

Intelligent Transport Systems

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MAGAZINE



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2026.itseuropeancongress.com

27-29 April 2026
ITS_Istanbul2026

No. 6 - Spring 2026
ITS European Congress - Istanbul

Welcome to Istanbul

Intelligent Transport Systems - Explained

Technologies to operate and manage transport infrastructure



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ITS Edge is published by **ITS Now**, which exists to promote best practice and professional development within the Intelligent Transport Systems (ITS) sector, in the UK and internationally.

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NO. 6 - SPRING 2026 - ITS EUROPEAN CONGRESS

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Hey everyone!

In this edition of **ITS Edge**, we are celebrating the **2026 ITS European Congress** in Istanbul. We are welcomed to the event by **Joost Vantomme**, CEO of ERTICO, who shows us what to look out for at the congress. We are also joined by **Max Sugarman**, Chief Executive of ITS UK, who explains how British innovation is class-leading in Europe. With so many technology developments occurring at the same time, I examine if **2026 is when ITS Comes of Age**.

In other articles, **Agne Vaitekenaitė**, Head of Advocacy and Partnership at ERTICO looks at why diversity is such an important consideration for transport and **Paula Clayton-Smith**, leading independent strategist, continues her examination of how trust is a make-or-break factor for technology deployments. We are also delighted to be joined by three leading experts from ERTICO, **Stephane Dreher**, **Maria Alonso-Raposo** and **John Paddington** who explain some of the challenges and opportunities facing connected vehicles in 'Navigating the data highway'. We are also joined by **Kealie Franklin**, CEO of ARTSM, who talks about the important role ARTSM plays in the sector.

We finish this edition with our **Technology Insight** item where we have worked with **Snow Proof Signals** to look at a solution to an unintended consequence of technology developments in traffic signals.

See you next time,
Alistair



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Welcome to Istanbul and to the 2026 ITS European Congress!



Joost Vantomme, CEO at ERTICO - ITS Europe, is delighted to welcome you to Istanbul for the **17th ITS European Congress**, and to bring together once again a diverse and dynamic community shaping the future of mobility.

Istanbul is situated at the crossroads of continents, cultures and transport corridors, providing an inspiring setting for discussions about integration, connectivity and cooperation. Across Europe and around the world, we are witnessing a clear transition in mobility's evolution. Innovation remains essential, but the real challenge before us now is integration: ensuring that technologies, policies and operational practices work together as coherent systems that deliver measurable benefits for people, cities and regions. Digitalisation, automation and connectivity are no longer emerging concepts, they are maturing realities that must be deployed, scaled and aligned across complex ecosystems.

This Congress reflects that shift. We will explore mobility from a systems perspective: examining safety, sustainability, resilience and efficiency not as isolated goals, but as interconnected outcomes. Through our Technical Programme, strategic discussions and exchanges of practical experience, we aim to bridge ambition and implementation, connecting research and policy with everyday operational realities.

At the heart of all these conversations lies the user. Integrated mobility must ultimately serve people: supporting accessibility, inclusivity and trust while responding to changing behaviours and expectations. Keeping this focus will be critical as systems become more automated and data-driven. As organiser of the Congress, ERTICO – ITS Europe is proud to facilitate this platform for dialogue and collaboration. Make sure you engage actively, share expertise and challenge perspectives. Together, we can continue shaping intelligent, integrated mobility systems that deliver real impact, here in Istanbul and beyond.



From the 27th to 29th April 2026, Istanbul will host the **17th ITS European Congress**, bringing together the full intelligent transport community to explore how mobility systems are evolving in practice. Cities, industry leaders, researchers and policymakers will meet in a setting that reflects the scale and complexity of today's transport challenges, creating a strong foundation for meaningful exchange and collaboration.

With more than 30 million journeys taking place daily, Istanbul offers a powerful real-world context. Its position as a bridge between continents, combined with its dense and diverse transport networks, makes it an ideal environment to examine how multimodal systems are coordinated, how traffic is managed at scale and how innovation is translated into operational solutions.

From vision to deployment

At a time when mobility systems are becoming increasingly interconnected, the Congress focuses on a central question: how to move from innovation to implementation. This edition places a strong emphasis on integrated, safe and seamless mobility, bringing together expertise from across the transport ecosystem. It builds on a well-established community while introducing new perspectives, ensuring that dialogue remains both relevant and forward looking.

A programme reflecting system complexity

The **Congress Programme** is structured around four strategic themes that mirror the realities of modern mobility systems: safety and resilience through intelligent systems, multimodal mobility system management, smart and sustainable logistics and transport beyond the road. Together, these themes provide a coherent framework to explore how policy, technology and operations interact in practice.

The **High-Level Programme** sets the strategic direction of the event. The Opening Ceremony on 27 April will welcome participants and outline shared ambitions, followed by the High-Level Plenary Session exploring how mobility can become truly seamless and user focused. The Smart Mobility Summit of Cities and Regions will bring together more than 35 cities and regional authorities to connect long term vision with implementation, addressing key topics such as automation, electrification, multimodal hubs and the societal dimension of mobility. The Congress will conclude with a Closing Ceremony that reflects on key outcomes and reinforces collective commitments.

>Continued.



Collaboration in action

A defining feature of this edition is the introduction of **eight co-created sessions**, developed with leading organisations including POLIS Network, Eurocities, 6G Infrastructure Association, SESAR Joint Undertaking, ITS Nationals, CILT Türkiye, the European Passengers Federation and PAVE Europe. These sessions are designed as interactive platforms, encouraging participants to work together on practical challenges such as aligning local and European priorities, expanding mobility systems beyond the road, strengthening international cooperation and embedding user perspectives into system design.

Connecting research, people and deployment

In parallel, the Technical Programme acts as the core knowledge and exchange platform, bringing together peer-reviewed research, operational expertise and cross-sector insights. It ensures that research is closely linked to real-world mobility challenges and deployment conditions, supporting practical application.

Complementing the core programme, dedicated side events bring additional focus to talent and inclusion. The Young Mobility Network's **Matchmaking session** creates space for emerging professionals to engage with the sector and build connections, while an interactive training session on **diversity and inclusion in automated public transport services** addresses how innovation can remain accessible and fair. Bringing together policymakers, operators and industry representatives, this session supports the development of more inclusive mobility solutions.

The **Exhibition** complements the Congress Programme by bringing together organisations and companies at the forefront of new solutions and services. Through technology showcases and live demonstrations, participants can explore how solutions are applied in practice and how they perform in real operational environments.

At the centre of the exhibition, the **ITS Arena** is the deployment stage, offering interactive sessions focusing on real-world operations. Featuring city representatives, operators and industry partners, participants gain direct insight into deployment experiences, including challenges, outcomes and lessons learned.

