saudi Arabia)
KIRA	KI-basierter Regelbetrieb autonomer On-Demand-Verkehre (AI-based regular operation of autonomous on-demand transport services)
NUICO	No-User-In-Charge Operator
ODD	Operational Design Domain
OEM	Original Equipment Manufacturer
OTA	Over-the-Air
SASO	Standards, Metrology and Quality Organization (Kingdom of Saudi Arabia)
SAVI	Smart and Autonomous Vehicles Industry

Abbreviation	Definition
SDV	Software-Defined Vehicle
SIP	Strategic Innovation Promotion Program
SME	Small and Medium Enterprise
TGA	Transport General Authority (Saudi Arabia)
UNECE	United Nations Economic Commission for Europe
V2I	Vehicle-to-Infrastructure
V2X	Vehicle-to-Everything
VC	Venture Capital
VRC	Vehicle-Road-Cloud
VRCI	Vehicle-Road-Cloud Integration
VVA	Verification, Validation, and Assurance
VVM	Verification and Validation Methods

SAE six levels of vehicle autonomy

Level 0
No automation

The driver is in complete control of the vehicle at all times.

Level 1
Driver assistance

The vehicle can assist the driver or take control of either the vehicle's speed, through cruise control, or its lane position, through lane guidance.

Level 2
Occasional self-driving

The vehicle can take control of both the vehicle's speed and lane position in some situations.

Level 3
Limited self-driving

The vehicle is in complete control in some situations, monitors the road and traffic, and will inform the driver when they must take control.

Level 4
Full self-driving under certain conditions

The vehicle is in full control for a described area or operation. Outside of that| area a human will need to intervene either physically or remotely.

Level 5
Full self-driving under all conditions

Full automation in all environments and conditions with no human intervention.

Foreword /

In today's rapidly evolving world, nations face an ever more complex web of challenges. From achieving critical net zero targets and driving economic recovery to fostering business growth and enhancing societal well-being, the demand for transformative solutions has never been higher.

Connected and automated mobility (CAM) stands at the forefront of this transformation, making an unprecedented and vital contribution to solving these multifaceted challenges, while fundamentally reshaping how we move people and goods.

The global CAM sector is not a single, isolated industry. Rather, it is a dynamic convergence of multiple ecosystems, encompassing road infrastructure, cybersecurity, insurance, energy, telecommunications, simulation and software. Over the past few years, we have witnessed a definitive shift in the global trajectory. The market is moving decisively away from the experimental stage and isolated trials, and towards permanent commercial legislation and scaled integration. International investment and innovation are accelerating rapidly, and we are seeing a distinct pivot towards high-yield industrial applications, hub-to-hub freight and advanced simulation-based safety validation.

For the UK to navigate this highly complex landscape and uncover localised solutions, an international perspective is essential. This 2026 update of Zenzic's International CAM Landscape provides a comprehensive evaluation of global progress, offering critical insights into 11 primary markets: the United Kingdom (UK), France, Germany, Israel, the United States of America (USA), Canada, China, Japan, South Korea, the United Arab Emirates (UAE) and the Kingdom of Saudi Arabia (KSA). By examining these nations through the specific lenses of policy and regulation, innovation environments, and testing and deployments, this report benchmarks global capabilities and reveals the structural dynamics driving the sector forward.

As countries around the world chart their own paths towards automated vehicle (AV) commercialisation, the UK is growing in both confidence and capability. However, forging a path as a true global leader requires robust collaboration and a deep understanding of our international partners. By gaining insights into global initiatives, digital sovereignty requirements and shifting supply chains, we unlock real opportunities to unite, collaborate, and create cutting-edge, customer-centric CAM technology. This report is designed to empower stakeholders to seize these global opportunities, build critical momentum and deliver the socioeconomic benefits that CAM promises.

Key Messages /

The research underpinning this 2026 update of the international connected and automated mobility (CAM) landscape has uncovered several pivotal global themes. These findings provide critical insights into the strategic trajectory of international markets and outline specific opportunities for the UK to strengthen its competitive position within the global supply chain:

- **A Transition to Permanent Frameworks:** Global markets are moving decisively from experimental sandboxes to permanent commercial legislation. The UK is exceptionally well positioned to lead this commercialisation, leveraging the robust statutory authorisation regime established by the Automated Vehicles Act 2024.
- **Capitalisation on Sovereign Strengths:** If we can maintain a tight focus on our world-class capabilities in Verification, Validation and Assurance (VVA), the UK has a clear opportunity to export high-integrity software and safety-case frameworks to rapid-growth international markets.
- **A Pivot to Industrial and Logistics Lead Markets:** The global deployment race is accelerating towards near-market, high-yield opportunities. International investment is shifting rapidly from universal passenger transport to specialised autonomous stacks for hub-to-hub freight, agricultural automation and bounded-port logistics.
- **Simulation as a Regulatory Mandate:** The global innovation ecosystem has formalised simulation and digital twins as primary requirements for statutory vehicle approval. The UK must build on its advanced simulation tools if it is to lead international standardisation and prevent vendor lock-in.
- **Digital Sovereignty and Cybersecurity:** Secure data governance and cybersecurity have become mandatory gating requirements for deployment. The UK's strict alignment with international security standards makes it a highly trusted environment for forming exciting commercial partnerships.
- **Infrastructure as a Prerequisite:** Widespread commercial deployment increasingly demands autonomy-ready infrastructure. The integration of 5G networks and vehicle-to-everything (V2X) connectivity is now functioning as a foundational safety layer across the world.
- **Strategic Supply Chain Alliances:** As the sector evolves into a complex ecosystem of sovereign technology stacks, the UK must look beyond its own borders to forge targeted international collaborations, positioning itself as a low-friction gateway for global developers.

To broaden your understanding of the UK's current position, we recommend reading Zenzic UK CAM supply chain reports, accessible below.

Maturing the UK Supply Chain 2024/2025
UK CAM Technology Growth Strategies Report

1. Introduction /

The United Kingdom is a central participant in the global collective endeavour to radically transform the transport and mobility sector by means of connected and automated technologies. Nations worldwide are exploring how such innovations can facilitate the safer and more efficient movement of people and goods, recognising the profound societal, environmental and economic benefits that they present.

Global forecasts predicting a massive market for CAM have driven unprecedented investment across the industry directed towards unlocking the promise of connected and self-driving vehicles. The critical question, therefore, is what specific role the UK should play in this maturing global supply chain.

While the UK does hold a strong position within the global CAM ecosystem, maintaining a competitive domestic sector requires strategic investment, a tight focus on comparative advantages, and open collaboration in areas that deliver the greatest value to both the UK and global economies.

This report provides a high-level overview of detailed analysis and insights into selected international CAM markets. The research benchmarks 11 primary ones: **the United Kingdom (UK), France, Germany, Israel, the United States of America (USA), Canada, China, Japan, South Korea, the United Arab Emirates (UAE) and the Kingdom of Saudi Arabia (KSA).**

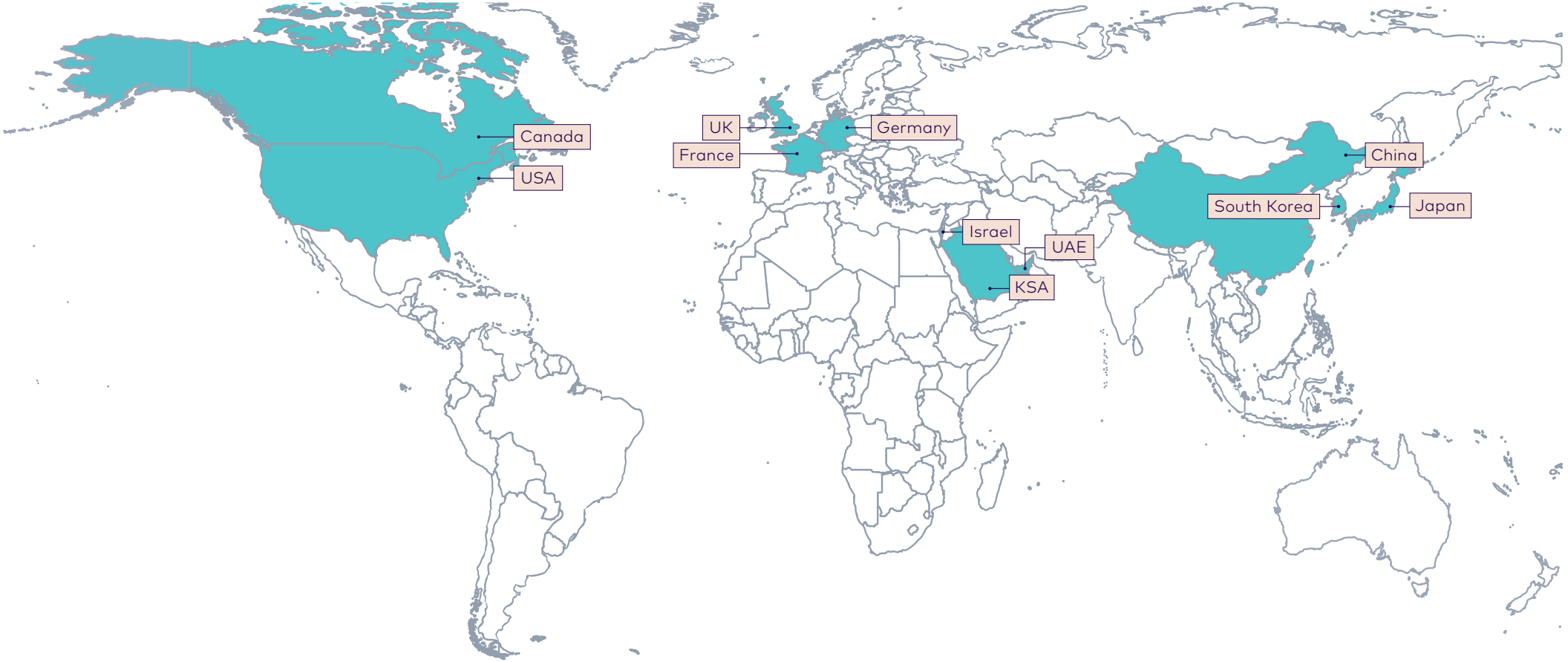
The analysis evaluates these nations across three critical capability areas: **Policy and Regulation, Innovation Environment, and Testing and Deployment.**

These countries were selected on the basis of various criteria, including their economic strength, the visibility of their CAM activities and their strategic relevance to the UK.

1.1 Markets in Scope

Figure 1 shows the rationale for why these countries were selected as part of this study.

Figure 1: Countries and rationale for those in scope of the study



Canada
Canada has established Commonwealth ties and presents strategic opportunities for UK organisations. Characterised by a collaborative federalism model, Canada's fragmented policy landscape offers critical insights into regional deployment strategies, autonomous heavy freight, and rigorous cybersecurity frameworks, presenting vital collaborative avenues in software validation.

United States of America
The USA remains a primary trading and investment partner for the UK, offering a distinct approach to regulation. As the nation makes robust advancements and American developers increasingly target European expansion, the market provides critical insights into commercialisation across a decentralised landscape.

United Kingdom
The UK has transformed its CAM position from localised trials into a formal, long-term industrial commitment. This transition is anchored by the Automated Vehicles Act 2024, which establishes a world-leading regulatory framework to support the commercial deployment of self-driving services by the end of 2027.

France
As a neighbouring European competitor, France provides a vital benchmark for the UK. Studying its ecosystem helps in identifying potential regulatory alignments and collaborative opportunities. By understanding France's state-led investment, rigorous safety validation, and decarbonisation-focused approaches, the UK can gain strategic insights that will directly benefit its own CAM development.

Germany
As a primary European competitor, Germany provides a crucial benchmark for the UK. Recognised for its pioneering primary legislation which offers absolute legal certainty for Level 4 operations, its ecosystem is rapidly advancing in hub-to-hub freight and industrial automation. Understanding these developments reveals vital insights and opportunities for targeted collaboration.

Israel
With a clear and ambitious focus on innovation, Israel offers a valuable perspective of how it transformed itself into a formidable player in CAM industry despite low traditional automotive capabilities. Whilst smaller in CAM market size, Israel presents an opportunity to learn from its approach towards CAM sector development.

Kingdom of Saudi Arabia
The KSA has made unprecedented investments in autonomous infrastructure and its transition into a strategic manufacturer, through initiatives like NEOM. Tied to strict decarbonisation and data sovereignty targets, this rapidly scaling market offers the UK significant partnership potential to export high-integrity safety frameworks and cybersecurity assurance.

United Arab Emirates
The UAE has adopted a rapid, deployment-first strategy, functioning as a global hub for operational integration rather than domestic software development. Driven by ambitious commercial targets across Dubai and Abu Dhabi, the market offers the UK prime opportunities to export operational compliance, safety governance, and fleet integration capabilities.

South Korea
South Korea has a mission-led industrial strategy and rapid commercialisation goals, driven by major automotive conglomerates. This dynamic ecosystem presents a strategic opportunity for the UK to export its world-class safety assurance and cybersecurity governance, and to position itself as a vital regulatory gateway for Korean developers expanding into Europe.

Japan
Japan has established automotive ties with the UK and presents new collaborative opportunities. Japan's ageing society and acute labour shortages in logistics have driven it to elevate autonomous rural transit and highway freight to critical national infrastructure, offering vital insights into Level 4 commercialisation and sensing technologies.

China
China is a global powerhouse in CAM, driven by rapid commercial growth and state-backed infrastructure. As Chinese developers look to expand internationally, understanding this market is vital. It enables the UK to build strategic relationships and position our world-class safety standards as the essential regulatory gateway for mutual trade and investment.

1.2 Approach

The analysis evaluates these nations across three primary pillars, reflecting the sector's maturation from isolated experimental trials to integrated commercial services:

Policy and Regulation

An assessment of the current legislative frameworks, liability models and government stances regarding testing and permanent commercial roll-out.

Innovation Environment

An analysis of the CAM and start-up ecosystems, including public and private funding landscapes, supply chain integration, and key advances in CAM research and development.

Testing and Deployment

A review of CAM testing infrastructure both on-road and off-road, including simulation and digital twin capabilities, alongside the maturation of commercial deployments, autonomy-ready infrastructure and cybersecurity protocols.

This report provides a high-level overview of detailed analysis and insights into the selected CAM markets. The research methodology follows a rigorous, multi-layered approach, combining desk research with targeted stakeholder engagement. The desk research utilised government resources, industry publications, multilateral organisation reports and Zenzic's in-house sector knowledge. To ensure that the findings are grounded in real-world activity, particularly in regions where public data is less accessible, the research team also conducted anonymised interviews with global public and private sector organisations.

2. Global Trends /

The comprehensive market research underpinning this report has revealed defining trends that illustrate the current trajectory and structural dynamics of CAM development and deployment globally. Through a rigorous evaluation of the specific challenges and strategic approaches within each benchmarked nation, this analysis has generated key global findings. These insights are categorised across the three core pillars of the sector: Policy and Regulation, the Innovation Ecosystem, and Testing and Deployment.

2.1 Policy and Regulation

A defining trend of 2026 is the maturation of legal frameworks from temporary trial exemptions to permanent legislation. Germany has consolidated its position as a global regulatory pioneer through the 2021 Act on Autonomous Driving together with its subsequent updates in 2024 and 2025, which provide regulatory frameworks for Level 4 vehicles in defined operating areas. The German Federal Motor Transport Authority (KBA) now issues nationwide Level 4 testing authorisations, moving beyond geographically restricted exemptions. Similarly, Japan's 2023 revision of the Road Traffic Act introduced the 'specified automated operation' classification, providing a clear legal pathway for Level 4 operations on public roads.

In France, the regulatory roadmap presented in April 2025 signals a definitive pivot towards scaling up deployments, moving from preliminary safety cases to a standardised certification framework. The French government has specifically legalised autonomous heavy goods vehicles (HGVs) through Decree No. 2024-1063, formalising the extension of the national framework to the logistics sector.

