



Shaping the Future of Mobility

The background of the cover is a composite image. The top half shows a wide, multi-lane highway with several cars driving on it. Overlaid on the highway is a complex network of glowing blue lines and nodes, representing a smart transportation system or a digital infrastructure. The bottom half of the image shows a closer view of the highway with cars, including a white bus and a black car, driving towards the viewer. The overall color scheme is dominated by blue, green, and yellow, with a red horizontal bar at the bottom.

SHAPING THE FUTURE OF MOBILITY IN INDIA

Digest

JULY-SEPTEMBER

2025



DATA | ENGINEERING | ROAD SAFETY - TECHNOLOGY

What if the way you travel could
add **years** to your **life**?

Walking

30%
Reduction

35-45%
Reduced Risk

30%
Reduction



Heart Disease



Premature Death



Risk of Diabetes

Cycling

46%
Reduction

40-47%
Reduced Risk

40%
Reduction

Walking and cycling create healthier,
safer & sustainable cities.

We provide **Solutions** to help you get there

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EDITOR'S PEN

The future of mobility is no longer defined by the roads we build but by the intelligence with which we operate them. Infrastructure, when coupled with technology, becomes not just functional—but safer, smarter, and more sustainable. Intelligent operations are now the key to reducing accidents, enhancing efficiency, and creating resilient transport systems.

Asset management is at the center of this transformation. Digital inventories—powered by dashcams, drone surveys, and video analytics—are making it possible to track assets and their conditions in real time. Coupled with **crowdsourced data from** citizens and fleet operators, authorities can now monitor asset health at scale, identify early signs of deterioration, and prioritise interventions with unprecedented precision. This digital-first approach ensures transparency, extends asset lifecycles, and improves safety for every road user.

Meanwhile, **Mobility as a Service (MaaS)** is reshaping how people move—seamlessly integrating public, private, and shared modes into one connected experience. **Mobility digital twins** are enabling cities to model, simulate, and test future scenarios before investing on the ground—ensuring that every decision is data-driven and outcome-orientated.

The larger trend is clear: we are moving from devices to decisions. Sensors, connected vehicles, and video systems are no longer passive collectors of data—they are part of an ecosystem that transforms raw information into actionable intelligence for operators, planners, and policymakers.

As we approach the **ITS India Congress 2025** (November 6-7) at IIT Hyderabad—a **Pre-Summit Event of the AI Impact Summit 2026**—India has a powerful story to tell. From AI-powered traffic management to digital safety frameworks and intelligent asset management, our ecosystem is rapidly maturing and is now positioned to contribute meaningfully to global innovation.

Organised by ITS India Forum, IIT Hyderabad, and OMI Foundation, this landmark **first-ever ITS India Congress** unites government, industry, academia, and startups to shape India's ITS roadmap for Vision 2030 & 2047.

The road ahead demands clarity of focus: let us make **technology-driven operations, data-based governance, and safety-first systems** the hallmarks of modern mobility in India.

Srinivas Ganji

Editor, ITS India Magazine

PRESIDENT'S MESSAGE



Dear Members, Partners, and Industry Leaders,

The last three months have been defining months in India's ongoing transformation toward intelligent, efficient, and inclusive mobility. As we commemorate 10 years of the Smart Cities Mission, it is evident that Intelligent Transport Systems (ITS) have become the cornerstone of India's efforts to build digitally connected, environmentally sustainable, and citizen-focused cities and highways.

At the heart of this evolution, the ITS India Forum continues to lead with vision and purpose. In September, we successfully convened the 4th Roundtable on Data-Driven Advanced Traffic Management Systems (ATMS), bringing together national experts and institutional stakeholders to co-develop a robust and scalable framework for India's ATMS architecture. This will soon culminate in a national white paper to guide both urban and highway-level deployment strategies.

On the international front, our partnership with IEEE India was formalised through a strategic memorandum of understanding signed in June. This collaboration marks a critical step in aligning India's ITS ecosystem with globally accepted standards while building local capacity through research, education, and pilot programmes. Together, we are bridging the gap between global expertise and local implementation.

We also continue to grow as a community. We are pleased to welcome **DataCorp Traffic Pvt. Ltd., Sego Automobile Solutions Pvt. Ltd., T-Systems, Vehant Technologies, YelloSKYE** as new corporate members, **Indian Road Survey Management Pvt. Ltd. (IRSM)** as Premium member, and **JIO Platforms** as Patron member and celebrate the elevation of **Arcadis IBI Group to Patron member status**. These organisations bring strategic capabilities in intelligent mobility and data-driven infrastructure that will significantly strengthen our collective impact.

Our Working Groups, comprising members from industry, academia, and government, are also making measurable progress on strategic focus areas. These groups are actively contributing to policy frameworks, technical standards, and innovation roadmaps that will shape the next decade of ITS deployment in India. Notably, the **Working Group on AI and Sustainability** has launched a new pilot project focused on **real-time enforcement of emissions in Delhi**, advancing the application of AI and ITS for environmental monitoring and compliance.

Another key highlight was the ITS India Forum's participation in the ITS World Congress, Atlanta, USA. It was the first time in the history of the ITS World Congress that a session exclusively focused on **"ITS - Revolutionizing the Transportation Sector in India"** was held. The session received tremendous response from global experts and industries and was one of the key attractions of the ITS World Congress this year. It demonstrates India's growing dominance in the future ITS Industry. With the 2nd-largest Road Network in the world and the 3rd-largest Vehicle market, with low-cost access to the world's Fastest-growing Connectivity Network, India is poised to be the leader of the ITS Industry.

In the coming months, the ITS India Forum is preparing for several high-impact events, capacity-building programs, more collaborations, and starting the first ITS India Congress in Hyderabad. Each of these will play a critical role in shaping our narrative around smart, secure, and sustainable transportation in reality.

Together, let us continue to foster collaboration, scale innovation, and shape a future where India leads the world in intelligent, inclusive, and resilient transportation systems.



Warm regards,

Akhilesh Srivastava,

President, ITS India Forum

GOVERNMENT ACTIONS SHAPING THE FUTURE OF INTELLIGENT MOBILITY IN INDIA

EV Manufacturing Incentives & Sustainable Corridors

The Government of India has launched a major incentive scheme to promote domestic electric vehicle production. Under the new policy, automakers committing over \$500 million in local investment are eligible for a significant import duty reduction—down to 15%—on a limited number of electric vehicle imports. Complementing this at the state level, Maharashtra introduced a revised EV policy that targets 30% adoption of electric vehicles and outlines the development of green mobility corridors along the Mumbai–Pune and Pune–Nagpur expressways. These corridors will be equipped with fast-charging infrastructure and hydrogen fuelling options, advancing India’s integrated approach to electric mobility, sustainable transport, and ITS-enabled highway management. ([Source](#))

Nationwide Cashless Treatment for Road Accident Victims

The Ministry of Road Transport and Highways has notified a new policy ensuring cashless treatment for all road accident victims across India. Under the scheme, victims are entitled to treatment worth up to ₹1.5 lakh per person per accident at designated hospitals for up to seven days. The National Health Authority (NHA) will implement the scheme in coordination with police, hospitals, and state health agencies. Designated hospitals will offer full treatment, while non-designated facilities may only provide initial stabilisation. State Road Safety Councils will serve as nodal agencies to ensure effective rollout and coordination. This initiative strengthens India’s emergency care framework and supports national goals of reducing road fatalities through timely and accessible medical intervention. ([Source](#))

Digital Tolling & Road User Charging (RUC)

The Ministry of Road Transport and Highways continues to drive the transition toward intelligent tolling systems. A key focus is the deployment of ANPR-enabled FASTag tolling infrastructure to support barrierless Multi-Lane Free Flow (MLFF) toll collection. NHAI has initiated bidding processes for these advanced toll plazas as a precursor to future GNSS-based tolling. At the international level, India has joined the Asia-Pacific Road User Charging (RUC) Alliance, with ITS India Forum playing a lead role. This collaboration reinforces India's commitment to smart road pricing, dynamic tolling models, and globally aligned, data-driven transport policies. ([Source-1](#)) ([Source-2](#))

AI-Led Traffic Enforcement Policy

Traffic enforcement in India is undergoing a digital transformation with the growing integration of AI-based technologies. Cities such as Mumbai, Delhi, and Kerala have adopted systems that combine CCTV surveillance, speed sensors, and Automatic Number Plate Recognition (ANPR) to automate the detection and penalisation of traffic violations. Offenses such as overspeeding, signal jumping, helmetless riding, and triple-riding are now identified automatically, with e-challans issued instantly through digital channels. At the policy level, national committees are evaluating the broader integration of AI into enforcement frameworks to improve transparency, reduce human error, and promote compliance. These developments reflect a systemic shift toward real-time, tech-enabled road safety governance.

National ATMS Architecture White Paper Underway

A unified national framework for Advanced Traffic Management Systems (ATMS) is currently being developed by ITS India Forum in collaboration with MoRTH and NHAI. The white paper aims to establish standardised architecture, policy guidelines, implementation strategies, and institutional responsibilities for ATMS deployment across India. The initiative is informed by expert roundtables, stakeholder consultations, and ongoing pilot implementations. Once finalised, the white paper will serve as a guiding document for both central and state-level agencies in designing interoperable, future-ready ATMS infrastructure across highways and urban networks, solidifying India's leadership in intelligent transportation governance.



DWARKA EXPRESSWAY GETS INDIA'S FIRST AI-POWERED SMART TRAFFIC CORRIDOR

In a major leap for highway modernisation, the National Highways Authority of India (NHAI), in collaboration with IHMCL, has deployed the country's first fully integrated AI-powered Advanced Traffic Management System (ATMS) along the 56 km stretch of the Dwarka Expressway. This intelligent corridor features 110 high-resolution PTZ cameras, Vehicle-Actuated Speed Displays (VASD), and Variable Message Signboards (VMS) to dynamically manage traffic and alert drivers. At its core is a 15-gantry Video Incident Detection and Enforcement System (VIDES) equipped with radar and ANPR technology, capable of automatically detecting over 14 types of violations—including overspeeding, triple riding, and seatbelt or helmet non-compliance. A centralized 24x7 Command and Control Centre processes live data, issues automated e-challans through the NIC platform, and supports real-time incident response, handling up to 600 violations daily.

This deployment marks a significant shift from manual, reactive traffic control to predictive, technology-led enforcement. Unlike traditional patrol-based systems, the Dwarka Expressway's AI-based ATMS autonomously monitors traffic behaviour, enabling proactive road safety and efficient emergency management. The project serves as a national model for future smart corridors and aligns with NHAI's broader plan to expand similar systems to high-density routes such as Delhi–Agra, Bangalore–Mysuru, and Lucknow Ring Road. With this initiative, India sets a new benchmark in intelligent transport systems—demonstrating how AI, data, and automation can converge to create safer, smarter, and more accountable expressways. ([Source](#))

HIGHWAY AI MONITORING PILOT LAUNCHED ON DELHI-MUMBAI EXPRESSWAY BY BITSENSING AND IKIO

India has taken a major leap toward intelligent highway management with the launch of a collaborative pilot project between Korean radar technology firm Bitsensing and Indian infrastructure company Ikio. Under a strategic MoU signed during the ITS Asia-Pacific Congress in Suwon, the pilot will deploy TIMOS™ 360° radar-camera systems across critical stretches of the Delhi-Mumbai Expressway and parts of the Lucknow corridor. These multi-sensor devices combine millimetre-wave radar, AI-powered video imaging, and real-time analytics to detect roadway incidents such as accidents, stalled vehicles, animal crossings, and adverse weather conditions—offering a next-generation solution for responsive highway monitoring.

