From Trials to Transformation? A Local Authority Perspective on Connected and Automated Mobility

C. Maltby[1]*, A. Smith[1], M. Shelton[2], D. Clarke[3]

[1]Solihull Council, Solihull, United Kingdom
[2]Transport for West Midlands, West Midlands, United Kingdom
[3]Greater Cambridge Partnership, Cambridge, United Kingdom
*colin.maltby@solihull.gov.uk

Abstract. This paper presents a consolidated perspective of people-moving Connected and Automated Mobility (CAM) on public highways from leading UK local authorities in the field, all of whom are members of the Automated Mobility Network. Drawing on their insights, the paper identifies systemic gaps, unresolved questions, sizable risks and strategic opportunities relating to the integration of CAM into transport systems. It highlights the critical role of public sector leadership, the complexity of deployment, and the need for coordinated strategy, learning and investment to ensure future CAM services align with the public sector's wider societal goals, not simply private sector ambition. Recognising its potential impact, the paper recommends a holistic national strategy relating to the future roll-out of CAM services; transparent learning and reporting mechanisms and structured cross-sector collaboration.

Index Terms: Connected Automated Mobility, Autonomous Vehicles, Local Authority, Public Transport

I. Preface

A. Automated Mobility Network

The Automated Mobility Network (AMN) [1] membership are UK public sector local authorities (LAs) with experience in Connected and Automated Mobility (CAM) and allied technologies. AMN members represent a small minority of LAs with a knowledge of the operational, commercial and societal challenges and opportunities relating to CAM deployment, primarily obtained via involvement in UK government funded CAM innovation projects.

Formed in April 2025, the AMN has a collective priority to develop CAM for the public good, with the stated aim to: *Ensure the development of safe, sustainable, equitable and appropriate CAM products and services that benefit the communities they may come to serve or impact.*

The AMN seeks to support the following priorities of the Department for Transport (DfT) [2]:

1) Grow the economy by enhancing the transport network, on time and on budget,
2) Improve transport users' experience, ensuring that the network is safe, reliable, and inclusive,

and the following objectives of the Centre for Connected Autonomous Vehicles (CCAV) [3]:

1) Make the movement of people and goods in the UK safer, fairer, greener, and more efficient,
2) Provide joint investment with industry through 2026 to overcome the barriers to commercial deployment thereby attracting, de-risking, and encouraging global investment, creating jobs, and strengthening UK supply chain.

B. AMN's Role and Activities

To achieve the priorities and objectives of LAs, DfT and CCAV, the AMN believe it is essential that LAs in the UK are well-informed, resourced and supported to engage, understand and prepare for CAM services. Failure to ensure such LA engagement risks CAM deployment that is solely aimed at meeting private sector objectives, which, if uninformed, ill-directed, or uncoordinated, will risk sub-optimal deployment, degrading public goodwill and trust towards CAM services and potentially lead to unintended, unforeseen, and / or undesirable consequences.

The AMN's target activities cover three distinct areas:

1) *Collaborate to Accelerate:* Work together to promote CAM sector learning. Share, compile and disseminate best practices, lessons learned, analysis, insight, documentation.
2) *Unify to Simplify:* Develop consistency to reduce barriers to entry for all parties.
3) *Vocalise to Optimise:* Proactive, purposeful engagement with the CAM eco-system. Understand and represent the societal good. Upskill the public sector in CAM technology.

By highlighting gaps, threats and corresponding opportunities to focus future work, this paper seeks to promote engagement, debate and discussion around the future of CAM services, and their corresponding impacts, in the public realm. The outputs provide a foundation for coordinated action across the CAM ecosystem.

The term *local authority* used throughout this report refers to UK public sector bodies with responsibility for highway and / or transport services, inclusive of combined authorities, unitary, city and country councils, etc.

This paper exclusively relates to people-moving, public highway CAM.

II. Introduction

A. The Challenge for Local Authorities

There is wide expectation that future people-moving CAM products / services will be most likely to take three forms: private sector led *Taxi-like* services; primarily public sector led *Bus-like* public transport (PT) services, and a third private sector led *Car-like (privately owned)* future being potentially feasible in the longer term. The introduction of any one of these three future products / services at scale, as is now increasingly likely, has the potential to greatly impact roads, communities and residents in profound ways.

Since 2015, CCAV has supported the precommercial development of CAM products, services and wider ecosystem in the UK through open grant funding calls, to

support UK business growth; upskill public bodies and gain valuable deployment insight with which to develop policy and legislation. Despite this welcome support, and the likely potential impact of CAM upon them, challenges relating to engagement at an *LA* level remain, specifically:

1) Limited LA capacity and capability to consider direct or indirect consequences of CAM,
2) Weak business cases for LA involvement in bus-like CAM beyond subsidised trials,
3) Lack of information sharing on how to deliver, deploy and integrate CAM services well, from operational challenges to strategic vision.