Participants also have the opportunity to experience mobility solutions at megacity scale through the organised **Technical Visits**. Across six locations in Istanbul, each visit will offer exclusive access to complex operational environments, where innovative solutions and technologies are implemented across large and interconnected networks. These visits link Congress discussions directly to real infrastructure and operations. Access to the Technical Visits is available for Knowledge Pass holders.

Building lasting connections

The Congress also offers a myriad of **networking opportunities** and informal exchanges throughout the three days. Key moments include the Welcome Reception following the Opening Ceremony on Monday 27 April, the ITS Dinner on Tuesday evening, 28 April and the Farewell Reception after the Closing Ceremony on Wednesday 29 April.

The ITS European Congress in Istanbul reflects a broader shift in the sector towards integrated systems and practical implementation. By combining strategic dialogue with real-world experience, it creates a unified platform where ideas are translated into action.

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Intelligent Transport Systems UK Strategic Outlook Ahead of the 2026 ITS European Congress in Istanbul

As we prepare to come together at the **ITS European Congress** in Istanbul, I am struck by how far the UK's intelligent transport sector has progressed and how clearly our direction of travel is now defined.

For ITS UK, this Congress is not simply another international gathering. It is an opportunity to demonstrate how British innovation, collaboration and leadership are helping to shape the future of transport across Europe and beyond. More importantly, it is a moment to show how intelligent transport systems are moving decisively from pilot projects and rhetoric into real-world delivery with measurable outcomes. _



Max Sugarman is Chief Executive of Intelligent Transport Systems UK, the membership body for the UK transport technology sector.

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From Technology to Outcomes

One of the most important shifts we have made as an organisation is moving beyond advocating for technology in isolation. Today, our focus is firmly on **outcomes**, such as cleaner journeys, safer roads, better data and transport systems that work for everyone.

Under the guidance of our Board and through extensive engagement with our members, we have crystallised our work around four strategic priorities:

- Decarbonisation through efficiency
- Smarter use of transport data
- Leadership in connected and automated mobility
- Inclusive innovation that serves both urban and rural communities

These priorities will underpin everything we showcase in Istanbul, because they reflect not only what the UK is capable of, but what Europe urgently needs.

Decarbonisation Starts with Smarter Systems

Transport remains one of the toughest sectors to decarbonise and while electrification is essential, it is not sufficient on its own. What excites me most is how intelligent transport systems are already delivering carbon reductions today by making better use of the infrastructure we have. Through initiatives such as **Greener Journeys**, our members are demonstrating how AI-enabled traffic management, public transport signal priority and the integration of micro-mobility can significantly cut congestion and emissions while improving the passenger experience. In Istanbul, UK-led case studies from Future Transport Zones will show how real-time data can actively influence travel choices, not through coercion, but by empowering people with better information at the right time.

Building Europe's Digital Transport Backbone

Data is the foundation of modern mobility. Yet too often it remains fragmented, inaccessible, or underused. That is why our work with the Department for Transport on a **National Access Point** and our strong advocacy for **Digital Traffic Regulation Orders (D-TROs)** is such a critical part of the UK's story. Turning road regulations into trusted, standardised digital assets creates a live digital representation of the road network. This is not an abstract ambition, it is a prerequisite for safer roads, better service planning and the responsible deployment of connected and automated vehicles. I firmly believe this is an area where the UK can lead by example and we will be making that case clearly in Istanbul.

From Testing to Deployment in Automated Mobility

The introduction of the **Automated Vehicles Bill** marks a turning point for the UK. It signals our move from experimentation to scaled deployment, giving industry the confidence and clarity it needs to invest and deliver. Through our **CAM Forum**, we are bringing together vehicle developers, infrastructure providers, insurers and policymakers to ensure this transition is safe, commercially viable and socially acceptable. Technologies such as remote operations, where the UK already has a strong competitive position, will feature prominently in our Congress presence.

Skills, Talent and Inclusion

None of this progress is possible without talented people. Like much of Europe, we face a significant skills challenge, but also a huge opportunity. Our **Early Careers Forum** is designed to attract diverse new talent by connecting technical innovation with social purpose: saving lives, reducing emissions and improving everyday mobility. Participation in the Congress's youth and student initiatives will help forge international links that strengthen the sector for the long term.

Putting Passengers First

Technology only succeeds when it is intuitive and inclusive. That is why our approach to **Mobility as a Service** now centres on interoperability rather than monolithic platforms.

By advocating open standards and seamless integration (from rural buses to national rail), we are focused on journeys, not apps. Lessons from the evolution of contactless payments and integrated ticketing in the UK demonstrate that the most impactful innovation is often the least visible to the user.

Safety as a Shared Responsibility

The UK's commitment to **Vision Zero** remains unwavering. Advances in **vehicle-to-everything (V2X)** communication show real promise in preventing collisions by giving drivers, vehicles and infrastructure a shared awareness of risk.

By embedding safety into system design rather than relying solely on individual behaviour, intelligent transport systems can help deliver roads where fatalities and serious injuries are no longer accepted as inevitable. _

A Collective European Future

As we head to Istanbul, my message is a simple one: the challenges we face, climate change, urbanisation, safety, are collective and so must be the solutions.

The UK delegation will represent a vibrant ecosystem of SMEs, researchers and global integrators, united by a belief that intelligent transport can deliver a cleaner, fairer and more efficient future. The Congress is our opportunity to demonstrate that the UK is not merely contributing to Europe's mobility transformation, we are helping to lead it.

Is 2026 when Intelligent Transport Systems Come of Age?

Alistair Gollop looks at how the convergence of technologies and applications could be transformational for the ITS sector

For more than a decade, Intelligent Transport Systems (ITS) have been described in modest terms. They were the enablers, the hidden layer, the digital glue that helped vehicles, roads and networks work a little better together. Useful, certainly, transformative at times, but rarely centre stage. That framing no longer holds. Over the past month, across conferences, exhibitions and policy announcements from Australia to Europe and East Asia, a striking pattern has emerged. Intelligent transport is no longer an accessory to the transport system. It is becoming the system itself. The digital layer has moved from the background to the foreground, reshaping how mobility is designed, operated and governed, is this when mobility grew up?

From software-defined to intelligence-native

One of the clearest signals of this shift came from the International Conference on Automotive Technology and Mechanical Engineering Solutions (ICATMES) 2026. For years, the automotive industry has rallied around the concept of the “software-defined vehicle”, promising flexibility, configurability and continual improvement through code. What emerged at ICATMES suggested that even this paradigm is already being overtaken. The conversation has moved on to the **AI-native vehicle**. These are vehicles architected around artificial intelligence from the outset, rather than retrofitted with smart features. Decentralised AI agents manage steering, braking and suspension in real time. Predictive physics models allow vehicles to anticipate changes in surface conditions milliseconds before they occur. Instead of simply reacting to hazards, they forecast them.