What sets this pilot apart is its predictive AI capability. The TIMOS™ system not only identifies violations like lane discipline breaches and vehicle classification but also forecasts risk patterns by analysing traffic behaviour and density in real time. Data from the field is relayed to a centralized platform for automated alerts, emergency coordination, and dynamic traffic rerouting, marking a shift from reactive to proactive safety management. Aligned with NHAI's larger ITS strategy, the Bitsensing-Ikio partnership showcases how advanced sensor networks can support India's transition to connected, AI-driven expressways, paving the way for scalable smart mobility solutions nationwide. ([Source](#))

INDIA TO PILOT FLASH-CHARGING ELECTRIC BUSES FOR NONSTOP INTER-CITY TRAVEL

In a significant move toward sustainable long-distance mobility, the Ministry of Road Transport and Highways has partnered with Tata Motors and EV startup EKA Mobility to launch a pilot project for flash-charging electric intercity buses. This initiative will deploy a fleet of luxury coaches equipped with cutting-edge technology capable of restoring a substantial battery range in just two minutes. The first phase will operate from Nagpur, with high-voltage, ICT-enabled charging stations installed along key corridors such as Delhi-Jaipur and Mumbai-Pune, enabling nonstop, high-frequency intercity service. The project represents a convergence of electric mobility and Intelligent Transport Systems (ITS), with real-time platforms managing grid load, vehicle diagnostics, charging patterns, and driver behaviour.

Unlike conventional e-buses that require hours of downtime, flash charging uses capacitor-based energy bursts coordinated by intelligent energy management systems. Integrated with ITS infrastructure, the model ensures efficiency, speed, and operational viability for long-haul travel. Building on the success of the 2024 iBus pilot in Delhi NCR, this initiative aims to establish electric buses as a practical alternative to diesel fleets. If successful, the model could scale across India's national corridors, including the Golden Quadrilateral, offering carbon-neutral, high-efficiency mass transit while supporting India's goals to electrify 30% of public transport by 2030 and achieve net-zero emissions by 2070. ([Source](#))

SMART SIGNAL MODERNISATION UNDERWAY ACROSS HYDERABAD'S URBAN ROAD NETWORK

The Greater Hyderabad Municipal Corporation (GHMC), in collaboration with the city's Traffic Police Department, has launched a ₹200 crore initiative to modernise over 400 signalised intersections using adaptive, AI-enabled traffic control systems. This large-scale Intelligent Transport System (ITS) project aims to replace legacy timer-based signals with smart controllers powered by real-time data from CCTV cameras, vehicle detectors, and AI algorithms. These systems will dynamically adjust signal cycles based on live traffic volume, pedestrian flow, and road conditions—enhancing mobility and reducing congestion across key corridors including Banjara Hills, Jubilee Hills, Hitech City, and Charminar.

The rollout, planned in phases, will feature dashboards, remote control capabilities, and integration with enforcement cameras. The project will also introduce vehicle-actuated signal timing, emergency vehicle prioritization, pedestrian-activate crossings, and countdown timers—bringing a new level of intelligence to Hyderabad's urban road network. This initiative not only aligns with India's broader Smart Cities Mission but also positions Hyderabad as a leader in scalable, AI-powered traffic governance. With added benefits of reduced idle times and emissions, the modernisation is expected to improve commute efficiency, air quality, and overall road safety—serving as a model for other Indian cities pursuing similar smart signal transformations. ([Source](#))



EVENT OF THE MONTH

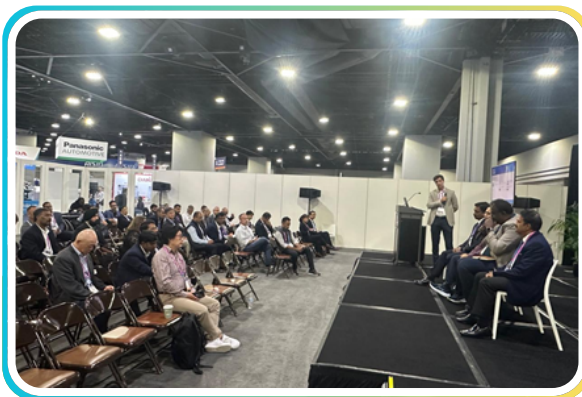
AUGUST 2025

ITS World Congress 2025, Atlanta

The ITS World Congress 2025, held in Atlanta, USA, marked a defining moment for India's emergence on the global mobility stage. Under the leadership of Akhilesh Srivastava, President, ITS India Forum, the event showcased India's growing influence in shaping the future of intelligent transport systems and sustainable mobility.



In his address, Mr. Srivastava emphasized India's transformation from a technology adopter to a global innovator, highlighting key achievements such as the world's largest FASTag network and the country's next frontier—Multi-Lane Free Flow (MLFF) tolling. He underscored India's readiness to scale data-driven, postpaid, and barrier-less highway systems powered by AI, IoT, and advanced analytics, aligning with the national vision of Viksit Bharat 2047.



A key attraction of the Congress was the India Pavilion, inaugurated at the Georgia World Congress Center, which drew international attention for showcasing India's technological leadership. The Pavilion featured live demonstrations of AI-enabled road safety systems, connected and sustainable mobility solutions, and digital tolling innovations.

It also served as a platform for global dialogue and collaboration, connecting policymakers, technocrats, and investors with India's growing ITS ecosystem.

The exclusive "ITS in India" panel session—a first in the history of the Congress—further highlighted India's milestones in tolling, road safety, and urban mobility. Discussions centered on scalable models for developing nations and the country's strategic roadmap toward connected, automated, and sustainable transport.

The event reaffirmed ITS India's pivotal role in representing India's technological progress on the global stage and advancing the nation's mission to create smart, inclusive, and future-ready mobility systems.

EVENT OF THE MONTH

SEPTEMBER 2025

PIONEERING ELECTRIC ROAD SYSTEMS FOR SUSTAINABLE MOBILITY

The NATRAX Sustainable Mobility Conclave 2025, held in Indore, featured a strong representation from ITS India under the leadership of Akhilesh Srivastava, President, ITS India. Addressing the challenges of India's vast road network, including rising congestion and the urgent need for digital traffic solutions, Mr Srivastava outlined ITS India's vision to integrate intelligent transport technologies for future-ready, sustainable mobility.



In his address, he highlighted innovative initiatives such as “Charge-as-you-go”, designed to enable commercial electric vehicle adoption through dynamic charging solutions. The conclave also marked a historic milestone with the release of India's first White Paper on Electric Road Systems (ERS), “Changing Ahead: Global Insights and India's Roadmap for Electric Road Systems”. Jointly launched by NATRAX, a division of NAB under the Ministry of Heavy Industries, and ITS India, the document provides strategic insights and a clear roadmap for ERS deployment in India.



Another key highlight was the signing of a Memorandum of Understanding (MoU) between ITS India and NATRAX, focused on advancing research, pilot projects, and the development of ERS test tracks and connected vehicle technologies. This collaboration represents a decisive step toward next-generation sustainable mobility solutions, aligning with India's environmental commitments and technological aspirations.

The conclave reaffirmed ITS India's pivotal role in shaping policy, fostering innovation, and driving India's transition toward intelligent, green, and future-ready transport systems.

EVENT OF THE MONTH

SEPTEMBER 2025

Intelligent Transport Systems and India's Transport Challenges

AITD ONLINE TRAINING SESSION | SEPTEMBER 19, 2025

The Asian Institute of Transport Development (AITD) hosted an online training session on “Intelligent Transport Systems (ITS) and India's Transport Challenges” on September 19, 2025, bringing together experts from government, academia, and industry to explore how technology can address congestion, safety, and mobility gaps across India.

Inaugurated by Shri B. N. Puri, Director, AITD, and Shri Akhilesh Srivastava, President, ITS India Forum, the session featured keynote addresses from Shri Sanjay Sharma, AIG Traffic Police & Chairman, Road Safety Lead Agency, Chhattisgarh, and Shri A. R. Chitranshi, COO, IHMCL. Speakers emphasized the growing importance of ITS within national initiatives such as Smart Cities Mission and PM Gati Shakti.

Three focused modules followed, covering (1) India's transport challenges and ITS opportunities, (2) next-generation safety technologies like ADAS and C-V2X, and (3) the role of AI-based enforcement in tackling violations, pollution, and number-plate cloning. Demonstrations highlighted how advanced sensing, automation, and connected-vehicle technologies can reduce human error and enhance compliance.

Participants engaged in active Q&A discussions on automated driving, enforcement reform, and adaptive lane management. Key recommendations included the creation of centralized traffic control agencies, mandatory helmet provision at vehicle sales, and the reinvestment of traffic fines into road safety programs.

The event reaffirmed ITS as a critical enabler for sustainable and intelligent transport in India. By aligning technology, enforcement, and policy, AITD and ITS India aim to accelerate the transition toward a safer, smarter, and more connected mobility ecosystem.

Shaping India's Tolling Future with Multi-Lane Free Flow (MLFF)

The ITS India Forum successfully organized its 1st Roundtable in the Multi-Lane Free Flow webinar series themed “Next Gen Tolling” on September 30, 2025. The session gathered the stakeholders from government, industry, academia, and technology to discuss India's transition towards barrier-less, postpaid, and completely digital MLFF systems from manual and FASTag-based tolling, representing a significant milestone in intelligent highway management.

With FASTag now the world's largest electronic tolling system—covering more than 10 crore users with 98 percent adoption—the conversation highlighted MLFF as the next leapfrog in India's mobility journey. The system will eliminate toll plazas by replacing them with AI-driven, free-flow gantries, combining RFID, ANPR, LiDAR, radar, and state-of-the-art analytics to provide for seamless movement, high detection rates, and assured revenue collection.

Setting the context, Mr. Akhilesh Srivastava, President, ITS India Forum, stressed the shift from prepaid, barrier-based to postpaid, frictionless tolling. Shri A. R. Chitranshi, COO, IHMCL, presented India's MLFF roadmap, suggesting a roll out across the country by 2029 with initial rollouts in FY 2025–26, underpinned by VAHAN-linked e-notices, annual passes, and standardization initiatives.

Mr. Richard Wu, FETC International Vice President, Taiwan, presented Taiwanese Martial V4 system learnings with 99.9 percent detection accuracy from a combination of sensors and AI-vehicle recognition. He assured that the model is being aligned for India through continuous pilots with ICICI by merging technology accuracy with robust backend audits.

Industry leaders Mr. Sachin Bhatia, CEO, Metro Infrasy and Mr. Debashish Debsikdar, JIO Platforms emphasized MLFF's potential to decrease congestion and emissions for urban expressways and tunnels where traditional plazas are not feasible. They pointed out that MLFF will also support smart city uses such as automated parking and cleaner, faster urban mobility.

Mr. Akash Sinha, CEO, Tecsidel, demonstrated ISA Group's MLFF system tailored for India, with dual-gantry redundancy and sensor fusion for dependability and business continuity. Backed by government and banking stakeholders, the solution is designed to establish a secure, scalable, and sustainable electronic tolling environment.

The event concluded on discussions related to HSWIM technology, revenue assurance using plate-to-tag mapping, and the announcement of the ITS India Congress 2025, taking place on November 6–7 at IIT Hyderabad on "AI in Mobility." The webinar reasserted the ITS India Forum's leadership in India's intelligent tolling conversation and its mission to create data-enabled, safe, and sustainable mobility systems that will shape the country's next phase of digital infrastructure

HIGHLIGHTED EVENTS BY ITS INDIA FORUM

SHAPING THE ROAD AHEAD: STRATEGIC EVENTS BY ITS INDIA FORUM

As India accelerates its shift toward intelligent, sustainable, and digitally governed transport systems, the ITS India Forum continues to serve as a national platform for vision-building, knowledge exchange, and stakeholder alignment.

In the months ahead, the Forum will convene a dynamic calendar of conferences, workshops, and global exhibitions—each designed to address pressing challenges, showcase emerging innovations, and shape the strategic direction of Intelligent Transportation Systems (ITS) across the country. From policy formulation and enforcement technology to connected mobility and international collaboration, these events reflect our commitment to advancing future-ready, inclusive, and impactful transportation solutions.

Traffic InfraTech Expo 2025 – National Exhibition of Transport Innovation

Date: October 7–9, 2025 | Bharat Mandapam, New Delhi

ITS India Forum will participate in the upcoming TrafficInfraTech Expo 2025 to showcase leading projects, policy models, and mobility innovations. The event will bring together transport authorities, solution providers, infrastructure developers, and investors to explore collaboration opportunities for future-ready cities.