B. Target Outcomes

A clear path from small trial bus-like CAM deployments towards safer, more reliable, affordable and accessible transport for users.

Short-term, local: engagement for LAs is easy-to-do, with a strong shared evidence base on what works well and co-ordinated activity to de-risk, simplify, and make the case, if found to be appropriate, to senior decision-makers (e.g. elected officials) for involvement and investment in CAM.

Long-term, national: develop a strategy for how challenges will be mitigated and opportunities realised. Eg: How are LAs properly engaged? What happens to drivers who find themselves out of a job? How will industrial relations issues be addressed?

C. Paper Structure

Collating a broad collection of work, this paper consolidates insights, questions, and proposed responses from AMN members experienced in the deployment of CAM services. The paper consists of two distinct parts:

1) A collection of independent CAM learning "snapshots", providing the context within which future CAM solutions must demonstrate capability and applicability to add social value, alongside specific hurdles CAM faces within a PT context and,
2) A summary of outputs from an LA CAM lessons-learned workshop held in September 2025.

III. LA CAM Learning Snapshots

Since 2015, members of the AMN have been involved in a significant number of CAM innovation projects, the majority of which delivered separately from one another, allowing for independent learning. Members have considered CAM in its widest context, including future technological developments, it's use in differing service types, and the likely implications for their respective transport networks. The following snapshots offer an LA perspective on the development of CAM products and services based on this learning. Although linked within this paper, each snapshot can be taken as a standalone piece of insight for consideration.

A. Primary Focus of Public Transport Investment

PT is seen as a central pillar of place-making due to its inherent capability to provide for high volumes of journeys while taking relatively little space, corresponding emissions and air-quality benefits, and its (often regulated) priorities for equity and accessibility.

All Local Transport Authorities in England are required to produce a Local Transport Plan that lays out their priorities for developing PT within their locality. These strategies include high-level target outcomes, against which investment will be made. Consistent across almost all strategies are four target outcomes, underpinned by a goal to reduce congestion:

1) *Increase safety:* Both real and perceived. This covers every aspect of using a service, e.g., the walk to and wait at a bus stop, and the ride on the bus.
2) *Increase reliability:* Punctuality is the primary success metric for PT services. It is an essential requirement for services to be adopted by communities, with PT links being relied upon by everyone from workers to school children to medical patients to leisure users.
3) *Increase affordability:* PT must always remain focussed on affordability for its users to ensure actual and perceived value for money.
4) *Increase accessibility:* PT exists for all member of society, and as such, the requirement to provide full inclusive and accessible services is and will remain a foundational requirement.

Understanding how future *bus-like* CAM services can meet, and certainly not erode / undermine, the above target outcomes, and if / how *taxi-like* CAM services may impact the ability to meet these target outcomes is essential for LAs.

B. Reasons for Dissatisfaction with Bus Services

CAM services considered within this paper are exclusively road based. Within a PT context this means bus services. For bus-like CAM services to meaningfully provide value, they must contribute to over-coming current challenges relating to bus adoption and ridership.

Significant data is available to understand the issues currently faced by users of traditional bus services. Below is a quarterly snapshot of the views of bus riders in the West Midlands regarding the primary reasons for dissatisfaction.

Table 1. Bus rider views in the West Midlands [4]

Reason	Response
Bus service unreliable/didn't turn up on time	72%
Buses don't run often enough	18%
Bus fares are too expensive	16%
Buses are dirty	16%
Felt unsafe/anti-social behaviour	14%
Services overcrowded/too busy	14%
Driver was rude/unhelpful	11%

One, perhaps obvious, point, "The presence of a driver", was not a reason given within survey responses for dissatisfaction and the simple removal of a driver should not therefore be expected to make a meaningful positive impact. There is a risk that the unreliability of buses (the source of 72% of dissatisfaction) is largely a result of congestion, which bus-like CAM services should not be expected to resolve without complementary local transport policy.

C. "Needs to be True" Statements

Linked to the four target outcomes in *A. Primary Focus of Public Transport Investment,* it is reasonable to provide a short series of statements against which future bus-like CAM services should be assessed – factors that should be considered as "needing to be true" to allow for widespread adoption. These statements were used as an assessment methodology within the Blythe and Rural Automated Vehicle Operations (BRAVO) CAM feasibility study [5].

1) An automated service should be perceived, and experienced, as being as safe, or preferably safer than a

traditional PT service.
2) The vehicle / service must be capable of operating within the static, dynamic, and environmental conditions of the route with risk as low as reasonably practicable.
3) An automated bus-like service should be as, or preferably more, resilient, robust, and reliable as traditional public bus options.
4) An automated service must be as, or preferably more, available and accessible as traditional public bus options.
5) The business case for investment must work for commissioners, suppliers, operators and future users.

With regards to the final point, PT commissioners will have many pressing socially valuable use cases where due to low ridership existing services are subsidised and at risk of ceasing. The theoretical lower costs of CAM services would be highly desirable; however, these use cases should not be assumed to be of immediate interest to CAM operators in the short to medium term due to the lower ridership, lower profile and expected higher costs of installation in the earlier stages of the technology roll out.