For ITS, this represents a profound change. Infrastructure can no longer assume vehicles will passively respond to signals and warnings designed for humans. The system now needs to provide **high-confidence, machine-readable intent**, data that autonomous decision-making systems can consume at machine speed. Signals, roadside units and digital twins must operate on the same temporal scale as automated control systems. Human-centred infrastructure logic is no longer enough. The implication is clear: the future of ITS is inseparable from the future of the vehicle and the vehicle is evolving faster than ever.

Australia: from pilots to platforms

If ICATMES showed where vehicles are headed, three major Australian conferences demonstrated how infrastructure is responding in practice. At the International Conference on Transportation & Logistics Technology (ICTLT) in Sydney, the message was unmistakable: the era of pilots is over. Australian cities are no longer experimenting with multimodal integration, they are deploying it at scale. Machine-learning-based traffic optimisation is already smoothing flows in live urban environments. Unified network management platforms are giving operators a single, coherent view of buses, rail, ferries and micromobility. Freight, too often overshadowed by passenger mobility, took centre stage. RFID-enabled visibility, logistics digital twins and agent-based simulations are now delivering measurable improvements in resilience and performance. As one speaker observed, “*the smartest kilometre in the supply chain is now the digital one*”. The International Conference on Traffic and Transportation Engineering (ICTTE), also in Sydney, reinforced this shift from concept to capability. Connectivity, cyber security, predictive safety analytics and climate-resilient materials are no longer fringe research topics. They are becoming foundational engineering requirements. The implication was unmistakable: ITS is not a digital overlay applied to infrastructure, it is infrastructure.

Brisbane pushed the thinking further still. At the International Conference on Traffic Flow Theory and Transportation Systems (ICTFTTS), delegates encountered “TrafficRobot”, an agentic AI framework that treats intersections as negotiating entities rather than passive control points. In simulations, it reduced idling time by more than 20 per cent. Researchers examined the realities of mixed traffic (human drivers, autonomous vehicles and delivery robots sharing the same space), and demonstrated how cooperative C-V2X “road trains” can increase capacity without adding lanes. Perhaps most striking was Brisbane’s city-scale digital twin, used to move from scheduled maintenance to predictive intervention, saving millions in emergency repairs. Even quantum simulation made an appearance, with early experiments already solving logistics optimisation problems that defeat classical approaches. As the city prepares for the 2032 Olympics, these technologies are increasingly viewed as strategic assets rather than curiosities. Australia, it seems, is no longer just hosting the conversation about future mobility. It is becoming a living laboratory for it.

Europe: merging energy and mobility

While Australia showcased operational maturity, Europe delivered a regulatory breakthrough. At the International Vehicle-to-Grid Conference in Münster, Germany announced a decisive shift in how electric vehicles are treated within the energy system. From April 2026, EVs are formally recognised as **mobile energy storage systems**. The long-criticised double grid-fee penalty has been removed and the MiSpeL framework has simplified technical integration. Bidirectional charging has moved from pilot to industrial reality. Manufacturers have responded accordingly. Renault is entering mass production of V2G-enabled vehicles, while Mercedes-Benz and BMW are making bidirectional capability standard across their 2026 line-ups. The implications for ITS are substantial. Kerbside chargers become grid assets. Logistics depots double as energy buffers. Dynamic tariffs become operational levers. Cities gain access to virtual power plants constructed from thousands of parked vehicles. Transport networks begin to participate actively in energy stability rather than merely consuming power. The technology is ready. The remaining challenge is scale and confidence.

China: the sensor layer comes of age

In Shenzhen, another critical piece of the puzzle fell into place: the industrialisation of the sensor layer. At Sensor Shenzhen 2026, LiDAR manufacturers reported profitability for the first time, signalling the transition from research to mass deployment. Radar-vision fusion systems improved early-warning accuracy by 30 per cent. BeiDou-based displacement monitoring functioned even where public networks were unavailable. Intelligent Rapid Transit systems delivered rail-like performance on existing roads and AI-driven rail maintenance platforms dramatically reduced downtime. Sensors, long described as enabling technologies, are increasingly better understood as the central nervous system of modern mobility.

The UK: embedding digital by default

Closer to home, the UK's new integrated transport strategy, Better Connected, marked a subtle but significant policy moment. Technology is no longer treated as a standalone theme. It is embedded throughout the strategy as a cross-cutting enabler of delivery. Commitments range from national multimodal contactless ticketing, to real-time bus data integrated into mapping platforms, investment in transport digital twins, AI-enhanced rail timetabling and the creation of a Transport Data Marketplace. The direction of travel is unmistakable: digital capability is now central to how local transport will be planned, delivered and experienced. Industry confidence is mirroring this policy shift. Yunex Traffic's decision to invest in a new 160,000-square-foot facility at Bournemouth Airport is more than a property move. It reflects belief in the long-term trajectory of intelligent transport as a manufacturing, services and critical infrastructure sector, not simply a digital niche.

Intelligence in the environment

Perhaps the most consequential shift of all comes from a growing recognition, articulated recently by UNECE, that a vehicle-centric philosophy has reached its limits. Safety and sustainability will increasingly depend on intelligence embedded in the environment itself. Connected junctions can detect vulnerable road users before they are visible to drivers. Adaptive corridors can prevent congestion before it forms. Digital twins can identify near-miss patterns before collisions occur. Low-cost sensor arrays can deliver safety benefits even in regions where advanced vehicles remain rare. This is not about smarter cars. It is about smarter systems. Even April Fools' jokes in the mobility sector are becoming telling. In 2026, the humour is no longer about flying cars, but about hyper-responsive infrastructure, dynamic rules and systems that explain their decisions. The jokes land because the ideas feel plausible. The line between parody and prototype is shrinking!

The integrated phase begins

Across all of these developments, a single narrative emerges. Mobility is entering its **integrated phase**, defined not by isolated innovations, but by the convergence of vehicles, infrastructure, energy, data and policy. Vehicles that anticipate rather than react. Infrastructure that communicates rather than signals. Energy systems that integrate rather than simply supply. Digital twins that predict rather than record. Policy that enables rather than follows. Industry that invests rather than experiments.

