ITS INDIA FORUM

YEARBOOK 2025-26

Shaping the Future of Mobility in India

TOWARDS
VIKSIT BHARAT
@2047

INTELLIGENT
MOBILITY
FOR A
DEVELOPED INDIA



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Shaping the Future of Mobility



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INTELLIGENT
MOBILITY
FOR A DEVELOPED
INDIA





PRESIDENT'S PERSPECTIVE

Intelligence Must Serve People

TECHNOLOGY FOR SAFER, CLEANER AND MORE INCLUSIVE MOBILITY

India stands at the threshold of an extraordinary mobility transformation. Our cities are growing, our economy is expanding, and our aspirations as a nation are higher than ever before. At the same time, we face complex challenges — congestion, road safety, environmental concerns, logistics efficiency and the need for inclusive mobility for all. Intelligent Transportation Systems offer a powerful set of tools to address these challenges and to build a smarter, safer and more sustainable future.

Technology, however, is only a means, not an end. The real measure of progress will be the difference it makes to people's lives — a safer journey home, a more reliable public transport system, cleaner air in our cities, and opportunities that reach every section of society. Intelligence must serve people, and our collective efforts must ensure that mobility solutions are inclusive, affordable and accessible to all.

This year has reinforced the importance of collaboration. The ITS India Forum brings together government, industry, academia, researchers, startups and mobility professionals to exchange ideas, develop practical solutions and advocate for enabling policies. Through our events, knowledge initiatives, capacity-building programmes and policy engagement, we are building a vibrant ecosystem for ITS in India.

I am particularly encouraged by the growing momentum around AI, connected vehicles, digital infrastructure, road safety technology and sustainable mobility. Our recent initiatives, including work on AI and road safety, highlight the potential of data-driven, predictive approaches to save lives and make our transportation systems more resilient.

Looking ahead, India's journey to Viksit Bharat @ 2047 will require world-class mobility systems. The ITS community has a vital role to play in shaping this future. Let us continue to work together — with commitment, innovation and a shared sense of purpose — to make intelligent mobility a reality for every citizen in our country.

I invite all stakeholders to join us in this journey. Together, we can move India forward.

Akhilesh Srivastava
President
ITS India Forum

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MESSAGES

FROM INDIA & ABROAD

ITS 2025-26







प्रो. अभय करंदीकर
Prof. Abhay Karandikar
सदस्य
Member

सत्यमेव जयते

भारत सरकार
नीति आयोग
Government of India
NATIONAL INSTITUTION FOR TRANSFORMING INDIA
NITI Aayog

MESSAGE



It is encouraging to note the important role being played by the ITS India Forum in advancing Intelligent Transportation Systems and sustainable mobility in India. As the country progresses towards Viksit Bharat 2047, transforming the mobility ecosystem to make it safer, smarter, greener and more efficient will be essential.

The theme of the 2nd ITS India Congress 2026, *"Connected, Integrated and Intelligent Mobility for Viksit Bharat 2047,"* is therefore highly relevant and timely. It reflects the need for a transportation system in which emerging technologies, physical infrastructure and diverse modes of transport work together to improve the movement of people and goods safely, efficiently and sustainably. The rapid advancement of Artificial Intelligence, ubiquitous connectivity, connected mobility, V2X communication, Internet of Things, intelligent traffic management, electronic enforcement and digital infrastructure presents significant opportunities to transform transportation. For India, these technologies must translate into practical, interoperable and scalable solutions suited to diverse mobility needs.

The ITS India Forum has an important role in bringing together government, industry, academia, research institutions, technology providers and international organisations to promote policy dialogue, research, standards, capacity building, pilot projects and technology deployment. Its engagements with institutions such as IIT Bombay, IIT Hyderabad and South Asian University, along with its international collaborations, can further strengthen the ITS ecosystem in India.

Road safety must remain central to this transformation. The Forum's work in Intelligent Traffic Management Systems, electronic enforcement, connected mobility and emerging satety technologies can enable more responsive and data-driven approaches to improving road safety. Moreover, its engagement with MORTH, NHAI, IHMCL and the DoT-TEC Task Force on ITS and V2X can further support an enabling environment for the development and adoption of these solutions.

I extend my best wishes to the ITS India Forum and the wider ITS fraternity for the success of the ITS India Congress 2026 and the ITS India Mobility & ITS Yearbook 2026.

I am confident that this platform will foster meaningful dialogue and collaboration towards a safer, more connected, sustainable and intelligent transportation future for India.

(Abhay Karandikar)

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वी. उमाशंकर
सचिव
V. Umashankar
Secretary

सत्यमेव जयते

भारत सरकार/Government of India
सड़क परिवहन और राजमार्ग मंत्रालय
Ministry of Road Transport & Highways

MESSAGE

Mobility is no longer about roads, vehicles and infrastructure. It is increasingly about people, technology, information and inter-face among them. Intelligent Transport Systems are helping us move towards a future where different modes of transport can work together, journeys can be planned more easily, traffic can be managed more effectively, and safety can be ensured at the core of every journey.

As we look ahead to the vision of Viksit Bharat 2047, the real promise lies in making every journey improve the lives of people from all walks of life, whether it is a commuter travelling to work, a student going to a school or a college, a family travelling across the country, or goods moving from one place to another. The transport systems must be reliable, safe, efficient and accessible and make every journey better. Technology will undoubtedly be a major enabler of this transformation. But technology alone cannot deliver the innovative mobility system we are aspiring to build. It requires close collaboration among all stakeholders, and most importantly, the people who use the transport systems every day.

The ITS Yearbook 2026 the Special Souvenir on the theme "Connected, Integrated and Intelligent Mobility for Viksit Bharat 2047" brings together ideas, experiences and innovations that reflect the energy and commitment of India's mobility community. As we move towards 2047, let us use technology not simply to make transportation smarter, but to make mobility safer, inclusive, sustainable and more human.

I congratulate all those associated with the ITS Yearbook 2026 and wish the entire ITS community continued success in contributing to India's journey towards a connected, integrated and intelligent mobility future.

Umashankar

(V. Umashankar)

Place: New Delhi.
Date: 17.9.2026.

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अनिल कुमार लाहोटी
Anil Kumar Lahoti

सत्यमेव जयते

अध्यक्ष
भारतीय दूरसंचार विनियामक प्राधिकरण
Chairman
TELECOM REGULATORY AUTHORITY OF INDIA

Message



I am pleased to note that the theme of ITS India Mobility and ITS Yearbook 2026 is "*Connected, Integrat-ed and Intelligent Mobility for Viksit Bharat 2047".*

The theme of the yearbook reflects the transformative role that technology and connectivity can play in shaping the mobility systems of a developed India. The convergence of telecommunications, intelligent transport systems and automotive technologies is cre-ating new opportunities for safer, more efficient and sustainable mobility. Vehicle-to-Everything (V2X) communication is an important enabler of this transformation, facilitating real-time communication be-tween vehicles, infrastructure, pedestrians and other road users. By enabling connected and intelligent mobility solutions, V2X has the potential to enhance road safety, improve traffic management, facilitate efficient use of transport infrastructure and support the development of advanced mobility services.

I believe that a forward-looking and enabling regulatory framework, complemented by technological inno-vation and coordinated efforts among all stakeholders, will be instrumental in building a robust eco-system for connected and intelligent mobility. Such an ecosystem can contribute significantly towards the broader vision of *Viksit Bharat 2047.*

appreciate the efforts of all stakeholders contributing to the development of Intelligent Transport Systems and commend the initiative of bringing together perspec-tives and developments through this yearbook. I wish the ITS India Forum community continued success in its endeavours towards creating a safer, smarter and more connected mobility ecosystem for India.

30/09/2026

(Anil Kumar Lahoti)

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MESSAGE FOR ITS INDIA MOBILITY & ITS YEARBOOK 2026



Akio Yamamoto

It is a great honor to contribute to the ITS INDIA MOBILITY & ITS YEARBOOK 2026. On behalf of ITS Japan and ITS Asia-Pacific, I sincerely thank the ITS India Forum for its active engagement in advancing intelligent mobility and strengthening collaboration across the global ITS community.

Mobility is undergoing profound change. Connectivity, automation, artificial intelligence, and data-driven services offer new opportunities to improve safety, efficiency, sustainability, and accessibility. At the same time, countries face common challenges, including road safety, climate change, aging populations, congestion, and the need for inclusive mobility.

Japan believes that technology alone is not enough. Sustainable progress requires close collaboration among government, industry, academia, infrastructure operators, and mobility service providers. This collaborative ecosystem is central to Japan's ITS approach.

Japan's Mobility Roadmap 2026 reflects this philosophy through two complementary goals: industrial growth through advanced vehicle automation and mobility innovation, and the resolution of transportation and societal challenges through automated driving and cooperative ITS, including V2X. Technology creates its greatest value when it directly serves people and society.

Among these technologies, V2X has tremendous potential to improve road safety, enhance the reliability of automated driving, protect vulnerable road users, optimize traffic operations, and strengthen transport resilience. Japan's ITS Infrastructure Roadmap envisions a phased approach: beginning with information and warning services at high-risk intersections; expanding to cooperation with vulnerable road users, ADAS, and vehicle control for Level 4 automated driving; and ultimately linking roadside infrastructure, communications, edge data, AI, and digital twins to support city-wide traffic management, disaster response, and safe, seamless mobility. Achieving this vision requires interoperability, international standards, trusted data sharing, and effective stakeholder collaboration.

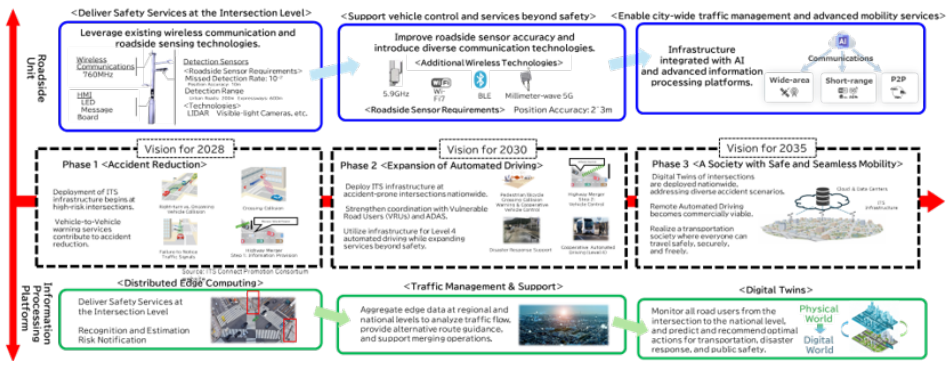
As Secretary General of ITS Asia-Pacific, I hope the ITS India Forum will continue its active participation and valuable contributions to our regional activities, events, and initiatives. India's expertise, leadership, and enthusiasm will enrich our community and strengthen cooperation across Asia-Pacific.