ITS India Congress – National Convergence on Intelligent Transport

Date: November 6–7, 2025 | IIT Hyderabad, Telangana

The ITS India Congress 2025, to be held for the first time at IIT Hyderabad, will bring together leaders from government, academia, industry, and civil society to collaborate on intelligent transport, digital tolling, and sustainable urban mobility. The national-level forum will feature sessions on policy, infrastructure, AI, and data to shape India's strategic vision for ITS deployment over the next decade. As part of the Congress, the ITS India Forum, in collaboration with TiHAN-IIT Hyderabad, will organize a National Hackathon on Intelligent Transportation Systems, featuring poster presentations and an award ceremony, and engaging students, researchers, and startups in developing real-world solutions using AI, IoT, and digital twin technologies to address key challenges in smart mobility and advance India's journey toward safer, smarter, and more sustainable transportation.

MoU Signing Ceremony with CSIR-CRRI

Date: November 17, 2025 | Delhi for collaborative research , special projects , Consulting and capacity building in ITS

The MoU Signing Ceremony with CSIR-CRRI marks a significant step toward advancing Intelligent Transport Systems (ITS) in India. This collaboration will focus on joint research, special projects, consulting, and capacity-building initiatives, fostering innovation and sustainable mobility solutions for the nation's transport ecosystem.

IIT BHU - MargShakti Industry Conclave

Date - November 21-22, 2025 | Varanasi

MargShakti Industry Conclave 2025 is a landmark event bringing together the brightest minds in highway infrastructure, logistics, and technology to shape India's transportation landscape.

Ador Powertron Traffic Summit - Innovative Mobility: Smarter Traffic & Safer Roads

Date: November 25, 2025 | Pune

The Ador Summit 2025 will focus on “Innovative Mobility: Smarter Traffic & Safer Roads,” showcasing cutting-edge technologies, real-world success stories, and collaborative strategies that are shaping the future of intelligent and safe mobility.

2nd Roundtable in MLFF Webinar series - MLFF in Action: Pilots, Challenges & Learnings from the ground

Date: December, 2025 | Online

Experience the 2nd Roundtable in the MLFF Webinar Series – “MLFF in Action: Pilots, Challenges & Learnings from the Ground”, a deep dive into real-world implementations of Multi-Lane Free Flow tolling.

Discover on-ground experiences, operational challenges, and transformative learnings driving the next phase of intelligent mobility in India.

Roundtable on Electronic Enforcement with Supreme Court Committee

Date: December 2025 | Delhi

The Roundtable on Electronic Enforcement with the Supreme Court Committee brings together key stakeholders to discuss technology-led approaches for improving road safety and compliance. The session will focus on best practices, policy frameworks, and real-world applications of electronic enforcement systems to ensure safer and smarter traffic management across India.

Connected Vehicle Stakeholders Meet 2 (CVS 2) – Future of V2X

Date: February 2026 | Mumbai

The second edition of the Connected Vehicle Stakeholders Meet will focus on advancing V2X communications, AI-based safety systems, and digital infrastructure for connected fleets. The event will include live demos, collaborative sessions, and presentations from OEMs, telecom providers, and transport authorities.

WELCOMING OUR NEW MEMBERS

JIO Platforms Limited

We are delighted to welcome Jio Platforms Limited as a **Patron Member** of the ITS India Forum.

Jio Platforms Limited, a subsidiary of Reliance Industries, is India's foremost digital ecosystem company, delivering next-generation solutions across connectivity, cloud, AI, and enterprise technology. Within this ecosystem, the **Traffic, Transportation & Tolling (TTT) Business Unit** plays a pivotal role in shaping the future of smart mobility through intelligent, secure, and highly scalable platforms.



Jio powers India's digital tolling backbone through its **Acquirer and Issuer Bank Platforms**, enabling seamless, high-volume FASTag transactions across national and state highways. The company is also at the forefront of India's transition to **Multi-Lane Free Flow (MLFF)** tolling, offering advanced technologies and platforms designed for barrier-less, AI-enabled highway operations.

Beyond tolling, Jio brings a comprehensive mobility technology suite that includes **traffic intelligence systems, AIS-140-compliant solutions, Jio Maps (Explore), fleet and transit management**, and robust **back-office platforms** serving concessionaires, government agencies, and logistics operators.

By integrating Jio's vast digital infrastructure with advanced AI/ML capabilities, the TTT Business Unit is contributing to India's most comprehensive and future-ready mobility ecosystem—enabling faster, safer, and smarter transportation for citizens, businesses, and public authorities.

We look forward to Jio Platforms' continued leadership and collaboration as part of the ITS India Forum community.



Indian Road Survey & Management Pvt. Ltd. (IRSM)

We are delighted to welcome Indian Road Survey & Management Pvt. Ltd. (IRSM) as a new **Premium Member** of the ITS India Forum.

Based in Chennai, India, IRSM is a pioneering firm specializing in road condition assessment and consulting services. With over 15 years of operational expertise, IRSM operates from three key locations—Chennai, Hyderabad, and Delhi—and employs 100+ qualified engineers. A joint venture with ARRB NTRO, Australia, IRSM leverages over six decades of global research and technical expertise.

IRSM offers end-to-end services including functional and structural evaluation of pavements, road safety and iRAP assessments, airport pavement evaluations, and advanced asset and pavement management systems. With state-of-the-art technologies such as NSV, HWD, Axle Load equipment, GPR, and MIT Dowel Bar Scanners, IRSM has successfully assessed over 600,000 km of road networks and multiple domestic and international airports. Renowned for timely delivery and technical excellence, IRSM is ISO 9001:2015 and ISO 39001:2012 certified, and is India's first company to execute iRAP Data Collection and Coding.

DataCorp Traffic Private Limited

We are pleased to welcome DataCorp Traffic Private Limited as a **Corporate Member** of the ITS India Forum.

DataCorp Traffic is a global transportation technology company committed to advancing sustainable mobility through innovative solutions in data analytics, road safety, and intelligent systems. Operating across 26+ countries, the company helps cities and governments shift from reactive traffic management to proactive, AI-driven risk prevention.



Its flagship product, the AI Lenz Sensor, is an edge-computing device offering real-time insights on vehicle and pedestrian movement, violations, air quality, and urban noise—empowering data-informed decisions across Smart Cities.

In India, DataCorp has led the way in deploying Automatic Traffic Counters and developing in-house computer vision modules aligned with NHAI's ATMS goals—supporting accident detection, stalled vehicle alerts, and road hazard monitoring. We look forward to collaborating with DataCorp in shaping the next generation of safe, connected, and intelligent transportation systems.

Sego Automobile Solutions Pvt. Ltd

We are delighted to welcome Sego Automobile Solutions Pvt. Ltd. as a new **Corporate Member** of the ITS India Forum. Sego is an emerging mobility startup committed to enhancing road safety through intelligent, retrofittable technologies. The company specializes in developing advanced solutions that integrate embedded electronics, IoT, and real-time data analytics to prevent vehicle collisions and enable seamless connected vehicle capabilities.



With a focus on affordable innovation and scalable deployment, Sego's technologies are designed to support both private and commercial fleets in making India's roads safer and smarter.

We look forward to collaborating with Sego on initiatives that drive innovation, safety, and intelligent transport transformation across the country.

T-Systems



We are pleased to welcome T-Systems, a global technology leader and a subsidiary of Deutsche Telekom, as a new **corporate member** of the ITS India Forum.

T-Systems is one of Europe's leading IT service providers, delivering a broad portfolio of digital services, including IT consulting, cloud infrastructure, cybersecurity, connectivity, and intelligent digital solutions.

With a mission to enable seamless digital transformation, the company supports businesses and public institutions across industries—fostering innovation, resilience, and future-readiness.

With a strong presence in Europe and strategic operations around the world, T-Systems brings global expertise and trusted technologies that align with ITS India Forum's vision of building an intelligent, connected, and secure mobility ecosystem.

We look forward to T-Systems' collaboration in shaping India's next-generation ITS landscape.



Vehant Technologies

We are delighted to welcome Vehant Technologies Pvt. Ltd. as a new **Corporate Member** of the ITS India Forum.

Vehant Technologies is a pioneering Indian deep-tech company incubated at IIT Delhi, specialising in AI/ML-based traffic enforcement, security screening, and intelligent video analytics. With nearly two decades of innovation, the company has built a strong reputation for delivering reliable, real-time urban and highway management solutions tailored to India's evolving mobility needs.

Vehant's intelligent traffic systems—including automated ANPR platforms, red-light and speed violation detection, and the widely deployed **TrafficMon®** solution—are operational across major Indian cities, supporting police departments in improving compliance, safety, and enforcement efficiency. Its portfolio also includes under-vehicle scanning systems, X-ray baggage scanners, and smart city video analytics that bolster public safety and situational awareness.

With a strong national footprint and expanding global presence, Vehant brings advanced engineering, indigenous manufacturing, and a commitment to digital innovation to India's transportation ecosystem.

We look forward to collaborating with Vehant Technologies as we collectively advance the country's journey toward smarter, safer, and more intelligent mobility systems.

YelloSKYE

We are delighted to welcome **YelloSkye** as a new **Corporate Member** of the ITS India Forum.

YelloSkye is an emerging leader in drone-based traffic analytics, digital road asset mapping, and AI-powered mobility insights.



Through high-precision aerial surveys and advanced computer vision models, the company delivers accurate, actionable data that supports smarter traffic planning, congestion management, and infrastructure optimization.

Its solutions including traffic volume studies, junction performance analysis, speed and classification reporting, and digital road inventory assessments—are being widely used by Smart Cities, highway authorities, and mobility planners across India.

With its commitment to innovation and data-driven mobility, YelloSkye is helping shape India's transition toward safer, smarter, and more efficient transportation systems. We look forward to collaborating with YelloSkye as part of our growing ITS India community.

Arcadis IBI Group

ITS India Forum is delighted to announce that Arcadis IBI Group, one of our long-standing partners in intelligent mobility, has renewed and elevated its engagement with the Forum by transitioning from Corporate Member to Patron Member as of 19 June 2025.



IBI GROUP

Arcadis IBI Group is globally recognised for its leadership at the nexus of urban design, infrastructure, and digital innovation. With over 3,500 professionals operating from 60+ offices worldwide, the group delivers future-focused solutions that shape how people move, live, and connect. From intelligent transportation systems to sustainable urban mobility and smart city infrastructure, the firm's projects reflect a deep commitment to technology-enabled, human-centred design.

As a Patron Member, Arcadis IBI Group reaffirms its leadership in shaping India's ITS future. We are honoured to have their continued support and strategic vision as we work together to define the next generation of safe, inclusive, and intelligent transportation systems.