The future of mobility is no longer being imagined. **It is being built, everywhere, all at once.**



See the video at:
https://youtube.com/shorts/PEc_GA0ZiP0

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Why Diversity Can No Longer Wait

A Strategic Imperative for Europe's Future

Transport is a pillar of mobility in our society. It moves people and goods, connects continents as well as urban and rural regions, links cultures, enables access to jobs and services and underpins economic growth. As its role expands, transport is increasingly shaping whether Europe can deliver on its climate, digital and social ambitions. Yet, despite this growing strategic importance, the sector has for too long been shaped by a narrow set of perspectives. Diversity has often been treated as a “nice to have”, rather than recognised as a strategic asset essential to meeting these ambitions.

Across Europe and beyond, transport is experiencing a fundamental transformation, driven by digitalisation, automation, climate neutrality targets, demographic change and labour shortages. These shifts are redefining how transport is designed, governed and experienced. Challenges that are complex, systemic and deeply human. They cannot be accurately addressed by homogenous decision-making.



Agne Vaitekenaitė is Head of Advocacy and Partnership at ERTICO and is European Commission Ambassador for #DiversityInTransport

Why this conversation matters now

Despite growing awareness, transport remains one of the least diverse sectors in Europe in terms of gender diversity. Women represent only around 22% of the transport workforce, despite making up more than half of the EU population. Representation further declines at senior and technical levels. The sector is also struggling with an ageing workforce and severe labour shortages across multiple modes.

Furthermore, young people often report limited visibility of career pathways into transport and perceive the sector as conservative, rigid or misaligned with their values. Meanwhile, older professionals are navigating rapid technological change and skills transformation. Voices from different socio-economic backgrounds, regions and lived experiences are still underrepresented in decision-making. These gaps matter because transport decisions shape access to jobs, services and participation in society. Moreover, transport faces growing skills shortages amid rising competition for talent. By 2030, younger generations will dominate the workforce, and many job seekers now prioritise diversity and inclusion. At the same time, the sector is rapidly shifting towards connectivity, automation and digital technologies, moving from hardware to software, data and AI, skills that are scarce in Europe and largely male dominated. To stay attractive, future-oriented and credible, transport must show it is inclusive, open and ready to evolve.



A personal reflection

I entered the transport sector at the age of 28. In many meetings, I was the only woman in the room and often the youngest. At first, that reality was surprising. Over time, it became formative. Finding myself in such situations, heightened my awareness of whose voices were heard, whose experiences were missing and how decisions were framed. It made me reflect on who sets the agenda, which assumptions go unchallenged and how power dynamics shape outcomes. I came to understand that diversity is not only about who is present, but about who feels empowered to speak, influence and lead. These early experiences shaped my long-term commitment to diversity in transport as a structural issue that affects innovation, talent retention and public trust. They strengthened my belief that progress requires both individual leadership and systemic change.

What we are doing at ERTICO – ITS Europe

At ERTICO, diversity is embedded in how we approach partnership, advocacy and innovation. As a public-private partnership bringing together stakeholders from industry, public authorities, research sector and users, we see every day how collaboration thrives when different perspectives come together. Compared to many other organisations in the EU policy bubble, ERTICO benefits from a higher level of gender diversity within its association environment, which enriches our dialogue, collaboration and the quality of our outcomes. In March this year, we took an important step forward with the launch of Gender Equality Plus (GEP+). The “Plus” is intentional. While gender equality remains a core focus, GEP+ recognises that diversity is multi-dimensional. It encompasses age, background, career stage, discipline and lived experience. The initiative seeks to drive meaningful change while promoting balanced representation across ERTICO activities and expert groups, supporting more inclusive leadership and governance practices, creating safe spaces for dialogue, mentoring and visible role models and equipping organisation with practical tools that help translate commitments into concrete action.

#DiversityInTransport

At European level, the #DiversityInTransport initiative led by the European Commission (DG MOVE) plays an important role in aligning action across the ecosystem. Through the Network of Ambassadors for #DiversityInTransport, it mobilises individuals and organisations to raise awareness, advocate for inclusive policies, share good practices and give voice to underrepresented groups.

Last year, I joined this initiative to help amplify its collective effort and impact. It reflects my belief that no single organisation (and no individual), can drive systemic change alone. Real progress happens when policy frameworks, funding instruments, leadership and organisational culture move in the same direction. European-level initiatives play a critical role in this process, translating shared values into clear expectations and transforming those expectations into measurable action.

Engaging youth in transport decision-making

Diversity is also about age and generation. Young professionals and students repeatedly highlight barriers to entry into the sector with limited visibility of career pathways, rigid organisational cultures and a perception that decision-making is disconnected from societal and environmental priorities. At the same time, they bring invaluable assets, such as digital fluency, systems thinking and a strong sense of purpose. I will be promoting this in New York, speaking at the United Nations Economic and Social Council Youth Forum, addressing the challenges young people face in transport across Europe and calling for action from governments. If transport is serious about long-term transformation, youth must be included as active contributors. It calls for opening governance structures, investing in mentoring and nurturing meaningful intergenerational dialogue, because bringing generations together leads to wiser decisions and more sustainable outcomes.

From conversation to culture change

The transport sector does not lack talent. What it lacks, at times, are structures that recognise, attract and retain that talent in all its diversity. Moving forward, diversity must be treated as a strategic enabler that is integrated into workforce planning, innovation programmes and governance models. That also means genuinely listening to voices that have historically been at the margins. Diversity in transport lights the way toward a more human future of mobility. When our systems reflect society and our leadership embraces difference, we do more than move people, we move communities, Europe and the whole world forward and build resilience into every journey.

That is a journey worth committing to, together.



From Words to Action

CLOSING THE TRUST GAP IN INTELLIGENT SYSTEMS

Paula Claytonsmith looks at how trust is now the make-or-break factor for intelligent transport and infrastructure technology. In this article, she sets out what closes the trust gap in practice and what happens when governance and communication lag behind deployment.



Paula Claytonsmith is a leading writer, policy and innovation strategist working at the nexus of transport, advanced technology and policy in the UK. She advises public authorities, industry and policymakers on highway maintenance, AI, intelligent systems and the real-world adoption and implications of emerging technologies.

In my previous article (in [ITS Edge No.5](#)), I argued that the future of intelligent systems depends not on technical brilliance alone, but on whether people **genuinely trust them**. That gap is already shaping which innovations succeed and which quietly disappear after the pilot phase. This follow-up explores what closing it looks like in practice, with examples of where mistrust has cost us, and where getting it right has made a difference.

When Trust Fails

Trust breaks fastest when systems work technically, but feel unpredictable, unaccountable, or imposed.

Adaptive traffic signal control systems in urban areas across the UK offer a familiar pattern. Technically, these systems perform well, reducing journey times, smoothing peak flows and cutting emissions.