I strongly believe that India will play an increasingly important role in shaping intelligent mobility, both regionally and globally. ITS Japan and ITS Asia-Pacific look forward to working with the ITS India Forum toward connected, intelligent, safe, sustainable, and inclusive mobility for all.

Akio Yamamoto
Secretary General
ITS Asia-Pacific

President & CEO
ITS Japan

ITS Infrastructure Roadmap





On behalf of ITS America, I am pleased to congratulate ITS India Forum as it builds on the success of last year's inaugural ITS India Congress to meet again for the 2026 ITS India Congress.

Guided by the theme, *"Connected, Integrated, and Intelligent Mobility for Viksit Bharat 2047,"* this year's Congress represents a dynamic commitment to accelerating progress, strengthening partnerships, and advancing a shared vision for the future of mobility. As emerging technologies transform the world's transportation systems, forums like this play a critical role in translating innovation into real-world outcomes.

India's leadership in digital transformation, combined with its vast transportation network, positions the nation to help shape the next generation of intelligent mobility solutions. Building on the achievements of its inaugural Congress, this year's gathering will foster valuable dialogue, showcase emerging technologies, and create new opportunities for collaboration across the public, private, and academic sectors.

Lasting success is built through sustained partnership and a commitment to innovation. We commend ITS India Forum for creating a platform that brings together leaders from across the mobility ecosystem to address today's challenges and seize tomorrow's opportunities.

We wish the 2026 ITS India Congress great success and look forward to experiencing the real-world impacts of advancing safer, smarter, and more connected transportation systems in communities in India and globally.

Ms. Laura D. Chace
President & CEO
Intelligent Transportation Society of America (ITS America)

TTS ITALIA Italian ITS Association



As the Italian ITS Association, TTS Italia is currently deeply engaged in developing ITS policies and strategies within Italy. Following Italy's transposition of the European ITS Directive 2661/2023, the Ministry of Infrastructure and Transport commissioned TTS Italia to draft a National ITS Action Plan. Specifically, the task involves identifying priority interventions for the next five years across the four priority areas designated by the European Commission:

- **Priority Area I:** ITS services for information and mobility (including digital multimodal mobility services and real-time traffic information).
- **Priority Area II:** ITS services for travel, transport, and traffic management.
- **Priority Area III:** ITS services for road and transport safety.
- **Priority Area IV:** ITS services for cooperative, connected, and automated mobility.

National priorities center on the availability and sharing of mobility data—in accordance with the standards set by the EC—which serve as the foundation for developing services in the other priority areas and for emerging technological trends such as MaaS (Mobility as a Service) and cooperative, connected, and automated mobility. Additionally, AI and cybersecurity are key issues affecting the ITS sector; these must be addressed to fully leverage service potential and ensure security.

All of this lays the groundwork for promoting the interoperable Italian ITS sector in international markets—such as India—and for fostering continued collaboration between TTS Italia and the ITS India Forum.

We wish you the best for your ITS Congress.

Olga Landolfi
Secretary General
Italian ITS Association

itsaustralia
Intelligent Transport Systems

A Global Perspective on the Future of Intelligent Mobility



The pace of change across the global transport sector is unprecedented. Around the world, governments, industry, researchers and technology providers are embracing intelligent transport systems (ITS) and digital mobility solutions to address some of society's most pressing challenges, from road safety and congestion to sustainability, productivity and equitable access to transport.

As transport networks become increasingly connected, automated and data-driven, no nation can navigate this transformation alone. The future of intelligent mobility will be shaped not only by technological advancement, but also by collaboration, shared learning and a commitment to interoperability across borders.

It is an honour to represent ITS Australia and present at the 2nd ITS India Congress 2026. The Congress highlights both the immense scale of opportunity and the shared challenges facing nations as they work towards safer, smarter and more sustainable transport systems. India's rapid growth, ambitious infrastructure investment and embrace of emerging technologies position it as one of the world's most exciting and influential transport markets.

Australia is proud to be contributing to the global evolution of ITS and intelligent mobility through the deployment of smart infrastructure, connected transport technologies and data-driven operations. Examples include Victoria's managed motorway network on the Monash Freeway and M80 Ring Road, alongside nationally significant research and trials in Cooperative Intelligent Transport Systems (C-ITS), automated vehicles, freight productivity and transport data interoperability led through organisations such as Austroads, the National Transport Commission and iMOVE Australia.

These initiatives demonstrate how technology can move beyond pilot projects to deliver real-world improvements in safety, efficiency and sustainability. They also reinforce the importance of standards, interoperability and trusted data exchange, ensuring that vehicles, infrastructure and transport operators can communicate seamlessly across jurisdictions and technology platforms.

Road safety remains one of the greatest drivers of innovation. Connected vehicle technologies, predictive analytics, artificial intelligence and real-time transport management systems are creating new opportunities to prevent crashes, protect vulnerable road users and improve incident response. At the same time, electrification, smart freight solutions, integrated public transport and emerging mobility services are helping create cleaner, more efficient and more resilient transport networks.

For Australia and India, the opportunities for deeper collaboration are significant. By strengthening partnerships between governments, industry, academia and technology providers, we can accelerate innovation, share knowledge and support globally aligned approaches to future mobility.

I also warmly invite colleagues from India and across the international ITS community to join us in Melbourne for the International Symposium of Freeway and Tolling Operations (ISFO) in 2027. The event will bring together global leaders in managed motorways, tolling, road user charging, traffic operations and connected mobility, providing another valuable opportunity to strengthen international partnerships and advance the future of intelligent transport.

The challenges facing transport are global, but so too are the opportunities. By working together through forums such as the ITS India Congress, ISFO 2027 and the broader international ITS community, we can build a future that is safer, more connected, more sustainable and more inclusive for generations to come.

Susan Harris
Chief Executive Officer
ITS Australia



On behalf of ITS New Zealand, I congratulate the ITS India Forum on hosting the 2nd ITS India Congress. Under the theme “Connected, Integrated and Intelligent Mobility for Viksit Bharat 2047”, the Congress shows how quickly India is shaping the future of intelligent mobility. We were pleased to contribute to last year’s souvenir and are glad to do so again.

The past year has shown how much the ITS community across the Asia-Pacific can achieve together. Connected, integrated and intelligent mobility depends on shared standards, open exchange of experience and strong relationships between ITS organisations and the businesses that deliver these solutions. We see real value in engaging with our counterparts across the region and in attending one another’s events.

We wish to acknowledge the ITS Asia Pacific Secretariat, led by ITS Japan, for its steady support of the regional network. We also thank ITS Taiwan for its secretariat support to the ITS RUC Alliance and for hosting its first Summit. Road user charging is a topic of growing interest in many of our economies, and the Alliance gives members a practical place to share lessons.

We also very much look forward to the ITS World Congress in Gangneung, which will again bring the global community together.

ITS New Zealand is very focussed on preparing to host the ITS Asia Pacific Forum in Auckland on 5-7 May 2027. We would be delighted to welcome colleagues from ITS India, including government, industry and academia, to take part, share India’s experience and build partnerships with delegates from across the region.

We commend the ITS India Forum for bringing together government, industry and academia, and we wish the Congress every success. We look forward to working with you in the year ahead.



Antony Dixon
Board Chair
Intelligent Transportation Systems New Zealand

Message from CSIR–CRRI for ITS India Mobility Yearbook 2026



India's mobility and road-safety challenges demand research that moves beyond conventional approaches towards innovation, emerging technologies and interdisciplinary solutions. CSIR–Central Road Research Institute (CSIR–CRRI) is contributing to this transformation by integrating transportation engineering, artificial intelligence, data analytics, intelligent transportation systems, infrastructure safety and human factors.

A significant example is Project iRASTE Telangana, where CSIR–CRRI worked with academic, government and industry partners to develop technology-driven solutions for highway safety. On key corridors including Hyderabad–Kodad, AI and Advanced Driver Assistance Systems (ADAS) were deployed to generate actionable safety insights. CRRI's expertise supported the identification and ranking of blackspots and the prediction of potential "greyspots" by combining vehicle-alert data with road and geometric information. The project also supported engineering interventions and evidence-based safety improvements.

The initiative demonstrates the value of interdisciplinary collaboration, bringing together CSIR–CRRI, IIIT Hyderabad/INAI, Intel, Telangana State Road Transport Corporation and other stakeholders. The programme combined vehicle safety, mobility analysis, infrastructure safety, awareness and emergency-care interventions. More than 600 first responders were trained in Active Bleeding Control along the Hyderabad–Kodad corridor, strengthening the post-crash response ecosystem.

CSIR–CRRI also places strong emphasis on skill development and capacity building. Research programmes are designed not only to generate technologies, but also to develop scientists, engineers, young researchers and practitioners capable of translating knowledge into field applications. Collaboration with universities, government agencies and industry creates opportunities for joint research, technology demonstration, professional training and knowledge exchange.

Our experience demonstrates that India's mobility challenges require a 4E approach Engineering, Education, Enforcement and Emergency Care supported by emerging technologies and reliable data. Through such partnerships, research outcomes can be translated into practical solutions for safer roads, intelligent mobility and sustainable transportation.

CSIR–CRRI remains committed to building an ecosystem where research, innovation, technology, skill development and academia–industry–government partnerships converge to address India's mobility and road-safety challenges and contribute towards a safer, smarter and more resilient transportation system.

Name
Designation
CSIR–CRRI

Intelligent Transportation Society, Singapore
100 Jurong East St 21, Singapore 609602
UEN: T01SS0165C

28 September 2026

Dear Akhilesh Srivastava,

On behalf of ITS Singapore, we extend our heartfelt congratulations to ITS India Forum on hosting the Second ITS India Congress 2026 — following the successful inaugural Congress in 2025.

As the most populous nation in the world, and with the fast-growing vehicle population, India is well-supported by networks of national and state roads. These are not merely defined by physical infrastructure, but by the digital intelligence embedded. As India accelerates its journey toward becoming a global economic superpower, the traditional definitions of transport infrastructure can be completely rewritten as are in many cities around the world.