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Caught by The Cloud

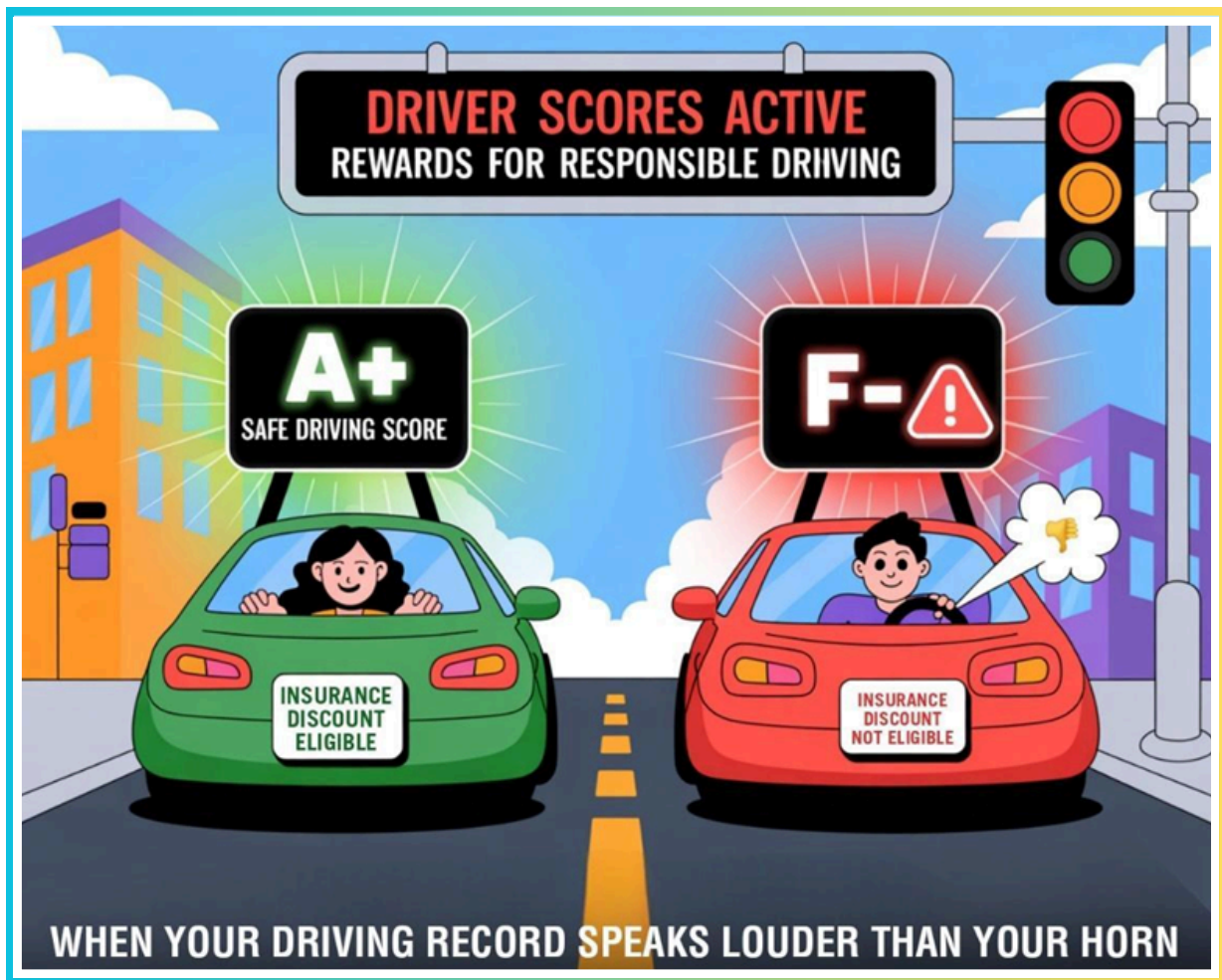


This cartoon humorously captures the shift from traditional traffic policing to cloud-based digital enforcement. A surprised driver receives an instant e-Challan for speeding, only to be reminded by an AI-powered traffic camera: “*Real-time enforcement never forgets.*”

With the widespread deployment of Automated Number Plate Recognition (ANPR) systems, speed sensors, and cloud-integrated surveillance, Indian cities are moving rapidly toward automated, rule-based traffic management. These systems detect violations instantly, generate digital penalties, and notify violators without human intervention.

Beyond the humour, the message is clear: in today’s ITS ecosystem, enforcement is automated, transparent, and constant. Driving responsibly is no longer optional—it’s digitally monitored and instantly recorded. In this new age of mobility, the cloud always remembers.

Safe Driving Scorecard



This cartoon cleverly captures the growing impact of data-driven traffic governance in India's evolving mobility landscape. At a red light, two cars are stopped side by side—one calm and composed, proudly glowing with an “A+ Safe Driving Score” and a green “Insurance Discount Eligible” badge; the other, noisy and impatient, overshadowed by a flashing red “F-” and a warning symbol.

While humorous on the surface, the illustration reflects a serious shift in the way driving behaviour is being monitored and rewarded. With Safe Driving Score (SDS) programmes gaining momentum, authorities and insurers are increasingly using onboard telematics, ADAS, and AI analytics to assess driver performance in real time—tracking speed discipline, braking patterns, lane changes, and overall vehicle control. The message is clear: in this new ITS-driven ecosystem, responsible driving earns visible rewards, while aggressive leads to reputational and financial costs. Initiatives like these are already being piloted across India, offering discounts and benefits to compliant drivers and encouraging a safer traffic culture.

SECURING THE FUTURE: WHY INDIA MUST PRIORITISE CYBERSECURITY IN CONNECTED AUTONOMOUS VEHICLES



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Date: 2 July 2025

About the Author :

Sumit Chouhan is a seasoned technology and mobility strategist, specialising in enterprise, automotive cybersecurity and intelligent transport solutions. He currently serves as the Chief Information Security Officer (CISO) at an automotive cybersecurity firm. With over two decades of experience advising enterprises and government institutions on securing critical digital infrastructure, he is deeply committed to advancing a secure and resilient future for India's connected mobility landscape. He can be reached at [sumit\(dot\)chouhan\(at\)hotmail\(dot\)com](mailto:sumit(dot)chouhan(at)hotmail(dot)com).

Introduction

India is on the cusp of a mobility revolution. With its ambitious push toward electric vehicles (EVs), smart cities, and intelligent transport systems, the evolution toward Connected Autonomous Vehicles (CAVs) is not a matter of if, but when. As global automotive giants, startups, and policymakers converge on making CAVs a reality, a critical element threatens to undermine this progress: cybersecurity.

The fusion of vehicular autonomy with real-time connectivity introduces a vast surface of cyber vulnerabilities. From data breaches to remote hijacking of vehicle controls, the risks are real and growing. India, with its vast population, expanding digital infrastructure, and complex traffic ecosystems, cannot afford to overlook this strategic domain.

CAVs and Cyber Risk: A Global Wake-Up Call

Modern vehicles can have over 100 million lines of code and multiple connectivity modules (Bluetooth, Wi-Fi, 4G/5G, V2X). Each represents a potential entry point for cyberattacks. In 2015, ethical hackers remotely took control of a Jeep Cherokee in the US, leading to a recall of 1.4 million vehicles. In 2020, Tesla's Model X was hacked using vulnerabilities in its keyless entry system. These are not hypothetical scenarios; they serve as stark reminders that vehicle cybersecurity is a national security concern.

According to McKinsey (2023), global cybersecurity spending in the automotive sector is expected to reach \$9.7 billion by 2030. The UNECE WP.29 regulation (R155) has already made cybersecurity compliance mandatory for new vehicle types in the European Union. India, with increasing exports and integration into global supply chains, must not fall behind.

The Indian Context: A Complex Opportunity

India's urbanisation is projected to reach 600 million urban residents by 2031 (NITI Aayog), with vehicular traffic expected to increase exponentially. As India embraces CAVs in sectors such as logistics, defence, public transit, and private mobility, the attack surface for adversaries multiplies. The convergence of IT and OT (Operational Technology) in CAVs also raises new national security challenges; foreign state actors could potentially disable fleets, manipulate data, or breach infrastructure through vehicular systems.

Moreover, the lack of standardised protocols and the fragmented regulatory environment make Indian CAV ecosystems particularly vulnerable. With over 1.4 billion people and a growing middle class, India presents one of the largest potential CAV markets globally. This scale demands a world-class cybersecurity strategy.

Why India Must Act Now

1. **Digital Infrastructure Is Expanding Rapidly:** India has over 1.2 billion mobile connections and is among the largest internet markets. With the rollout of 5G and IoT, vehicular communication (V2V, V2I, V2X) will become the norm, introducing new vectors for attack.
2. **Strategic Importance of Mobility:** The mobility sector contributes nearly 7.1% to India's GDP and employs over 37 million people. A cyberattack on this sector could result in economic paralysis.
3. **Military and Emergency Use Cases:** India's armed forces and paramilitary are actively exploring autonomous ground vehicles and UAVs. These require hardened security architectures to prevent sabotage.
4. **Absence of Indigenous Standards and Testing Infrastructure:** While AIS 189/190 are steps in the right direction, India needs a comprehensive framework aligned with international best practices such as ISO/SAE 21434 and UN R155.
5. **Startup and Tech Ecosystem Synergy:** India hosts one of the world's largest startup ecosystems. With the proper regulatory support, cybersecurity for CAVs could emerge as a high-value export capability.

Recommendations for India's CAV Cybersecurity Strategy

- **National CAV Cybersecurity Framework:** Establish a dedicated regulatory and compliance framework integrating global standards (UN R155, ISO 21434) under the Ministry of Road Transport and Highways (MoRTH) and the Ministry of Electronics and IT (MeitY).

- **Testbeds and Simulation Labs:** Create secure mobility testing labs under NATRiP and TiHAN (IIT-H) for real-world validation of CAV security.
- **Public-Private Collaboration:** Encourage joint R&D between OEMs, Tier 1 suppliers, startups, and defence PSUs focused on CAV security architecture.
- **Capacity Building and Talent Development:** Launch specialised programmes under institutions like IISc, IITs, and IIITs to build next-gen automotive cybersecurity professionals.
- **Cybersecurity Certification for CAV Startups:** Develop fast-track audit and compliance programmes to mitigate risks associated with early-stage innovations in the CAV domain.

Conclusion

As India steps into the autonomous era, the need to embed cybersecurity from the design stage is no longer optional; it is imperative. The cost of inaction is not just measured in economic losses but in human lives and national sovereignty. Cybersecurity is the seatbelt of the connected mobility age. It's time India buckled up.



NEXT GENERATION VEHICULAR COMMUNICATION

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1. Introduction

Urbanisation and higher expectations for convenience and ease of use for transport are driving the development of Intelligent Transport Systems (ITS) around the world. As cities continue to grow, the negative health environment and economic impacts of vehicle emissions and longer travel times due to traffic congestion will have to be managed more aggressively. Sophisticated autonomous driving and ADAS (Advanced Driver Assistance System) vehicle connectivity, route planning, toll payment, and health, wellness and well-being features are gradually becoming urbanisation vehicles. Many cities are experiencing more traffic congestion and pollution than ever before. Vehicles are a main source of greenhouse gas emissions. In developing countries traffic congestion and vehicle emissions pose more serious risks to people's well-being and environment. The supporting of vehicle communication and intelligent transportation systems will enhance road safety, improve traffic efficiency, and reduce carbon emissions, which will in turn promote the digital transformation of developing countries. Vehicle communication has become prominent in intelligent transport systems, providing drivers with reliable information, including safety through communication between road surroundings and vehicles facilitated by traffic management centres and operators.

2. Advanced Driver Assistance system (ADAS)

Cars with advanced driver assistance systems (ADAS) serve as eyes and ears of the vehicles. The ADAS helps in processing data in real-time and activates safety manoeuvres from lane keep assist to auto-parking and braking to help the driver. The ADAS uses LiDAR (Light Detection and Ranging), long/medium/short-range radars, and ultrasound. This technology enables applications such as park assist, real collision warning, blind-spot detection, cross-traffic alert, adaptive cruise control, lane assist, departure warning, and emergency braking/collision avoidance. It helps drivers to maintain safe distances and navigate bad weather and road conditions. It surpasses human sensing and cognitive abilities, enabling it to provide advanced intelligence and features like collision avoidance, platooning, cooperative driving, pedestrian protection, emergency support, and hazard detection. It addresses vulnerable road users (VRU) protection to pedestrian and bicyclist traffic fatalities around the road. The radar and LiDAR require different computer processing than vision processing and object recognition. In vision processing, a camera sensor needs to be able to analyse video, identify the objects, and make decisions about the objects in time to enable ADAS to take action.

3. Autonomous Vehicles

The vision for connected vehicles is autonomous driving, where the vehicle drives by itself. Safety is paramount in autonomous driving. At the heart of the system are decision-making and motion-planning capabilities, which dictate how vehicles navigate and respond to their dynamic environments. The autonomous vehicles are equipped with radar, LiDAR, cameras and advanced computational capabilities, which can replicate human driving behaviour, incorporating advanced connectivity into the transport ecosystem. A combination of sensing modules actively gather data from around the vehicle, with each type of sensor and their supporting sensing processor best suited for particular driving and weather conditions. External sensors in the environment will be able to detect objects and people in the physical world and recreate them in the digital world as a digital twin to work with AI (artificial intelligence) systems. This will be able to better predict the speed and direction in the environment and whether a collision might occur. It will improve awareness of surroundings and optimise routes even more efficiently. The 5G connectivity will become a baseline requirement, and it is only a matter of time before we begin fully exploring what 6G will mean for levelling up the connected driving industry. The park assistance will help the vehicle to act on its own to park, based on what its sensors see? Highway navigation enables a vehicle to drive autonomously on a road dedicated to vehicle traffic with no pedestrians, bicycles, etc. City navigation is more complex to implement, given the variety of hazards and nearby objects that must be taken into account.