In the Middle East, Dubai's Law No. (9) of 2023 established a dedicated licensing and liability framework for automated vehicles, creating a defined set of requirements that facilitates a rapid transition from trial to operation.

Evolution since 2023 Assessment: In contrast to the 2023 findings, which highlighted a global reliance on temporary sandboxes and experimental permits, the 2026 landscape indicates that leading jurisdictions have moved to establish permanent primary legislation. While the 2023 report characterised the regulatory environment as a patchwork of exemptions, the current landscape has evolved into one of institutionalised commercialisation. This shift is significant, because it provides the long-term legal certainty required for mass-market investment, moving CAM from a research-led activity to a component of national industrial strategy.

2.1.1 The Emergence of the Operator-First Liability Settlement

The 2026 data reveals a global convergence towards liability models that prioritise rapid compensation of victims by specifying strict liability of the vehicle operator or keeper. Germany utilises a three-pillar liability model: strict liability for the keeper, specific driver liability for Level 3, and a shift to the technical supervisor for Level 4. Notably, Germany doubled its liability limits in 2017 to €10 million for

personal injury to account for autonomous risks. France adheres to the 1985 Badinter Law, which entitles victims to immediate compensation from the vehicle's insurer regardless of fault, with the insurer subsequently retaining the right of recourse against the manufacturer for technical defects.

Israel employs a no-fault absolute liability system for bodily injuries under its 1975 Road Accident Victims Compensation Law, ensuring that victims are compensated regardless of whether a human or an autonomous system was at fault. This model provides high legal certainty for insurers and operators by decoupling immediate victim support from lengthy technical investigations. In Dubai, Law No. (9) of 2023 explicitly places initial liability on the operator, allowing them to manage risk contractually upstream with software providers and manufacturers. Canada has adopted a single-policy model through the Insurance Bureau of Canada, whereby both human and machine are covered under a single policy so as to bypass initial fault determination.

Evolution since 2023 Assessment: While the 2023 report highlighted a liability vacuum that was deterring commercial deployment, the current landscape has developed into a structured environment where risk is allocated by statute rather than by litigation. In contrast to 2023's focus on assigning blame to the artificial intelligence, the 2026 assessment shows that regulators are prioritising victim protection through strict liability, treating the Automated Driving System (ADS) as a product risk to be handled via subrogation. This maturity allows insurers to price risk more accurately, facilitating the transition to commercial-scale fleets.

2.1.2 Digital Sovereignty and Cybersecurity as Gating Requirements

Cybersecurity and data governance have shifted from the realm of technical considerations to being considered as regulatory requirements. South Korea treats cybersecurity as a primary compliance area, requiring manufacturers to obtain cybersecurity management system (CSMS) certification before individual vehicles can undergo in-service verification. China's 2025 Regulations on Network Data Security Management have introduced strict controls, including annual risk assessments, 24-hour incident reporting, and tight restrictions on cross-border data transfers.

Saudi Arabia's Personal Data Protection Law and national cybersecurity controls require in-country data hosting and strict access controls for sensor and video data, shaping the market around data sovereignty. Japan has codified UNECE (United Nations Economic Commission for Europe) Regulations UN R155 and UN R156 into national law, making compliance mandatory for all new vehicle registrations since July 2024. Furthermore, the mutual recognition agreement between Japan and the UK regarding security standards indicates a growing trend of international harmonisation to reduce compliance friction.

Evolution since 2023 Assessment: In contrast to the 2023 findings, which viewed cybersecurity as a voluntary alignment with international guidelines, the 2026 data indicates that it is now a mandatory homologation requirement. While the 2023 report focused on connectivity, the current landscape has evolved into a focus on sovereignty. This shift is significant, because it introduces operational impacts for new market entrants, who must now design products for sovereign deployment, including in-country hosting, or if they are to access key global markets.

2.1.3 Formal Integration of Simulation into Statutory Safety Validation

A pivotal shift in regulatory philosophy is the move from prescriptive, physical-mileage testing towards simulation-based safety validation. Israel is a global pioneer in this domain, using the Cognata platform to virtually test thousands of edge cases as a formal requirement for statutory vehicle approval. Similarly, France has officially adopted a scenario-based approach, with the DGITM (French Ministry for Transportation) 2024 methodology setting national standards for combinatorial scenario generation.

Germany has pioneered the regulatory acceptance of simulation through projects such as VVM (named after 'verification and validation methods'), which established a standardised methodological framework for safety verification that is currently being proposed

as a global ISO standard. China's GB/T 44461.1-2024 mandates documentation for validation in both normal and faulty states, supported by national scenario libraries. Japan now allows high-fidelity simulation data from the DIVP (Driving Intelligence Validation Platform) consortium to replace a significant portion of the physical mileage traditionally required for type approval.

Evolution since 2023 Assessment: While the 2023 report highlighted simulation as a tool for research and development, the current landscape shows that it is now viewed as a formal regulatory requirement. In contrast to 2023's heavier reliance on safety drivers and physical miles, 2026 regulators accept digital twins and synthetic data as evidence. This represents a significant shift, because it acknowledges the statistical impossibility of proving safety through physical driving alone, thereby accelerating the commercialisation of Level 4 systems.

2.1.4 Inter-Jurisdictional Dissonance and the Fragmented Policy Map

Despite international standardisation efforts, inter-jurisdictional friction remains a significant barrier. Canada presents a stark example of a fragmented policy map: while Ontario has launched a ten-year Automated Commercial Motor Vehicle Pilot for Level 4 trucking, British Columbia implemented a comprehensive statutory ban on Level 3, 4 and 5 vehicles in April 2024. This regulatory dissonance forces original equipment manufacturers (OEMs) to adopt geofenced deployment strategies, enabling features via over-the-air (OTA) updates only in permissive provinces.

Similarly, the UAE faces potential fragmentation between Emirates: whereas Dubai has a single integrator and a dedicated automated vehicle law, Abu Dhabi operates a platform-led governance model through AViTOMS (Autonomous Vehicles Integrated Testing, Operations and Management System). At the federal level, it is not yet clear whether approvals will be cross-compatible, treating Dubai and Abu Dhabi as separate and competing markets. Germany, by contrast, has sought to reduce friction through municipal empowerment, allowing local authorities to prioritise autonomous public transport on environmental and public health grounds, backed by the 2024 StVG (Road Traffic Act) reform.

Evolution since 2023 Assessment: While the 2023 report focused on global harmonisation through UNECE, the 2026 data indicates a resurgence of regionalism. In contrast to 2023's optimism about unified markets, the current landscape is characterised by geofenced regulation. This shift is significant for global companies, as it requires a two-part strategy: aligning with international technical standards while navigating highly divergent local operational permissions.

2.2 Innovation Ecosystem

2.2.1 Industrial and Agricultural Lead Markets

A profound shift in the 2026 innovation landscape is the move away from the universal driver ambition towards highly specialised, sector-specific autonomous stacks. Japan has emerged as the global leader in extreme environment autonomy, as exemplified by Kajima's A^{4}CSEL system. In July 2024, Japan achieved the world's first fully automated mountain tunnel excavation, involving automating drilling, blasting and waste removal without human intervention at the tunnel face. This represents a breakthrough where autonomy is used to mitigate acute labour shortages and high-risk environments rather than being merely for consumer convenience.

Similarly, the agricultural sector has become a primary driver of commercial innovation. In Israel, Bluewhite has transitioned from pilot to commercial scale with its Pathfinder retrofit kit, which converts standard tractors into autonomous machines capable of spraying and mowing across 150,000 acres in the USA alone. Japan's agricultural sector, facing an average farmer age of 69, has seen Kubota unveil a Level 4 hydrogen fuel-cell tractor at Expo 2025 Osaka, capable of 12 hours of unmanned operation. In China, the Westwell Q-Truck, a cabinless, purpose-built Level 4 heavy truck, has achieved commercial maturity in port operations, utilising battery-swap technology (carried out autonomously) to maintain continuous duty cycles.

Evolution since 2023 Assessment: In contrast to the 2023 findings, which focused on robotaxis as the primary innovation goal, the 2026 data indicates a definite pivot towards industrial applications. While the 2023 report highlighted the development of general-purpose artificial intelligence, the current landscape has evolved into a market for domain-specific hardware, such as cabinless trucks and tunnelling robotics. This shift is significant, because it demonstrates that the most rapid returns on investment and technical maturity are being found in bounded, high-value environments such as mines, ports and farms, rather than in the more complex urban environments.

2.2.2 Simulation-Centric Validation and the Digital Twin Mandate

The innovation ecosystem has formalised simulation as the primary engine for safety validation. Israel remains the epicentre of this digital twin economy, with the Cognata platform serving as a statutory requirement for vehicle approval. This represents a shift in which software breakthroughs are no longer solely about the driving stack, but are taking place in the high-fidelity synthetic environments used to stress-test it. South Korea has mirrored this through K-City, which integrates physical testing with hybrid reality and virtual assessment, including dedicated facilities for cybersecurity stress-testing.

The Japanese DIVP consortium has taken this trend further by developing simulation models that replicate extreme weather and GPS canyons, allowing developers to replace physical mileage with high-confidence virtual data. China has formalised this through national standards (GB/T 44461.1-2024), which mandate the documentation of validation in both normal and faulty states, supported by massive national scenario libraries. This simulation-first approach has drastically reduced the capital expenditure required for new market entrants by greatly shortening the physical testing phase.

Evolution since 2023 Assessment: While the 2023 report highlighted simulation as a useful research and development tool for start-ups, the current landscape has seen it evolve into a mandatory component of the global supply chain. In contrast to the 2023 findings, which saw simulation as a 'black box' held by individual companies, the 2026 data indicates a move towards standardised, government-vetted synthetic environments. This is significant, as it levels the playing field for smaller software innovators, who can now validate their stacks against the same virtual benchmarks as major OEMs.

2.2.3 Integrated Supply Chains and Sovereign Tech Stacks

A major supply chain shift identified in 2026 is the movement towards sovereign or resilient tech

stacks, whereby nations seek to reduce dependence on external proprietary systems. South Korea exemplifies this through its mission-led industrial framing, where the CAM ecosystem is treated as an export-resilience programme. By anchoring the ecosystem around domestic giants such as Hyundai and LG, Korea has created a highly integrated supply chain where hardware platforms and software stacks are co-developed for reasons of national security and economic competitiveness.

Saudi Arabia has adopted a similar strategy, moving beyond being a mere consumer of technology to playing a role as a strategic investor and manufacturer. Through its logistics productivity programme and Vision 2030, Saudi Arabia is localising manufacturing and supply chain presence, as evidenced by the US$100 million joint venture between Pony.ai and NEOM (Saudi Arabia's futuristic city and development project) to establish a regional autonomous vehicle manufacturing and research hub. The UAE has also demonstrated this strategic flexibility – after the exit of some USA-based developers, Dubai pivoted towards price-competitive Chinese developers like Baidu to maintain its 2030 deployment targets.

Evolution since 2023 Assessment: In contrast to the 2023 findings, which characterised the supply chain as a global, open-market collaboration, the 2026 assessment reveals a trend towards strategic decoupling. While the 2023 report highlighted the dominance of a few global tech leaders, the current landscape is one characterised by a world of national champions and local content requirements. This shift is significant for the UK, as it suggests that access to high-growth markets such as South Korea or the Gulf states will depend increasingly on the ability to localise intellectual property or form sovereign partnerships.

2.2.4 Connectivity-as-a-Platform: V2X and 5G Infrastructure Integration

The 2026 innovation ecosystem marks the maturity of Connectivity-as-a-Platform: the vehicle is no longer an isolated actor but now functions as one component in a broader digital infrastructure. China is in the vanguard of this trend, deploying vehicle-road-cloud (VRC) pilots across cities like Beijing and Shanghai. Huawei's dual-band networks provide the millisecond-level emergency response capability that is required for the automation of container-handling in ports, reducing signal interference and improving equipment utilisation by 15%.

France has followed a similar path with its 5G Open Road project, which tests remote supervision and vehicle-to-infrastructure (V2I) communication on public roads. In Israel, the collaboration between Bluewhite, Intel and Federated Wireless to deploy private 5G networks in rural areas has solved the

rural connectivity gap, ensuring that autonomous tractors can use artificial intelligence to perform real-time crop analysis in remote locations. Furthermore, Japan's 100-kilometre autonomous truck lane on the Shin–Tōmei Expressway serves as a physical–digital hybrid, providing the infrastructure readiness necessary for Level 4 freight.

Evolution since 2023 Assessment: While the 2023 report viewed 5G and V2X communication as emerging technologies with uncertain use cases, the current landscape has evolved into a state in which connectivity is a primary safety requirement. In contrast to 2023's focus on on-board sensor processing, the 2026 data indicates a shift towards cloud-supported autonomy. This is significant because it moves the cost burden of safety from the individual vehicle's sensor suite to the national infrastructure, in turn facilitating the deployment of lower-cost autonomous units in connected smart cities.

2.2.5 Propulsion and Sustainability: The Convergence of CAM and Net Zero

The convergence of automation and decarbonisation increasingly defines innovation in 2026. Japan's development of Level 4 hydrogen fuel-cell tractors indicates a strategic move to solve the energy density problem for long-duration autonomous tasks. Meanwhile, China's Westwell Q-Trucks utilise six-minute battery-swapping technology, ensuring that the efficiency gains of autonomy are not lost to long charging cycles. Saudi Arabia's targets are explicitly tied to NEOM and the Saudi Green Initiative, treating autonomous public transport as a core component of future carbon-neutral urbanism.

Evolution since 2023 Assessment: In contrast to the 2023 findings, which treated connected mobility and electric vehicles as separate technological tracks, the 2026 assessment shows how they are now inextricably linked. While the 2023 report focused on the vehicle's artificial intelligence, the current landscape has shifted to a focus on total lifecycle cost, with autonomous operation and sustainable propulsion co-optimised. This shift is significant, as it introduces new requirements for autonomy-ready charging and refuelling infrastructure into national planning.

2.3 Testing and Deployments

2.3.1 The Rise of Hub-to-Hub Autonomous Freight and Dedicated Corridors

One pre-eminent trend in 2026 is the industrialisation of autonomous trucking by the use of hub-to-hub logistics on high-speed motorways. Germany has moved aggressively into this space with the ATLAS-L4 (Automatisierter Transport zwischen Logistikzentren auf Schnellstraßen im Level 4, Automated Transport between Logistics Centres on Expressways at Level 4) project, which has successfully validated Level 4 heavy-duty trucks on Bavarian motorways. This project has proved that autonomous HGVs are able to safely manage travelling at Autobahn speeds, merging, and undertaking emergency lane manoeuvres, all without human intervention – effectively creating a blueprint for the German AFGBV (Autonome Fahrzeuge Genehmigungs- und Betriebs-Verordnung) regulatory implementation. In parallel, Japan has operationalised a 100-kilometre dedicated autonomous truck lane on the Shin-Tōmei Expressway, providing the physical and digital infrastructure that is required for consistent Level 4 freight operation.

Canada exhibits a split approach to this trend: while British Columbia has implemented a statutory ban on Level 4 vehicles, Ontario launched a landmark ten-year Automated Commercial Motor Vehicle pilot in August 2025. This pilot is specifically designed to assess the commercial viability of autonomous freight in cold-weather climates and complex multi-jurisdictional logistics chains. China has further industrialised this via port-based deployments, where Westwell's cabinless Q-Trucks operate continuously in high-intensity terminal environments, achieving precise 3-centimetre positioning accuracy and millisecond-level response times through 5G integration.