D. CAM Deployment Complexity Assessment

Bus-like CAM services should be assumed to be the primary focus of LAs due to their social, place-making value, and the statutory obligation for them to be delivered. They should however be considered as being more complex to commercialise when compared with taxi-like services. This complexity spans several key factors. 18 parameters, and a high-level rationale for why they should be expected to impact upon complexity, are offered below. The list is not exhaustive but could be considered as a reference checklist or 'key lines of enquiry' at an early stage of CAM project development or scoping.

Table 2. Key public CAM services complexity factors.

ID	Parameter	Easier	Mid	Harder	Rationale
1	Service Model	Private Occupancy		Shared Occupancy	Impacts on concerns, practicalities and additional requirements relating to internal rider safety when sharing with strangers
2	Land Ownership of Route	Private		Public	Impacts on decision making, regulation and timescales
3	Service Hours	Daylight	0600 - 2000	24 Hrs	Impacts on complexity of Target Operating Domain (TOD), passenger safety concerns and increased risks relating to anti-social behaviour
4	Distance	<2 miles	2 - 4 miles	>4 miles	Impacts on complexity of TOD and passenger safety
5	Fare Paying	No	Yes – App-Based	Yes	Impacts on practicalities and additional requirements for fare paying solutions and revenue protection
6	Service Type	Scheduled		Demand Responsive	Impacts on complexity of service and supporting systems
7	Service Registration	Unregistered		Registered	Impacts on service level expectations / requirements
8	Public Readiness	Ready		Not Ready	Impacts on likelihood for abuse / vandalism / societal acceptance & adoption
9	Vehicle Size	<8 Passengers		>8 Passengers	Impacts on practicalities and additional legislative & regulatory requirements relating to passenger carrying services
10	Fleet Number	<5 Vehicles	5 - 10 Vehicles	>10 Vehicles	Impacts on procurement, maintenance, depot space, co-ordination / Project Management
11	Service Speed	<16mph	16 - 30 mph	>30mph	Impacts on complexity of TOD and passenger safety
12	Service Route	Fixed		Roaming	Impacts on complexity of route set-up process and service delivery (floating bus stops, dynamic routing)
13	Route hazards	Minimal	Medium	Many	Impacts upon complexity of TOD. Hazards include junctions, roundabouts, filters, lane changes, ped crossings, traffic lights etc.
14	Traffic Segregation	Segregated		Unsegregated	Impacts on concerns, practicalities and additional requirements relating to handling traffic / vulnerable road users
15	Location Weather	Temperate		Subject to Extremes	Impacts on complexity of TOD and passenger safety
16	Remote Support	Tele-Operation	Assistance	Monitoring	Expectation that vehicles being remotely tele-operated will not need to be intelligent / as intelligent, allowing quicker deployment. *Note – this may not be an optimized technical solution*
17	Stakeholder Experience	Significant	Some	None	Impacts upon the ability to scope, develop and deliver the project effectively
18	Path	At grade	Part-Elevated	Elevated	Impacts on costs, requirements for planning permissions and capital funding

E. Headwinds for CAM in PT

Expanding on the *CAM Deployment Complexity Assessment* parameters as set out above, increasing the understanding of the context within which future bus-like CAM services must operate is essential to identify and remove barriers to commercialisation where practicable.

24 specific challenges or 'headwinds' faced by bus-like CAM have been identified by the AMN, over and above those that exist for taxi-like CAM services:

Financial

1) Profit margins traditionally low in PT sector.
2) Focus on taxi-like CAM services and passenger car Advanced Driver Assistance Systems (ADAS) from institutional investors, taking focus away from bus-like CAM
3) Under-developed / unclear / un-proven business cases for bus-like CAM.
4) Lack of investment opportunity awareness.
5) PT is not a luxury product able to attract a premium fare.

Operational

6) Often complex, long and heavily trafficked Target Operational Domains (TOD – the routes needing to be

served).
7) High level of expectation / requirement for PT services e.g., can't readily stand down service once launched.
8) Challenges regarding ticketing / fare payment approaches that ensure equity of access and minimise fare evasion.

Regulatory
9) Legislation (still emerging) and alignment to existing PT regulation (complexity).
10) High level of passenger accessibility and non-discrimination requirement / expectation.

Social
11) Unionisation of bus drivers acting as a deterrent to bus-like CAM developers, operators and public bodies.
12) The impact on driving jobs, reducing explicit "pull" from public bodies.
13) Unknown levels of the unconscious value to existing PT services that the presence of a physical driver offers amongst travelling public, most notably with regards to perception of safety
14) Long-term societal move towards car and away from PT.

PT Market
15) Fragmented nature of PT market and the potential impacts caused by franchising
16) PT needs and requirements not readily understood by private bus-like CAM developers.
17) Regional and national variation in PT operator services, systems and requirements (no "one way in").
18) Traditional PT operators likely find it harder / slower to innovate & collaborate due to low margins, stifling sector progress.
19) PT opportunity not clearly articulated / presented.