The integration of next-generation digital ecosystems is fundamentally transforming how our society moves. By harnessing the power of the Data and Artificial Intelligence, Internet of Things (IoT), Cloud and Edge Computing, Autonomous Operations, and Next-Gen Connected Vehicle-to-Everything (V2X) Communication, we convert static highways into intelligent, self-optimising pathways.

Technology is the ultimate game-changer. The deployment of deep-learning algorithms and real-time data analytics lead to a new paradigm of road safety and smoother rides. Through sensor-fusion technologies, automated incident detection, and intelligent spatial mapping, we are moving closer to a future of connected, integrated and intelligent mobility, which rightly state the theme **"Connected, Integrated and Intelligent Mobility for Viksit Bharat 2047"** for the 2026 ITS India Congress.

The future of transportation needs the bold, the innovative, and the collaborative. I sincerely hope this ITS India Congress will provide the platform for the technologists, industry disruptors, research pioneers, and policymakers to build a smarter, safer, and infinitely connected India.

I wish you a successful Second ITS India Congress 2026 and our well wishes on your journey towards Viksit Bharat 2047.

Best Regards,

Howie Sim
President, ITS Singapore



สมาคมระบบขนส่งและจราจรอัจฉริยะไทย

THAI ITS ASSOCIATION

Dear President of ITS India

It is my great pleasure, on behalf of the Thai Intelligent Transport Systems Association (ITS Thailand), to extend our warmest greetings and congratulations to the organisers, partners and participants of the 2nd ITS India Congress 2026.

The theme, **"Connected, Integrated and Intelligent Mobility for Viksit Bharat 2047,"** reflects the direction of mobility transformation worldwide. Intelligent Transport Systems are evolving from standalone technologies toward integrated ecosystems connecting vehicles, infrastructure, digital platforms, transport services and users.

From ITS Thailand's perspective, the future of intelligent mobility will be driven by stronger international cooperation in areas such as **Connected and Automated Mobility (CAM), Vehicle-to-Everything (V2X), Artificial Intelligence (AI), digital twins, smart infrastructure, cybersecurity and advanced traffic management**. At the same time, common standards, interoperability and trusted data governance will be essential to ensure that different systems, cities and countries can work seamlessly together.

Technology must also remain focused on people. Road safety, sustainability and accessibility should be central to future ITS development. Predictive analytics, connected infrastructure and real-time safety systems can help shift transport policy from responding to crashes toward preventing them, while intelligent mobility can also support public transport, electric mobility, multimodal integration and more efficient use of infrastructure.

India's scale, innovation capacity and rapidly developing mobility ecosystem create significant opportunities for international cooperation. ITS Thailand looks forward to strengthening collaboration with ITS India and the wider global ITS community in research, standards, capacity building, pilot projects and industry partnerships.

Together, we can advance a future of mobility that is **connected, interoperable, safe, sustainable and people-centred**.

Warm regards,

Lt.Col. Dr. Tongkarn Kaewchalermtong
President, Thai Intelligent Transport Systems Association (ITS Thailand)

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Message from the Secretary General, Highways Investor Association (HIA)

It is a privilege to extend my warm greetings and best wishes to the **ITS India Congress 2026,** being held on **7th and 8th October 2026.**

The remarkable journey of Intelligent Transport Systems (ITS) in India reflects the nation's growing commitment to building a **safe, connected, sustainable and intelligent mobility ecosystem.** The initiatives being undertaken by the ITS fraternity to advance technology, innovation and integrated transportation are truly laudable and have the potential to transform mobility in India.

As India progresses towards the vision of **Viksit Bharat 2047,** the transportation sector will be a critical enabler of economic growth and national development.

The convergence of **artificial intelligence, real-time data, connected infrastructure, intelligent traffic management, digital tolling and advanced safety systems** can fundamentally reshape the way our roads and transportation networks are planned, operated and experienced.

For the highway sector, ITS represents not merely technological advancement, but an opportunity to create **safer roads, more efficient infrastructure, faster incident response and seamless mobility.** The integration of technology with infrastructure, complemented by strong institutional and industry collaboration, will be central to achieving these objectives.

I firmly believe that the future of mobility will be defined by **intelligence, integration and collaboration.** Platforms such as the ITS India Congress provide an important forum for bringing together Government, industry, technology providers, infrastructure investors and knowledge institutions to accelerate this transformation.

On behalf of the **Highways Investor Association (HIA),** I applaud the dedicated efforts of the ITS fraternity and am sanguine that ITS in India will continue to scale new heights and make a meaningful contribution to the nation's mobility and development aspirations.

My very best wishes for a successful and impactful ITS India Congress 2026.

Col. Rajeev Sood (Retd.)
Secretary General
Highways Investor Association (HIA)

ITS INDIA CONGRESS 2025

Official Pre-Summit Event of the
India–AI Impact Summit 2026
Government of India



6–7 November 2025 | IIT Hyderabad

AI in Mobility — Safer, Sustainable & Connected Roads

2 Plenary Sessions • 5 Technical Sessions • 9 National Reports •
Policy Roundtables • Innovation Showcase • Poster Presentations •
350 delegates • 40 Speakers

Key Focus Areas:

- Barrier-less Tolling
- Connected Vehicles
- Road Safety & Enforcement
- Sustainable Mobility
- AI-Enabled City Mobility

ITS INDIA CONGRESS 2026



7–8 October 2026 | Bharat Mandapam, New Delhi

Connected, Integrated & Intelligent Mobility for Viksit Bharat 2047

Key Focus Areas:

- AI & Digital Enforcement
- MLFF & GNSS Tolling
- V2X & Connected Mobility
- PM Gati Shakti
- Future-Ready ITS
- Digital Rail & Urban Transit

Key Highlights:

Inaugural Session • Technical Sessions • Global Leaders Roundtable • Valedictory & Awards

Co-located with **Transport + Traffic Infratech Expo**

Alongside ROAD INFRATECH EXPO | PARKING INFRATECH EXPO

Shaping India's Connected & Intelligent Mobility Future.

ITS COMMITTEES

ITS 2025-26







COMMITTEES

15 WORKING COMMITTEES | 8 STANDING COMMITTEES

A COORDINATED PLATFORM FOR MOBILITY TRANSFORMATION

Bringing focused expertise together to translate global best practice into India-specific standards, pilots, policy and deployable outcomes.

Safer | Greener | Smarter | Inclusive | Connected

A — 15 WORKING COMMITTEES

Technical and thematic committees focused on advancing intelligent, safe, sustainable and connected mobility.

01 Sustainable Green Mobility Advance sustainable, inclusive and low-carbon mobility through public transport, EVs, NMT, multimodal integration and sustainable freight.	**02 Active Mobility (NMT)** Make walking and cycling safer and more attractive through VRU detection, signal priority, bike-share integration and NMT data.	**03 AI in Mobility** Guide responsible AI adoption for traffic management and urban decongestion across cities and national corridors.
04 Capacity Building & R&D Build skills, research and indigenous technology capability through the Forum's Academy, academic partnerships and startup incubation.	**05 Safe Driving Score (SDS)** Develop a population-scale Safe Driving Score to measure and improve driving behaviour using explainable, privacy-first AI and DPI.	**06 Developing RUC Framework** Design a barrier-less, distance-based Road User Charging framework covering technology, policy, interoperability, accuracy and privacy.
07 V2X & Connected Mobility Develop standards, spectrum and testing frame-works for V2X and connected/autonomous mobility in India.	**08 Inclusive Women-Centric Mobility** Improve the safety, comfort and accessibility of public and shared transport for women through ITS, analytics and gender-disaggregated data.	**09 Electronic Enforcement Implemen-tation** Accelerate electronic traffic enforcement through ANPR, cameras and e-challan, with standardised evidence and system integration.
10 Cyber Security in Mobility Develop cybersecurity standards, threat assess-ment and resilience practices for connected vehi-cles, ITS infrastructure and transport data.	**11 Market Research** Generate market intelligence on ITS adoption, technology, investment and business models to guide pilots and policy.	**12 Emerging Technologies** Evaluate and pilot frontier technologies including AI, digital twins, 5G/6G, edge computing, drones and advanced sensing.
13 MLFF Implementation Drive Multi-Lane Free-Flow tolling through standards for GNSS, ANPR, FASTag, interoperability, accuracy, enforcement and privacy.	**14 ADAS Implementation** Advance ADAS adoption through India-specific deployment, testing and validation frameworks aligned with AIS standards and Bharat NCAP.	**15 ATMS Implementation** Scale Advanced Traffic Management Systems through standardised architecture, incident detection, control centres and data integration.

WORKING COMMITTEES FOCUS

From sustainable mobility and AI to V2X, electronic enforcement, MLFF, ADAS and ATMS, the Working Committees address specif-ic mobility challenges through focused technical work and implementation-oriented outputs.

B

8 STANDING COMMITTEES

Governance, knowledge, membership, policy, events and global engagement functions supporting the Forum's institutional strength.

01 Finance Committee Oversee financial planning, budgeting, expenditure, controls and resource allocation while ensuring transparency and statutory compliance.	**02 Audit Committee** Provide oversight of internal controls, risk management and audit process-es, safeguarding financial reporting and governance.
03 Research, Innovation and Publication Committee Guide the research agenda and oversee innovation, peer review and quality of reports, white papers, journals and knowledge products.	**04 Membership Committee** Drive membership growth, engagement and retention while strengthening value across individual, corporate, academic and institutional members.
05 Event and Awareness Committee Plan conferences, summits, workshops and outreach campaigns while raising awareness of ITS, road safety and sustainable mobility.	**06 Policy Advocacy Committee** Engage government, regulators and ecosystem partners on ITS and mobili-ty policy through position papers, representations and recommendations.
07 Knowledge Dissemination Committee Curate and disseminate Forum knowledge through digests, newsletters, digital platforms and capacity-building content.	**08 Global Collaboration Committee** Build international partnerships, delegations and MoUs and facilitate ex-change of global ITS best practices, standards and technology.

COMMON DELIVERY FRAMEWORK

01	02	03	04	05
ASSESS Review the Indian scenario and benchmark global best practice	**DESIGN** Develop India-specific standards, frameworks and reference architectures.	**PILOT** Identify 3–5 pilots with viable financing or PPP models.	**CONSULT** Convene government, industry, academia and ecosystem stakeholders.	**DELIVER** Produce reports/white papers, consultations or summits and practical implementation frameworks.