Evolution since 2023 Assessment: In contrast to the 2023 findings, which focused predominantly on last-mile delivery robots and low-speed urban shuttles, the 2026 data indicates a definitive realignment towards middle-mile and long-haul heavy logistics. While the 2023 report highlighted the potential for autonomous trucking, the current landscape is more one of formal ten-year pilots and dedicated expressway lanes. This shift is significant, as it moves CAM into the backbone of the global supply chain, prioritising economic productivity and labour shortage mitigation over consumer-facing services.

2.3.2 Fleet Integration and the Maturation of Urban Robotaxi Services

Urban deployments have transitioned from experimental closed-loop trials to city-scale, integrated mobility services. South Korea has emerged as a global benchmark in this area, launching Korea's first late-night autonomous taxi service in Gangnam and a driverless shuttle service along the Cheonggyecheon Stream. These services form part of a broader progression in validation, one that moves from pilot operation zones to city-scale living labs aimed at proving public acceptance and service reliability in dense urban environments.

The UAE, specifically Dubai and Abu Dhabi, has adopted a platform-led governance model to manage rapid scaling. Abu Dhabi's AViTOMS system provides end-to-end monitoring for 69 registered autonomous vehicles, including Level 4 driverless robotaxis that operate under commercial permits. Dubai, following its 2030 target of 25% of public transport trips being made autonomously, has pivoted towards well-capitalised international developers such as Baidu to fill the delivery gap left by the exit of USA firms, planning a 15-square-kilometre dedicated testing zone for 2026. Saudi Arabia has mirrored this intensity, with over 1,000 beneficiaries already using autonomous vehicle services in Riyadh via the Transport General Authority's Regulatory Sandbox.

Evolution since 2023 Assessment: While the 2023 report highlighted urban robotaxis as aspirational, the current landscape shows an evolution to a state of commercial operation with established passenger counts. In contrast to 2023's fragmented trials, the 2026 assessment shows that leading cities now utilise centralised governance platforms, such as AViTOMS, to manage live fleets. This is a

significant shift, indicating that the primary challenge has moved from proving whether the vehicle can drive, to determining how to manage a fleet of numerous vehicles in a live transport network, thereby signalling that the so-called operational middle layer of scaling AV (Autonomous Vehicle) services is becoming more critical.

2.3.3 Autonomy-Ready Infrastructure as a Prerequisite for Deployment

The 2026 data highlights a move away from vehicle-only intelligence towards infrastructure-supported deployment. France's Brest métropole 'Mon réseau grandit' project represents a massive structural investment in which new tram and bus rapid transit lines are being engineered as autonomy-ready networks. These networks incorporate high-capacity fibre-optic backbones and digital signalling systems designed to support V2I communications and ensuring future compatibility without the need for costly retrofitting.

In Israel, the National Project for Autonomous Public Transportation (2024 to 2026) has deployed the Imagry-powered Bus Line 5 in Nahariya, which relies on a combination of high-fidelity maps and real-time connectivity to navigate standard bus routes. Similarly, Japan's J'Town facility and Isuzu's site in Hokkaido provide simulated urban environments and extreme weather testing grounds to stress-test connectivity and navigation before deployment on public roads. China's VRC pilot cities represent the peak of this trend, treating the road itself as a sensing and compute layer that supports the on-board vehicle systems.

Evolution since 2023 Assessment: In contrast to the 2023 findings, which viewed infrastructure merely as a supplementary factor, the 2026 data indicates that it is now a fundamental requirement for commercial scaling. While the 2023 report focused on making vehicles smarter at handling poor roads, the current landscape reveals a new focus on smart roads designed to make vehicles safer. This shift is significant for government planners, as it necessitates the integration of digital layers – such as 5G, fibre and advanced connectivity – into all new civil engineering projects in order to avoid technological obsolescence.

2.3.4 The Pivot to Non-Traditional Operational Design Domains: Construction, Mining and Agriculture

Testing and deployment in 2026 are increasingly found in bounded but high-value operational design domains. Japan achieved a landmark world first in July 2024 by fully automating mountain tunnel excavation through the A^{4}CSEL system. This system automates drilling, blasting and waste removal, removing humans from high-risk environments and proving that automated technology has reached sufficient maturity for extreme industrial applications.

Agricultural deployment has achieved commercial scale in Israel and the USA, where Bluewhite's Pathfinder retrofit kits manage 150,000 acres of autonomous farming. These deployments are supported by private 5G networks to enable real-time crop analysis in remote areas. China has extended this into mining, with autonomous fleets operating at high altitude in Tibet and Xinjiang, proving the resilience of autonomous hardware in sub-zero and low-oxygen conditions.

Evolution since 2023 Assessment: While the 2023 report characterised industrial and agricultural applications as niche or off-road, the 2026 assessment identifies them as the most commercially mature segments of the market. In contrast to 2023's focus on urban passengers, the current landscape shows that the most robust returns on investment and technical reliability are being proven in bounded industrial environments. This shift is significant, because these low-complexity, high-consequence environments provide the data and revenue needed to fund the supply chain and enable it to grow.

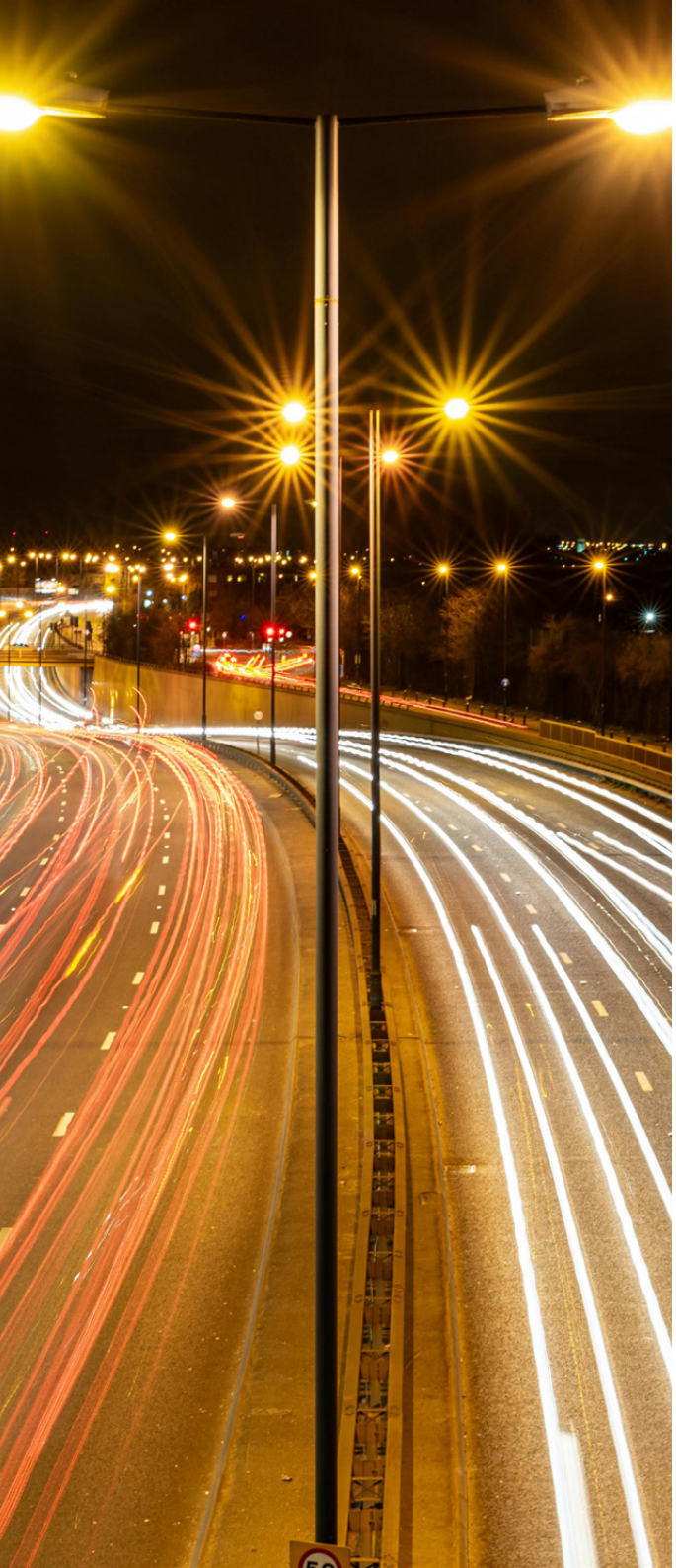
2.3.5 Operational Divergence and the Geofencing of Commercial Success

A final trend in 2026 deployments is the increasing reliance on geofencing and unique municipal permissions. In Canada, the contrast between Ontario's ten-year pilot and British Columbia's total

ban creates a fragmented market in which developers must tailor their deployments to specific provincial boundaries. Similarly, the pilot in Toronto for Magna's delivery robots was capped at 32 km/h and restricted to specific wards so as to navigate local council objections and data privacy concerns.

Germany has sought to prevent this problem through municipal empowerment, allowing local authorities to authorise Level 4 shuttles as part of the public transport provision under the 10th StVG (Road Traffic Act) amendment. This allows for a patchwork of success, where individual cities, such as Hamburg, through the ALIKE project, become high-density autonomous hubs while other regions remain conventional.

Evolution since 2023 Assessment: In contrast to the 2023 findings, which anticipated a uniform roll-out of autonomous technology, the 2026 data indicates a future characterised by autonomous islands. While the 2023 report highlighted global standards, the current landscape has evolved into a reality where deployment is governed by hyper-local political and infrastructure readiness. This is significant for industry leadership, as it requires a city-by-city rather than country-by-country commercial strategy.



2.4 The United Kingdom's Position

2.4.1 Policy and Regulation

The UK's regulatory position is defined increasingly by a transition from trialling to a robust, statutory authorisation regime. The definitions within the Automated Vehicles Act 2024 are central to this change, establishing a clear legal threshold for accountability by distinguishing between the technology developer and the service operator. By aligning with international standards such as UN R155 and UN R156, the UK positions itself as a high-assurance jurisdiction. This assurance-as-an-export strategy prioritises legal certainty and safety-case transparency, and offers a competitive alternative to opaque, permit-driven regimes in emerging markets.

2.4.2 Innovation Environment

The UK's innovation strategy is increasingly pivoting from generic research and development towards assurance products and services, capitalising on its globally recognised strengths in safety-case verification to enable exports of high-integrity regulatory frameworks to rapid-growth markets such as the Gulf Cooperation Council. While domestic hardware manufacturing remains selective, the UK occupies a critical niche in the CAM value chain through high-integrity software, sensor fusion and V2X security standards. Strategic alignment with the UN R155 and UN R156 standards enables the UK to act as a technical bridge between the highly integrated, OEM-led ecosystems of East Asia and the fragmented North American market, prioritising interoperability and digital sovereignty.

2.4.3 Testing and Deployments

The UK's deployment strategy has definitively matured from localised trialling to the orchestration of live commercial services, propelled by the substantial growth of the CAM Testbed UK ecosystem. Following the successful completion of the foundational Commercialising CAM (CCAM) projects, the national strategy has evolved through the Pathfinder programme to prioritise highly specific, high-yield commercial use cases, such as automated port logistics, airside logistics and factory logistics. Concurrently, the UK is establishing itself as a premier destination for complex urban mobility. Capitalising on the fast-tracked Automated Passenger Services regulations, global developers are now actively preparing to launch commercial robotaxi fleets in London. This dual approach ensures that automated deployments are driven by both immediate economic productivity and scalable passenger transport.

3. Country Overviews /

Country Dashboard /

The United Kingdom

The UK's position with respect to CAM has undergone a transformation from a focus on localised trials into a formal, long-term industrial commitment. The country's main strength lies in intellectual property, software, verification and validation (V&V), simulation toolchains and cybersecurity, rather than in mass hardware manufacturing.

CAM Vision

The UK's CAM vision is led by a cross-departmental strategy to attain global leadership in the autonomy sector. CAM is structurally integrated as a priority within the UK's broader economic and security policy, codified in the government's Modern Industrial Strategy 2025 and its Transport Artificial Intelligence Action Plan. Two key organisations, Zenzic and the Automotive Council UK, champion this ecosystem and shape its overarching strategy.

Special Mentions

- The UK pioneers scenario-based evaluation for virtual validation, utilising the Safety Pool™ Scenario Database and BSI (British Standards Institution) Flex standards, rather than distance-based physical testing.
- Cybersecurity is a fundamental criterion for GB Type Approval, with mandatory technical requirements (UN R155) entering into force in June 2026.
- The digitalisation of Traffic Regulation Orders will require local authorities to create machine-readable digital maps of temporary closures and speed limits, thereby allowing self-driving algorithms to take account of legal constraints automatically.
- The Connected and Autonomous Plant Roadmap to 2035 aims to transition construction machinery to fully automated ecosystems, projecting a £200 billion economic contribution by 2040.

Policy and Regulation

The UK has established a world-leading regulatory framework by means of the Automated Vehicles Act (AVA) 2024, which represents the most significant road traffic law reform in decades. Rather than relying on temporary exemptions, the Act codifies clear legal roles and responsibilities for the authorisation and operation of automated driving services. The transition to a fully regulated autonomous environment is targeted for full implementation by the end of 2027.

Priorities

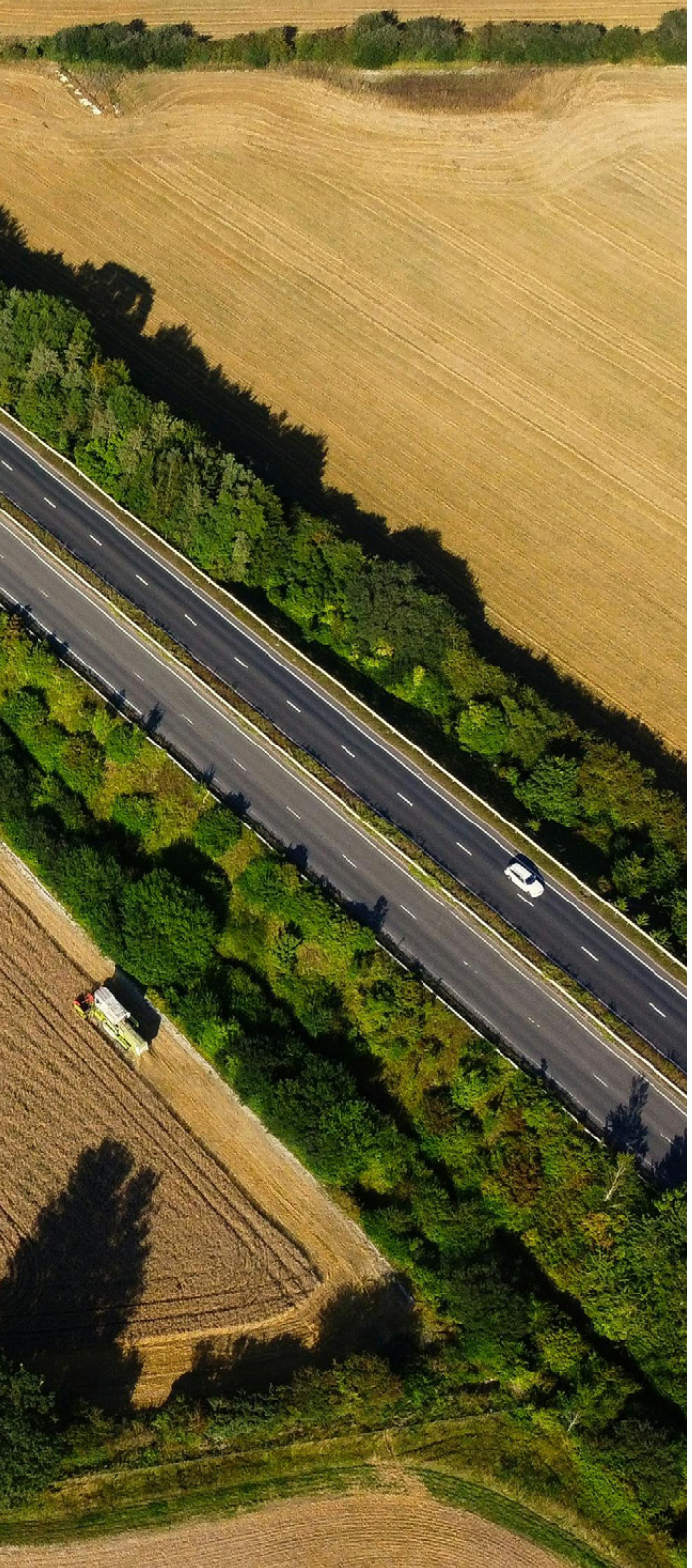
- Securing UK leadership in the global autonomy sector
- Embedding responsible AI in a resilient transport system, while acknowledging the novel systemic risks that require specific governance
- Delivering measures to enable advanced trials and early commercial pilots of self-driving vehicles by 2026
- Supporting the UK supply chain to grow and capture a global market share in software and high-value components
- Aligning CAM deployment with net zero targets, and improving transport accessibility in rural areas

Strategic direction

- The overall direction will be guided by the Zenzic UK CAM Roadmap to 2035, together with the government's Modern Industrial Strategy 2025 and its Transport AI Action Plan.
- The strategy focuses on six high-value areas categorised into applications (freight, off-highway, public transport, personal mobility) and enablers (infrastructure/data, VVA services).
- A £2.5 billion investment package, comprising the CAM Pathfinder and DRIVE35 (Driving Research & Investment in Vehicle Electrification, funded until 2035) programmes, aims to de-risk the industry's transition to zero-emission and automated vehicle manufacturing.
- The Transport Data Action plan 2025 reflects the priority of creating an 'open by default' transport data environment for scaling algorithmic systems.