Route to Market
20) Variation in vehicle type and size requirements, dependant on disparate local need / use cases.
21) High levels of public sector interest and involvement (traditionally complex and risk averse sector).
22) Complex, disparate and undeveloped procurement routes, particularly in public sector.
23) High level of confidence in longevity, reliability and financial security of provider and solution required to be awarded any public funds (beyond UK government innovation funding).
24) Differing expectations for bus-like CAM developers from innovation project to project.

F. Worst Case Scenario for CAM application

As proposed, the potential for profound impacts at an LA level relating to the proliferation of CAM products and services is significant.

Understanding the worst-case scenario related to any future technology should be seen as a necessary step, specifically for public bodies, ahead of meaningful deployment / integration into public life. Building on insight from *Autonomous Vehicles Are Coming—And We're Going to Mess It Up* [6] six considerations are provided below to promote debate and engagement:

1) Taxi-like CAM will increase congestion, making conurbations more car-dependent, not less - by making car travel cheaper and more convenient. Restricting taxi-like CAM could be politically challenging: for example, implementing road user charging for taxi-like CAM after the introduction of cheap, convenient taxi-like CAM. Taxi-like CAM risks reinforcing car-centric urban patterns rather than solving them.
2) In most places taxi-like CAM will undermine PT by drawing riders away from it and slowing innovation due to labour resistance and poor reinvestment of savings.
3) Taxi-like CAM will overwhelm kerb space during peak hours. Conurbations will respond by building more car-oriented infrastructure, worsening urban design.
4) Most CAM will not be shared. In the future many people will prefer owning their own Automated Vehicles (AV), thus limiting reductions in vehicle numbers and further increasing urban space use.
5) Existing PT drivers will be protected in some places, but it will be temporary. Most places will offer minimal support to displaced drivers. A few will protect current workers or offer meaningful transition programs, but these will be rare. This problem may cause local unrest.
6) Urban sprawl will get worse. AVs will make longer commutes more tolerable for occupants, encouraging people to live farther from city centres, increasing sprawl and car dependency.

Considering the likelihood and impact of each of these identified risks should be considered a matter of priority at both a local and national.

G. Local Authorities role in CAM integration

The importance of the role of LAs within successful, effective and well-considered CAM integration (both bus-like and taxi-like) into communities should not be under-estimated. 25 examples of the role LAs can, do, will, could or should play are provided below.

Before detailing these roles however, it should be noted that although they will be crucial in assisting any CAM developer / operator targeting deployment, it should not be assumed that LAs will be resourced, supportive, sufficiently upskilled or motivated to fulfil these roles effectively. LA's lack of capacity presents a significant risk to the successful, controlled and thoughtful integration of CAM into public life. Of approximately 383 LAs in the UK, only a small number (est. 30) have been involved in funded CAM projects. Outside of funded projects it should be assumed that there is little to no capacity to consider CAM development and its potential impacts at the local level, and there will be little to no organisational learning / understanding with which to ensure timely, well-considered decisions.

LA Regulatory / Statutory Role
1) The taxi-like licensing authority within the future Automated Passenger Services (APS) permitting scheme.
2) Highways authority, with power to reapportion road space; change road layouts and speed limits; add roadside technology; grant and restrict kerb access.
3) Responsible for highways maintenance – "lines and signs", greenery, street-lighting, bus stops, pavements.
4) Traffic co-ordination, control, monitoring and management facilities.
5) Planning authorities, so will help / guide where planning permission is required

6) Road works permits issuer.
7) Road safety remit.
8) Transport data collector, aggregator and owner
9) Transport mode integrator.

LA Policy / Strategy Role

10) Develop and own Local Transport Strategies that are used to agree transport priorities and target funding.
11) LA's lead commercial and residential master-planning – introducing AV solutions early in the process.
12) Develop 'Local Plans' – define s106 and CIL funding requirements for transport services
13) Lead and own local and regional economic & investment strategies.

LA Stakeholder Management Role

14) Trusted broker within the area / region – unlocking access to businesses / organisations
15) Local stakeholder introduction / co-ordination (business and civic).
16) Key stakeholder within CCAV Code of Practise for Automated Deployments.
17) Help navigate the often-complex local political ecosystem.
18) Help develop the right political relationships
19) Owner of communications channels & local / regional forums.
20) Well connected to other LAs and CAs.

LA Route to Market Role

21) Local use case & market expertise.
22) Commissioner of road-based PT services (home to school, future bus franchising, ring & ride, etc).
23) Local knowledge of road / neighbourhood dynamics.
24) Public procurement advice and guidance.
25) Able to instruct what services are wanted and needed, and where the bar is for products and services.