And yet, in multiple cases (though not all), residents have pushed back hard. Signals change in ways that feel unpredictable and local knowledge is seemingly overridden without explanation. Where authorities have not communicated what the systems do, or how complaints are handled, residents fill that vacuum with suspicion. Systems have been scaled back not because they failed technically, but because the narrative around them collapsed.

European C-ITS and connected vehicle trials show a similar dynamic. Deployments under the EU-funded SHOW and InterCor programmes have reported safety-focused outcomes and promising results in pilots. But where public communication is treated as secondary, minor incidents can become major trust events, the story shifts rapidly from "innovation" to "risk".

When Getting It Right Makes a Difference

Where organisations publish data, document decisions and communicate limits, scrutiny becomes manageable rather than fatal.

Transport for London's open data approach offers a counterpoint. TfL publishes extensive operational performance data, including reliability, passenger volumes, road collisions and payment use.

It also sets out transparency expectations for commercial partnerships, including routinely publishing relevant contracts. The framework is not perfect, but TfL's consistency means it has something to stand on when scrutiny arrives, governance in place before the questions.

Tampere, Finland, has taken a similarly deliberate approach to autonomous shuttles. Since 2020, the city has run successive pilots, integrating automated vehicles as tram feeder services and working openly with its transport operator, Nysse and Tampere University. In November 2025, Tampere launched Finland's first commercially operated automated bus service. Operational challenges (harsh winter conditions and kerbside and parking constraints) have been discussed openly rather than buried in vendor communications. That honesty is why confidence has grown.

The Governance Gap

If authorities cannot explain how automated decisions are made and corrected, public confidence is undermined before benefits are realised.

Intelligent systems are often procured faster than the governance frameworks that should accompany them. The technology moves at commercial pace; accountability moves at institutional pace. In my view, that gap is where trust goes to die.

AI-assisted road monitoring tools are accelerating across the UK and Europe, yet many local authorities have limited visibility into how the algorithms make decisions, or, more importantly, how errors are corrected. When contracts lack transparency requirements and procurement teams cannot interrogate vendor claims, trust failure is baked in.

The EU AI Act's tiered risk framework, adopted in 2024, is a step forward, but implementation will take years. It also gives the UK much to think about. Decisions made now will shape public confidence long before the regime is fully embedded.

The Inclusion Problem

A system that protects only the people with the right device is not a public safety system.

These gaps are not theoretical. They show up in live networks when systems fail, and organisations are forced to explain themselves after the fact.

Many V2X deployments assume users carry compatible devices. A child walking to school does not necessarily carry a V2X device; an elderly pedestrian does not either.

When smart systems serve some people better than others, communities draw reasonable conclusions about whose safety is being prioritised and those conclusions are hard to reverse.

Research through programmes such as SmartDENM has demonstrated prototype infrastructure-side detection approaches that can identify pedestrians without device dependency (including in controlled testing). The challenge now is procurement commitment, not technical feasibility.

Failure Requires Honesty

When failures happen, the deciding factor is not whether the system was perfect, but whether the operator is transparent and accountable.

The National Highways smart motorway story is instructive (and still painful for many). Between June 2022 and February 2024, Freedom of Information data obtained by BBC Panorama showed nearly 400 incidents in which smart motorway technology lost power, sometimes leaving key safety systems (including stopped-vehicle detection) unavailable for days. In February 2023, National Highways reported a software outage that froze signs and signals and disabled stopped-vehicle detection across multiple motorways. The Office of Rail and Road also flagged stopped-vehicle detection performance shortfalls in December 2022. Much of this detail entered the public domain through FOI and media reporting. When Panorama's investigation aired in April 2024, National Highways was responding from a largely reactive footing; this is one of the hardest positions from which to rebuild trust even if there is mitigation in place that place safety highly.

What Good Looks Like

These are practical requirements that can be written into procurement, governance and communications, not optional extras:

- **Transparency by default.** Authorities must be able to explain, in plain language, what their systems do and what happens when they fail. This is a procurement requirement, not just a communication one.
- **Engagement before deployment.** Tampere's publicly documented, iterative approach is replicable. Pre-launch engagement costs time upfront; it is cheaper than managing a collapsed narrative after the fact.
- **Inclusive design as a requirement.** Device-dependent safety systems are not genuinely public systems. Authorities must require evidence that systems work for vulnerable road users in real conditions, not just ideal ones.
- **Honest failure communication.** Systems that fail safely matter. Institutions that communicate clearly when they fail matter even more.

The Ongoing Race

The next wave of deployment will succeed only if trust is treated as an engineering and management deliverable.

The UK and Europe do not need to win **the** technology race; they need to win **the** trust race. That means treating **trust as infrastructure: specifying transparency in contracts, designing for people without devices and communicating failures before headlines do.** The systems that will define intelligent transport are being deployed now and public confidence will be won or lost, project by project. We already know what good looks like. The question is whether authorities, suppliers and regulators will make it the default.

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The ITS1827E is a comprehensive, spreadsheet-based suite of forms designed for Traffic Signal Engineers and Transport Planners. It serves as the definitive blueprint for defining the functional requirements of traffic signal controllers.

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- **Assessments:** Providing data for transport planners and site audits.

"The ITS1827E specification forms are the essential toolkit for traffic signal practitioners, ensuring documentation remains robust, flexible, and ready for the road ahead."

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The Challenges and Opportunities of Remote Driver-Derived Data in the Age of CAVs

The evolution of **Connected and Automated Vehicles (CAVs)** represents one of the most significant shifts in mobility since the internal combustion engine. However, this revolution is not powered by fuel alone; it is fuelled by an unprecedented volume of data. For CAVs to operate safely and efficiently, they must continuously exchange information with infrastructure, other road users and remote servers.

This "vehicle probe data" derived from remote driver and vehicle interactions, presents a dual-edged sword. While it offers a pathway to near-zero road fatalities and optimised traffic flow, it also introduces complex technical, legal and social hurdles that the industry and regulators must urgently address.

About the Authors

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The Monopoly of the "Extended Vehicle"

One of the most pressing economic challenges in the current landscape is the control of data by Original Equipment Manufacturers (OEMs). Under the "extended vehicle concept", manufacturers often route all in-vehicle data directly to their proprietary servers. While this ensures a level of cybersecurity and brand consistency, it creates a de facto monopoly.