Regulation

- A rigorous 'self-driving test' certification process and the establishment of the Authorised Self-Driving Entity (ASDE) and No-User-In-Charge Operator (NUICO) roles
- A dedicated Automated Passenger Services permitting scheme, serving as an alternative to traditional taxi and bus licensing
- A mechanism whereby victims claim directly against insurers under the Automated and Electric Vehicles Act 2018, with the ASDE holding strict liability during NUICO operations under the AVA 2024
- Stringent criminal sanctions for senior managers who provide misleading safety data to regulators, carrying a maximum penalty of 14 years' imprisonment if misrepresentation results in death or serious injury
- A dual-gate system requiring both GB Type Approval (technical certification) and authorisation (operational permission) to operate without a human monitor
- Secondary legislation for ASDE and NUICO licensing regimes, anticipated in late 2026 and leading to the full regulatory regime taking effect in the second half of 2027



The United Kingdom *continued* /

Innovation Environment

The UK's innovation environment is supported by centralised public funding through the Centre for Connected and Autonomous Vehicles (CCAV), and delivered by Zenzic and the Advanced Propulsion Centre. The supply chain is highly skewed towards intellectual property, software and engineering services, rather than mass hardware. Strategic private investments are increasingly shifting from traditional modular autonomous stacks towards end-to-end AI models and computing infrastructure.

Public funding

- The CCAV has facilitated over £600 million in joint government–industry funding since 2015, supporting over 100 projects.
- The DRIVE35 programme commits £2.5 billion towards the transition to zero-emission and automated manufacturing.
- The CAM Pathfinder programme provides £150 million to accelerate technological capabilities and demonstrate commercial viability.
- The CCAM programme delivered £44 million across 68 organisations from 2022 to 2025.

Private investment

- The UK venture capital landscape for CAM and deep tech shows resilience, with British businesses backed by venture capital (VC) raising £9 billion in 2024.
- London-based AI firm Wayve secured US$1.05 billion in May 2024 and a further US$1.5 billion in a Series D investment round in February 2026, valuing the firm at US$8.6 billion.
- The UK is prioritising the computational hardware needed to train billion-parameter models, with the AI Opportunities Action Plan recommending AI Growth Zones to accelerate data centre construction.

Testing, Trials and Commercial Deployment

The UK benefits from the highly interoperable CAM Testbed UK network, a world-class array of eight facilities providing diverse operational design domains (ODDs), from dense urban centres to high-speed motorways. Commercial deployments are progressing rapidly, with active deployments in public transport and logistics.

On-road

- The first commercial pilot schemes for automated passenger services are scheduled to launch in spring 2026, permitting paying passengers without a safety driver.
- The Connector project in Cambridge integrates three self-driving buses into public transport networks, operating on a private 5G network.
- The CAVForth 2 project extends Stagecoach's autonomous bus service to a 19-mile route in Scotland using electric buses integrated with an upgraded CAVStar[1] ADS.
- The SCALE (Solihull and Coventry Automated Links Evolution) project operates a fleet of three self-driving vehicles connecting Birmingham International Rail Station, the NEC and Birmingham Business Park.
- The SAMS (Sunderland Advanced Mobility Shuttle) project explores a Level 4 autonomous, teleoperated passenger service.
- Waymo, Uber and Lyft all have plans to deploy AV taxis in London under the Automated Passenger Services scheme later in 2026.

Off-road

- The Port of Felixstowe operates a fleet of 68 autonomous Q-Trucks in a mixed-traffic environment, coordinated via a private 5G network.
- Project V-CAL in Sunderland takes the UK's first automated 40-tonne logistics service into live operations between the Vantec and Nissan sites.
- The Harlander project operates a two-vehicle autonomous passenger shuttle on mixed-use roads within the 2,000-acre Belfast Harbour Estate.
- The Pathfinder programme is funding a proof-of-concept for an autonomous container transport system at the Port of Tyne.
- The Ramp Ready project at East Midlands Airport, led by Aurrigo, is developing autonomous cargo dollies and baggage-handling vehicles for aviation logistics.

[1]CAVstar is an automated driving system developed by Fusion Processing which can integrate with OEM systems, or be tailored and retrofitted into any vehicle, providing SAE Level 4 or 5 of autonomy.

Country Dashboard /

France

France has built a highly structured CAM position around centralised state direction, strong regulatory oversight and targeted public investment. Its main strength is the alignment of automation with industrial sovereignty, public transport modernisation and decarbonisation, although activity remains more focused on shared mobility and logistics than on private AV deployment.

CAM Vision

France's CAM vision has moved from experimentation into commercial integration, with CAM positioned as a core pillar of the wider 'France 2030' industrial strategy. The updated roadmap presented in April 2025 focuses on scaling deployments, industrialising safety validation, improving infrastructure and connectivity, and prioritising freight and logistics as early commercial use cases.

Special Mentions

- France's strongest differentiator is its scenario-based validation doctrine, which is increasingly influencing international regulatory work at UNECE level.
- UTAC (Union Technique de l'Automobile, du motocycle et du Cycle) has become a key regulatory gatekeeper, and was the first Accredited Qualified Body for overall ARTS assessment in late 2025.
- The 5G Open Road programme achieved 4 ms user-plane latency using 5G standalone and edge computing, showing strong progress on remote supervision capability.
- France's main commercial near-term opportunities appear to be automated public transport, last-mile logistics and industrial automation, rather than private Level 3/4 passenger vehicles.

Policy and Regulation

France has one of the most codified CAM regulatory frameworks in Europe, combining EU vehicle homologation with an additional national service authorisation model. Rather than relying on self-certification, deployment is controlled through a formal Automated Road Transport System (ARTS / STRA) regime, with strict requirements for safety files, qualified assessment and operational approval.

Priorities

- CAM is a primary strategic objective under France 2030, linked to industrial sovereignty and decarbonisation.
- The French state is prioritising automated public transport, logistics and service efficiency over private high-level passenger AVs.
- Safety validation, connectivity and ecological alignment are central policy priorities.

Strategic direction

- The France 2030 plan is a €54 billion national investment programme, with CAM positioned within the 'Transport of the Future' agenda.
- A €200 million ring-fenced fund for 2024–25 was set aside to accelerate connected and smart mobility technologies through project calls from CORAM (Comité d'Orientation pour la Recherche Automobile et Mobilité), a strategic initiative designed to support the French automotive sector to become one of the leading producers of clean vehicles worldwide).
- The 2025–27 roadmap focuses on industrialising safety validation, improving connectivity and prioritising freight and logistics deployment.

Regulation

- On-road trials and commercial service approvals through the ARTS/STRA framework under the Mobility Orientation Law and subsequent decrees
- A dynamic control regime that transfers criminal liability from the driver to the manufacturer when the ADS is active
- Mandatory third-party insurance under the Badinter Law, with immediate victim compensation and insurer recourse against manufacturers where technical defects are proven
- Specific freight deployment rules under Decree No. 2024-1063, on automated road freight transport including GAME (Globalement Au Moins Équivalent: globally at least equivalent) safety requirements and exclusion of dangerous goods
- A mandated Data Storage System for Automated Driving (DSSAD) 'black box' to determine whether the human or ADS was in control during incidents

France *continued* /

Innovation Environment

France's innovation environment is built around large-scale public investment, coordinated industrial policy, and a research ecosystem which is centred on trustworthy AI, validation and connected infrastructure. Public funding remains the main market driver, while private investment has become more selective, shifting towards logistics, sensors, deep tech and software-defined vehicle architectures.

Public funding

- France 2030 includes a dedicated €570 million envelope for the digitalisation and decarbonisation of mobility.
- The flagship 5G Open Road programme has a budget of approximately €90 million.
- Confiance.ai operates with a budget of around €45 million, focused on trustworthy and certifiable AI.
- Funding is channelled through CORAM, i-Demo (France 2030's flagship large-scale selective bidding competition for industrial-scale technology projects) and regional co-funding, with subsidy rates of 60–70% for industrial research involving SMEs (small and medium enterprises) in the 2024–25 waves.

Private investment

- The French VC landscape has tightened, but capital remains active in selected niches.
- MILLA GROUP secured around €15–16 million in Series A funding to support industrialisation.
- Goggo Network raised approximately €49 million in Series A funding and is focusing on an asset-light logistics operator model.
- The now defunct Navya business was stabilised through an estimated €20 million capital injection following its restructuring under new ownership.
- Major OEMs such as Renault and Stellantis are increasingly shifting from proprietary AV stack development towards partnerships and integration strategies.

Testing, Trials and Commercial Deployment

France has a strong testing and validation ecosystem centred on accredited testbeds, digital twins and scenario-based safety demonstration. Commercial activity is strongest in public transport, logistics and controlled industrial environments, rather than the realm of private passenger AVs.

On-road

- France is prioritising Level 4 shared mobility and public transport over robotaxi deployment.
- The flagship Mach2 project is deploying commercial-grade automated public transport in Châteauroux, integrating Level 4 minibuses into the municipal network by 2026.
- The project is supported by a 'Team France' consortium consisting of Renault, EasyMile, Keolis, Equans, Alstom and StatInf.
- Renault and WeRide also operated a high-profile Level 4 autonomous shuttle service at Roland-Garros in 2024 and 2025.
- France also engages in emerging last-mile commercial activity, including Goggo Network and Carrefour's Level 4 grocery delivery service on the Plateau de Saclay.

Off-road

- Off-road and closed-environment deployments are more commercially mature, particularly in industrial logistics.
- At Airbus Saint-Nazaire, TractEasy's EZTow autonomous tractor was deployed in 2025 for aircraft sub-assembly logistics, with a towing capacity of up to 20 tonnes.
- CNTS (Centre national de tir sportif, the National Shooting Centre – a shooting range) in Châteauroux continues to operate as a permanent living lab and active Level 4 shuttle deployment site.
- Port-related automation is also progressing, with HAROPA PORT expanding private 5G-supported smart port infrastructure.

Country Dashboard /

Germany

Germany remains one of the most advanced CAM markets in Europe, combining a strong legal foundation, a deep industrial base and a broad testing ecosystem. Its main strength is the combination of global leadership in Level 3 passenger vehicles with a clear strategic push into Level 4 logistics and public transport, supported by a highly structured regulatory framework.

CAM Vision

Germany treats CAM as an industrial imperative and sees it as tied to national competitiveness, transport resilience and the leadership of future mobility. The roadmap is built around a phased transition from Level 3 to Level 4 by 2030, with particular emphasis on logistics, public transport and integrating autonomous services into the wider transport system.

Special Mentions

- Germany's strongest differentiator is its combination of legal certainty with industrial depth, allowing regulation, infrastructure and deployment to evolve together.
- The VVM project invested €47 million to establish a standardised framework for simulation-based safety validation, one that is now being proposed as a global ISO standard.
- Germany is also pushing a strong data-sovereignty model through the Mobility Data Space, which had more than 200 organisations involved in May 2024.
- By mid-2025, 5G coverage had reached 94.6% of Germany's surface area, supporting the deployment of broader CAM and C-ITS (cooperative intelligent transport systems).
- Germany's main near-term strengths remain Level 3 consumer systems, Level 4 logistics and high-quality public transport integration, rather than mass-market Level 4 personal AVs.

Policy and Regulation

Germany has one of the most mature CAM regulatory environments globally, relying on primary legislation rather than temporary exemptions. The 2017 and 2021 Road Traffic Act amendments, together with the AFGBV (Autonome Fahrzeuge Genehmigungs- und Betriebs-Verordnung: Autonomous Vehicles Approval and Operation Regulations) ordinance, created a stable legal basis for Level 3 and Level 4 operation, while further legislation is being prepared to support remote driving and wider commercial scaling.

Priorities

- Maintaining Germany's global position as a leading provider of autonomous technologies across the full value chain
- Supporting Vision Zero (the goal of achieving zero road fatalities and serious injuries) and reducing accidents caused by human error
- Addressing logistics labour shortages, including a deficit of around 100,000 truck drivers, by means of hub-to-hub automation

Strategic direction

- The 2017 StVG amendment enabled Level 3, while the 2021 Act on Autonomous Driving created the first comprehensive legal framework for Level 4 vehicles in defined operating areas.
- Current policy is moving from legal foundation and validation into commercial pilot deployment and the expansion of ODDs.
- Germany's roadmap targets regular driverless operations from 2026, wider ODD linking by 2028, and deeper integration of the ecosystem by 2030.

Regulation

- Level 3 consumer deployment, including the first UN-R157 approval for Mercedes-Benz DRIVE PILOT
- Level 4 operations in defined operating areas under a three-stage approval process comprising vehicle approval, operational area approval and registration
- Mandatory third-party insurance, with strict liability of the keeper and limits on liability of €10 million for personal injury and €2 million for property damage
- Data storage requirements through DSSAD and a growing legal distinction between technical supervision and future remote driving
- A dedicated remote driving framework is expected through the StVFernLV ordinance

Germany *continued* /

Innovation Environment

Germany's innovation environment is shaped by targeted federal support, strong OEM and Tier 1 investment, and a growing set of pragmatic CAM scale-ups. Public funding is increasingly concentrated on strategically selected Level 4 use cases and SME digitalisation, while private capital is flowing towards teleoperation, autonomous logistics and enabling technologies.

Public funding

- The Future Fund for the Automotive Industry[1] was reduced to around €70.77 million in 2025, down from €81.86 million in 2024.
- Flagship federal projects remain well funded, including ATLAS-L4 (at €59.1 million), AUTOtech.agil (at €25 million) and KIRA (KI-basierter Regelbetrieb autonomer On-Demand-Verkehre: AI-Based Regular Operation of Autonomous On-Demand Transport Services) (€2.2 million).
- The Port Digital Testbed Funding Programme (Förderprogramm für Innovative Hafentechnologien, IHATEC) was initially funded with €63 million and has continued to support port automation and the development of terminal logistics.
- Public policy is increasingly focused on infrastructure, connectivity and digital transformation, rather than subsiding hardware more broadly.