IV. CAM Lessons Learned Workshop

A. Overview

Members of the AMN met in September 2025 to undertake a day-long workshop with the aims of consolidating learning by:

1) *Looking backward:* Vocalising lessons learned, consolidating and sharing knowledge and experience from respective projects within the CAM transport sector.
2) *Looking forward:* Identifying barriers to progress by identifying long list of risks / issues and in doing so developing a shared view of barriers and, where reasonable, associated responses.

LA representatives participated from Solihull Council; Coventry City Council; Greater Cambridge Partnership; Milton Keynes City Council; Transport for West Midlands; Hertfordshire County Council. The workshop was hosted by the Transport Research Laboratory (TRL) and facilitated by Alan Walker from automotive consultancy Syselek.

The workshop was primarily, but not exclusively, focussing on public shared transport. Acknowledgement of the impact of all other forms of autonomy (i.e., taxi-like services, pavement robot, etc.) were considered within discussion.

Split across three individual sessions, the cohort were tasked with:

1) Individually considering *Gaps / Questions / Concerns / Opportunities*, based on their knowledge of the sector and then present each point back to the group at the end of a 20-minute period. This then pushed each member to clarify / define / expand on their comment to ensure accuracy.
2) Consider any *Proposed Responses*, as public sector organisations, to *Gaps / Questions / Concerns / Opportunities* that had been identified. This was not done on an issue-by-issue basis, rather left open to each member to respond to what they see as the biggest / most urgent opportunities.
3) Focussing particularly on how the CAM eco-system can be optimised around its first *Collaborate to Accelerate* strategic focus, i.e., how do we collect and share learning across the national funding programmes.

George Beard (TRL) presented a summary of the recently released TRL Automated Passenger Services: Researching Driver Roles and Passenger Inclusivity report [6]. The report details 60+ roles that a human driver of a PT bus service currently carries out, beyond the core driving task.

B. Outputs

Responses coalesced organically around seven specific themes when looking specifically at *Gaps / Questions / Concerns / Opportunities* relating to CAM technology and services, these were:

1. Societal
2. Business Case
3. On-road Operations
4. Remote Support
5. Digital / Cyber
6. Specification
7. Public Sector's Role

These themes were used to then sort any *Proposed Responses*.

Separately, outputs were grouped across two additional themes that related specifically to UK Funding / Competitions, and UK Sector Learning & Progress. *Gaps / Questions / Concerns / Opportunities* and corresponding *Proposed Responses* relating to these two themes were collected in the same manner as the seven CAM development themes.

C. Key Themes and Insights

Across the seven identified themes, a summary overview of outputs is provided below. A more detailed overview of participants' comments is provided at Appendix 1. Images of the raw workshop outputs are provided at Appendix 2.

Societal

Concerns: Social readiness, job displacement, cultural norms, and equity of access.

Opportunities: Public sector leadership, social value framing (e.g. high-skilled job creation), and inclusive design.

Actions: Engage with non-AV sectors, charities, and communities to co-develop future scenarios.

Business Case

Challenges: Commercial viability, funding sources, and cost-benefit trade-offs.

Insights: Removing drivers may not reduce costs; tech complexity could increase them.

Recommendations: Model alternative deployment strategies, learn from other industries and clarify public value.

On-road Operations

Issues: Passenger safety, accessibility, kerbside management, and service usability.

Needs: Clear masterplans, mock-up experiments, and understanding of user behaviour.

Focus: Define what drivers currently provide and how to replicate or replace that value.

Remote Operations

Risks: Security, latency, and control centre requirements.

Unknowns: Role and ratio of remote operators, telecoms infrastructure adequacy.

Next Steps: Develop standards and test environments for remote operation protocols.

Digital / Cyber Infrastructure

Concerns: Cybersecurity, network resilience, and digital dependency.

Requirements: Physical and digital infrastructure assessments, network slicing feasibility.

Actions: Establish standards and testbeds for telecoms and cybersecurity.

Specification and Standards

Needs: Clear frameworks, Key Performance Indicators, and universal specifications.

Gaps: Overload of guidance, lack of clarity on stakeholder responsibilities.

Proposals: Develop "What needs to be true?" statements and align with existing PSV regulations.

Public Sector's Role

Reflection: LAs must define their role, challenges, and expectations.

Barriers: Limited CAM awareness and understanding, fragmented engagement, very limited funding, unclear social impact

Suggestions: Top-down engagement, clearer articulation of LA needs.

In addition to the seven CAM related themes, a summary of the views collected relating to Funding and Competitions and Sector Learning and Development are provided below

Funding and Competition

Problems: Fragmented funding, lack of continuity, and poor knowledge sharing.

Ideas: Vertical competitions (e.g. ticketing, cyber), trusted partner vetting, and revised funding models.

Recommendations: Align competitions with LA challenges and mandate learning dissemination.

Sector Learning and Development

Observations: Progress feels stagnant; learning is not systematically captured or shared.

Solutions: Create a central library of reports, formalise learning processes, and increase visibility of networks.