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POLICIES

ITS 2025-26







MAJOR POLICY DEVELOPMENTS 2025–2026

Intelligent, Connected & Sustainable Mobility

	POLICY / NOTIFICATION	DATE
1	**Advanced Traffic Management System (ATMS)** Scales up AI-based traffic monitoring, incident detection (VIDES) and automated enforcement on busy national highways and ex-pressways, anchoring India's wider Intelligent Transportation Systems architecture. (MoRTH / NHAI)	26 March 2025
2	**Essential Requirements for CCTV Security — STQC Testing** Makes STQC cybersecurity testing and BIS registration mandatory for every CCTV camera sold in India — cameras being core sensing infrastructure for traffic surveillance, ANPR and automated enforcement. (MeitY)	9 April 2025
3	**Rah-Veer Scheme** Rewards ordinary citizens who help road-accident victims with ₹25,000 and a certificate, encouraging rapid aid during the 'Golden Hour' to reduce fatalities. (MoRTH)	21 April 2025
4	**Cashless Treatment Scheme / PM-RAHAT** Provides cashless treatment up to ₹1.5 lakh per road-accident victim for seven days at designated hospitals; notified in May 2025 and launched nationwide as PM-RAHAT on 13 February 2026. (MoRTH)	5 May 2025, 13 Feb 2026
5	**SPMEPCI — EV Passenger-Car Manufacturing** Offers customs-duty concessions tied to domestic value-addition targets to attract global electric pas-senger-car makers to manufacture in India under Make-in-India. (MHI)	2 June 2025
6	**FASTag Annual Pass** Introduces an annual FASTag pass for private cars — valid one year or 200 national-highway crossings — operational from 15 August 2025 for simpler, predictable tolling. (MoRTH / NHAI)	17 June 2025
7	**Adapted Vehicles (AIS-169/178/183)** Lays down technical standards for vehicles modified for persons with disabilities, enabling safe, certi-fied and accessible mobility. (MoRTH)	23 June 2025
8	**HSRP for Hydrogen-Fuelled Vehicles** Extends High Security Registration Plate provisions to hydrogen-fuelled vehicles, bringing an emerging clean-fuel category into the national registration framework. (MoRTH)	25 June 2025
9	**Flex-Fuel Framework — Above E85** Widens the flex-fuel regulatory framework to cover blends above E85, supporting vehicles that run on high-ethanol fuels and India's biofuel push. (MoRTH)	27 June 2025
10	**Motor Vehicle Aggregator Guidelines, 2025** Updates the national framework for app-based ride aggregators, covering licensing, fares and dynamic pricing, driver and passenger safety, insurance and grievance redress. (MoRTH)	1 July 2025
11	**National Highways Fee Rules — Toll for Structures** Revises how user fees are calculated for highway sections with major structures such as bridges, tunnels, flyovers and elevated roads. (MoRTH)	1 July 2025
12	**PM E-DRIVE — Electric Truck Incentive** Launches the first PM E-DRIVE demand incentive for N2/N3 electric trucks, requiring a scrapping certificate for an old diesel truck to link electrification with fleet renewal. (MHI)	10 July 2025
13	**Draft Framework — Recovery of Unpaid ETC Fees** Draft mechanism to recover unpaid electronic-toll charges from detected vehicles — essential groundwork for barrier-free, stop-free MLFF tolling. (MoRTH)	11 July 2025

	POLICY / NOTIFICATION	DATE
14	**PM E-DRIVE — EV Public Charging Infrastructure** Dedicates ₹2,000 crore to EV public charging and issues operational deployment guidelines (26 Sep-tember 2025) covering eligible locations, feasibility and nodal agencies. (MHI)	18 July, 26 Sep 2025
15	**Extension of PM E-DRIVE to March 2028** Extends the PM E-DRIVE scheme to 31 March 2028 with a ₹10,900-crore outlay, giving longer runway to buses, trucks, charging and testing infrastructure. (MHI)	8 August 2025
16	**Data Sharing from National Transport Repository** Sets a consent-driven policy for sharing Vahan, Sarathi, e-Challan, eDAR and FASTag data with govern-ments, researchers and industry, aligned with the DPDP Act. (MoRTH)	18 August 2025
17	**PM E-DRIVE — e-3W / L5 Implementation Revision** Adjusts the implementation of demand incentives, targets and allocations for the electric three-wheeler (L5) segment under PM E-DRIVE. (MHI)	August 2025
18	**PM E-DRIVE — PMP for e-Buses & e-Trucks** Advances the Phased Manufacturing Programme to progressively localise production of electric buses, trucks and their critical components. (MHI)	30 September 2025
19	**NH Fee (Third Amendment) — Differential Fee Without FASTag** Charges non-FASTag vehicles twice the toll if paying by cash and 1.25× if paying by UPI, with a zero-transaction receipt where the system fails; effective 15 November 2025. (MoRTH)	3 October 2025
20	**ADAS Regulatory Framework (Rule 125Q)** Inserts Rule 125Q mandating ADAS — driver-drowsiness, blind-spot, moving-off and lane-departure warnings — on M2/M3/N2/N3 buses and trucks from 2027–28. (MoRTH)	3 / 11 Nov 2025
21	**Digital Personal Data Protection Rules, 2025** Operationalises the Digital Personal Data Protection Act, 2023 — India's first data-protection law — establishing consent, breach-notification and the Data Protection Board. (MeitY)	13 November 2025
22	**Draft Bharat NCAP 2.0 (AIS-197 Rev. 1)** Draft crash-safety upgrade to a five-pillar, 100-point rating with five crash tests and mandatory ESC, taking effect from October 2027. (MoRTH)	21 November 2025
23	**PM E-DRIVE — e-3W L5 Target Achievement & Closure** Closes the electric three-wheeler (L5) incentive window after the segment met its notified sales target. (MHI)	26 December 2025
24	**National Highways Fee Rules — Fourth Amendment** Provides a transitional method for calculating tolls while two-lane highways are being widened to four or more lanes. (MoRTH)	31 December 2025
25	**CMV (1st Amendment) — AVAS for EVs** Mandates an Acoustic Vehicle Alerting System on electric M and N category vehicles — new models from October 2026 — so near-silent EVs remain audible to pedestrians. (MoRTH)	6 January 2026
26	**CMV (2nd Amendment) — Digital Toll Enforcement** Defines an 'unpaid user fee' and links outstanding toll dues to restrictions on vehicle services, building the enforcement base for MLFF tolling. (MoRTH)	20 January 2026
27	**CMV (3rd Amendment) — Licence Disqualification & e-Challan** Allows licence disqualification after five or more offences in a year and formalises a digital, electronic e-challan procedure with fixed payment timelines. (MoRTH)	21 January 2026
28	**PM E-DRIVE Amendment — Revised e-2W/e-3W Incentives** Revises electric two- and three-wheeler incentive amounts, caps and timelines, setting 31 July 2026 as the terminal date for registered electric two-wheelers. (MHI)	27 March 2026

	POLICY / NOTIFICATION	DATE
29	**Road Warning Information on MSP Platform** Publishes geo-tagged national-highway hazard alerts in real time to Google Maps and Mappls via API Setu, giving commuters live safety updates. (NHAI)	10 May 2026
30	**Urban Decongestion Policy** Shifts ring-road and bypass funding to centre-state cost sharing and requires access control, green buffer zones and a 50-year design horizon. (MoRTH)	29 May 2026
31	**C-V2X Licensing Exemption — 5.9 GHz Band** Exempts C-V2X on-board units in the 5.9 GHz band from individual licensing, enabling connected vehi-cle-to-everything communication. (DoT)	10 June 2026
32	**77–81 GHz Automotive Radar — Licensing Exemption** Permits licence-free use of 77–81 GHz short-range automotive radar, underpinning ADAS sensing, colli-sion avoidance and connected mobility. (DoT)	11 June 2026
33	**Draft Spectrum Allocation Rules, 2026** Draft rules for administrative spectrum assignment, explicitly covering spectrum for the safety and operation of roads and other transport systems. (DoT)	17 June 2026
34	**PM E-DRIVE — Electric Ambulance Incentives** Extends PM E-DRIVE demand incentives to electric ambulances (Types B/C/D) with ₹500-crore support and domestic-manufacturing conditions. (MHI)	17 June 2026
35	**PARIVARTAN Fleet Scrappage Scheme** A ₹9,585-crore Delhi-NCR scheme to scrap and replace over 2 lakh ageing trucks and buses, with loan subvention, tax waivers and OEM discounts. (MoHUA / MoRTH)	14 July 2026
36	**Digital & Barrier-Free Tolling Status** Parliamentary status update: about 98% of toll is collected via FASTag, with MLFF tolling (ANPR + FASTag) awarded at 17 plazas and five already live. (MoRTH / PIB)	22 July 2026
37	**Integrated Public Transport & Smart Mobility** MoHUA clarifies there is no standalone smart-transport mission, while NCMC 'One Nation, One Card', PM-eBus Sewa and digital ticketing continue to expand. (MoHUA)	30 July 2026
38	**Draft V2V Communication Framework (AIS-230)** Draft framework for phased vehicle-to-vehicle (C-V2X) safety communication under AIS-230, with for-ward-collision and emergency-brake alerts from 2027–28. (MoRTH)	3 August 2026
39	**PM E-DRIVE — e-2W Extended to 2028, 11,900 cr** Extends electric two-wheeler incentives to March 2028 and raises the scheme's total outlay to ₹11,900 crore. (MHI)	10 August 2026
40	**PACT — Aggregating Clean Transport** NITI Aayog's platform aggregates freight demand from shippers and logistics firms to accelerate de-ployment of zero-emission trucks across corridors. (NITI Aayog)	7 September 2026
41	**NHAI High-Speed Corridor Design Guidelines** Issues the first unified design standards for access-controlled high-speed corridors, supporting the national goal of 50,000 km by 2036–37. (NHAI)	20 September 2026
42	**Union Cabinet Approves ITMS for Delhi** Union Cabinet approves a ₹1,789.52-crore AI-based adaptive-signal and automated-enforcement system across 42 Delhi corri-dors, implemented by Delhi Police. (CCEA / MHA)	30 September 2026

ARTICLES

ITS 2025-26







Topic : The shift from FASTag-based plazas to Multi-Lane Free Flow (MLFF) is essentially a transition from a "transaction-based" system to a "data-stream" system.