Private investment

- Vay secured a €34 million venture loan from the European Investment Bank in late 2024 to support teledriving expansion.
- Vay also received a strategic investment from Grab (the market leader in taxi and ride-hailing app in Singapore) including an initial US$60 million tranche, with potential for this to rise to US$410 million as milestones are met.
- FERNRIDE extended its Series A by €18 million in 2025, bringing the total round to €75 million.
- DeepDrive raised €30 million in Series B in 2024.
- Germany's industrial incumbents are also investing heavily, with Bosch expecting €3 billion in software-defined vehicle (SDV)-related vehicle computer revenue by 2026, and ZF (the global supplier of advanced mobility products and systems) securing orders for more than 12 million of its ProAI controller units.

Testing, Trials and Commercial Deployment

Germany has one of the broadest CAM testing ecosystems in Europe, combining public-road corridors, controlled environments, digital twins and cross-border interoperability projects. Commercial activity is strongest in Level 3 passenger vehicles, autonomous logistics and public transport shuttles, with industrial and confined-domain automation also advancing quickly.

On-road

- Germany is the leading global market for commercially available Level 3 passenger AV systems.
- Mercedes-Benz Drive Pilot is now approved for operation at up to 95 km/h on German motorways, while BMW Personal Pilot L3 is commercially available for around €6,000 and operates up to 60 km/h.
- Public transport and shuttle activity is progressing through projects such as KIRA, KelRide and MOIA/ALIKE, with Germany prioritising integration into existing public transport networks over pure robotaxi deployment.
- Autonomous freight is advancing through ATLAS-L4, which has validated Level 4 hub-to-hub trucking on public motorways.
- Germany also has an important teleoperation bridge model, acting as a link between remote operators and automated vehicles run by Vay, which is already operating teledriven car delivery services.

Off-road

- The 'confined domain' (off-road) and industrial automation are proving more commercially mature in the near term.
- In agriculture, Claas and AgXeed are commercialising autonomous AgBot tractors for field operations.
- In industrial logistics, BMW's iFactory uses large fleets of autonomous mobile robots supported by digital twin infrastructure and private 5G connectivity.
- The ANITA (Autonome Innovation im Terminalablauf: Autonomous Innovation in Terminal Operations) project has demonstrated autonomous truck operation in terminal logistics, with potential efficiency gains of around 40%.
- Port and terminal automation is also progressing through funded testbed activity and modular logistics concepts.

Country Dashboard /

Israel

Israel has built a highly distinctive CAM position through strong state coordination, a deep mobility start-up ecosystem, and global leadership in automotive software, sensing and cybersecurity. Its main strength is not large-scale domestic vehicle manufacturing, but the ability to generate high-value AV technologies and move them through regulatory sandboxes into public transport, logistics and industrial applications.

CAM Vision

Israel treats CAM as a national strategic priority, coordinated through the Fuel Choices and Smart Mobility Initiative within the Prime Minister's Office and supported by cross-ministerial action. The current roadmap is pragmatic and phased, with regulation and deployment tied to operational evidence, such as kilometres travelled and safety performance rather than fixed dates alone.

Special Mentions

- Israel is a global leader in automotive cybersecurity, with cyber compliance treated as a precondition for AV operation and reinforced through specialist centres such as CyITS in Beersheba.
- Israel is also a pioneer in the formal regulatory acceptance of simulation, using the Cognata platform and digital twins of Israeli roads to validate edge cases before deployment on public roads.
- The country's strongest global technology anchor remains Mobileye, whose technology is now deployed in more than 230 million vehicles worldwide.
- Israel's biggest structural advantage is its ability to convert defence-grade software, sensing and cyber expertise into commercial CAM products which have global reach.
- The main remaining gap is the absence of a permanent large-scale commercial licensing regime beyond the current trial-permit framework.

Policy and Regulation

Israel's regulatory model combines international vehicle standards with a tailored domestic framework for autonomous operations. The Law to Amend the Traffic Ordinance (No. 130) (published in March 2022) created the legal basis for driverless testing and trial operations, while the current system continues to rely on time-limited permits as the country works towards a permanent commercial licensing regime.

Priorities

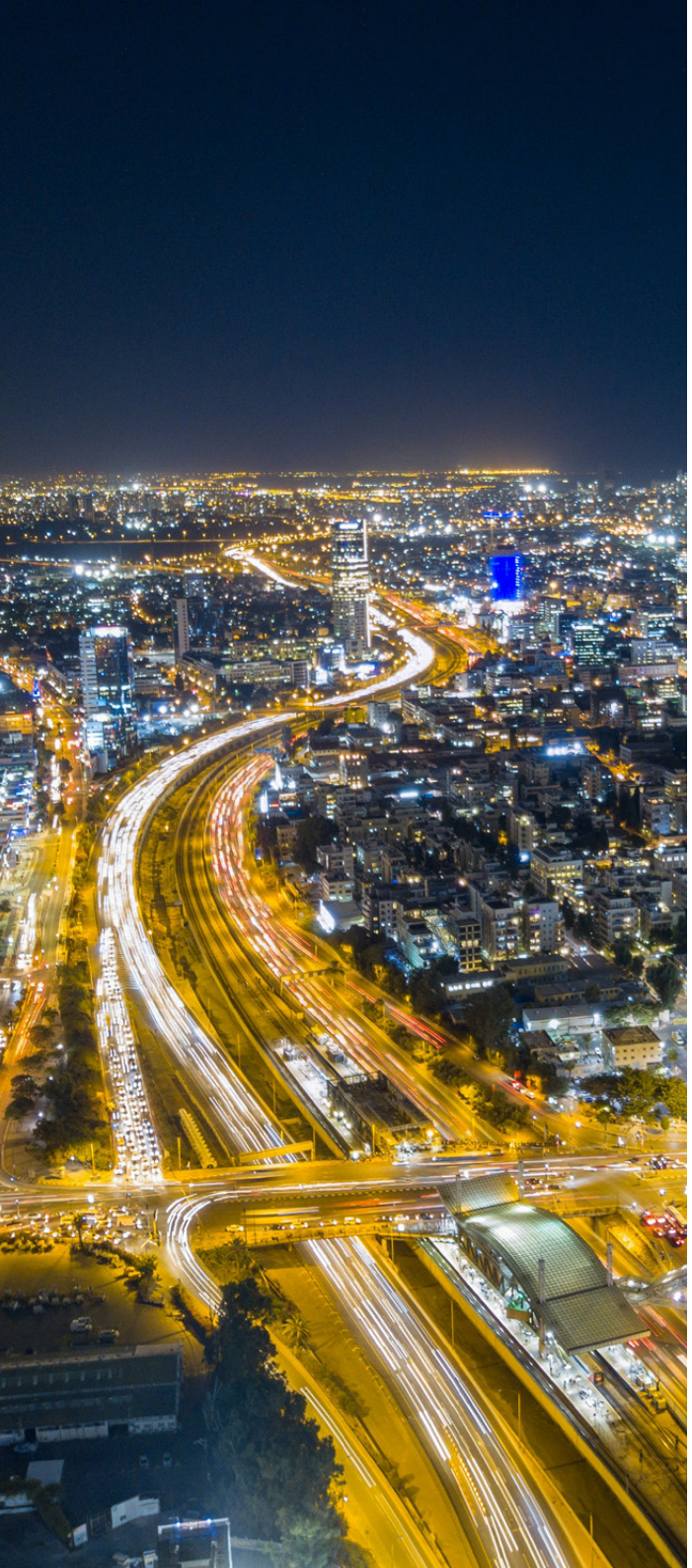
- CAM is treated as a national economic and strategic priority, with a focus on retaining intellectual property, talent and export strength in mobility technologies.
- The government is prioritising autonomous public transport to address problems of severe congestion and chronic driver shortages.
- Cybersecurity, simulation and remote supervision are treated as core safety enablers, not optional add-ons.

Strategic direction

- Government Resolution No. 2316 allocated around NIS 250 million (circa £55 million) for the 2017–21 period (five full years) to help establish the ecosystem.
- The current 2024–26 roadmap is centred on the Autonomous Public Transportation initiative and a phased transition from trial operation to commercial driverless services.
- Israel uses a dynamic roadmap based on distance travelled and safety thresholds, including a key 100,000 km validation benchmark for progression towards Level 4 commercial operation.

Regulation

- Driverless testing and trial operations under Amendment No. 130, supported by operation permits granted by the National Traffic Commissioner
- Public-road autonomous bus and shuttle trials under a defined permit regime, with mandatory oversight by a control centre
- A no-fault bodily injury model under the Road Accident Victims Compensation Law, with compensation through compulsory insurance, regardless of fault
- Operational liability assigned to the permit holder, with property damage remaining subject to general tort law and possible subrogation against manufacturers
- Mandatory teleoperation and remote supervision requirements through a manned control centre for all driverless operations



Israel *continued* /

Innovation Environment

Israel's CAM innovation environment is built on strong direct public funding, deep venture capital activity and a globally connected R&D ecosystem. The market is especially strong in computer vision, sensor fusion, mapless driving, teleoperation and automotive cybersecurity, with start-ups scaling through partnerships with global OEMs and Tier 1 suppliers.

Public funding

- The Israel Innovation Authority and public sector partners allocated NIS 61 million to four autonomous bus consortia to deploy commercial autonomous bus lines.
- In 2024, the Israel Innovation Authority launched a NIS 44 million initiative to establish national data infrastructures, including support for transport data resources.
- Public grants typically cover around 50% of approved R&D expenditure for eligible high-risk projects.
- Israel also uses a conditional-loan-style model for deep-tech start-ups, where repayment is usually triggered only if commercial success is achieved.

Private investment

- Israel remains the world's fourth-largest mobility start-up hub, with cumulative mobility-sector investment of more than US$30 billion since 2010.
- Israeli tech companies raised around US$12.2 billion in 2024, and US$9.3 billion in the first half of 2025 alone.
- Major corporate investments include US$39 million for Addionics (a start-up making EV battery components) and a an US$80 million NRE (non-recurring engineering) deal with Innoviz (a LiDAR and perception software manufacturer) and the wider strategic scaling of companies such as Mobileye, Upstream and Ottopia.
- The market has shifted from broad start-up expansion towards larger, higher-confidence rounds for proven technologies and scale-ups.

Testing, Trials and Commercial Deployment

Israel has built a tiered testing and deployment system that brings together under one roof simulation, closed-course validation, cybersecurity and public-road operation. Commercial maturity is strongest in autonomous buses, geofenced shuttle services and certain industrial applications, while wider consumer and freight deployment remains at an earlier stage.

On-road

- Israel is prioritising autonomous public transport, with four major consortia advancing autonomous bus and shuttle deployment.
- The flagship public-road example is Imagry and Nateev Express on Line 5 in Nahariya, which became the first licensed commercial autonomous bus line to operate on public roads in the country.
- The Metropolin consortium is also active, combining Karsan vehicles, ADASTEC software and Israeli teleoperation capability.
- Israel's on-road robotaxi and AV-taxi activity is not commercially advanced, although Mobileye's Tel Aviv pilot remains active, and the draft bill for Shared Transportation Law (approved in January 2026 by the Ministerial Committee for Legislation) creates a more enabling framework for future services.
- Freight and logistics deployments are still limited on public roads, with more emphasis so far being placed on enabling technologies and pilot-zone preparation rather than scaled commercial service.

Off-road

- Autonomous systems are most advanced in Israel's maritime and logistics sectors, where port operations use semi-autonomous AGVs.
- The Sheba Medical Centre operates autonomous shuttles across its 200-hectare campus, making it a key off-road passenger use case.
- Haifa Bayport is a major example of industrial automation, with eight autonomous ship-to-shore cranes and automated rail-mounted gantry cranes already in operation.
- In agriculture, Bluewhite has developed retrofit autonomy kits and, by 2025, was managing more than 150,000 acres of autonomous farming activity in the USA while continuing to use Israel as a proving ground.
- Israel's off-road logistics and port autonomy remain partly hybrid in practice, but they represent some of the clearest near-term commercial pathways.

Country Dashboard /

The United States of America

The USA remains one of the most active CAM markets globally, combining a strong technology base, deep private capital, large-scale testing and live commercial deployments across multiple use cases. Its key strength is the breadth of activity across robotaxis, freight, shuttles and industrial autonomy, although the lack of a unified federal framework continues to create complexity for scaling across states.

CAM Vision

The USA does not currently have a national CAM roadmap and continues to advance through a combination of federal policy signals and state-led regulation. At the federal level, CAM sits within a broader innovation and technology agenda, and the 2025 AV Framework is focused on three priorities: improving the safety of AV operations on public roads, removing unnecessary regulatory barriers, and enabling commercial deployment. If passed, the Autonomous Vehicle Acceleration Act would require the Department of Transportation to develop a national roadmap within 12 months.

Special Mentions

- The USA is a global leader in AV simulation and virtual validation.
- Around 73 million AV miles (L4) were driven on public roads in the USA between June 2024 and May 2025, compared to well under 20,000 miles in total in Europe.
- Safety performance is becoming a stronger differentiator, with Waymo reporting significantly lower injury-causing crash rates than human benchmarks in its operating domains.
- The main structural challenge remains fragmentation across regulation, liability, infrastructure readiness, and deployment conditions between states.

Policy and Regulation

The USA regulatory landscape remains active but fragmented. There is still no unified federal AV framework, meaning that policy and regulation continue to develop through a mixture of federal action and state-by-state legislation. This has enabled rapid experimentation and deployment in some states, but harmonisation remains a major challenge to scaling across the country.

Priorities

- Commercial deployment of AVs across multiple use cases, including robotaxis, freight and shuttles
- Safety oversight of AV operations on public roads
- Reducing unnecessary regulatory barriers to innovation

Strategic direction

- There is no national CAM roadmap currently in place.
- Federal direction is guided through the 2025 AV Framework, sometimes referred to as 'AV Policy 5.0'.
- Regulation continues to be heavily led at state level, with growing pressure for greater national harmonisation.

Regulation

- Self-driving pilots with and without a safety driver, in states with approved legislation
- Commercial AV deployment in 26 states with explicit deployment statutes in 2026
- Federal oversight through measures such as AV STEP (the ADS-equipped Vehicle Safety, Transparency, and Evaluation Program), Standing General Order crash reporting, and ongoing FMVSS (Federal Motor Vehicle Safety Standards) rulemaking for AVs
- Increasing alignment, but state-level approaches to liability, insurance and cybersecurity remain inconsistent

The United States of America *continued* /

Innovation Environment

The USA has one of the strongest CAM innovation environments globally, supported by a mature ecosystem of car manufacturers, technology companies, AI firms, infrastructure players, universities, incubators and testbeds. Private capital remains the main driver of market growth, although investment is increasingly concentrating around larger, closer-to-market operators and platforms.

Public funding

- Strengthening Mobility and Revolutionizing Transportation (SMART) Grants programme worth US$100 million annually for fiscal years 2022–26
- Rural Autonomous Vehicle Research Program worth US$25 million, announced in 2025
- Wider support also coming indirectly through programmes linked to transport infrastructure, connectivity and semiconductor resilience

Private investment

- Waymo raised US$5.6 billion in July 2024 and a further US$16 billion in February 2026.
- Waabi raised US$200 million in June 2024 and US$1 billion Series C in January 2026.
- Stack AV secured circa US$1 billion in September 2023.
- Kodiak raised US$150 million in April 2024.
- Applied Intuition raised US$125 million in June 2025.

Testing, Trials and Commercial Deployment

The USA has a broad and mature CAM testing and deployment landscape. The ecosystem now extends well beyond pilot activity, with commercial services operating in selected geographies, and a strong momentum in robotaxis, freight and industrial autonomy. The USA testing base is also evolving towards mixed-reality environments, digital twins and remote-access validation.