Initiatives: Shared learning sessions, peer groups, and public engagement through demos.

V. Conclusion

A. Conclusions

With the advent of the first commercial CAM services, now is a critical time in the technology development and implementation cycle to consider the appropriate introduction and integration of CAM technology into public life, and this document offers key discussion points to be considered and debated as we move forward.

CAM services have long been heralded as offering significant benefit to society, along safety, economic and environmental themes, and as such have been pursued at pace by national bodies. The detail contained within this report seeks to offer a perspective that provokes thought, engagement, challenge and, in time, collective co-ordinated action to ensure the integration is considered, timely and brings maximum benefit to communities.

To harness the significant opportunities and avoid serious pitfalls of CAM, the development of a holistic national strategy that fully considers the likely effects of the automation of both public and private transport, and the role of LAs in managing these effects is essential.

B. Next Steps

1) Convene a session to present this work to senior leaders within DfT, DBT, CCAV, Zenzic, Advanced Propulsion Centre and discuss the issues and opportunities herein.
2) Present this work to wider industry to upskill them with regards to the public sector's role and requirements in future CAM roll out.
3) Review internationally to gain / share learning.

VI. Glossary

Abb	Definition
AMN	Automated Mobility Network
APS	Automated Passenger Services
ASB	Anti-Social Behaviour
AV	Automated Vehicle
CAM	Connected and Automated Mobility
CCAV	Centre for Connected and Autonomous Vehicles
DfT	Department for Transport
iUK	Innovate UK (implied from context)
LA	Local Authority
LTA	Local Transport Authority
NUICO	No User In Charge Operator
PSV	Public Service Vehicle
PT	Public Transport
TOD	Target Operating Domain
TRL	Transport Research Laboratory
UKTIN	UK Telecoms Innovation Network

VII. Appendix 1: AMN workshop materials

Table 3. Digital/cyber factors.

Gaps / Questions / Concerns / Opportunities	Response
• Cyber security assurance & test • Cyber / data - standards, regs - enough? • Capability / resilience / redundancy of networks to support remote operations • Over-riding risks of becoming increasingly dependent upon digital / technology • Suitability and capability of comms infra for AV demands • What are the likely infra requirements (physical and digital) • Network slicing req, feasibility and benefit	• Telecoms - testing and understanding network issues

Table 4. Business case factors.

Gaps / Questions / Concerns / Opportunities	Response
• Commercial viability? • Investment and BST in being a leader • Deployment model - something different to current models? • Understand if there's a trade-off between potential savings and usability • Understand vehicle capacity / demand • Should LA's really be driving the business case? • Does removing the driver actually lower costs? • Identify barriers where investment should be targeted • Is there a market failure? • Will shared public transport AV's ever have enough funding to make work? Where will money come from? • Will there be so much tech required to substitute driver that it renders PT options unaffordable • What are the realistic benefits of AV? • Why not "do nothing"? Legal, operational, reputational • Why should public sector subsidize infra?	• Explore and model different deployment models • Build universal framework / tools to support use case identification, development and assessment • Identify market failure • Learn from parallel industry examples: Amazon fresh UK exit • Be clear on public value • LA CAV leads need to be better integrated into transport commissioners • Procure at scale (Europe)

Table 5. Operations factors.

Gaps / Questions / Concerns / Opportunities	Response
• How do you ensure occupant safety within a CAV • What impact will removal of driver have upon different demographics propensity to use services • Need clarity / masterplan of what needs solving • What does a driver provide to passengers? • How do you ensure all users can use service? • Impact on kerbside - how to manage? • What are transport issues v AV issues? • Need to identify new future unique CAV passenger issues • How does someone pay for a ride? • Booking; payment; rev. protection; accessibility • Ticketing / revenue protection • APS - role of robotaxis - our response • Will shared access driverless on-road systems only ever be suitable to certain niche ODDs • What assumptions are we making? E.g. DLR works so will this?	• Observe how riders use the service. Operate & use - mock up experiments

Table 6. Specification factors.

Gaps / Questions / Concerns / Opportunities	Response
• What do LA's need from ASDE / NUICO • Data - driver decision making; safety record; planning; performance • Industry detail • Discover - what do we need / want • What do / might future AV services look like • Vehicle accessibility / equity • What do providers need LA to provide - Infra etc. • Speed of development within AV / AI space • Absence of clarity / reality within development community • So many standards / guidance being developed - impossible to be across it all	• Alignment to existing regs for PSVs • Agree KPIs for assessing safe and secure operations • Agree responsibilities of each stakeholder and liabilities • Framework: what questions do Avs need to answer to operate on UK roads • Adopt a new PT benchmark: "At least as good / safe as a driven PT service" • Develop and adopt a list of "What needs to be true?" statements that we can assess services against • LA infrastructure - understand need to adapt and risks to LA's • Regulators and legislators need to coordinate cross industry • Have representatives sitting on various sector cohorts able to represent and feed back • Universal Spec

Table 7. Remote operations factors.