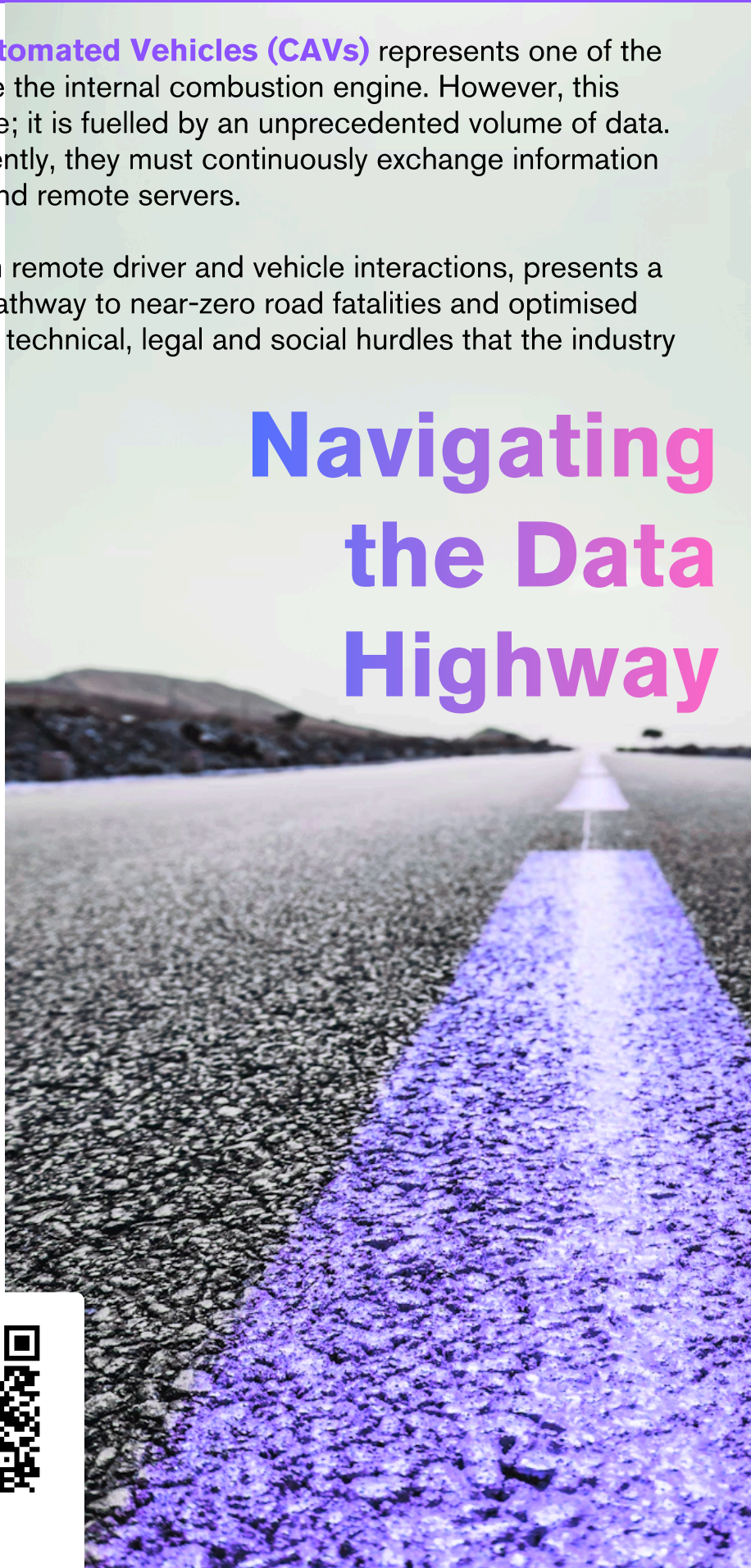
This exclusive control prevents third-party service providers from accessing real-time, direct data. Without a "level playing field", independent garages, fleet managers and diagnostic services struggle to compete. To address this, the European Commission's GEAR 2030 group has called for harmonised rules on data recording and access.

Navigating the Data Highway

To find out more, read the whole paper at:

<https://www.itsnow.org/article-NavigatingTheDataHighway.html>

or scan the QR code>



The **EU Data Act** (2023) serves as a pivotal legislative response. By establishing the rights of users to access and share data generated by their connected products, the Act aims to break down these proprietary silos. However, gaps remain, specifically regarding safety-critical "black box" data (Event Data Recorders), which are still largely governed by separate vehicle safety regulations.

Strategic Resources and Global Divergence

While the EU focuses on consumer rights and fair competition, other global powers view vehicle data through a different lens. In China, the **Business to Government** (B2G) mandate for New Energy Vehicles (NEVs) requires manufacturers to share real-time navigation and electro-mechanical data directly with government authorities.

This policy treats vehicle data as a strategic national resource, used for performance monitoring and preventing subsidy fraud. This highlights a growing geopolitical divergence: is vehicle data a private consumer asset, a corporate commodity, or a public utility?

The Triple Challenge: Social, Technical and Environmental

As we look toward the 2030 horizon, the industry faces a triad of evolving challenges:

1. Social: The Digital Divide and Public Trust

Automation holds the promise of liberating those currently excluded from mobility, such as the elderly or disabled. Yet, there is a risk of a new "digital divide" for those lacking digital literacy. Insights from the **SINFONICA** project (concluded in August 2025) revealed a complex social tapestry. After surveying over 5,000 Europeans, the project found strong interest in automated public transport, but significant wariness among the elderly. The primary conflict remains: will consumers accept constant monitoring as the "price of convenience", or will they insist on absolute data autonomy?

2. Technical: Cybersecurity and Standards

Every connection increases the "attack surface" for cyber threats. The **Cyber Resilience Act** (CRA) 2024 establishes essential horizontal cybersecurity requirements, but technical interoperability remains a hurdle. Without standardised communication protocols, AVs risk becoming isolated "silos," unable to communicate with a traffic light or a pedestrian's smartphone. ERTICO continues to bridge this gap by linking Research & Innovation (R&I) projects with global standardisation initiatives.

3. Environmental: The Energy Cost of Intelligence

A rising concern is the "hidden" environmental footprint of CAVs. Data centres already account for approximately 2.7% of EU electricity demand, a figure expected to rise by 28% by 2030. The energy required for on-board sensing, high-performance computing and constant V2X communication is non-trivial. Recent research by **Garus et al.** (2025) suggest that through technological optimisation, the additional energy consumption of CCAM systems could be reduced by over 80% compared to early prototypes, making energy-efficient automation a critical R&D priority.

Safety Benefits vs Ethical Dilemmas

The promise of connectivity is a 20% increase in road capacity through smoother traffic flow (JRC, 2019). Cooperative Intelligent Transport Systems (C-ITS) enable use cases like "Emergency Vehicle Priority" and "Vulnerable Road User Protection" that are simply impossible for disconnected vehicles.