On-road

- In the USA, on-road activity is led by robotaxis, freight and shuttle services.
- Waymo, Alphabet's autonomous driving business, operated more than 2,500 vehicles by February 2026 and exceeded 450,000 paid trips per week by December 2025.
- Zoox, Amazon's autonomous vehicle subsidiary, launched public robotaxi services in Las Vegas and San Francisco in 2025 using a purpose-built vehicle without a steering wheel or pedals.
- Freight deployments are progressing through companies such as Aurora and Gatik, while shared shuttles continue to operate through providers such as Beep.

Off-road

- Off-road autonomy is more commercially mature than many on-road use cases, particularly in mining, agriculture, logistics yards and ports.
- Caterpillar and Komatsu are leading the field in mining and quarry autonomy, while John Deere is scaling autonomous agricultural machinery.
- Yard and port automation is also advancing through companies such as Outrider, and advanced automated port activity at the Port of Los Angeles.

Country Dashboard /

Canada

Canada has developed a strong CAM position through a safety-first policy approach; targeted innovation support; and specialist strengths in adverse-weather validation, autonomous freight and industrial autonomy. Its main strength is the combination of federal safety leadership and high-value provincial activity, although differing approaches between provinces continue to create a fragmented deployment environment.

CAM Vision

Canada's CAM vision is shaped by a collaborative federalism model, with Transport Canada setting a national safety framework, while provinces determine operational permissions. The current direction links CAM increasingly closely with decarbonisation, particularly through the convergence of automated driving and zero-emission freight.

Special Mentions

- Canada has carved out a distinctive niche in severe-environment and winter-weather validation, supported by Area X.O, ACE and PMG Technologies.
- Area X.O provides an advanced 5G, V2X and cybersecurity testing capability, while PMG remains the main federal compliance testing site.
- Canada's biggest structural challenge remains inter-provincial fragmentation, with very different operating conditions between Ontario, Quebec and British Columbia.
- The country's strongest near-term commercial opportunities appear to be middle-mile freight, adverse-weather validation and industrial autonomy.

Policy and Regulation

Canada's policy and regulatory environment is defined by a federal–provincial matrix. Federally, the market is guided by a safety-first framework and increasingly by systems-based regulation, while provinces have adopted a wide variety of approaches to testing and deployment, ranging from active commercial pilots in Ontario to statutory prohibition in British Columbia.

Priorities

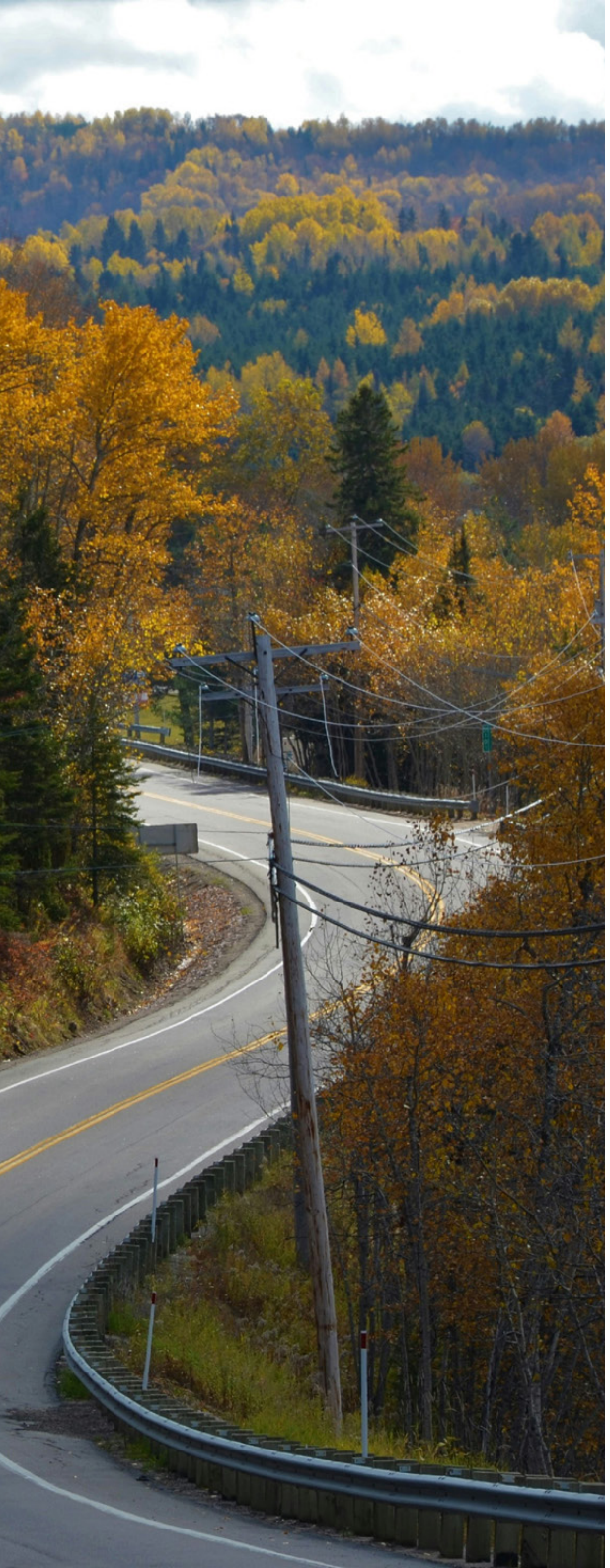
- Safe integration of CAM technologies while maintaining or improving transport system safety
- Greater use of Safety Management Systems and audit-based regulation for increasingly complex ADS technologies
- Linking CAM with decarbonisation and zero-emission freight as part of a modernised transport system

Strategic direction

- The country is guided federally by *Canada's Safety Framework for Connected and Automated Vehicles 2.0*.
- There is no fully harmonised national operating permit system, with provinces continuing to shape market access and deployment conditions within their own jurisdictions.
- Ontario is positioning itself as the main deployment jurisdiction, while Quebec remains controlled and focused on public transport, and British Columbia remains precautionary and restrictive.

Regulation

- Public-road testing and pilot activity through provincial frameworks, particularly in Ontario and Quebec
- A ten-year automated commercial motor vehicle pilot in Ontario, supporting Level 4 trucking and including fully driverless operations with remote oversight
- A mature insurance and liability approach through the single-policy model, supported by subrogation and, in Quebec, a no-fault public insurance regime
- Growing support for simulation, data reporting and cybersecurity through tools such as the Vehicle Cyber Security Assessment Tool



Canada *continued* /

Innovation Environment

Canada's innovation environment is built around targeted industrial policy, strong Tier 1 and software anchors, and a growing set of high-value CAM scale-ups. Public funding is being directed towards enabling infrastructure, supply chain capability and AI, while private investment is strongest in freight, simulation and software-defined vehicle technologies.

Public funding

- Strategic Innovation Fund investments include CA$240 million for AI company Cohere, CA$169.4 million for Linamar (a car parts manufacturer), and continued support for the MICA (Mining Innovation Commercialization Accelerator) mining autonomy network, including a CA$40 million allocation.
- Additional public support includes CA$7 million from FedDev Ontario and CA$4 million from OVIN (the Ontario Vehicle Innovation Network) for Project Arrow 2.0.
- Ontario's OVIN has become a major orchestration engine, including a CA$8 million investment in Technology Pilot Zones to help more than 40 SMEs validate technologies in live environments.
- Broader enabling support includes CA$135.8 million through Clean Ports funding, and earlier ACATS allocations of CA$2.9 million to support connectivity, automation and the development of standards.

Private investment

- Waabi raised US$200 million in in June 2024 and a further US$1 billion Series C in January 2026, making it one of Canada's leading CAM scale-ups.
- Gatik is scaling through its commercial partnership with food retailer Loblaw, supported by strategic equity investment and a planned roll-out of 50 autonomous trucks in the Greater Toronto Area by 2026.
- Magna, BlackBerry QNX and other industrial anchors continue to provide foundational capability in compute, software and systems integration.
- Canada's ecosystem is especially strong in AI-first simulation, middle-mile logistics and harsh-environment perception.

Testing, Trials and Commercial Deployment

Canada has built a specialist CAM testing and deployment proposition centred on adverse weather validation, freight and industrial autonomy. Its testing landscape is anchored by Area X.O, ACE (the Automotive Centre of Excellence) and PMG Technologies, while deployments are strongest in middle-mile freight and off-road industrial use cases.

On-road

- Canada has strong public-road and controlled-environment testing, particularly in Ontario and Quebec, although deployment remains fragmented across its provinces.
- The most mature on-road commercial use case is middle-mile freight, led by Gatik and Loblaw, with plans to scale to 50 autonomous trucks in the Greater Toronto Area by 2026.
- Passenger shuttle activity is continuing through pilots such as Aurrigo's Auto-Shuttle in Ottawa.
- Last-mile activity is also emerging, including Magna's pilot of autonomous delivery robots in Toronto.

Off-road

- Canada is a global leader in off-road autonomy, particularly in mining.
- Suncor operates one of the world's largest single-site autonomous haulage fleets in the Alberta oil sands, while Teck is advancing major autonomous fleets at Elkview and Highland Valley Copper mines.
- Yard automation is progressing through companies such as NuPort Robotics and Outrider.
- Port automation activity is emerging, although labour opposition remains a major barrier to wider roll-out.

Country Dashboard /

China

China remains one of the most advanced and fastest-scaling CAM markets globally, combining strong national direction, large-scale public infrastructure investment, extensive real-world testing and rapidly expanding commercial deployments. Its core strength is the integration of vehicle, road and cloud systems at city and national level, supported by a highly structured regulatory and industrial ecosystem.

CAM Vision

China's CAM vision is highly coordinated and long-term, with Intelligent Connected Vehicles (ICVs) employed as a national priority through multi-ministerial action, structured standards development and the implementation of city-level pilots. The 2023 National ICV Standard System roadmap sets out an aggressive path towards adopting more than 100 standards by 2025 and more than 140 by 2030, with connectivity announced in 2025 pointing to 95% 5G penetration in passenger cars and 98% network coverage on urban roads.

Special Mentions

- China has one of the world's most advanced simulation and digital-twin ecosystems, supported by platforms from Baidu, Huawei, Tencent and others.
- Beijing's High-Level Automated Driving Demonstration Zone is among the world's most ambitious AV zones, with expansion from 160 km² in 2023 towards an ultimate goal of 3,000 km².
- China's strongest structural differentiator is the integration of regulation, infrastructure, cloud systems and commercial deployment within a single national ecosystem.
- Key remaining gaps include the lack of a unified national liability regime and the absence of a single nationwide commercialisation law for full AV roll-out.

Policy and Regulation

China's policy and regulatory environment is mature and highly interventionist, combining national standards, ministerial guidance and city-level implementation. The market has already moved beyond early-stage trials into structured commercial deployment, although full national harmonisation on liability and commercialisation law is still evolving.

Priorities

- ICVs are treated as a strategic national priority which is tied to technological advancement, industrial competitiveness and the transformation of future mobility.
- There is a strong emphasis on coordinated national infrastructure, including V2X, cloud control systems, 5G connectivity and intelligent roadside infrastructure.
- Cybersecurity, data governance, software integrity and safety validation are core priorities across the CAM lifecycle.

Strategic direction

- Progress is guided by the National ICV Standard System Roadmap (2023 Edition), and supported by national ICV standards, VRCI policy and city-level pilot zones.
- China is moving from isolated pilots towards an integrated national VRC ecosystem, with 20 VRCI pilot cities selected in 2024.
- National roll-out is increasingly supported by local regulatory sandboxes in cities such as Beijing, Shanghai, Shenzhen and Hangzhou.

Regulation

- Trial and commercial deployment are both regulated through a combination of national guidance and city-level frameworks.
- By August 2024, China had established 32,000 km of autonomous-vehicle testing roads and issued 16,000 test licences.
- National Level 3 approvals were issued in December 2025 for the Deepal SL03 and ARCFOX Alpha S vehicles, marking a major step from pilots into formal higher-level deployment.
- Mandatory national standards now cover cybersecurity, OTA software updates and data storage, while strict data sovereignty rules govern local storage and cross-border transfers of data.
- China still lacks a single national commercialisation law and an explicit nationwide liability framework for full AV deployment.

China *continued* /

Innovation Environment

China's innovation environment is broad, well funded and deeply integrated across public policy, industrial capital and private investment. Public support is focused on VRC infrastructure, intelligent roads, cloud platforms and strategic industrial capability; while private investment is concentrated in robotaxis, logistics, compute, LiDAR and smart EV platforms.

Public funding

- China is treating CAM infrastructure as a public utility, financing it through government-backed programmes, special bonds and city-led infrastructure platforms.
- Wuhan approved a ¥17 billion VRCI infrastructure project covering roadside units, MEC (multi-access edge computing) nodes, a city-level cloud control platform and a high-definition digital twin.
- Beijing's Yizhuang demonstration zone continues to receive public support for intelligent intersections, roadside LiDAR and cameras, mapping and compute hardware.
- National and local public investment is also supporting vehicle-road-cloud integration (VRCI) pilots, cloud control systems and smart-road deployment at scale.

Private investment

- China continues to attract major late-stage CAM funding, including DeepBlue Auto's US$867 million round and Neolix's US$600 million Series D.
- Pony.ai was listed in Hong Kong in November 2025 and raised HK$6.45 billion (around US$830 million).
- Huawei is investing more than US$1 billion per year in autonomous driving compute and ADS platforms.
- China's ecosystem is also supported by large cross-industry partnerships, including Toyota–Pony.ai, Volkswagen–XPeng and Audi–SAIC.

Testing, Trials and Commercial Deployment

China has one of the world's most extensive CAM testing and deployment ecosystems, combining large city-scale real-world zones, simulation-first validation, and significant live commercial operations. Its main strength is the ability to scale from structured testing into citywide operations through integrated VRC systems.

On-road

- China is a global leader in robotaxi and on-road autonomous deployment, with major activity in passenger services, shuttles and logistics.
- Baidu's Apollo Go had delivered more than 17 million cumulative rides by late 2025 and was completing around 250,000 driverless rides per week, with 3.1 million driverless rides in Q3 2025 alone.
- Baidu's sixth-generation Apollo RT6 robotaxi has a reported production cost of ¥250,000 (around US$35,000), supporting a strong path to fleet-scale economics.
- Pony.ai reported US$25.4 million in Q3 2025 revenue and is targeting a fleet of more than 1,000 robotaxis in 2025, rising to 3,000 in 2026.
- WeRide reported ¥171 million in Q3 2025 revenue and continues to scale robotaxis, robobuses and robovans.
- China also has strong commercial activity in autonomous delivery and logistics, particularly through players such as Neolix.

Off-road

- China is a global leader in off-road autonomy, particularly in mining, ports and industrial logistics.
- By July 2025, China was operating 2,090 autonomous mining trucks, the largest fleet globally.
- EACON had deployed more than 1,800 active autonomous mining trucks by late 2025, with fleets covering more than 50 million autonomous kilometres.
- Port automation is also highly advanced. Tianjin Port's automated terminal is operating as a zero-emission commercial site, and Westwell's Q-Truck has already been commercialised for port operations.
- Off-road logistics and industrial compounds are also seeing structured deployment of AV technology under China's wider V2X and cloud control ecosystem.

Country Dashboard /

Japan

Japan has built one of the most mature CAM positions globally, using a highly coordinated state-led model focused on social implementation rather than purely commercial experimentation. Its main strength is the alignment of CAM with national socio-economic needs – particularly rural mobility, ageing demographics and freight resilience – all supported by strong regulatory maturity and an advanced testing capability.

CAM Vision

Japan's CAM vision is shaped by the need to address a decline in rural transport, a shrinking workforce, and the logistics shock created by the 2024 overtime cap for truck drivers. The roadmap is moving from isolated demonstrations to broad social implementation, with Level 4 buses, autonomous freight and infrastructure-assisted autonomy functioning as critical national systems rather than niche technology pilots.