Mr. Sankar Narayanan

Here is a breakdown of why standardization and software functionality are the real "brains" of this operation:

1. The Need for Hardware Standardization

While hardware should ideally have "near zero downtime," the real challenge is interoperability. If every gantry uses different sensor brands or data protocols, the national grid becomes a maintenance nightmare.

High-Speed RFID Readers: To pick up FASTag's at speeds up to 100–120 km/h.

4D Radar & LiDAR: Critical for vehicle classification (e.g., distinguishing a SUV from a light commercial vehicle) and positioning.

ANPR (Automatic Number Plate Recognition): High-resolution cameras act as the "backup" for vehicles without tags or with damaged tags.

Redundancy: To achieve that "zero downtime," systems are being designed with overlap. If a camera lens is obscured by dust, the 4D radar still "sees" the vehicle and logs the passage.

2. Software: The Central Nervous System

The software isn't just recording a bill / e-notice; it is managing a high-speed logic puzzle.

Deduplication & Correlation: If a vehicle passes through at 100 km/h, the system receives an RFID ping, a radar shape, and a front/rear license plate image. The software must correlate these three distinct data points into a single transaction in milliseconds.

Exception Handling: This is where the functionality counts. The software must handle "edge cases"—vehicles tailgating, changing lanes under the gantry, or plates covered in mud—without human intervention.

Edge Computing: Processing is moving from central servers to the Gantry Edge. By processing the image and tag data on-site, the system reduces the bandwidth needed and prevents "lag-induced" revenue leakage.

3. Analytics as the "Revenue Assurance" Layer

Analytics turns raw traffic into actionable intelligence and prevents the system from being cheated.

Fraud Detection: AI models analyze patterns to spot "cloned" tags or mismatched vehicle classes (e.g., a truck using a car's FASTag).

Predictive Maintenance: Analytics monitor the health of every sensor. If a camera's recognition accuracy drops by even 2%, the system alerts a technician before the unit fails completely.

Traffic Flow Optimization: Real-time data allows authorities to implement Dynamic Pricing, where toll rates can fluctuate based on congestion to balance the load across different routes.

4. Enforcement

While the technology is advanced, the enforcement mechanism for non-compliance remains the "Achilles' heel" of the Indian MLFF rollout.

The Challenge in India: The current linkage between vehicle registration (VAHAN) and owner addresses is not always updated or reliable for civil recovery of small toll amounts. Relying solely on "double charging" at the next physical checkpoint is only a temporary fix. But a welcome step to start with. We also have customers tampering their number plates or hiding few digits of the vehicle registration number which is an offence as per law itself.

The Needed Fix: India has put in a unified legislative framework that treats toll evasion as a serious traffic violation. While we do have some checks put in but Ministry of Road transport and Highways and its implementing body Indian Highways Management Company limited. Without a "fear of the huge fines," when customer induced evasion is found. The system risks high revenue leakage if these are not plugged immediately by the authorities.

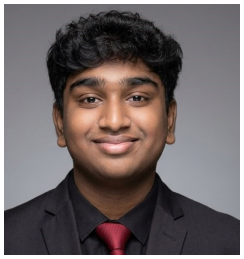
CCTVLenz — The AI Surveillance Platform

An analysis of why large camera estates fail to raise alarms in time, and of the architecture required to close the gap between recording and noticing.

Nithya Kamatchi
Principal Software Architect, ITS Product Development, Datacorp Traffic

Kavin Nadar
Student Intern





1. The problem of surveillance at scale

Video surveillance in India has expanded faster than the capacity to interpret it. The national market grows at close to ten per cent a year, yet a control room staffed for a dozen screens is routinely asked to hold a few hundred. The failure is rarely an absence of coverage: the cameras are usually present, working and recording. It occurs earlier, in the interval between a condition becoming visible on a screen and a decision-maker being told about it. Post-incident inquiries return to the same observation with some regularity: the evidence was captured, and the warning was not issued.

2. The escalation gap

A surveillance system's response has four stages: a condition arises, is captured, is noticed, and is notified to someone who can act. Estates are procured on the first two, which usually work; failure concentrates in the third and fourth, which are not properties of the equipment at all.

In a controlled study of experienced CCTV operators monitoring live feeds over ninety minutes, operators detected a mean of 55 per cent of target behaviours; only 12 per cent exceeded 75 per cent accuracy, and false-alarm rates remained consistently high (Donald, Donald & Thatcher, Applied Ergonomics, 2015). Three properties of the monitoring task compound this.

Attention is divisible but not multipliable. Adding cameras does not add observers; it fractions the observers already there. Coverage scales with capital expenditure, and interpretation does not.

The judgement is comparative, not absolute. An operator must decide whether an area is busier than it should be, which requires a reference value that is rarely available at the point and moment of judgement.

Escalation carries an asymmetric cost. An unnecessary alarm is expensive and visible; a missed one is invisible until it is not. This is a design property, not a staffing problem.

3. Requirements for a credible intervention

Five requirements follow, stated before any system is named, as the test any candidate should pass.

R1: Continuous evaluation independent of operator attention. Detection must not depend on who happens to be looking at which screen.

R2: An explicit, pre-declared reference value. A rated capacity, design occupancy or permit condition should be held in the system rather than in a document.

R3: Automatic, not discretionary, escalation. The asymmetric cost of raising an alarm must be removed from the individual.

R4: Discrimination sufficient to preserve trust. An alert that fires indiscriminately is disabled in practice within months.

R5: Operation independent of central connectivity. A function that fails when a wide-area link fails is an analytics tool, not a safety control.

A sixth, practical requirement: it must work with the installed camera base, since the worst-affected sites have already spent their capital on cameras.

4. The CCTVLenz approach

CCTVLenz, developed in-house by Datacorp Traffic, is an AI layer placed over an existing CCTV estate. It consumes standard ONVIF/RTSP streams from cameras and network video recorders already in service, runs computer-vision

models against them continuously, and raises a structured event with a timestamped evidence image whenever a pre-configured condition occurs. Nothing is replaced in order to begin.

Inference at the edge (R1, R5). Models execute on a Local Processing Unit in the site's own communication room, so every assigned stream is evaluated on every cycle. If the central link fails, detection continues, events buffer on site and reconcile when connectivity returns.

Declared thresholds and bounded rules (R2, R4). Every model instance is bound to an operator-drawn region of interest or line, with its own threshold and dwell time. Undifferentiated motion detection, which fires on wind, headlights and birds, is precisely why many control rooms have learned to disregard their own alarms.

Automatic escalation and an indexed record (R3). Routing is set by configuration rather than by judgement under pressure (app, SMS, messaging, e-mail or API push), scoped by site, zone and time of day. Every detection is logged and exportable; the installed recorder remains the system of record.

5. Detection capability

Twelve production models ship with the platform; a single camera may carry several, each with its own region and threshold.

Group	Models	Application
Security	Intrusion detection · Unattended object · Weapon detection	Restricted zones, perimeters and public areas; after-hours presence
Safety	Fire detection · PPE compliance	Workshops, stores and cable galleries; PPE compliance evidenced continuously
People and crowd	Crowd density · People counter · Person absence	Occupancy against rated capacity; directional footfall; manned-post assurance
Traffic and enforcement	ANPR with violation capture · ATCC · Wrong entry · Parking occupancy	Plate, colour and vehicle type; classified counts; wrong-direction movement; live bay availability

6. Scope and limits

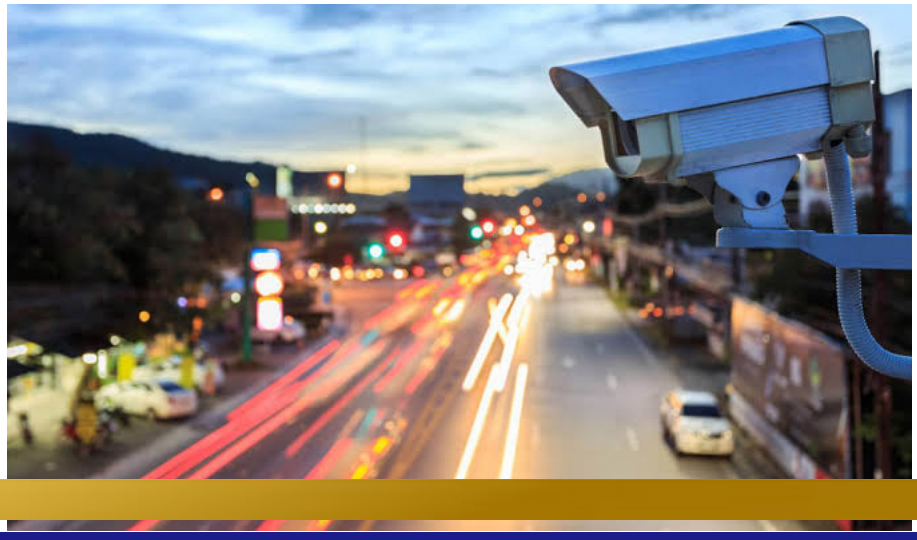
The architecture addresses one class of problem: a measurable state precedes a costly event, falls within camera coverage, and currently depends on a person noticing. Transport hubs, venues, plants and parking routinely meet all three. Automated detection does not substitute for planning, permitting, staffing, physical design or emergency response; its contribution is bounded to the escalation gap. Accuracy is site-specific and should be witnessed per zone at commissioning.

7. Regulatory and governance considerations

Two regimes now govern deployment: the BIS Essential Requirements for CCTV cameras (fully effective from 1 April 2026) and the DPDP Rules, 2025. An overlay adds no certification exposure beyond cameras actually purchased, and edge inference, configurable retention and audit logging support data minimisation.

8. Conclusion

The dominant constraint on video surveillance is no longer the cost of cameras but the attention available to interpret them. A camera that nobody is watching is a recording device; a camera evaluated continuously against a declared threshold is an instrument. For estates already invested in coverage, closing that gap is the least expensive improvement available.



ETHICAL CONSIDERATIONS IN THE DESIGN OF AUTONOMOUS VEHICLE

Prof. Pradip. K Sarkar

Former Professor, & Technical Committee members of ITS Committees at ISO and BIS



1.0 introduction

Designing an ethical safe autonomous vehicle is as complex as behavior of human mind as the perceptions of exhibiting ethical safety behavior does appear to be varying across the different sections of people. The common approaches so far used to study the ethical behavior on safety are namely i) Consequentialism, ii) deontological iii) Visual Ethics that offer their own merits and demerits .