However, as we move from SAE Level 3 automation upwards, the liability shift, from the human driver to the AI system, necessitates a robust legal framework. The **AI Liability Directive** is essential here to clarify definitions of "autonomous" driving and ensure that when a machine makes a split-second decision in a crash scenario, there is a transparent, explainable chain of accountability.

From Squeamishness to Acceptance: The Power of Co-Creation

Public perception remains a bottleneck. Eurobarometer data suggests over half of Europeans are still uncomfortable with driverless technology, often due to the disproportionate media coverage of rare accidents.

To make technical progress "palatable," we must move beyond presenting technology as a finished product. The **MetaCCAZE** project, coordinated by ERTICO, demonstrates the power of "Living Labs." By involving citizens in the "what, why and how" of low-emission automated services from the outset, we build a sense of shared ownership. When a community helps define how a service functions in their own neighbourhood, trust follows.

A Roadmap for Safeguarding Progress

As we move forward, the governance of mobility data must be dynamic rather than static. To safeguard the future of ITS, we recommend:

- **Federated Data Sharing:** Utilising frameworks like European Data Spaces to enable anonymised data exchange without compromising privacy.
- **Privacy-by-Design:** Embedding data protection into the very architecture of the vehicle.
- **Algorithmic Explainability:** Ensuring that AI decisions are not "black boxes" but are interpretable by regulators and insurance providers.
- **Equity Protections:** Ensuring that the benefits of CAVs are distributed fairly, preventing the marginalisation of vulnerable groups.

The journey toward fully autonomous, connected mobility is as much about social and legislative engineering as it is about software and sensors. By balancing the drive for efficiency with a steadfast commitment to privacy and equity, we can ensure that the data highway leads to a safer, more sustainable future for all.

How ARTSM Champions Road Safety Through Standards and Collaboration

The **Association for Road Traffic Safety and Management (ARTSM)** plays a leading role in shaping the future of road safety across the UK and beyond. As the trade body representing manufacturers and service providers of road safety equipment (from traffic signals and signage to cones and PPE), ARTSM stands firmly at the intersection of innovation, safety and standards.



Building Safer Systems Through Equipment and Expertise

The safe management of our road network depends not only on good design and responsible driving but also on the reliability and performance of the equipment used every day. Although these products are often the final component installed on our roads, they are fundamental to keeping all users safe.

ARTSM embraces the Safer Systems approach by promoting better design, proper installation and effective use of equipment, ensuring that everyone, from pedestrians to vehicle operators, benefits from a well-managed, consistent and secure road environment.

Driving Consistency Through Standards

For decades, ARTSM has contributed expertise to the development of national and international standards, ensuring that road safety equipment is interoperable and provides a seamless user experience. Whether it's the colour of a road sign or the operation of a pedestrian crossing, ARTSM members work collaboratively to make sure consistency and clarity underpin every aspect of road safety infrastructure.

The association also supports product registration and standards development through TOPAS and continues to advise on standards with organisations such as BSI. This active involvement helps balance innovation with safety, avoiding a “wild west” approach to emerging technologies. By ensuring safety requirements evolve alongside new products, ARTSM prevents unintended consequences and protects road users from unseen risks.

Collaboration, Guidance and Continuous Learning

Change in standards or technology requires education, and in the absence of government guidance, industry must often take the lead. ARTSM convenes experts through its technical working groups, where members share challenges, propose updates to standards and develop guidance to reflect best practice. When formal change takes time, ARTSM provides interim guidance to help practitioners interpret standards effectively.

ARTSM's Guidance Notes are objective, collaboratively developed publications that benefit from broad peer review, including feedback from local authorities, government and industry professionals. The association's consultative approach (seen, for example, in the development of its Guidance for Portable Signals), has earned recognition, including commendation from the Department for Transport's Traffic & Technology division.

Kealie Franklin is CEO at the Association for Road Traffic Safety and Management (ARTSM) and is also Administrator for Traffic Open Products and Specifications (TOPAS)

To find out more, visit ARTSM at:
<https://artsm.org.uk/>

or scan the QR code >



Responding to Innovation and Emerging Risks

Innovation often brings new safety considerations. During the COVID-19 pandemic, the introduction of non-contact push buttons at pedestrian crossings provided a timely example. ARTSM quickly contributed to the development of a TOPAS standard defining safety requirements for these devices, ensuring consistent functionality and user experience. Later, when unintended safety issues emerged (such as Bluetooth buttons remaining active when signals were out of use), ARTSM responded with timely guidance on signal bagging and switching off equipment, raising awareness of maintenance risks and helping authorities prevent accidents.

A Watchdog for Industry Standards

ARTSM sees its “watchdog” function as essential to maintaining trust and professionalism across the industry. The Association’s constitution empowers it to ensure members are aware of mandatory standards and to support the resolution of non-adherence issues.

At times, this involves issuing formal guidance; at others, simple reminders via social media are enough, for example, clarifying that traffic signals are not permitted on zebra crossings. Every action, big or small, contributes to maintaining high standards and public confidence in road safety management.

Open Access to Guidance and Resources

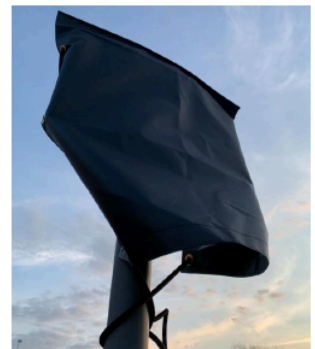
All ARTSM Guidance Notes are publicly available and free to access via the Association’s website. They are designed for everyday use by local authorities, manufacturers and safety professionals providing clear, concise resources suitable even for quick reference. Their accessible format enables users to refresh knowledge, revisit best practice and understand the context behind key safety requirements.

The Road Ahead

Through collaboration, engagement and technical expertise, ARTSM continues to raise the bar for safety, consistency and innovation in road traffic management. The association’s commitment to open communication and high standards ensures that the UK remains a leader in safe, intelligent transport systems.



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A driver's perspective from inside a car, looking out at a city intersection during sunset. The sun is low on the horizon, creating a golden glow and long shadows. Two traffic lights are visible, both showing green. The car's interior, including the steering wheel and dashboard, is partially visible in the foreground. The background shows city buildings and other vehicles on the road.

AI in intersection control – a win-win situation

The management of urban corridors with signalised intersections can benefit from the responsible use of Artificial Intelligence.

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When does a Traffic Signal look like something out of Thunderbirds?



LEDs have transformed traffic signals with lower energy use and longer lifecycles, but they also removed a surprising by-product of older lamps, heat. In winter conditions, that missing warmth can allow snow to accumulate and mask critical indications. Snow Proof Signals' clear, cone-shaped lens cover is designed to keep aspects visible when it matters most.