Special Mentions

- Japan's strongest differentiator is the that way CAM is framed as essential public and logistics infrastructure rather than a premium consumer technology.
- The Dynamic Map Platform provides a centralised HD 3D map layer covering approximately 35,000 km of expressways, helping to avoid the fragmentation seen in other markets.
- Japan is also a leader in cybersecurity regulation, having been the first country to codify UN R155 and UN R156 into national law, and launching the JC-STAR (Japan Cyber-Security Technical Assessment Requirements) labelling scheme in 2025.
- Japan's sensor and mapping strengths remain globally significant: Sony has a 48% share of the CMOS image sensor global market, and Dynamic Map Platform's expansion to 1.8 million km of mapped coverage globally.
- The main commercial challenge remains moving from tightly controlled, low-speed deployments into broader mixed-traffic and higher-speed services whilst keeping the economics sustainable.

Policy and Regulation

Japan has one of the most codified CAM regulatory systems in the world, built around amendments to its core national traffic and vehicle legislation rather than ad hoc exemptions. Level 4 'Specified Automated Operation' became fully legal in April 2023, and the regulatory model now supports route-specific permissions, remote supervision and structured paths to commercial operation.

Priorities

- CAM is treated as a critical socio-economic response to demographic decline, rural isolation and labour shortages in the logistics sphere.
- The '2024 Problem' refers to logistical disruptions caused by two separate pieces of historical legislation (one relating to overtime, and the other to total working hours and rest periods), each scheduled to apply to truck drivers from April 2024, and having the effect of significantly curtailing their working hours. In freight this is a major driver of labour shortages, with projected transport-capacity shortfalls of 34% by 2030 if no countermeasures are taken.
- Japan is prioritising autonomous buses, municipal MaaS (Mobility as a Service) and heavy-duty freight over mass-market private AV ownership.

Strategic direction

- The annual Public-Private ITS (intelligent transport systems) Initiative/Roadmap and the 'RoAD to the L4' programme provide the main strategic direction.
- In FY2024–25, Japan was scaling autonomous mobility services to around 50 locations and activating a 100 km autonomous truck priority lane on the Shin-Tōmei Expressway.
- The strategy aims to expand Level 4 services to more than 100 municipalities from FY2026 onward.
- Expo 2025 Osaka and the Toyota Woven City was being used as flagship showcases for national CAM capability.

Regulation

- Vehicle type approval for Level 3 systems, including Honda's world-first certified Level 3 'Traffic Jam Pilot', a low-speed conditional automation feature enabling hands-off driving in congestion.
- Level 4 public-road deployment under the 'Specified Automated Operation' framework from April 2023
- Route-by-route permissions granted by Prefectural Public Safety Commissions, supported by remote 'Specified Automated Operation Supervisors'
- Compulsory automobile liability insurance and a strict-liability model for operators under the Act on Securing Compensation for Automobile Accidents
- Future work on a Next-Gen Highway Code, cross-jurisdictional licensing and AI-native safety governance for 2026–30

Japan *continued* /

Innovation Environment

Japan's innovation environment is strongly shaped by public mission-oriented funding, strong corporate venture participation and deep industrial R&D in its automotive and electronics sectors. Public funding is concentrated on implementation, validation and the national data ecosystems, while private investment is increasingly flowing into open software platforms, AI-native autonomy and the automation of logistics.

Public funding

- The RoAD to the L4 programme receives more than JP¥6 billion annually to accelerate commercialisation across four major themes.
- The third phase of the SIP (Strategic Innovation Promotion Program) is allocating approximately JP¥2.5–3.0 billion per theme per year to build the Japan Mobility Data Space and mobility digital twins.
- Public funding is also supporting national implementation targets for rural mobility, mixed-traffic services and autonomous trucking on expressways.
- Wider support also comes through programmes such as the Green Innovation Fund and the Digital Garden City Nation Initiative.

Private investment

- The company Tier IV extended its Series B in June 2024 by JP¥8.5 billion (US$54 million), bringing the total Series B to JP¥20.7 billion (US$132 million) and cumulative funding to US$243 million.
- Turing reportedly closed a Series A of nearly JP¥15.3 billion (US$99 million) by late 2025.
- Japan's nine leading car manufacturers plan combined R&D spending of JP¥3.976 trillion for FY2026, with Toyota alone accounting for JP¥1.37 trillion.
- The Woven City is a JP¥10 billion living lab for autonomous mobility, robotics, AI and urban technologies at the foot of Mount Fuji, primarily funded by Toyota.
- Japan's funding model remains heavily reliant on corporate venture capital, with major OEMs and conglomerates investing for long-term industrial continuity rather than purely financial return.

Testing, Trials and Commercial Deployment

Japan has a highly developed testing and deployment system that combines world-class proving grounds, digital validation, infrastructure-assisted autonomy and structured public-road operations. Commercial maturity is strongest in low-speed rural mobility, public transport services, automated logistics support and industrial autonomy, while more cautious progress is seen with urban robotaxis and broader private autonomy.

On-road

- Japan already has live Level 4 public-road operation, with Eiheiji Town operating the country's first commercially licensed Level 4 service from May 2023.
- Eiheiji's service runs seven-seater electric vehicles on a 2 km dedicated corridor at up to 12 km/h, showing that Japan has moved beyond pilots into regulated operation, although within tightly controlled ODDs.
- BOLDLY has become Japan's leading autonomous-fleet operator, running Level 4-ready services at Haneda Innovation City and across multiple municipalities.
- Sakai Town is one of Japan's most established long-term autonomous public transport deployments, and is currently transitioning from commercial Level 2 service to Level 4.
- Autonomous trucking is centred on the Shin-Tomei Expressway in the RoAD to the L4 project, designating it as Japan's primary corridor. It is underpinned by the 'Theme 3' heavy-duty truck consortium (Isuzu, Hino, Mitsubishi Fuso and UD Trucks).
- Urban robotaxis remain a frontier case, with the Honda–GM–Cruise venture targeting a Tokyo launch and a fleet of 500 vehicles, but still at the mapping and validation stage rather than in active deployment as yet.

Off-road

- Japan's industrial and controlled-environment autonomy is more commercially mature than its open-road urban autonomy.
- In logistics, automated forklifts from Toyota Industries are already in full-scale operation at distribution centres for firms such as Coca-Cola and Kao.
- In construction, Komatsu has deployed more than 700 autonomous haulage system units globally, while Kajima completed the world's first fully automated mountain tunnel excavation in 2024.
- In agriculture, Kubota and Yanmar have commercialised both supervised and unsupervised autonomous tractors, while Kubota has also showcased a hydrogen-powered Level 4 concept tractor.
- Japan's agricultural robot market was valued at around US$368 million in 2024 and is projected to grow at more than 18% compound annual growth rate.

Country Dashboard /

South Korea

South Korea has built a strong CAM position through sustained national funding, a structured regulatory pathway, and deep industrial capability across vehicles, electronics, connectivity and AI. Its main strength is the combination of pan-ministerial coordination, the anchoring of OEM, and a staged route from testbeds to city-scale living labs – although large-scale commercial normalisation beyond zone-based pathways is still being finalised.

CAM Vision

South Korea treats CAM as both an priority when it comes to industrial competitiveness and a wider public-service innovation agenda, linking automated driving to the resilience of exports, AI leadership and strong domestic manufacturing. The K-Mobility Global Leadership Strategy sets out a staged pathway to attaining legal and institutional readiness by 2026, commercial-stage deployment by 2027 and global leadership by 2030.

Special Mentions

- South Korea's strongest differentiator is its state-orchestrated full-stack commercialisation model, which combines policy, funding, regulation, testbeds, city demonstrations and OEM partnerships into a single progression pathway.
- Gwangju is becoming Korea's first citywide pilot operation zone from 2026, with 200 demonstration vehicles planned in a KRW 61 billion (US$40 million) programme.
- K-City remains the national technical verification anchor, combining physical testing, hybrid virtual experimentation and explicit cybersecurity assessment.
- Korea's strongest near-term applications are public-service mobility, freight automation and ODD-bounded service models, rather than consumer-owned Level 4 vehicles.
- The key remaining challenge is turning today's permit- and zone-based deployment model into a fully standardised national commercial regime for Level 4+ services.

Policy and Regulation

South Korea's CAM framework combines a model of self-certifying vehicles, involving structured permits, pilot zones and temporary approvals that bridge the gap between testing and early commercial services. The legal foundation is already mature enough to support trials, designated pilot operations and some paid services, but the wider national regime for fully normalised Level 4 operations is still evolving.

Priorities

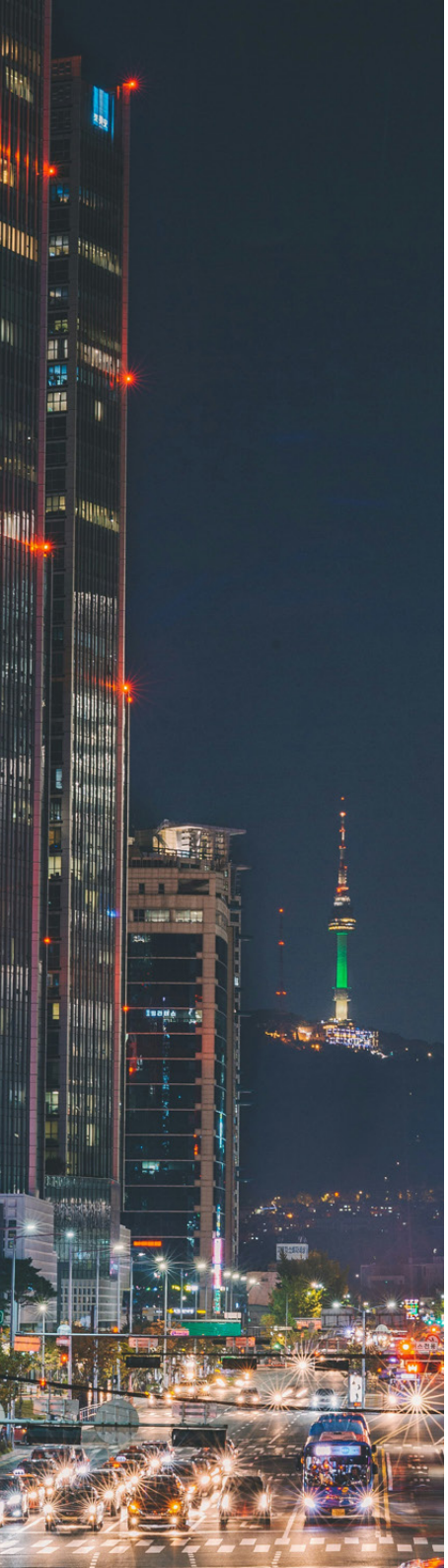
- CAM is positioned as a strategic national capability tied to Korea's future-vehicle competitiveness and its agenda for broader AI transformation.
- The K-Mobility strategy aims to mass-produce automated vehicles by 2028, and close its technology gap with the USA and China by 2030.
- Priority is being given to public-service applications, automated logistics and city-scale demonstrations as constituting the main path to deployment.

Strategic direction

- The MOTIE (South Korea Ministry of Trade, Industry and Energy) K-Mobility Global Leadership Strategy outlines Korea's medium- to long-term plan for automated mobility, centred on a ten-year vision in which automated driving becomes normalised and autonomous taxis and buses are deployed at scale:
  - Phase 1 (2025–27) establishes Gwangju as a demonstration city, expands motorway freight demonstrations and launches Hwaseong Autonomous Driving Living Lab public-service use cases;
  - Phase 2 (2028–29) broadens the deployment of robotaxis, shuttles and logistics with more mature liability and insurance arrangements;
  - Phase 3 (2030+) is intended to introduce a national permitting regime and more structured mechanisms for licence renewal and cancellation.

Regulation

- Temporary autonomous driving permits for real-road testing and progression into pilot operation zones
- Paid services in limited cases through the limited transport licence for autonomous driving, subject to insurance, limits on the number of vehicles, local permissions and onboard safety-driver requirements
- A formal cybersecurity compliance pathway through CSMS (cybersecurity management system) certification and vehicle conformity checks
- Insurance endorsements for automated operation and paid transport services, with evolving thinking as regards liability allocation for Level 4 and above
- Ongoing refinement of the end-state legal model for scaled commercial AV services, especially in the areas of liability, remote supervision and national permissions beyond zone-based pathways



South Korea *continued* /

Innovation Environment

South Korea's innovation environment is supported by large-scale public R&D, strong policy finance, tax support and major OEM-led industrial investment. Public funding is designed to move technologies by means of development, demonstration and city-scale service validation, while private capital is directed increasingly towards autonomy-enabling software, freight automation, simulation and AI infrastructure.

Public funding

- South Korea's flagship automated-driving R&D programme carries total funding of KRW 1.1 trillion (US$729 million) up to and including 2027.
- A dedicated future-mobility innovation fund of KRW 50 billion (US$33 million) supports the wider strategy.
- Recent enabler investments include KRW 21.6 billion (US$14 million) in late 2025 for Korean-style SDV (software-defined vehicle) development and end-to-end AI models.
- More than KRW 60 billion (US$39 million) over three years is being spent on city-based real-world demonstrations to validate AI systems and accelerate commercialisation.
- The expansion of national AI infrastructure also includes plans for more than 2,000 GPUs dedicated to AV development.

Private investment

- Private mobility-start-up VC softened in 2025, with sector investment totalling KRW 224.6 billion (US$149 million) for the period January to November, down 35% year-on-year.
- Despite this, RideFlux (a start-up that develops full-stack software technology for autonomous driving) is progressing towards a pre-IPO raise of KRW 33 billion (US$22 million).
- MORAI (which delivers high-fidelity digital twin simulation) previously secured KRW 30 billion (US$20 million), evidencing a continued appetite for simulation and validation tooling.
- Hyundai remains the main industrial anchor; a planned KRW 500 billion (US$331 million) capital increase in 42dot (a start-up focused on autonomy-enabling software and AI, acquired by Hyundai in 2022) will strengthen its autonomy-enabling software and AI capability.
- Korea's funding pattern increasingly favours deployable autonomy enablers, logistics applications and platform components over longer-horizon consumer AV services.

Testing, Trials and Commercial Deployment

South Korea has one of the clearest staged deployment pathways in the market, moving from controlled validation at K-City (the world's first 5G-based autonomous vehicle testing centre) to pilot operation zones and then to city-scale living-lab deployment. Commercial activity is strongest in public-service shuttles, automated taxis, motorway freight trials, port and terminal automation, and building-integrated last-mile robotics.

On-road

- Public-road deployment in South Korea is already substantial, with more than 55 pilot operation zones active as of early 2026.
- In 2024, these zones supported around 490,000 km of operation (including 460,000 km on expressways), totalling approximately 130,000 user trips and with 38 vehicles operating under paid-transport special permissions.
- Seoul launched Korea's first late-night automated taxi pilot in Gangnam in September 2024, later expanding it following safety verification.
- Seoul also introduced Korea's first self-driving shuttle without a driver's seat on a 2.8 km circular route in Cheonggyecheon, although still as a supervised operational service rather than a paid commercial route.
- Automated freight truck trial operations have been expanded to all 44 highway routes, covering 5,224 km, from March 2025, showing that line-haul freight is one of the main near-term scaling pathways.

Off-road

- Off-road and controlled-environment automation is also well established, particularly in ports, terminals, warehouses and selected airport settings.
- Busan New Port is the flagship example, combining automated terminal systems, remote-controlled cranes and automated-guided-vehicle-style horizontal transport.
- Incheon International Airport operates indoor automated people-mover services and cart-style robots.
- In residential and building-integrated last-mile logistics, Samsung C&T and Neubility have expanded door-to-door autonomous delivery robots in apartment complexes.
- Korea also displays industrial automation in mining and warehousing, including autonomous limestone haulage and guided-vehicle activity in fulfilment centres.