The preparation of a safety matrix plays an important role as a part decision-making algorithm. A system should be based on value-of-life estimates to start with. It is important to state that the stakeholders are also required to identify the constraints and common interests and come to consensus decisions to select the most appropriately suiting to the values arising out from the three components of technically possible, ethically justifiable and legally desirable[1] to societies' requirement out various conflicts situations as shown in Fig 1.

2.0 Design Consideration for Ethical Safety

The automated vehicle can interpret the sensor data and make a decision, but the decision itself is a result of logic developed and coded over months or years ago. The study by Noel [2] examines the automated vehicle crashing and conclusive findings are related to : (i) automated vehicles will almost certainly crash, (ii) an automated vehicle's decisions preceding certain crashes will have a moral component, and (iii) there is no obvious way to effectively encode complex human morals in software. Finally the authors made a three-phase approach to developing ethical crashing algorithms, which consist of a rational approach, an artificial intelligence approach, and a natural language requirement. In the following, the discussion on ethical deliberations surrounding the autonomous vehicle, including involved stakeholders, technologies, social environments, and costs vs. quality can be put forward along with emphasis security and privacy, trust and transparency [3,4] .

2.1 Safety

Safety comes as a primary requirement of autonomous cars. The moot question is then: what are methods by which should a self-driving car [4] be tested? How the guideline should be to formulate to make sure that AV is safe for its use. For example, the ISO 26262 is one of the documents specifying the safety standard for road vehicles. Presently an attempt is being made to develop self-driving cars standards, based on experiences and R& D. It is noteworthy to mention that Google autonomous car tests have already travelled more than one million kilometers without any accident.

2.2 Security

Overall Security can be said to be very important, with more emphasis on the requirement of software security for AV. "Key principles of vehicle cyber security for connected and automated vehicles" [5] rest on the following eight basic principles:

(1) Organizational security is owned, governed, and promoted at board level;
(2) Security risks are assessed and managed appropriately and proportionately, including those specific to the supply chain;
(3) Organizations need product aftercare and incident response to ensure systems are secure over their lifetime;
(4) All organizations, including sub-contractors, suppliers, and potential 3rd parties, work together to enhance the security of the system;
(5) Systems are designed using a defense-in-depth approach;
(6) The security of the software is managed throughout its life- time;
(7) The storage and transmission of data is secure and can be controlled;
(8) The system is designed to be resilient to attacks and respond appropriately when its defenses or sensors fail.

2.3 Privacy

Privacy is also one of the very important factors [4,5] which cannot be ignored while designing the AV. Even a single sensor associated with recording visual objects or sound could invade privacy of the concerned person during driving the AV, if the data is distributed without the consent of the involved persons. The general question is what would be nature and magnitude of data the car supposed to collect for the decision-making? Who will access those data? When will these data to be destroyed?

2.4 Trust

Trust is an integral part of behavior [4] which is also somewhat related to ethical system, which cannot be overlooked even in the design, and development of autonomous vehicle. as a part of the system trustworthy?

2.5 Transparency

In additions of the above, the transparency of the vehicle's performance is of immense significance. It is felt necessary that Transparency is an important component for ethical engagement in the development of autonomous cars that should address all aspects such as nothing hidden, no cover-ups, no withholding of information [6].

2.6 Responsibility and Accountability

It is of utmost importance to define the responsibility of the autonomous cars. There are frequent questions arising out most when the AV meets with an accident. After the accident or incident, the question is: how is the responsibility to be defined. The present EU regulations on algorithmic decision-making and a "right to explanation" elaborates that it is the right for user to ask for an explanation of an algorithmic (machine) decision that was made about them.

2.7 Quality Assurance Process

Finally it is believed that any product released from the factory can be placed in the market through the process of testing and quality assurance. It is extremely imperative that all concerned activities must be contemplated and placed in proper scientific framework in order to ensure to the adherence to the high quality of the product. Stakeholders - General Public Interests

3.0 Conclusions

Presently a lot of efforts are directed towards to attain the AV technology to a five level system under controlled conditions with the focus on the practical technological solutions and their social and ethical consequences. It is needless to say that human factor is the major safety concern. This calls for the basic requirements like security, safety, privacy, trust etc. and social challenges in general including legislation and stakeholders interests. Therefore these real-world techno-social problems must be taken seriously.

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From Motion to Intelligence

Sumit Agarwal

Global Manager - Presales at Norden Communication



How Global Shutter Imaging Can Transform Traffic Management in India

High-speed mobility demands high-quality visual data. Global Shutter imaging can provide a stronger foundation for ANPR, automated enforcement, vehicle traceability and AI-driven traffic management - helping authorities move from simply monitoring roads to understanding mobility.

India's road infrastructure is undergoing a remarkable transformation. Expressways, access-controlled highways, tunnels and intelligent corridors are increasingly being equipped with Advanced Traffic Management Systems (ATMS), video analytics and integrated command-and-control platforms. As mobility becomes faster and more connected, the effectiveness of these systems ultimately depends on one fundamental factor: **the quality and accuracy of the data captured at the roadside.**

A traffic-management platform may have sophisticated AI and analytics, but if a camera cannot capture a clear image of a vehicle travelling at high speed, the intelligence generated from that image will always have limitations. This is where Global Shutter imaging technology can play an important role in the next generation of Intelligent Transportation Systems.

Why high-speed imaging needs a different approach

Most conventional surveillance cameras use Rolling Shutter technology, where different rows of an image sensor are exposed sequentially. This works effectively for many surveillance applications, but fast-moving objects can present challenges. A vehicle may change position while different portions of the frame are being captured, potentially creating motion-related distortion or reducing image usability.

A Global Shutter sensor captures the complete frame simultaneously, effectively freezing the scene at a particular instant. For traffic applications, that can mean cleaner visual evidence from fast-moving vehicles and better input data for ANPR and AI analytics.

ROLLING SHUTTER	GLOBAL SHUTTER
Sequential row exposure Fast motion can create distortion Suitable for general surveillance	Whole-frame exposure Designed to freeze fast motion Strong fit for high-speed ITS capture

From capturing vehicles to understanding traffic



Rolling Shutter vs Global Shutter Moving-Vehicle Illustration

The value of Global Shutter technology extends beyond Automatic Number Plate Recognition (ANPR). When combined with appropriate optics, illumination and intelligent video analytics, high-quality imaging can support number-plate recognition, vehicle classification, seat-belt violation detection, vehicle tracking and other traffic-enforcement use cases.

CLEAR IMAGE	ACCURATE DETECTION	RELIABLE ANALYTICS	ACTIONABLE INFORMATION	SAFER ROADS

For authorities managing thousands of vehicles across highways and urban corridors, improvements at the image-acquisition stage can therefore have a multiplier effect across the complete ITS ecosystem.

Accuracy that can strengthen enforcement

Automated enforcement systems must produce evidence that is reliable and operationally useful. If the captured image is unclear, authorities may need manual verification, reducing the efficiency of automation. High-quality Global Shutter imaging can improve the consistency of number-plate capture for moving vehicles and consequently support better vehicle traceability across multiple camera locations.

When ANPR cameras across an expressway are integrated with an ATMS or ITMS platform, authorities can correlate vehicle observations from different locations. This can assist in investigating incidents, identifying vehicles of interest, analysing traffic movement and strengthening enforcement operations. The objective shifts from simply “seeing traffic” to creating structured and actionable traffic intelligence.

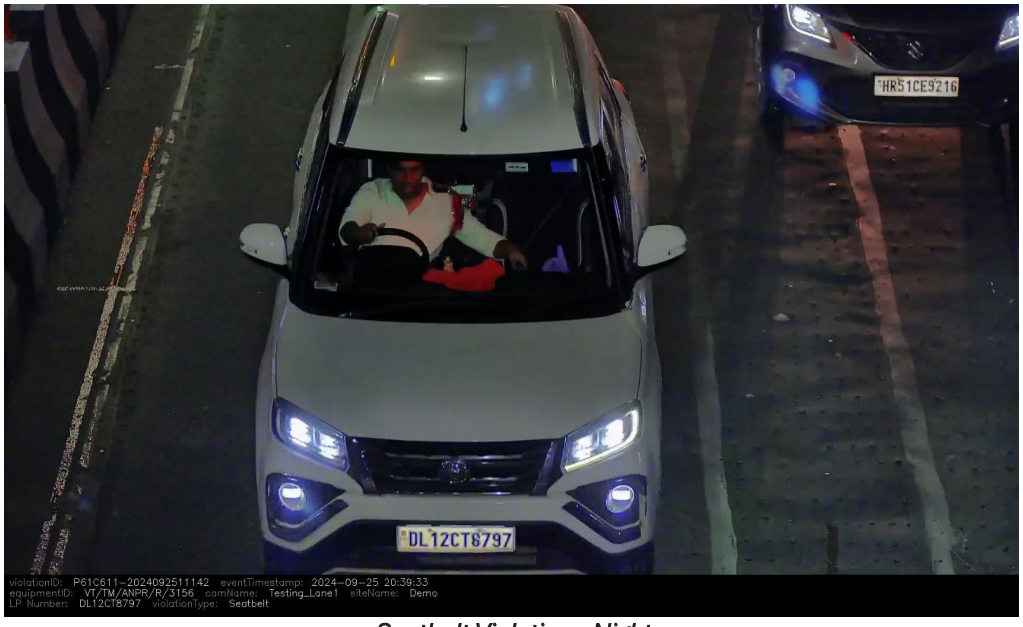
Day and night performance is equally important

India's highways operate around the clock, and an intelligent traffic system cannot afford to become less effective after sunset. Night-time traffic imaging introduces low illumination, headlight glare, reflective number plates and significant contrast variation. Global Shutter technology therefore needs to be considered as part of a complete imaging architecture incorporating the right sensor, lens, exposure strategy, illumination and camera positioning.

In Norden's ATMS experience on the Dwarka Expressway, Global Shutter ANPR cameras were deployed with external white LED illumination to support clear, full-colour imaging for high-speed number-plate capture and seat-belt detection. The camera layer was integrated with centralized VMS, ITMS and ATMS Command & Control systems for real-time traffic monitoring and enforcement.

THE KEY PRINCIPLE

The intelligence of a traffic-management system can only be as reliable as the data it captures.