For decades, signal engineers could count on an unglamorous feature of incandescent and halogen signal heads, their inefficiency. Traditional lamp-based aspects wasted a significant portion of their power as heat, warming the lens and surrounding housing. In cold weather, that waste heat often proved helpful, melting light snowfall and discouraging build-up on the face of the signal. Drivers approaching a junction might never realise they were benefiting from a design "flaw" that doubled as a de-icing aid.

The shift to LED technology changed that balance overnight. LEDs deliver the same visual performance with a fraction of the energy, and their longevity reduces routine lamp changes and call-outs. But the very efficiency that makes LEDs attractive also means far less heat at the lens surface. In prolonged sub-zero conditions, wet snow can cling, compact and gradually obscure the displayed indication, particularly on the windward side of exposed junctions, on higher-speed approaches or

where blowing snow and road spray are persistent. The result is an unintended consequence, the signal keeps working electrically, but its message is physically hidden.

When traffic signals are hard to see, the risks multiply. At best, authorities face increased public reports, emergency maintenance visits and reputational damage. At worst, reduced conspicuity can contribute to hesitation, harsh braking, red-light violations or driver confusion at exactly the moment when road conditions are already degraded. Some networks have responded with heated signal heads, add-on heaters or more frequent winter inspections. These measures can be effective, but they also add cost, complexity and ongoing power draw, partly eroding the efficiency gains that drove the LED transition in the first place.

Snow Proof Signals takes a different approach by preventing accumulation rather than trying to melt it. The company's product is a clear, cone-shaped cover that fits over the traffic signal lens. By changing the geometry of the exposed face, the cover harnesses airflow around the visor: relatively higher-pressure, slower-moving air at the leading edge is directed across the lens, while faster-moving air through the visor creates a lower-pressure path that helps carry snow and spindrift away. In simple terms, the stronger the wind, the more effectively the shape helps keep the aspect clear and maintains driver visibility. The cover also reduces the flat surface area where snow typically settles and packs. Snow and slush are encouraged to slide away under their own weight, and the tapered profile helps shed wind-driven precipitation that might otherwise stick to a conventional lens. Because the cover is transparent, the signal's light output remains visible through the cone while the key challenge—snow bridging and masking the aspect—is addressed mechanically.

Watch the associated video on the @ITSNow
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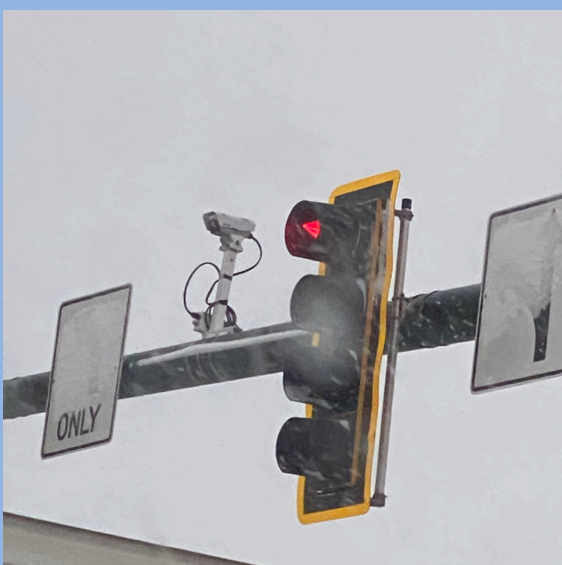


For practitioners, solutions that are passive and retrofittable have obvious appeal. A cover that does not require wiring, thermostats, control interfaces or additional energy supply can be deployed selectively, targeting known trouble spots such as rural sites, elevated installations, bridge decks or approaches with regular drifting. It can also simplify winter resilience planning rather than committing to system-wide heated heads, asset owners can treat snow shielding as a localised countermeasure informed by incident history and maintenance records.



As with any modification to the signal face, there are practical considerations. Authorities will want assurance that the cover does not introduce problematic reflections, reduce contrast or create visual artefacts in low sun or at night. Cleaning regimes may need minor adjustments if road film accumulates on the cone surface and compatibility with existing housings, visors and backboards matters for consistent deployment. In many regions, procurement teams will also check conformity with applicable highway standards and approvals, ensuring that any add-on preserves the signal's recognised appearance and viewing performance.

Yet the broader lesson is a familiar one in transport technology, improvements in one dimension can quietly remove an advantage somewhere else. LEDs cut energy consumption and maintenance, but they also took away the "free" heat that once helped keep lenses clear in snowfall. Snow Proof Signals' cone cover is a reminder that resilience does not always require complex electronics.



This is an elegantly pragmatic engineering solution to an unintended consequence of technology developments in traffic signals, and can restore visibility, reduce winter call-outs and keep signals working clearly when conditions are at their worst.

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As a highly experienced and respected freelance consultant, I provide a comprehensive range of Intelligent Transport Systems (ITS) and Traffic Signal consultancy services to navigate this complex landscape. My mission is to be the critical link between technological potential and practical implementation, ensuring innovation delivers meaningful outcomes.

I work with a diverse client base, including **highway authorities, engineering / management consultancies** and **commercial technology firms** to deliver expert guidance, innovative solutions and tangible results for transport infrastructure projects. The common thread in my work is bridging the critical gap that often exists between different stakeholders. Public authorities need to procure effective, future-proof solutions; technology companies need to align their products with genuine market needs; and engineering consultancies require specialist knowledge to deliver robust project designs. I operate at the nexus of these requirements, speaking the language of public policy, commercial strategy and technical engineering with equal fluency.

For my **public sector clients**, I provide independent, expert advice on everything from strategy development and systems specification to procurement support and project assurance. My guidance ensures that investments in new technology are sound, deliver maximum public benefit and avoid costly pitfalls. When partnering with other **consultancies**, I act as a specialist extension of their team, bringing niche expertise in advanced traffic signal control, ITS architecture and emerging mobility trends to enhance their project delivery capabilities.

For commercial **technology firms**, both established players and market entrants, I provide the strategic insight needed to succeed. This includes critical guidance on product localisation for the UK market, identifying the most appropriate applications for new solutions, facilitating strategic introductions to key industry players and providing technical business development support. By aligning your innovative technology with the specific challenges and procurement frameworks of the transport sector, I help accelerate your path to commercial success and impactful deployment.

Ultimately, my work as a technologist, author and speaker is driven by a passion for creating better transport systems. Whether I'm designing an advanced traffic signal strategy, advising a company on market entry or speaking at an industry conference, my goal remains the same: *"to apply deep technical knowledge and strategic thinking to solve real-world problems"*.

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Intelligent Transport Systems - Explained



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