Gaps / Questions / Concerns / Opportunities	Response
• Remote ops/ assist is a massive question - safe? Secure? Will they ever be truly secure? • Remote human operators - understand this role further • Processes for remote operators to take over CAV? Safe and secure? • Conditions needed in control centre? • How many remote operators per X number of CAVs • Latency & control centre • Operations, telecoms in city - good enough?	

Table8. Public sector role factors.

Gaps / Questions / Concerns / Opportunities	Response
• What does the sector need from us? Needs to be defined • What role are we willing to play? Needs to be defined • LA's need to focus on defining the challenge / need • Little engineering experience within LA's	• Engagement with LA's is better top - down

Table 9. Societal factors.

Gaps / Questions / Concerns / Opportunities	Response
• What is the likely social impact of AV services? • Social value narrative e.g. jobs? • When do we get to the point we say this won't work / we don't want it / it will not improve service provision? • Is the UK socially / societally ready for PT shared AV? If not, will it ever be? • Not localized cultural norms in functional behaviour! • Entry level job removal • Honesty re: impacts of automation • Should we make the case against autonomy in public transport? If even to work to disprove / challenge / focus • Should we get a better understanding of the risks of autonomy (tech-dependency etc) • Is shared PT at scale realistic / possible / desirable? • Are we being too positive?	• LA's / Public sector are only ones with social interest - we need to reflect this and properly lean into and lead this • Engage with public bodies / charities / non-AV sector to look at potential futures / impacts

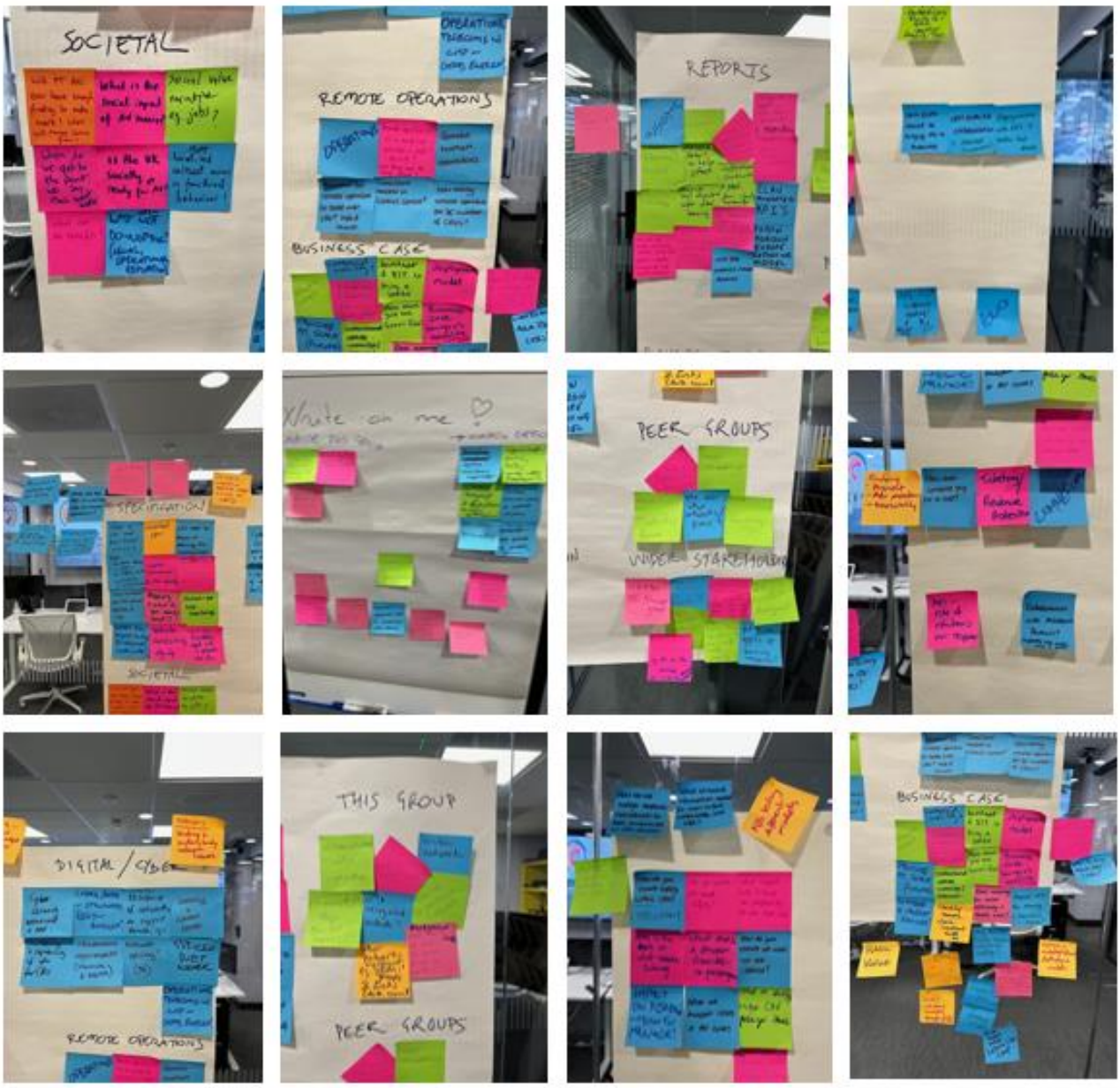
Table 10. Funding / competition factors.