Seatbelt Violation - Night

A foundation for AI-driven traffic management

Artificial Intelligence is rapidly becoming central to ITS, but AI is only as reliable as the information provided to it. Better image acquisition improves the quality of inputs available to AI-based traffic analytics. Integrated with ANPR, VMS, ITMS and ATMS platforms, high-quality imaging can support vehicle identification and classification, traffic-flow analysis, incident verification, violation management and vehicle traceability while allowing control-room operators to respond to events in near real time.

What this means for governments and road authorities

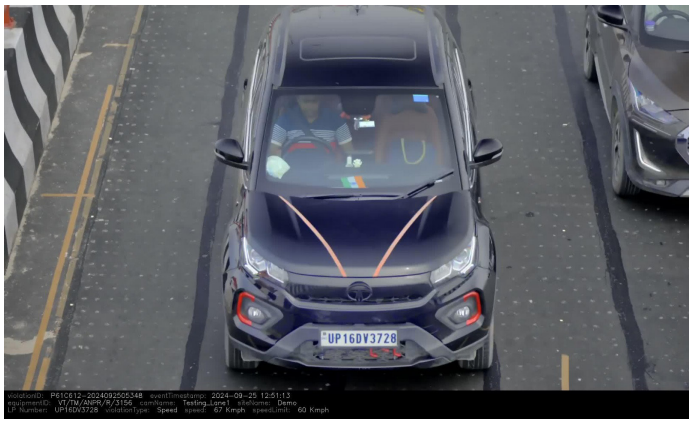
ENFORCEMENT	TRACEABILITY	RESPONSE	PLANNING
More dependable visual evidence and reduced manual verification	Better correlation of vehicle observations across locations	Faster incident verification and operational decision-making	Higher-quality traffic intelligence for data-driven infrastructure decisions

Designing India's highways for 2047

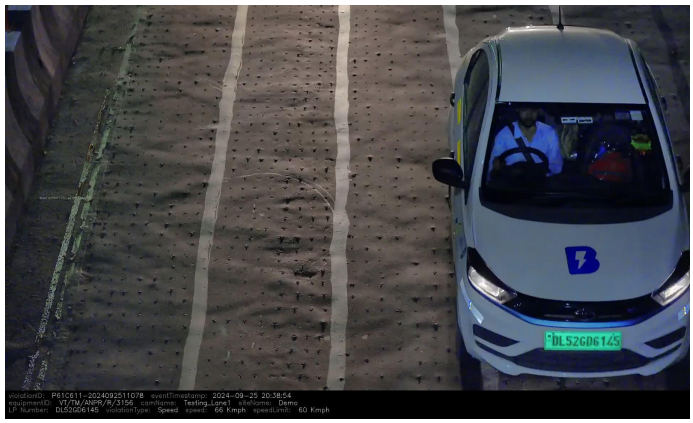
As India moves towards Viksit Bharat 2047, transportation infrastructure must increasingly become digital, connected and intelligent. The highways of the future will not simply carry vehicles; they will continuously generate information that helps authorities make roads safer and mobility more efficient.

The future of ITS will not be defined by any single camera, sensor or software platform. It will emerge from the integration of high-quality sensing, AI analytics, communications infrastructure and centralized traffic-management platforms working together. By adopting imaging technologies designed for high-speed transportation environments, India can build ITS infrastructure that does more than monitor roads - it can understand mobility, strengthen enforcement, enable faster response and ultimately help save lives.

Industry perspective based on Norden's experience in Advanced Traffic Management System deployments, including the Dwarka Expressway (NH-248BB) and Dwarka Tunnel.



Speed Violation - Day



Speed Violation - Night

PRAMA's Intelligent Transportation Solutions (ITS) for a Safe & Secure Viksit Bharat 2047

Prama India

The Indian transportation ecosystem is evolving with changing times and future trends that needs to be decoded with help of customized solutions. The innovative transportation solutions can be customized as per the local requirements for connected and integrated mobility to realise the vision of Viksit Bharat 2027.



The latest technologies, products and solutions are much in demand with evolving trends. The transportation security management can be perpetual challenge. The fast growing transportation vertical has emerged with specific requirements for Smart Traffic and Mobility Solutions. The latest transportation solutions for highways, metros, airports and ports, includes solutions for License Plate Number Recognition, Public Safety, Law Enforcement and 'on board vehicle monitoring system'.

Smart Transportation Trend and Intelligent Transportation System

The Intelligent Transportation System (ITS) is the backbone of the Smart Transportation Trend. Augmenting itself in the smart segment as Intelligent Transportation System (ITS), transportation function ranges across public transport services, freight and commercial applications, road safety system, security/crime prevention, Cash Van and School buses.



Prama India offers the best-in-class solutions to make the transportation, smart and secure at every touch point. For smart transportation requirements, we offer innovative solutions in the following segments to enable smart traffic management and safe transit.

PRAMA's Advanced Traffic Systems and solutions include, illegal parking detection system and a mobile police security system integrated into a comprehensive control platform. The ATMS subsystems offers solutions related to Parking Violation, Mobile Enforcement, etc.The Artificial Intelligence (AI) enabled ATMS solutions can help in addressing and eliminating security threats.

Smart Traffic Solutions

PRAMA offers Smart and Advanced Traffic Solutions, which has the capabilities of resolving the key traffic issues. This solution can help in managing the traffic congestion situations in various scenarios. It offers varied transportation and traffic solutions, which are empowered by the Artificial Intelligence (AI). This includes, identification of vehicle and driver behaviour analysis. The PRAMA's Transportation Product Portfolio has Advanced Traffic Management Cameras and myriad solutions including ANPR Cameras.

Resolving Challenges

The challenges to security in smart transportation can be classified into cyber security and physical security threats. The physical security threats relate to traffic rule violations, non -compliance of road safety norms (Seat belt, Helmet, Red Light violation, etc.), attacks on traffic police, traffic congestion, road-rage, over speeding, hit and run cases, and toll fare evasion. These challenges are the core traffic safety and transportation security issues. The cyber security threats, include, conventional cyber-attacks on Smart Transportation networks.

AI Innovations

The transformative Artificial Intelligence Technology's impact is visible on the Smart Transportation sector in India and across the globe. The passengers prefer the mode of mobility based on three key factors- affordability, experience, and convenience.

Smart City and Safe City projects

The Smart City and Safe City projects are giving a major boost to the Smart and intelligent transportation infrastructure. The Urban Transportation (Metro Rail, Railway & BRTS) roadmap and Smart transportation projects need serious planning as per the evolving situation.

Advantages of PRAMA's Transportation Solutions

Transport is where security, safety, and uptime face the everyday challenges. Prama's transport solution portfolio covers the full journey — from bus depots to metro rails, highways to ports.

Bus Transportation Solution: The key challenges faced by the government and private bus transport operators is Fare leakage, driver fatigue, women safety and vandalism. These issues can be resolved quickly with help of PRAMA's bus transportation solution. It offers 4G MDVR, AI driver monitoring, panic buttons and central depot monitoring to resolves the challenges.

Metro & Rail Segment Solution: In Metro & Rail segment the key transportation security challenges include platform crowding, track intrusion, coach surveillance and blind spots. The PRAMA solution offers metro-grade IP cameras.

Highway and Toll Plaza Solution: Highways & Toll Plaza solution offers ANPR accurately to detect toll evasion, accident incident & evidence collection, and overweight vehicles. The solution deck involves Smart ANPR cameras with AI analytics. It helps in incident detection and evidence collection.

Logistics Fleet Solution: Logistics Fleets face challenges of Cargo theft, route deviation, driver behaviour & insurance fraud. The PRAMA solution includes GPS live tracking with MDVR solution.

Airports & Ports Solution: Airports & Ports face the challenges of perimeter breach, PPE detection, baggage theft detection and customs compliance issues. The PRAMA's solution includes 4K IP camera and PTZ smart cameras with AI analytics for monitoring and real time notifications to command centre. The highly dynamic and sensitive Transportation sector needs 'security on the move' all the time. The PRAMA offers rugged, 3G/4G, GPS, vibration-proof, and centralized monitoring solution. This is the PRAMA's advantage delivered by the various transportation solution.

PRAMA India is driving indigenous video security and traffic innovation to build the backbone of a safe, secure, and digitally advanced transport network for Viksit Bharat 2047. As India's premier homegrown surveillance brand, PRAMA's Intelligent Transportation Solutions (ITS) target the specific infrastructural challenges of Indian roads, public transit, and major logistical hubs.

About Prama India

Founded on the core belief to put India on the global map for video security products, PRAMA is India's largest and one of the first companies truly representing the motto of 'Atmanirbhar Bharat'. The indigenous brand, PRAMA celebrates the maxim of 'Made for India, Made by India and Made in India' and manufactures high quality video security products catering to all the security needs.

Encouraged by the Indian government's 'Make-in-India' initiative, Prama India has established India's first world-class manufacturing facility to help transform India into a global manufacturing and export hub for video security products. The company has a commitment to empower India through indigenous manufacturing of video security products. Its R&D Centre has been developed keeping in mind the ever-changing technology and advancements to innovate and update the hardware and software solutions.

Removing the Barrier: Why Multi-Lane Free Flow Tolling Can Advance India's Green Mobility Transition

Sainath Gurav

Founder, Sthaar Consulting

Chairperson, Sustainable & Green Mobility Committee, ITS India Forum



India's green mobility transition is often discussed through the lens of electric vehicles, alternative fuels, public transport, modal shift and cleaner energy. These are undoubtedly critical pillars of decarbonisation.

However, sustainable mobility must also address another fundamental question:

How efficiently are the millions of vehicles already using India's transport infrastructure moving?

For a country where road transport remains central to freight movement, reducing unnecessary operational inefficiencies can deliver sustainability benefits immediately—without waiting for the entire vehicle fleet to electrify or for freight to migrate to other modes.

This is where India's move towards **FASTag–ANPR based Multi-Lane Free Flow (MLFF)** tolling deserves attention not merely as a toll-collection technology upgrade, but as a potential **Green Highway and Sustainable Freight intervention.**

The Toll Plaza as an Artificial Interruption

India has invested significantly in creating high-speed National Highways and expressways. Yet conventional tolling introduces a designed interruption into this otherwise continuous journey.

Even with FASTag, a vehicle approaching many toll plazas must decelerate, align into a designated lane, slow down or stop depending on traffic conditions, complete the transaction and accelerate again.

For passenger vehicles, this primarily represents inconvenience and lost time.

For commercial transport, the consequences are wider.