4. Vehicle Connectivity

Connecting vehicles means cars can access and share data, download software, and update and communicate with other vehicles and their environment. Vehicle connectivity today is associated with connecting to the car's infotainment system via Bluetooth and WiFi.

a) In-Vehicle Infotainment

As more people use driving services, it is believed that cars will become more of an entertainment and work centre. The devices bring 3D-graphics performance and 4K-video resolution multimedia capabilities to the vehicles' infotainment system. It prompts access to HD-quality streamed TV shows, video gaming, live sports, and movies and graphics performance. Driverless cars support 'workplace on wheels'. It enables seamless transition from work to car to home, being able to have video conferencing call to start the work, continued in the car, and finish at home. computer without interruption in place of pull over and stop to manually attempt to transfer call between devices.

b) Vehicle-to-other (V2X) Connectivity

V2X communication enables seamless interaction with other vehicles and infrastructures to enhance safety and traffic efficiency. The V2X collect and share data across vehicles, devices, and road traffic infrastructure in real-time. This needs reliable infrastructure, manage traffic, and make use of all the data collected to improve transport system efficiency. The V2X technology is critical for improving road safety and traffic efficiency. By enabling real-time communication between vehicles, infrastructure, and vulnerable road users, V2X empowers drivers and autonomous system to make instant improved decision. The V2X is set to play a pivotal role in shaping a safer, smarter, and more efficient transportation ecosystem. The V2X encompasses vehicle-to-vehicle (V2V), to infrastructure (V2I), to pedestrian (V2P), to workman (V2W), to bicyclist (V2B), to network (V2N), to network to cloud (V2N2C), to satellite (V2S) communication as shown in Fig. The V2X technology makes vehicles to interact with other vehicles, pedestrians, and surrounding traffic infrastructure. It enables data sharing and position between vehicles and surrounding objects. The V2X can warn drivers of potential dangers, improving collision avoidance, and significantly reducing chances of injuries or fatalities. It also enhances efficiency by providing congestion warning and proposing alternative routes to drivers when possible. In V2V, if a vehicle several cars ahead suddenly brakes, each of the vehicles behind it could have immediate awareness of this, so that they can take appropriate proactive measures.

The V2X operates in 5.9GHz (5855-5925 MHz) frequency band, which is reserved to allow wireless access in vehicular environments (WAVE). This frequency band is used by dedicated short range communication (DSRC) also known as IEEE802.11p Wireless local area network (WLAN) standard.

The DSRC provide short to medium two-way wireless communication with high speed and secure data communication between vehicles and infrastructure. The V2X also works with cellular(C)-V2X using cellular technology to create direct communication link. The C-V2X using 4G/5G standard technology could also meet V2X requirements. Today WiFi, Bluetooth, cellular 4G/5G, UWB (ultra wide band) technologies enable low latency, long range, hand-free connectivity. The UWB is used for digital key locking/unlocking. The UWB transceiver assigns time to transmit their scrambled timestamp sequence signal. This process repeats each time the user enters or leaves the vehicle. The V2X uses other data transmission standards like global positioning system (GPS)/GNSS (Global navigation satellite system) to find the position of the devices. The 5G real-time data enhances V2X by working with vehicle sensors and roadside infrastructure for road safety. The C-V2X broadcast their unique identity, position, speed, direction to other vehicles and traffic management infrastructure systems. The smartphones can also support vehicle-to-pedestrian(V2P), bicyclist (V2B), and motorcycle (V2M) communication. A connected car could react appropriately to the location and movement of every pedestrian, bicyclist, and vehicle on the road around it.

5. Traffic Monitoring

Real-time traffic information would be accessible through traffic sensors collecting data from multiple points, including the number of vehicles, pedestrians waiting to cross roads, and vehicle speeds. With in-road sensors and traffic lights, one could analyse traffic bottlenecks and identify road infrastructure wear and tear. The traffic data counters record the number of vehicles on the road, the average speed at which vehicles are travelling on a specific route, and vehicle emissions. It keeps sampling traffic data every minute and provides consolidated analysis to mobility service operators for optimal route planning and transport services. A smart traffic management system using AI/ML (machine learning) would be able to use collected data to make predictions and better manage traffic flows.

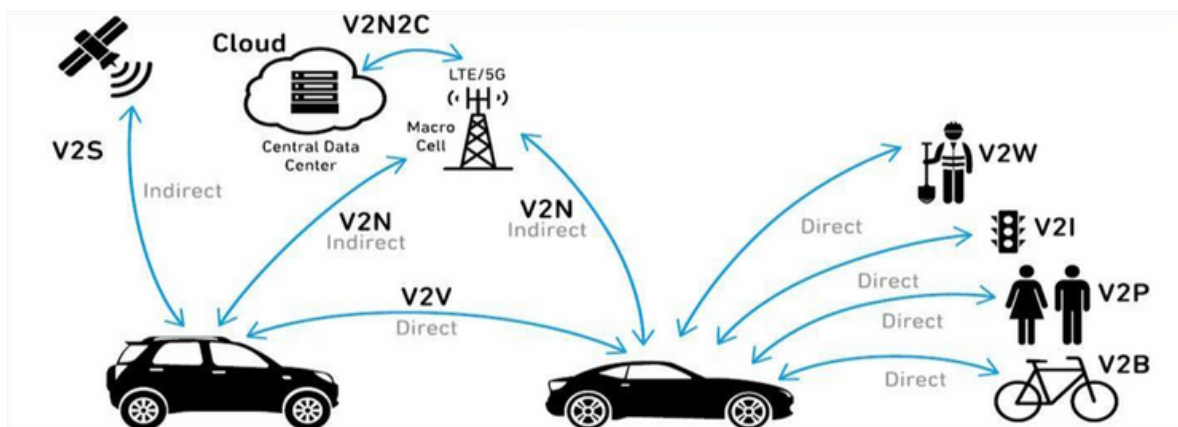
6. Health Monitoring

Automakers are developing in-vehicle health monitoring of drivers and passengers. It reduces risks and accidents under all driving conditions. Vehicles could soon have widespread built-in systems to monitor fatigue and detect and analyse driver behaviour. The system would gather information from driver input and body measurements such as control of vehicle, eye movement, brain waves (EEG), lateral position, steering wheel grip, and speed. For specific purposes, cars capable of autonomous operations are able to give back control to human drivers under extraordinary situations such as severe bad weather or the absence of road or lane markings.

Here, human drivers would be better able to adapt and take appropriate actions than autonomous driving systems mostly relying on sensor data. This makes monitoring driver stress and fatigue important even with continuous advancement in vehicle autonomy. The fatigue and stress monitoring meter could become valuable for individual drivers and fleet managers. For drivers, proactive health monitoring could prevent driver health condition-related accidents from even taking place.

To summarize

The connected vehicles moving away from fuel-to-electric power become more wireless and have more electronic devices, advanced telematics, and infotainment systems. The SAE (Society of Automotive Engineers) defined six levels of driving to reach full automation driving. It will take a decade for fully autonomous vehicles to penetrate the market. The 5GAA (Automotive Association) is globally working with automotive technology and ICT (Information and Communication Technology) together to develop end-to-end solutions for future mobility and transport services.



An approach towards understanding the safety of School Children for commuting between Residences and School using its system

Dr Pradip K. Sarkar

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INTRODUCTION:

A significant number of schoolchildren commute by bus daily in most of the countries in the world. Generally, school authorities take the responsibilities for safe and secure transportation of schoolchildren. These are increasingly becoming one of the top priorities for school authorities. This article intends to introduce the concept of safe travel for school children from the point of boarding at the bus stop to the alighting from the bus at the school and back to their home by reverse process on the return journey. A bus tracking system will ensure safe transportation of children to the school. Many a time, supervision of children during their boarding and alighting to/from the bus can be difficult. Sometimes small kids forget to leave the bus. This has often led to serious problems for many children as well as their parents due to the lack of attention of drivers.

An ITS-based system for the above travel for the daily school trips has been attempted to be developed as a prototype for safety for students entering or exiting to/from the bus at the bus stop, along with the tracking and monitoring of their school trip right from home to school and back to their residences. The system proposed will identify children on the basis of information stored in an RFID tag itself, which is exchanged over radio waves through a reader

that transmits the name of each student to be displayed on an LCD display in the bus. This enables the driver to know whether a child is still inside or not with the use of an RFID reader. In case there is an overspeeding of the school bus, a buzzer prompts or alerts the driver to know the speed to be minimised for the safety of children. Along with RFID, other elements, namely GPS, GPRS, and GSM, are used in monitoring the data being generated. The combination of GPS, GPRS and GSM plays an important role in effective tracking and monitoring of the situation in a real-time working system. With this system, drivers and children, whether it follows the scheduled bus route. The proposed system should be able to enhance the safety and efficacy of the system.

2.0 CONCEPT

Before the details of various components of the system are presented, it is worthwhile to present the system concept of the “RFID Application for School Buses”. It can be seen that RFID is linked with all the sub-systems, like School Bus, School Child Safety Server and Delivery Channels and End Users via Internet.

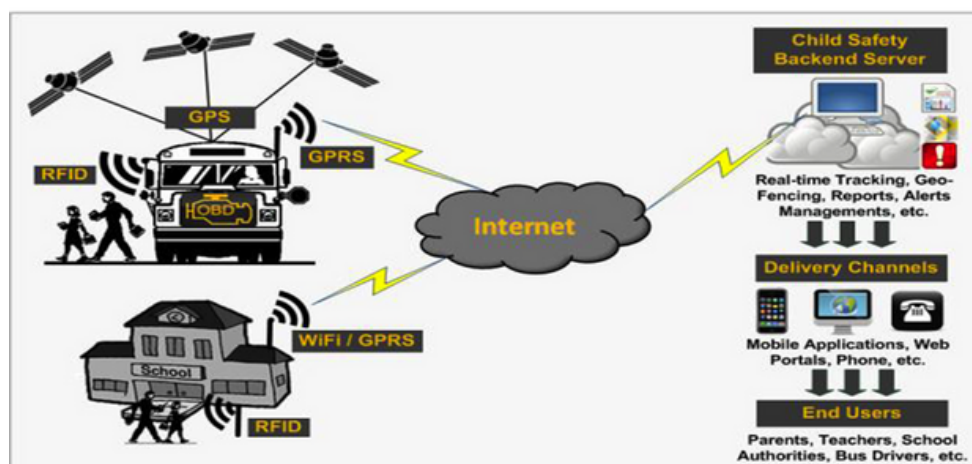


Fig. 1 Demonstration of Concept

Fig. 1 demonstrates the concepts of the system functioning. The GPS is used for tracking and monitoring the locational activity of the bus route. An optional camera can also be used for data authenticity.

3.0 UNDERSTANDING THE SYSTEM DESIGN

The system components, as shown in Fig.2, is designed according to the system architecture with the following engineering requirements:

- The system should recognise each child and detect when every child boards or leaves the bus.
- The system should have a database to store students' information.
- The system should be easy to reconfigure.
- The communication should be reliable.

In this system, when the child boards the bus supported with the RFID tag either attached to the school bus bag or embedded in the identity card, then a message gets transmitted to the child's parent as well as to the school server in the form of "your kid is now on the bus" or "particular student in the bus". It will also display the name of the child, roll no., address, parents' names and the status "Child inside bus". With the mobile app, the parents and school authority or concerned stakeholders can see the location of the bus with the help of the Google map.

Now when the bus reaches the school, again the child's tag interacts with the reader of the bus while leaving the bus in the bus unit. This triggers a message the reader transmitted to the child's parent with the message "Your child reached school." At the same time, a message is transmitted to the school server with the display name of the child, roll no., address, parents' names and the status "Child reached school". Subsequently, the location of the bus is displayed in the Google map. A similar procedure is followed when the child returns home. The data generated for all schoolchildren boarding and alighting at different bus stops are recorded and monitored.

In order to develop the system, it generally consists of two units, i.e., the bus unit & school unit. The bus unit will consist of the following components as shown in Fig. 2.