Country Dashboard /

United Arab Emirates

The UAE has become one of the most visible CAM markets in the Gulf, combining strong political backing, fast-moving emirate-level regulation and a clear willingness to import mature international AV capability. Its main strength is the way that Dubai and Abu Dhabi are using different but complementary models – Dubai as a target-led deployment engine and Abu Dhabi as a platform- and ecosystem-led scaling environment.

CAM Vision

The UAE does not operate through a single detailed federal CAM roadmap; instead, practical delivery is led mainly by Dubai and Abu Dhabi, with federal policy providing the wider digital, AI and transport backdrop. Dubai is pursuing a strong deployment-first model through the Roads & Transport Authority and its target for 25% of all transportation trips to be smart or driverless by 2030; Abu Dhabi is building a more structured operating and assurance stack through AViTOMS, the SAVI (Smart and Autonomous Vehicles Industry) cluster and the planned Abu Dhabi Autonomous Vehicle Test Hub.

Special Mentions

- The UAE's strongest differentiator is the combination of fast political backing and its ability to mobilise large international operators quickly by means of regulator-led partnerships.
- Dubai is the clearest example of a target-led AV deployment market, while Abu Dhabi is building a more systematised governance and assurance environment through AViTOMS and the AV Test Hub, which is expected to open by the end of 2026.
- Abu Dhabi's AViTOMS platform is especially important, because it acts as a live digital backbone for permitting, oversight, monitoring and eventually commercial operations.
- A major UAE-wide enabler is the emerging Sovereign Mobility Cloud platform for intelligent transport, designed to support in-country data residency, fleet management, HD mapping and digital-twin functions.
- The biggest structural challenge remains the lack of a fully harmonised UAE-wide AV operating regime, particularly pertaining to teleoperation, data interfaces, certification pathways and permit portability across emirates.

Policy and Regulation

The UAE's regulatory model is layered. Federal law sets the baseline for vehicle registration, insurance and general road traffic compliance, while emirates are shaping AV-specific operating rules, permits and deployment conditions. Dubai has the most explicit dedicated AV legislation through Law No. (9) of 2023 (Regulating the Operation of Autonomous Vehicles in the Emirate of Dubai) and its 2025 implementing regulation, while Abu Dhabi is using a permit-, platform- and oversight-led model rather than a single published AV law.

Priorities

- The UAE treats CAM as part of a wider smart-city, AI and economic-diversification agenda, with Dubai and Abu Dhabi as the main delivery engines.
- Dubai's clearest strategic target remains the aim of 25% of trips being smart or driverless by 2030.
- Abu Dhabi is prioritising governance infrastructure, commercial robotaxi deployment and ecosystem-building through SAVI and AViTOMS.

Strategic direction

- Dubai is scaling by mode and use case, with specific pathways for taxis, buses, shuttles and automated heavy vehicles.
- Abu Dhabi is scaling through AViTOMS, a permit-led route into commercial operations, and its upcoming AV Test Hub.
- Both emirates are using partnerships with mature international AV suppliers to accelerate deployment, rather than waiting for a large domestic AV stack to emerge.

Regulation

- Public-road AV testing and operation in Dubai through the 2019 test-run framework, Law No. (9) of 2023 and Administrative Resolution No. (939) of 2025.
- Operator-first liability in Dubai, where the licensed operator is the primary accountable party for compensation and can then seek contractual recourse upstream.
- AV operations in Abu Dhabi through staged permits, AViTOMS oversight and route- or use-case-based approvals.
- Mandatory insurance using UAE-licensed insurers, with AV-specific insurance products emerging, especially in Abu Dhabi.
- Important gaps remaining in the areas of teleoperation, public technical standards for virtual validation, and clearer UAE-wide mutual recognition of permits between emirates.

United Arab Emirates *continued* /

Innovation Environment

The UAE's innovation environment is strongest where CAM intersects with challenge funding, sovereign or state-backed venture platforms, and large operational partnerships. Dubai's model is more challenge- and deployment-led, while Abu Dhabi combines ecosystem incentives, test infrastructure and larger market-building platforms.

Public funding

- Dubai's main AV funding instrument is the Dubai World Challenge for Self-Driving Transport, a multi-year competition with a different theme each round. In 2025 it had a US$3 million prize pool linked to self-driving deployment in Dubai Autonomous Zone.
- At the national level, the UAE has introduced a refundable R&D tax credit of 30–50% as of 1 January 2026, improving the economics of AV engineering, mapping and safety work.
- In Abu Dhabi, the Ghadan 21 accelerator programme provides an umbrella funding package of AED 50 billion, while the ADIO (Abu Dhabi Investment Office) Innovation Programme contributes AED 2 billion across strategic growth sectors that can support CAM-adjacent innovation.
- Public funding in both emirates is less about recurring open CAM grants and more about challenge funding, infrastructure, incentives and deployment-linked support.

Private investment

- Dubai's venture-capable ecosystem is supported by the Dubai Future District Fund, while Abu Dhabi's Hub71 platform has helped facilitate around US$2.17 billion in start-up funding across 371 start-ups.
- Abu Dhabi's Mubadala sovereign investment vehicle has demonstrated a strategic interest in AV at a global scale, exemplified by participation in Waymo's US$2.25 billion round and later involvement in its US$16 billion funding round.
- Private capital in the UAE CAM space is most visible through strategic operating partnerships and direct deployment investment from major global AV players, rather than local early-stage AV venture rounds.
- This makes the UAE especially attractive to large, mature operators able to scale quickly through regulated partnerships.

Testing, Trials and Commercial Deployment

The UAE has moved well beyond proof-of-concept activity, particularly in Dubai and Abu Dhabi, with structured public-road robotaxi pilots, off-road industrial automation and expanding control-centre capability. The most advanced use case is clearly autonomous passenger mobility – particularly robotaxis – while ports, airports and controlled-environment logistics form the strongest secondary applications.

On-road

- Dubai now has one of the clearest public-road robotaxi pathways in the region, with permits issued to Baidu's Apollo Go, WeRide and Pony.ai.
- The most immediate live public example is the Uber–WeRide robotaxi pilot in Dubai, bookable through the Uber app and operating in Umm Suqeim and Jumeirah, initially with a safety driver.
- Baidu's Apollo Go received Dubai's first permit to test fully driverless vehicles without a safety driver, and plans up to 1,000 vehicles over the next three years, supported by a 2,000 m^2 Dubai operations centre opened in January 2026.
- In Abu Dhabi, the strongest evidence is for commercial robotaxi operation through Uber / WeRide, including fully driverless operations on Yas Island from late November 2025 and subsequent expansion of the operating area.
- Abu Dhabi is also seeing additional operator pathways emerging through Apollo Go / AutoGo, planned Mercedes–Momenta luxury robotaxis, and regulator-led last-mile delivery trials in Masdar City.

Off-road

- Off-road and controlled-environment autonomy is already more operationally mature than many broader public-road use cases.
- In Dubai, dnata (Dubai National Air Travel Agency) has deployed six automated baggage tractors at Dubai World Central Airport, following General Civil Aviation Authority of UAE (GCAA) approval.
- DP World (a provider of end-to-end supply chain solutions) and partners are also progressing electric and, increasingly, automated freight activity within Jebel Ali Port.
- In Abu Dhabi, Khalifa Port / CSP Abu Dhabi Terminal provides one of the clearest off-road AV logistics examples, with automated terminal truck systems and broader terminal automation.
- Controlled-campus and district deployments, such as Masdar City and earlier pod-style systems, continue to act as stepping stones for broader service models.

Country Dashboard /

The Kingdom of Saudi Arabia

The KSA is positioning CAM as a strategic enabler of its national framework for transformation, Vision 2030, and the National Transport and Logistics Strategy, using a sandbox-led model to attract mature international operators while building domestic capability over time. Its main strength is the combination of strong political backing, giga-project integration and centralised programme leadership, although the transition from sandbox pilots to repeatable commercial operating regimes is still incomplete.

CAM Vision

KSA's CAM vision is to accelerate CAM by importing mature global capability, deploying them in controlled environments, and building local value through localisation and future manufacturing. The Transport General Authority and Ministry of Transport and Logistics Services are using sandboxes, flagship zones and strategic investments as a means of moving from pilot activity towards commercial services, while building the regulatory and digital infrastructure needed for scaling.

Special Mentions

- KSA's strongest differentiator is its ability to combine sovereign capital, sandboxes and purpose-built environments to create large, visible CAM programmes at speed.
- The KAUST Future Mobility Sandbox is a notable national asset, described as a 1.56 km² multimodal testbed for land, air and sea mobility technologies.
- NEOM and Oxagon are especially important because they offer 'default-by-design' environments where infrastructure, operational rules and mobility systems can be designed around automation from the outset.
- KSA's main structural challenge is the gap between approving vehicle technology and regulating full-scale public services. Key areas that still require aligned operating rules include operator licensing, incident management, remote operations and standardised reporting.
- The Kingdom's strongest commercial opportunities for suppliers are therefore not restricted to vehicles, but lie also in the operational middle layer: integration, assurance, cyber, control-centre operations, data platforms and deployment toolchains.

Policy and Regulation

KSA's policy and regulatory model is built around a sandbox-first approach rather than a single standalone AV law. Vehicle conformity is being anchored through SASO's Technical Regulation for Autonomous Vehicles (SASO being the Kingdom's Standards, Metrology and Quality Organization), while operational deployment is currently being enabled through TGA (Transport General Authority) permissions, sandbox conditions and wider national rules on cybersecurity, data and communications.

Priorities

- KSA is treating CAM as a strategic national capability linked to Vision 2030, logistics modernisation and wider AI-driven digital transformation.
- The Kingdom has publicly referenced targets of 15% of public transport vehicles and 25% of goods and freight vehicles being automated by 2030.
- Early deployment is being prioritised in controllable ODDs such as regulated pilot corridors, planned districts, giga-projects, ports and logistics zones.

Strategic direction

- The current roadmap can be understood in three broad phases: strategic baselining, pilot and demonstrator activity, and scaling to 2030.
- The immediate emphasis is on sandbox-enabled pilots in Riyadh, logistics environments and giga-projects, with wider commercial services expected to follow only when service-operating regimes are more fully defined.
- A major near-term regulatory milestone is the mandatory date of 29 April 2026 for the SASO Technical Regulation for Autonomous Vehicles.
- KSA's long-term model appears to use projects such as NEOM, Oxagon and other planned zones as at-scale demonstrators for future domestic and regional CAM capability.

Regulation

- Product conformity through SASO's AV technical regulation and related standards, drawing heavily on UNECE, ISO, IEC and SAE (Society of Automotive Engineers) concepts
- Trial and pilot operation through TGA sandbox permissions, including public-facing pilots in Riyadh and delivery-robot deployments in bounded areas
- AV insurance products approved under the existing cooperative insurance framework, alongside the Unified Compulsory Motor Insurance Policy
- Strong cross-cutting requirements through the Personal Data Protection Law, SDAIA (Saudi Data & AI Authority) data-governance rules and National Cybersecurity Authority controls
- Significant gaps remaining in the areas of operator licensing, remote operations, service-level safety management, incident reporting and liability allocation for large-scale commercial deployment

The Kingdom of Saudi Arabia *continued* /

Innovation Environment

KSA's innovation environment is dominated by state-backed capital, procurement pull, and strategic partnerships, rather than broad-based grant funding. The strongest support exists where CAM aligns with giga-project delivery, industrial localisation or enabling technologies such as AI, robotics, logistics tech and smart-city systems.

Public funding

- There is no dedicated national CAM grant scheme, but KSA is using strategic deployment funding, testbeds and flagship projects to de-risk the adoption of AV technology.
- KAUST's (The King Abdullah University of Science and Technology's) TAQADAM start-up accelerator provides non-dilutive funding of up to US$140,000 for participating start-ups, giving CAM-adjacent firms a route into testing and partnership opportunities.
- Generic RDI support is also available through bodies such as RDIA (Research, Development and Innovation Authority) and the National Technology Development Program, particularly where projects align with 'future economies', AI, mobility technology or smart-city goals.
- KSA's public funding model is strongest when it is linked to deployment and validation, rather than upstream standalone AV R&D.

Private investment

- The most visible CAM-related investments are strategic and state-linked, not those connected with pure venture rounds.
- The NEOM Investment Fund made a US$100 million investment in Pony.ai, alongside a joint-venture framing and regional R&D and manufacturing headquarters.
- TASARU Mobility Investments took a 33% stake in HOLON, with ambitions to onshore manufacturing and export mobility solutions across the wider MENA region.
- The broader VC market is growing, but CAM-specific venture activity appears to sit mainly in adjacent AI, robotics, logistics-tech and enabling-software categories, rather than a deep standalone AV start-up pipeline.
- KSA's state-shaped capital model is therefore favouring near-market deployment and platform partnerships over a broad early-stage domestic AV start-up base.

Testing, Trials and Commercial Deployment

KSA's testing and deployment model is centred on sandboxes, bounded ODDs and controlled demonstrator environments rather than broad open-network deployment. Activity is strongest in managed passenger routes, last-mile delivery in constrained districts, ports and industrial zones, with giga-projects acting as future scaling platforms.

On-road

- On-road CAM activity in KSA is currently strongest in controlled passenger services and delivery pilots, rather than in at-scale commercial AV operations.
- Uber and WeRide are operating an automated passenger pilot in Riyadh with a safety driver, serving 13 pick-up and drop-off points, including airport terminals and major urban nodes.
- During Hajj 2023, KSA also ran a limited trial of self-driving electric shuttles on controlled routes for pilgrim transport.
- Last-mile deployment, including automated food delivery in the ROSHN Business Front district, is emerging through delivery robots.
- By contrast, there is still little evidence of active middle-mile or first-mile automated freight deployment on public roads, despite significant 2030 ambitions.

Off-road

- Off-road and bounded-environment applications are currently more mature than open-road AV services.
- KAUST introduced self-driving shuttles on campus in late 2022, making campus mobility one of the clearest use cases for existing passengers.
- Port of NEOM is progressing towards automation using both remote-controlled and automated cranes, and planned deployment of electric, AI-powered Intelligent Guided Vehicles, with a broader ambition for end-to-end automation by the end of 2028.
- Automation as applied to industry and mining remains at an earlier stage, although there is evidence of intent to develop this through partnerships such as the Ma'aden–OffWorld memorandum of understanding on AI-powered mining robotics.
- It would therefore seem that KSA's strongest adoption of automation in the near future will become evident off-highway in ports, and also in logistics parks, campuses and planned districts.

4. What's Next /

The international CAM landscape is an ever-evolving ecosystem. As countries advance their strategies to realise the vast opportunities offered by CAM technology, it remains critically important to look beyond the UK's borders, learn from our international neighbours and seize opportunities for productive global collaboration.

In the next phase of our international comparison work, Zenzic will continue to build on the UK's understanding of its strategic position within this complex global landscape. We will actively monitor how leading markets transition from experimental sandboxes to permanent commercial legislation, and how the UK can leverage the Automated Vehicles Act 2024 to maintain its competitive edge. A key focus will be tracking the rapid shift in international investment towards industrial-led markets, such as hub-to-hub autonomous freight and agricultural automation, to ensure that the UK supply chain is primed for these high-yield opportunities.

Furthermore, future research will closely evaluate the global standardisation of simulation-centric validation, and the rapidly growing importance of digital sovereignty. By keeping a watch on these important requirements, we aim to highlight how the UK can capitalise on its world-class capabilities in VVA and export high-integrity software and safety frameworks to rapid-growth markets. Ultimately, our goal is to uncover targeted opportunities to build momentum, forge strategic supply chain alliances, and fully realise the socioeconomic benefits that CAM can offer.

If you would like to contribute your thoughts to future iterations of this work, or if you would like to discuss the content of this report in greater detail, we encourage you to submit your comments and questions to our team.

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