Gaps / Questions / Concerns / Opportunities	Response
• No stability / continuity - all dependent upon competition • No central collation of learning • Co-ordination • IP considerations & encouraging behaviour amongst consortia partners • How do we scale from small private to large public domain	• Introduce cross project co-ordination - no reinventing of wheels - more aligning • Rearrange competitions vertically e.g. ticketing, on-board safety, cyber • Collaboration with academic partners? Supports info access which is good • Define agreed timeframe expectations • Differentiate pilots, FOT's, living labs (sand boxes) • Common language and definitions to align expectations • Sandbox environments to validate solutions • PAS188x terminology • Funding models of LA's involvement to be changed • Change the competition / funding to give more options over contract management • How to engage with CCAV / Zenzic • Increase the level of expectation from CCAV, iUK, MOs • Put LA challenges forward as the basis for funding competition • Gov. seed market with Zebra-like market • Introduce trusted partner that carries out due diligence on potential partners • Need to build to a bigger picture • Build a cohesive, coordinated narrative that we're working towards, and our place in it • Sharing of close-out reports • Standard report / deliverable templates • Have formal project deliverables • Standard feasibility study • CCAV mandated KPIs • Follow Horizon Europe reporting model • CCAV / IUK enhanced standard reporting • Lessons learned reports within projects • Mandate LA's / public bodies to take part in XX forums / bodies / consultations if part of funded programme • To ever get public funding feasibility studies will have to be compared with other modes (Green Book) • Need feasibility study guidance • What happened to feasibility study lessons-learned outputs collected by Fred?

Table 11. Sector learning / development / progress factors.

Gaps / Questions / Concerns / Opportunities	Response
• Insufficient co-ordination - what are the gaps we can address	• Reports • Catalogue of reports to make them discoverable • Record detail to help others • Library of studies • Reconcile local objectives with wider learning • Formalize learning from deployments - report covers details of project; what lessons learned • Commission work via First Mover group • This group • Formalize the group • Collaboration not competition • Increase visibility of network • Shared learning sessions • Group discussion (informal) • Support / help / guidance from cohort • Raise awareness of future AV landscape for new bodies (e.g. APS) • Other networks engagement, e.g. OEMs, groups and links (Auto council) • Be clear on purpose / value proposition of group - not exclusively cheer-leading • Frame our exploratory work / deployments / role • Organize formal upskilling / programme of insight sessions - for us and newcomers • Create a image 1) what we currently see, 2) what we need to see • Peer groups • Cohort dissemination • Shared learning sessions in topic specific groups • Learning • Who are other networks / peers? • Access to networks / forums • Wider stakeholders • UKTIN 5G / Transport Groups • Make relevant experience for non-spec background • Briefings of lessons learned (standards bodies; public bodies; user groups; education / STEM) • Getting to deployment • Know how we can maximize and justify longevity • Follow on application of learning - services • Industry sharing e.g. art of the possible. Use cases e.g. refuse transport • Overseas approaches / exemplars • Public demonstration • Public engagement • Doing it • Access to live demos and services • Demos

VIII. Appendix 2: Workshop Output Images



IX. References

[1] Automated Mobility Network, https://zenzic.io/cam-community/automated-mobility-network/ Members of the AMN include the following LAs: Solihull, Transport for West Midlands, Greater Cambridge Partnership, Coventry, Milton Keynes, Hertfordshire, Sunderland. Although not an LA, the trust port Belfast Harbour are also an affiliate member.

[2] Department for Transport, https://www.gov.uk/government/organisations/department-for-transport/about

[3] Centre for Connected and Autonomous Vehicles, https://www.gov.uk/government/organisations/centre-for-connected-and-autonomous-vehicles/about

[4] TfWM Travel Trends & Behaviour Survey Q1 24/25

[5] Consortium. "Blythe & Rural Automated Vehicles Operations (BRAVO) Feasibility Study", November 2024, https://www.solihull.gov.uk/sites/default/files/2025-10/bravo-report-202411.pdf

[6] Russell King. "Autonomous Vehicles Are Coming—And We're Going to Mess It Up". October 2025. https://transport-leaders-club.kit.com/posts/autonomous-vehicles-are-coming-and-we-re-going-to-mess-it-up

[7] A. Knightley, et al. "Automated Passenger Services: Researching Driver Roles and Passenger Inclusivity", July 2025, https://www.trl.co.uk/publications/automated-passenger-services--researching-driver-roles-and-passenger-inclusivity