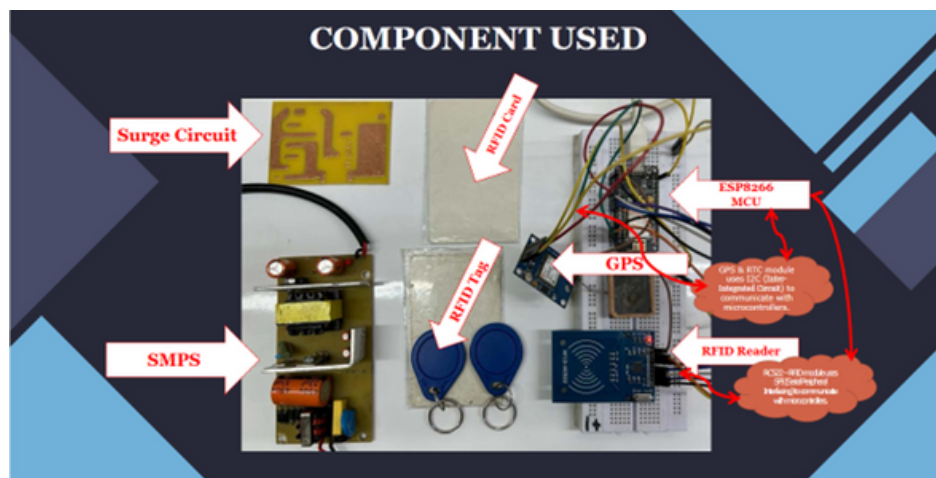


Fig 2. The Components of the RFID system in the bus unit.

System Components inside the Bus

- RFID Tag
- RFID Reader
- LTE WiFi (GPRS & GSM) Router
- Node MCU ESP8266 Microcontroller
- GPS Unit
- LCD Unit
- RTC Unit
- IP Camera
- Surge Protection with DC-DC Convection Circuit

The School unit consists of the following components:

System in the School in the School Unit-

- NVR
- Screen
- WiFi Router

CONCLUSION

As a full system of RFID-based applications for the school safety of school children on the school bus is yet to be developed in our country with the desired standards and specifications, an attempt is therefore made to appreciate the conceptual functioning of the system. A descriptive analysis along with an experiment for the functioning of the RFID system, GPS, GPRS and GSM team experiment has also been worked on separately so that full-scale development of the system can be accomplished with necessary standards. It is therefore imperative to ensure integration between RFID technology and GSM technologies for safety and security purposes.



UPDATES FROM WORKING GROUPS AND COMMITTEES

WORKING GROUP ON AI AND SUSTAINABILITY PILOTS REAL-TIME EMISSION ENFORCEMENT SYSTEM IN DELHI

To address the growing challenge of vehicular pollution in India's capital, the **ITS India Forum Working Group on AI and Environmental Sustainability**, in collaboration with **DataCorp Traffic Pvt. Ltd.**, has developed a comprehensive project plan to deploy an AI-powered, real-time emissions monitoring and enforcement system in Delhi. The initiative showcases the Forum's commitment to applying Intelligent Transport Systems (ITS) for improved environmental and public health outcomes.

Titled "Integrated AI Solution for Pollution in Delhi", the project proposes a new approach to urban pollution control—merging intelligent technologies with data-driven enforcement strategies.

At the heart of the system is a fully automated platform combining **thermal imaging, automatic number plate recognition (ANPR)**, and integration with **VAHAN and PUC databases**. These technologies work together to detect high-emission or non-compliant vehicles in real time, enabling fast and targeted enforcement in pollution-prone corridors.

The pilot will launch at the **Anand Vihar corridor**, one of Delhi's most polluted stretches. The system will flag vehicles with expired PUCs, excessive exhaust heat signatures, or older emission standards. Alerts will be sent instantly to enforcement officers equipped with mobile devices for on-the-spot action.

A key feature of the project is the **centralised dashboard** powered by edge computing and real-time analytics. It provides violation heatmaps, predictive reports, and integration with **AQI data**, helping authorities link emissions to local air quality and prioritise enforcement zones.

The pilot is designed for future expansion across corridors such as ITO, Dhaula Kuan, and Ring Road. Strategic partnerships are planned with the **Delhi Police, MoRTH, NIC, DPCC**, and the **Delhi Transport Department**, with **ITS India Forum** serving as the lead strategic advisor for scale-up and policy alignment.

To support the system, the Working Group has recommended progressive policy measures, including **Low Emission Zones (LEZs), congestion pricing, RFID-linked emission checks**, and **scrappage incentives**. These proposals are inspired by international best practices and adapted for Indian urban mobility needs.

The project will be showcased at the **Advanced ATMS National Conference**, inviting dialogue on its findings and potential for national replication. As India moves toward cleaner, smarter cities, this initiative represents a vital step in proactive, AI-enabled pollution control.

GUEST COLUMN

BUILDING INDIA'S CONNECTED VEHICLE FUTURE: FROM TECHNOLOGY TAKER TO TECHNOLOGY LEADER

Prof. Archak Mittal

Assistant Professor at IIT Bombay specializing in intelligent transportation systems, connected and automated vehicles, and traffic safety research. Formerly a researcher at Ford Motor Company and Leidos Inc., he brings global industry and academic experience to advancing smart mobility in India.



The world of mobility is on the brink of a transformation. Connected Vehicles (CVs) are no longer confined to futuristic visions—they are shaping policies, industrial strategies, and consumer expectations across the globe. In countries such as the US, Japan, and Germany, these technologies are already transitioning from research labs to roads, backed by strong government initiatives and industry alliances.

India, however, stands at a crossroads. While our automotive industry is the fourth largest in the world, we remain largely dependent on imported technology for advanced driver assistance, connectivity, and automation. This dependence raises critical questions: will India remain a passive consumer of mobility technologies, or can we seize the opportunity to become a global leader in connected vehicle innovation?

Globally, the connected vehicle ecosystem is growing at an unprecedented pace. Automakers are investing heavily in Vehicle-to-Everything (V2X) communication, digital twins for traffic systems, and advanced data platforms. Policymakers are also stepping in: the EU has set regulatory timelines for connected mobility, while the US and China are investing billions into infrastructure to enable real-world deployment.

These advancements highlight a simple truth—connected mobility is not just about technology. It is about competitiveness, safety, sustainability, and sovereignty.

India's urban centres face unique challenges: high traffic density, heterogeneous driving patterns, and limited infrastructure readiness. These challenges cannot be solved by adopting Western technologies alone; they require indigenous R&D, nationally coordinated testbeds, and a strong ecosystem of public-private partnerships.

These conditions demand *tailored solutions*, not imported templates. Unfortunately, most current deployments in India are pilots led by multinational OEMs, with limited focus on local research and ecosystem development.

If this continues, we risk becoming locked into expensive foreign technologies that may not address Indian realities. The gap between local needs and imported solutions could slow progress and leave Indian stakeholders dependent on external players.

What India requires is a deliberate strategy to build its own connected mobility ecosystem. This means moving beyond isolated pilots and creating **national-level testbeds, policy frameworks, and collaborative platforms** where industry, academia, and government can work together.

Efforts must focus on developing India-specific solutions—whether it is algorithms for mixed traffic, affordable sensing technologies, or scalable data platforms. National coordination will be key: without it, innovation will remain fragmented and adoption slow. For India to lead, four priorities stand out:

- **Testbeds and Living Labs** – Establish large-scale test environments in Indian cities to experiment with V2X communication, connected intersections, and automated driving features under real traffic conditions.
- **Policy and Standards** – Frame a national roadmap that harmonises research, deployment, and regulation while aligning with global standards to keep Indian industry competitive.
- **Industry-Academia Collaboration** – Encourage OEMs, start-ups, and research institutes to work together on shared platforms to accelerate development, reduce duplication, and ensure relevance to Indian conditions.
- **Skilling and Talent Development** – Launch national skilling programmes to prepare the next generation of engineers, data scientists, and policy makers to design and manage connected mobility systems.

India has proven time and again that it can leapfrog when the vision is clear and the ecosystem aligned—from the IT services revolution to the growth of digital payments. Connected mobility presents a similar opportunity. By investing today, India can build not only technologies for domestic needs but also solutions exportable to the Global South—markets that share our traffic realities more closely than the West.

The choice before us is stark. We can either remain technology takers in one of the most transformative shifts in mobility history, or we can take the driver's seat and shape a future where Indian innovation powers global connected mobility.

The window is open—but it will not remain so forever. This is not optional—it is a strategic necessity for India's future in mobility. If we don't act now, the world will design connected vehicles for itself, and India will have to retrofit them at great cost. But if we lead, India can shape the next decade of mobility — and ensure our roads are not just connected but safer, greener, and more efficient for all.

FEATURE ARTICLES

INTEGRATING STRUCTURED ROAD ASSET MANAGEMENT INTO ORGANIZATIONAL STRATEGY: ALIGNING WITH PAS 55 AND ISO 55000 IN INDIA

Srinivas Ganji

Solution Delivery Director (Urban Transport) at Arcadis, is an urban mobility expert focused on sustainable public transport, traffic engineering, and low-emission transport systems, helping Indian cities design cleaner and more efficient mobility networks.



Road infrastructure is one of India's most critical public assets, underpinning economic growth, trade, and regional connectivity. With a vast road network exceeding 6.3 million kilometers, India's highways, expressways, and rural roads facilitate nearly 65% of freight and 80% of passenger movement. Despite significant expansion, asset management in India has largely been fragmented, driven by engineering judgment, short-term budget allocations, or reactive maintenance. Globally, frameworks such as PAS 55 and the ISO 55000 series have redefined asset management as a coordinated, organization-wide system for optimizing value across the life cycle of assets. For India, embedding these principles into the business of road agencies can transform management practices from reactive measures to structured, long-term strategies.

The urgency for adopting structured asset management is clear. Road agencies face multiple pressures: aging infrastructure, rising traffic volumes, climate-induced stresses such as flooding and heat waves, and tightening fiscal space. Simultaneously, road users demand safer, smoother, and more reliable travel, while governments emphasize accountability and efficient spending. In this context, structured asset management offers a framework to balance performance, risk, and cost through life-cycle thinking, customer focus, reliable data integration, and alignment with organizational objectives, all principles central to ISO 55001.

Global experiences demonstrate the value of this approach. Transport for London (TfL) applied PAS 55 principles to its transport network, achieving measurable improvements in asset reliability and customer satisfaction. In Australia, state road agencies using ISO 55000 frameworks have reported reduced life-cycle costs and better alignment with long-term funding cycles.

Utility companies such as Scottish Water and National Grid in the UK, early adopters of PAS 55, likewise gained efficiency and credibility by integrating asset management into business strategy. These organizations benefitted not only from improved operational performance but also from stronger investor confidence, reduced regulatory scrutiny, and enhanced reputational standing, which in turn secured long-term funding stability.

Indian practices are beginning to move in this direction as well. The National Highways Authority of India (NHAI) has rolled out digital platforms for monitoring construction quality and asset condition, aiming to build a central repository for asset data. Performance-based maintenance contracts and long-term concessions under Public-Private Partnership (PPP) modes also reflect a growing shift towards life-cycle thinking, where concessionaires are incentivized to deliver sustained performance rather than short-term construction targets. Several state highway agencies have experimented with network-level asset management pilots, signalling an early but important recognition of the value of structured approaches.

Organizational Benefits of Adoption

For road agencies and concessionaires, adopting PAS 55 and ISO 55000 provides several clear advantages. First, it improves financial predictability by linking budget organisations' costs rather than annual allocations. Second, it enhances risk management by systematically addressing climate impacts, traffic growth, and safety risks. Third, it builds investor and stakeholder confidence, critical for PPP projects, by ensuring transparency and accountability. Finally, it improves service quality and customer satisfaction by embedding performance standards into daily operations. Together, these benefits position organisations not only to manage assets more efficiently but also to strengthen their long-term credibility and resilience.

Yet, significant challenges remain. Many agencies still depend on periodic, manual condition surveys rather than integrated information systems. Skill gaps persist in areas such as life-cycle costing, risk-based planning, and performance monitoring. Institutional inertia and political imperatives often limit adoption of long-term strategies. Overcoming these barriers requires investment in training, modern data systems, and stronger awareness among decision-makers, contractors, and road users that structured asset management is not an administrative burden but a pathway to efficiency and accountability.

The long-term benefits of adopting PAS 55 and ISO 55000 in India are substantial. Agencies would be able to optimise investment decisions, extend infrastructure service life, reduce maintenance backlogs, and improve user satisfaction. More importantly, alignment with international standards would signal to investors, multilateral agencies, and the public that India's road sector is committed to transparency and sustainability, an assurance that is vital in scaling up PPP procurement models.

Ultimately, the objective must be to institutionalise structured asset management as part of everyday business. Strategic policy decisions, network-level planning, and project execution should all be guided by a common framework. By embedding PAS 55 and ISO 55000 principles into organisational culture, Indian road agencies can move from reactive, project-driven maintenance to proactive, performance-orientated, and customer-focused management. This transformation is essential for safeguarding the long-term value of India's vast road network and ensuring that it continues to serve as a resilient foundation for national mobility and economic growth.



FEATURE ARTICLES

VEHICLE VISIBLE POLLUTION IDENTIFICATION AND ENFORCEMENT WITH AI VISUAL DEVICES

Anil Chhikara

Former Deputy Commissioner, Transport Department, Delhi, is known for leading road-safety and transport reforms, promoting innovation in urban mobility, and contributing to policy modernization within India's transport ecosystem.



Background

The National Capital Region (NCR) of Delhi faces one of the world's most severe air pollution crises, with vehicular emissions contributing about one third of the capital's air pollution burden as claimed by few studies. This comprehensive paper examines the deployment and implementation of advanced camera technologies—including High Definition (HD), Artificial Intelligence (AI), Thermal, and Infrared (IR) systems—for vehicle visible pollution identification and enforcement. Under the mandates of the Commission for Air Quality Management (CAQM), Ministry of Road Transport and Highways (MORTH), and Supreme Court directives, Delhi needs to pioneer an integrated approach to combat vehicular pollution through sophisticated surveillance and enforcement mechanisms. The traffic police has already yielded significant results, with over 3.6 crore vehicles screened through Automated Number Plate Recognition (ANPR) systems, leading to ₹168 crore in penalties for various traffic offences. This technological transformation represents a paradigm shift from traditional manual inspection methods to automated, real-time enforcement systems that operate continuously across Delhi's transportation network.

Supreme Court Directives and Judicial Oversight

The Supreme Court of India has played a pivotal role in establishing the legal framework for vehicular pollution control in Delhi-NCR. Dating back to 1999, the Court recognized the severe health impacts of diesel exhaust and initiated comprehensive measures to address the crisis. The Court has emphasized the need for continuous digital enforcement over periodic, easily circumvented checks, supporting the transition to automated camera-based monitoring systems.

In July 2024, the Supreme Court made a significant adjustment to its enforcement strategy by removing the requirement for Pollution Under Control (PUC) certificates as prerequisites for third-party vehicle insurance. This decision, prompted by concerns about potential "disastrous consequences" for accident victims, highlighted the Court's pragmatic approach to balancing pollution control with public welfare. Instead, the Court advocated for the use of various technologies to track vehicles in Delhi-NCR, further strengthening the case for advanced camera-based monitoring systems.

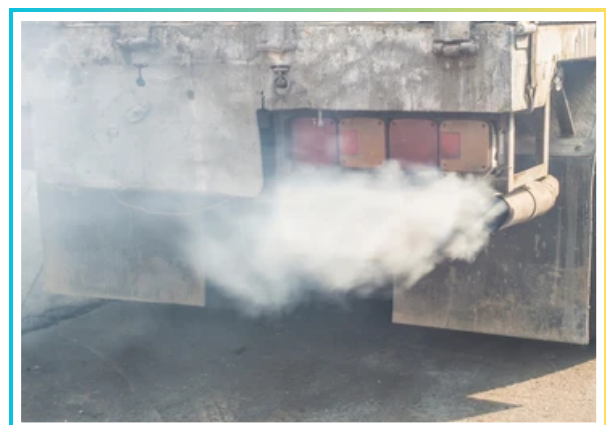
CAQM's Statutory Authority and Implementation Framework

The Commission for Air Quality Management (CAQM), established as a statutory body in August 2021, serves as the overarching authority for air quality management in the NCR and adjoining areas. CAQM replaced the Environment Pollution (Prevention and Control) Authority (EPCA) and consolidated various regulatory bodies under a unified framework with enhanced penal provisions. Non-compliance with CAQM's orders can attract imprisonment for up to five years and/or fines up to ₹1 crore.

CAQM's comprehensive policy framework addresses multiple pollution sources, with vehicular emissions receiving primary attention due to their significant contribution to air quality degradation. The Commission has issued Statutory Direction No. 89, which mandates the denial of fuel to end-of-life vehicles identified through ANPR cameras and other monitoring systems. This directive applies staggered implementation timelines: Delhi (July 1, 2025), five high vehicle density districts (November 1, 2025), and the rest of NCR (April 1, 2026).

MORTH Technical Standards and Guidelines

MORTH's regulatory framework encompasses both type approval testing and Conformity of Production (COP) procedures for vehicles. The ministry has established stringent emission standards progressing from Bharat Stage IV to BS-VI, with the latest standards representing significant improvements in emission control. The Central Motor Vehicle Rules (CMVR) provide the legal foundation for emission compliance, with Rule 115(7) mandating idle emission tests and free acceleration smoke tests for all vehicles.





Thermal and Infrared (IR) Camera Technologies

Thermal infrared cameras provide unique capabilities for vehicle emission detection by measuring heat signatures and temperature variations associated with vehicular emissions and mechanical systems. These cameras operate on the principle of detecting electromagnetic energy in the mid-wave (3-5 μm) and long-wave (8-14 μm) infrared bands.

Emission Detection Capabilities: Thermal cameras can identify:

- Exhaust system temperature anomalies indicating incomplete combustion
- Engine thermal profiles revealing mechanical inefficiencies
- Brake system overheating during extended operation
- Tire performance characteristics through thermal imaging

Environmental Advantages: Unlike visible light cameras, thermal systems maintain consistent performance across varying environmental conditions:

- 24/7 operation capability regardless of lighting conditions
- Penetration through fog, smoke, and atmospheric haze
- Detection of temperature differentials as small as 0.1°C
- Operation in extreme weather conditions from -30°C to +60°C

Technical Specifications: Advanced thermal cameras for vehicle monitoring feature:

- Sensor Resolution: 320×240 to 640×480 pixels
- Temperature Range: -40°C to +500°C measurement capability
- Accuracy: $\pm 2^\circ\text{C}$ or $\pm 2\%$ of reading
- Frame Rate: 30 Hz thermal imaging video output
- Communication: Ethernet connectivity with cloud integration

Delhi's Camera-Based Vehicle Monitoring – A First-Person Perspective on a City's Tech-Driven Transformation

When I think about Delhi, the first images that come to mind are of its endless movement – cars, buses, auto-rickshaws, and bikes woven into a constant,

chaotic dance. But alongside this vitality lies an undeniable truth: our city has been choking. Not only from its sheer traffic volume but from the invisible, harmful emissions that silently erode our health and quality of life.

For years, enforcement has been a slow, manual affair — a handful of officers in a sea of vehicles, struggling to catch even a fraction of offenders. But now, something remarkable is happening. Delhi has begun to turn the tide, not through more manpower but through technology — a vast network of intelligent, camera-based vehicle monitoring systems that quietly watch, record, and enforce twenty-four hours a day.

The Payback – More than Just Money

Here's the thing most people don't realise: these cameras don't just pay for themselves — they pay back fast. Within the first six months of full operation, Delhi collected ₹168 crore in penalties.

We're not talking about overzealous enforcement here — each violation detected, from an overdue PUC certificate to excessive visible smoke emissions, is backed by timestamped, tamper-proof visual evidence.

The effects ripple outward:

- An 85% increase in PUC renewals is proof that people are rushing to comply rather than risk fines.
- Fuel stations are no longer wasting manpower on tedious manual checks — a 95% reduction in the inspection load.

It's not just enforcement; it's behaviour change on a citywide scale.

The Hidden Benefits – Health, Industry, and Confidence

If you've lived here long enough, you know the smog isn't just unpleasant — it's deadly. Cleaner air, even incrementally, means fewer hospital visits, less asthma medication, and fewer lost workdays. This is money back in citizens' pockets.

The vehicle maintenance industry is also quietly thriving — more people are getting cars serviced, replacing faulty parts, and tuning engines to meet emission norms. Cleaner technology adoption, from EVs to CNG, is accelerating. Even the city's image benefits; investors and tourists alike see a capital that's finally getting serious about environmental governance.

Crunching the ROI – The Business Case of Clean Air

- From an economic standpoint, the numbers are solid — remarkably solid for a civic project.
- ANPR-based systems recoup costs in 18–24 months.
- AI-enhanced setups take only a little longer — 24–36 months.
- Thermal camera networks, being the most advanced, need 36–48 months but bring broad environmental monitoring capabilities. The consolidated system promises a 15–20% annual return over five years, not counting healthcare savings.

Smart Engineering – How the Problems Are Being Solved

- The engineers behind this rollout aren't just installing cameras; they're building resilient ecosystems.
- By combining optical HD, AI pattern recognition, and thermal technologies, the system can cross-verify detections in real time.
- Redundant installations ensure that if one camera misses something, another won't.
- Mobile monitoring units plug the gaps in coverage.
- The back end is just as robust:
- Real-time syncing with VAHAN instantly validates violations against official records.
- Machine learning continuously improves plate recognition, even with quirky fonts or obscure mounts.
- Integration with live weather data means the system adjusts for fog or rain automatically.

Peering into the Future

The next phase feels almost sci-fi:

- AI that predicts vehicle breakdowns before they happen.
- LiDAR mapping for exact 3D profiling.
- IoT sensors feeding hyper-local pollution readings.
- Blockchain-based records make every penalty tamper-proof.

It's not fantasy — these upgrades are already being trialled.

Policy – Cementing the Gains

The Ministry of Road Transport and Highways (MORTH) and the Commission for Air Quality Management (CAQM) understand that tech without policy support is useless. That's why standards like AIS-170 are being updated to mandate AI-based systems and thermal imaging specifications.

Regional coordination is being planned so the NCR acts as one integrated enforcement zone, not fragmented jurisdictions. Dynamic penalty systems and incentives for clean vehicle adoption are also on the cards.

This isn't a quick fix; it's a platform that can grow with the city's needs. And if implemented with care and transparency, it could become one of Delhi's proudest governance achievements — and a replicable blueprint for cities worldwide.

The implementation of advanced camera technologies for vehicle visible pollution identification and enforcement in Delhi represents a significant milestone in urban air quality management. Under the coordinated efforts of CAQM, MORTH, and Supreme Court oversight, Delhi has established one of the world's most comprehensive automated vehicle monitoring systems.

The success of Delhi's camera-based enforcement system provides a template for other metropolitan areas facing similar air quality challenges. The multi-technology approach addresses various monitoring requirements while maintaining cost-effectiveness and operational efficiency. However, continuous technological advancement and regulatory adaptation remain essential for long-term success.

Future developments should focus on enhanced AI integration, improved weather resistance, and expanded coverage across the entire NCR. The evolution from reactive enforcement to predictive pollution prevention through advanced framework enhancement, and multi-stakeholder cooperation, camera-based vehicle pollution monitoring systems will evolve into even more sophisticated tools for environmental protection. The integration of artificial intelligence, thermal imaging, and remote sensing analytics and machine learning will further strengthen the system's effectiveness. Additionally, integration with emerging technologies such as electric vehicle infrastructure monitoring and carbon credit systems will expand the scope of environmental protection measures.

The collaborative framework established between judicial oversight, regulatory authority, and technological implementation demonstrates the potential for comprehensive environmental policy enforcement. As air quality standards become increasingly stringent and public health concerns continue to rise, camera-based vehicle monitoring systems will play an increasingly critical role in sustainable urban transportation management. The Delhi model's success in combining legal mandates, technological innovation, and practical implementation provides a robust foundation for addressing one of the 21st century's most pressing environmental challenges.

Through continued investment in technology advancement, regulatory technologies promise to deliver unprecedented accuracy and efficiency in vehicle emission control, contributing significantly to improved air quality and public health outcomes in Delhi and beyond.



SUMMARY BY DIRECTOR GENERAL

Dr Shiv Kumar

Director General, ITS India Forum



The last 3 months have further strengthened the ITS India Forum's mission to drive safe, smart, and sustainable mobility solutions across the nation. As we mark **10 years of the Smart Cities Mission**, the role of Intelligent Transport Systems (ITS) in enhancing urban governance, national transport efficiency, and digital infrastructure has become more pivotal than ever.

Our strategic focus on **Data-Driven Advanced Traffic Management Systems (ATMS)** marked a key milestone this period. The **4th National Roundtable** brought together experts and practitioners from across the ITS ecosystem to co-create a unified vision for India's ATMS framework. Insights from this initiative are now feeding into the **National ATMS Architecture White Paper**, being jointly developed with **MoRTH and NHAI**, ensuring that India's traffic systems are future-ready, AI-enabled, and interoperable.

Another major highlight was the signing of a **Memorandum of Understanding with IEEE India**, opening a new chapter in standardisation, research collaboration, and capacity building. This partnership positions ITS India to align its initiatives with international benchmarks while fostering innovation through joint events, workshops, and technical harmonisation.

We also welcomed **DataCorp Traffic Pvt. Ltd., Sego Automobile Solutions Pvt. Ltd., T-Systems, Vehant Technologies, yelloSKYE** as new Corporate Members, **Indian Road Survey & Management Pvt. Ltd.** as a Premium Member and **JIO Platforms Limited** as a Patron Member as a while **Arcadis IBI Group** was elevated to **patron member** status—strengthening our ecosystem with strategic expertise and global insight.

Our **working groups** continue to play a critical role in shaping national ITS priorities. A standout initiative during this period was the launch of a **Real-Time Emission Enforcement System in Delhi**, piloted by the **Working Group on AI and Sustainability**. This innovative project demonstrates the potential of AI, thermal imaging, and live data integration to enable intelligent pollution control—an important step toward environmentally responsible transportation systems.

Looking ahead, our participation in upcoming platforms such as the **Advanced ATMS Conference**, and the **ITS India Congress in Hyderabad** will provide opportunities to showcase India's ITS advancements and deepen engagement with global peers. We encourage all members to contribute actively to these landmark events and help shape practical, scalable solutions for India's unique mobility challenges.

Let us continue to move forward with shared purpose and innovation. The future of transportation in India is being shaped today—by the leadership, commitment, and collaboration of this vibrant community.

COMING UP IN THE NEXT DIGEST

The first ITS India Congress: 6-7 Nov 2025- A historic event.



The forthcoming Digest will include an overview of an important institutional milestone: the recent Memorandum of Understanding signed between CSIR-Central Road Research Institute (CSIR-CRRI) and the ITS India Forum. This strategic partnership marks a forward-looking step toward strengthening India's Intelligent Transport Systems through coordinated research, innovation, and capacity-building initiatives.

This edition offers only an initial indication of this development.

A detailed account of the collaboration and its broader implications will be presented in the next Digest.

The first ITS India Congress: 6-7 Nov 2025- A historic event.

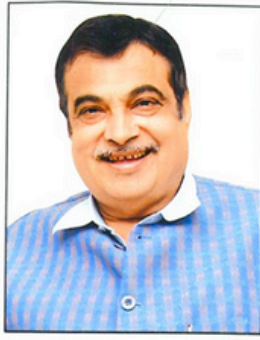
(We will talk about this in detail in our next Digest.....)

As we move beyond the July - September edition, our next Digest will bring an exclusive highlight of the First ITS India Congress 2025 held as an official Pre-Summit Event of the India-AI Impact Summit 2026 under the guidance of the IndiaAI Mission, Government of India, the Congress brought together key government leaders, experts, and industry stakeholders for focused discussions on AI-driven mobility and electronic enforcement.

This edition carries only a brief glimpse – the complete coverage, insights, and outcomes from the Congress will be featured in the upcoming Digest.



नितिन गडकरी
NITIN GADKARI



मंत्री
सड़क परिवहन एवं राजमार्ग
भारत सरकार
Minister
Road Transport and Highways
Government of India

Message

I am glad to know that the Intelligent Transport Systems (ITS) India Forum, in partnership with IIT Hyderabad and OMI Foundation Trust, are convening the inaugural “ITS India Congress 2025 on Artificial Intelligence (AI) in Mobility” on 6-7 November, 2025, at the IIT Hyderabad, aimed at showcasing how AI could re-define road safety, urban efficiency, logistics competitiveness, and inclusive access.

2. The vision of the Ministry of Transport and Highways is not only to build world-class transport infrastructure, but also to make every kilometre of roads, safer, smarter, and more humane. From Bharat New Car Assessment Programme (Bharat NCAP), to data-driven interventions for black-spots identification, our efforts are rooted in evidence, empathy, and accountability.

3. I commend the organisers of the ITS Congress 2025 for advancing this important dialogue. Achieving safer roads requires the collective effort of policymakers, industry, academia, and citizens. Together, by leveraging technology with purpose and data driven decision making, we can create a future where every journey is safer, smarter, and more secure. I wish the conference a grand success.

New Delhi
27th October, 2025.



(Nitin Gadkari)

Key Sessions at a Glance

There were 2 Plenary Sessions and 5 Technical Sessions held during the Congress, covering key themes across AI, enforcement, sustainability, and emerging ITS technologies.

Plenary Session 1 | Roadmap for Electronic Enforcement in India

Aligned with MoRTH's Electronic Enforcement SOP (October 2025) and guided by SCCoRS, this session outlined India's national roadmap for technology-driven enforcement. It focused on policy frameworks, standards, and data integration with platforms like Vahan, Sarathi, and e-Challan, while inviting insights from industry, academia, and enforcement agencies to enable transparent, efficient, and safety-oriented implementation across the country.

Plenary Session 2 | AI in Mobility: Hyderabad Leading the Future

This session highlighted how Hyderabad was leveraging AI to build smarter, safer, and more efficient mobility systems. It showcased advanced applications in traffic management, transit optimisation, and data-driven urban planning that positioned the city as a national benchmark and a global model for AI-enabled mobility.

Technical Session 1 | Barrier-less Tolling and the Way Forward

This session explored India's transition to MLFF-based barrier-less tolling, the future potential of congestion pricing, and the roadmap toward GNSS-based tolling. Experts also discussed interoperability and standards essential for seamless and efficient next-generation tolling systems.

Technical Session 2 | Connected Vehicle Ecosystem

This session explored cutting-edge innovations in connected mobility, intelligent surveillance, and electric transport systems, highlighting how emerging technologies were enabling safer, smarter, and more sustainable urban transit.

Technical Session 3 | ITS Solutions for Advancing SDGs

This session showcased innovative ITS solutions driving measurable progress toward the Sustainable Development Goals. Highlights included Electric Road Systems (ERS), ADAS-based road safety, digital tools for construction zone safety, and smart traffic management that reduced congestion and emissions—advancing safer, smarter, and more sustainable mobility.

Technical Session 4 | Emerging ITS Technologies & Policy Push

This session highlighted cutting-edge ITS innovations, emerging research trends, and the policy momentum shaping smart mobility in India. Experts from academia, industry, and government shared insights that connected technology, research, and regulation to accelerate future-ready ITS adoption.

Technical Session 5 | Emerging ITS Technologies for Highway Design

This session explored advanced ITS solutions transforming modern highway design, including smart sensors, digital twins, traffic prediction tools, and safety-focused design technologies. Experts discussed how data-driven planning and intelligent systems were shaping safer, more efficient, and future-ready highway infrastructure.

Poster Presentations & Networking Session

The Poster Presentations and Networking Session brought together young researchers, innovators, and industry professionals to showcase emerging ideas in AI, traffic management, road safety, and mobility technologies. Participants had the opportunity to share insights, exchange feedback, and build meaningful connections with experts and peers. The session created a vibrant space for collaboration, knowledge sharing, and future partnership opportunities within the ITS community.

Valedictory Session & Award Ceremony

The Valedictory Session and Award Ceremony marked the formal conclusion of the Congress, celebrating key contributions, breakthrough ideas, and outstanding innovations presented during the event. Distinguished guests honoured researchers, startups, and industry leaders whose work was advancing India's smart mobility landscape. The session reflected on major takeaways, acknowledged collective efforts, and reinforced the commitment to driving safer, smarter, and future-ready transport systems.

Special Focus

- Spotlight: MoRTH's Electronic Enforcement SOP (2025)

A landmark plenary session chaired by Hon'ble Justice Abhay Manohar Sapre, Chairman, Supreme Court Committee on Road Safety deliberated on the newly issued Electronic Enforcement SOP (MoRTH, 28 October 2025). This was the first national stakeholder discussion after the release of the SOP and set a clear direction for data-driven, technology-enabled enforcement across India.



Featured Reports

- **Release of National Reports**

Comprehensive reports unveiled actionable, data-driven strategies to accelerate India's intelligent mobility ecosystem.

1. **National Mission on AI in Mobility: Accelerating Safe, Smart, and Sustainable Transport through Artificial Intelligence in India** - This roadmap outlines how India can strategically deploy Artificial Intelligence to create transportation that is safer, cleaner, more efficient, and inclusive. It identifies clear priorities for action, starting with the adoption of AI-based traffic management to transform how India moves.
2. **Monitor, Model, Mitigate: Harnessing AI for Vehicular Emissions Control** - The report demonstrates how AI can transform the challenge of air pollution by using thermal and infrared monitoring to detect high-emission vehicles in real-time. This data can be integrated with VAHAN and PUC databases to predict pollution hotspots and trigger targeted enforcement.
3. **Priority By Design: Advancing Emergency Mobility with Cellular Vehicle-to-Everything (C-V2X) in Telangana & India** - This Futures Report details a strategy to use C-V2X technology for fast, reliable, and scalable emergency vehicle prioritization across India, beginning with Hyderabad. The technology aims to reduce the loss of lives caused by delayed emergency care by ensuring emergency vehicles are never delayed by design flaws.
4. **Breaking the Gridlock: An AI Roadmap for Urban Decongestion in Telangana and India** - This comprehensive framework provides a solution for using AI to transform traffic management, improve safety, and create sustainable, citizen-centric mobility systems. The study affirms that AI can turn congestion into a manageable challenge, with predictive analytics potentially reducing delays by 25-30% on arterial corridors.
5. **UrbanAI: Navigating Tomorrow** - This report explores how the convergence of AI, digital infrastructure, and urban mobility can reimagine transport as an intelligent, proactive, and human-centric network. AI presents solutions that are efficient, equitable, and sustainable, from managing complex traffic and optimizing public transport to dynamic EV charging.
6. **Smart Mobility Blueprint for India: A Roadmap for Intelligent Transport Systems** - This is a high-level blueprint that provides a roadmap for the implementation and scaling of Intelligent Transport Systems (ITS) in India. It sets the strategic vision for the country's move towards smarter and more efficient mobility solutions.

7. **Charging Ahead: Global Insights and India's Roadmap for Electric Road Systems (ERS)** - This Futures Report provides global case studies and a strategic roadmap for deploying Electric Road Systems (ERS) across India. ERS is presented as a critical technology for achieving decarbonisation, energy security, and significantly reducing fossil fuel consumption in the road freight and public transport sectors.
8. **AI for Public Transport Optimisation: Enhancing Throughput, Efficiency, and Sustainability in Telangana** - This Futures Report charts a decisive path toward a more efficient, reliable, and sustainable public transport system using Artificial Intelligence. It introduces an AI Throughput Framework to optimize five key domains, demonstrating how AI can power public transport to move people and possibilities.
9. **Predict, Prevent, Protect: An AI Roadmap for Safer Roads in Telangana and India** - This Futures Report lays out a strategy for using Artificial Intelligence to achieve Vision Zero—no deaths on Indian roads—by enabling the system to predict, prevent, and protect in real time. It calls for the full-scale deployment of AI-based enforcement systems (computer vision, ANPR) and predictive analytics for blackspot identification across the country.



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