A heavily loaded truck travelling at highway speed must dissipate its kinetic energy while braking and consume additional fuel to regain cruising speed. When queues develop, vehicles idle or crawl, creating additional fuel consumption and concentrated emissions around the toll plaza.

The cost is therefore not limited to the transaction itself. It includes: **braking, queueing, idling, re-acceleration, lost vehicle-hours and reduced journey reliability.**

For a commercial vehicle, time is a productive asset. When a truck waits, the driver, vehicle, cargo and working capital embedded in that cargo are all waiting with it.

From Manual Tolling to FASTag—and Beyond

India has already demonstrated how intelligent transport systems can improve tolling efficiency.

The transition from manual cash collection to FASTag significantly reduced transaction time and removed a large component of toll-plaza delay. Earlier work by TCI and IIM Calcutta had highlighted how road-freight delays, repeated stoppages and additional fuel consumption imposed considerable economic costs on the logistics system.

Subsequent IHMCL impact assessments demonstrated that electronic toll collection could reduce waiting, fuel use and associated emissions.

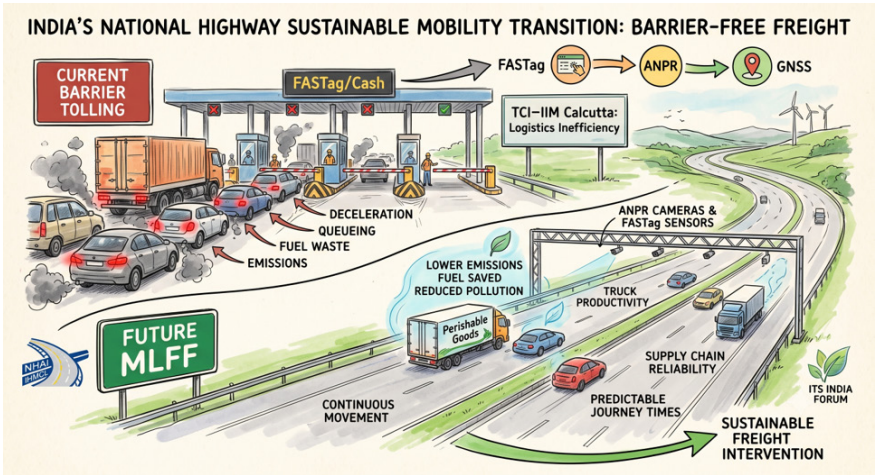
FASTag therefore represented an important first step.

But FASTag primarily **digitised the payment transaction.**

The toll plaza—and therefore much of the physical interruption—remained.

Multi-Lane Free Flow represents the next logical step.

With FASTag RFID technology supported by **Automatic Number Plate**



Recognition (ANPR), vehicles can be identified and charged while continuing through a free-flow tolling point without entering conventional toll lanes or stopping at a barrier.

The operating model changes from:

Highway speed → braking → queueing → transaction → acceleration → highway speed

to:

Highway speed → identification and transaction → highway speed.

From a sustainability perspective, that difference is significant.

Why Commercial Freight Matters

Road freight should be an important focus of the MLFF sustainability discussion.

Commercial vehicles typically consume considerably more fuel than passenger vehicles, and stop-and-go operating conditions impose a disproportionate energy penalty on heavy vehicles.

But fuel is only one dimension.

Repeated toll interruptions reduce driver productivity and truck utilisation, introduce uncertainty into delivery schedules and increase supply-chain buffers.

For manufacturing, this affects inbound logistics and inventory planning.

For e-commerce and distribution businesses, it affects delivery reliability.

For exporters, unpredictable highway travel times can affect port arrival windows.

For **perishable and temperature-sensitive cargo,** reliability becomes even more important.

Fresh produce, dairy, seafood, meat, pharmaceuticals and refrigerated cargo all operate within time and temperature constraints. Toll-plaza delays may not be the principal cause of food or cold-chain losses, but they represent an avoidable source of transit-time variability.

Reducing such variability can support better route planning, lower refrigeration demand, more predictable market arrival and potentially longer remaining shelf life.

This is why the sustainability value of MLFF should not be limited to measuring seconds saved at the toll point.

Its wider value lies in making highway freight **more predictable, productive and energy-efficient.**

The Air-Quality Dimension

Toll plazas also create localised emission hotspots.

Concentrations of stationary or slow-moving diesel vehicles can increase exposure to particulate matter, black carbon and nitrogen oxides for toll workers and nearby communities.

MLFF can reduce the conditions that create these concentrated emissions by removing queues and reducing repeated acceleration and deceleration.

This makes barrier-less tolling relevant not only to climate mitigation, but also to:

local air quality, occupational exposure and roadside environmental health.

A Green Highway should therefore be evaluated not just by tree plantation, renewable power or EV charging infrastructure, but also by how efficiently traffic itself moves through the corridor.

What If 1,000 Tolling Locations Become Free Flow?

The current NHAI and IHMCL procurement programme provides an important starting point.

India is now moving from individual MLFF demonstrations towards bundled procurement across multiple tolling locations.

The larger opportunity is to imagine what happens if, over the next five years, approximately **1,000 National Highway tolling locations transition to true Multi-Lane Free Flow operation.**

At that scale, the impact would no longer be limited to improving individual toll plazas.

It could influence billions of highway passages.

The cumulative benefits could include:

- lower stop-and-go fuel consumption;
- reduced CO_2 and local pollutant emissions;
- millions of productive commercial vehicle-hours recovered;
- improved utilisation of trucks and buses;
- more predictable freight journeys;

- improved reliability for agricultural and temperature-sensitive logistics; and
- more efficient utilisation of the National Highway infrastructure already created.

Importantly, these outcomes should not merely be assumed.

They should be **measured.**

From Tolling KPIs to Green Mobility KPIs

As MLFF deployment expands, India has an opportunity to establish its own evidence base around the sustainability impact of barrier-less tolling.

Before-and-after studies at selected locations could measure:

average vehicle speed through the tolling zone, queue length, commercial vehicle travel time, fuel consumption, acceleration and deceleration patterns, CO_2, PM2.5, black carbon, NOx, noise and journey-time variability.

This would allow NHAI, IHMCL and the ITS ecosystem to move beyond traditional tolling metrics such as transaction accuracy and system availability.

A broader set of Green Mobility KPIs could ask:

How many litres of fuel were saved per million crossings?

How many commercial vehicle-hours were recovered?

How much did air quality improve around the tolling location?

How much did freight journey variability reduce?

Such metrics would demonstrate how Intelligent Transport Systems directly contribute to India's sustainability objectives.

ANPR and GNSS: An Evolution, Not a Competition

India has also spent several years evaluating **GNSS-based tolling,** which introduces the possibility of charging vehicles based on the distance actually travelled.

GNSS remains an important longer-term opportunity.

However, it requires a wider ecosystem involving onboard technology, standards, communications, payment architecture, regulatory frameworks and enforcement mechanisms.

FASTag–ANPR MLFF can provide a pragmatic path towards barrier-less operation while building on infrastructure and payment systems already familiar to Indian road users.

The evolution can therefore be viewed as:

Barrier tolling → FASTag → ANPR-based MLFF → progressively sophisticated GNSS-enabled free-flow and distance-based charging.

The strategic objective should not be framed simply as ANPR versus GNSS.

It should be:

How quickly and effectively can India remove unnecessary physical barriers to mobility while building a tolling architecture capable of evolving with technology?

Sustainable Mobility Is Also About Efficiency

India will continue to need electrification, cleaner fuels, public transport investment and modal shift towards rail and waterways.

But the country's existing commercial vehicle fleet will remain an essential part of economic activity for many years. Sustainable mobility must therefore operate on two tracks simultaneously: **transform the vehicles and fuels of the future, while making today's transport system progressively more efficient.**

Multi-Lane Free Flow tolling provides an opportunity to do the latter.

As India advances its MLFF programme, success should ultimately be measured not only in toll transactions processed or barriers removed, but in **fuel saved, emissions avoided, vehicle-hours recovered and freight journeys made more reliable.**

Intelligent Transport Systems have the potential to make India's highways not only smarter, but greener and more productive.Sometimes, an important step towards sustainable mobility can begin with something remarkably simple: **removing the barrier in front of the vehicle.**

Ubiquitous Connectivity for Future Vehicles

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Abstract

Future vehicles will offer immense functionalities such as V2X(Vehicle-to-Everything) connections. Most of the vehicles driven today are in the areas covered by the cellular terrestrial networks. The Cellular-V2X can provide better quality of service support, large coverage, and high data rate for moving vehicles. The 5G-V2X will revolutionize the transformation by enabling safer roads, reducing congestion, and adoption of autonomous vehicles. However, the automotive technology faces significant coverage gaps in rural and sparsely populated remote areas. Faced with this reality, the autonomous sector is entering phase where connectivity can no longer rely only on single terrestrial infrastructure, but on a hybrid terrestrial network and the non-terrestrial network (NTN) resilient model, which will provide ubiquitous vehicular connectivity. The demand for ubiquitous connectivity in automotive is growing at an unprecedented rate, fueled by combination of technological advancements, shifting consumer expectations, and evolving industry trends.

1 Introduction

Connectivity requirements in automotive are growing in both intensity and sophistication. The automotive are now expected homogeneous continuous and reliable coverage across the entire journey including roads in rural and remote areas, and mountainous terrain. Currently automotive services are primarily delivered via cellular terrestrial networks (TN), however, the TN are insufficient for providing universal coverage needed to realize ubiquitous connectivity (UC) due to their reliance on land based infrastructure, which is limited to populated areas. Today, cellular network cover approximately 20% of the earth's surface in total while addressing the need of 95% of world's population for mobile services. The autonomous industry faces the significant coverage gaps, particularly in rural and sparsely populated remote areas. Present day mobile networks rely on cell towers and underground fiber cables. Due to higher infrastructure cost, the TN are unable to deliver connectivity to remote and rural areas. Despite all the technological advancements, the TN are unable to reach remote villages, vast oceans, or mountainous regions. Also in dense urban centers with high concentration of vehicles such as airports, stadiums, or traffic jams, the traffic network may be congested to unable to meet demands of so many users. The vehicles can lose connectivity even when there is cellular signal available but network is overloaded. A ubiquitous connectivity is needed in both the situations. In densely populated areas FR2 frequency band between 24.25 to 52.6GHz mm wave provides speeds that are 4 to 5 times faster than FR1(410-7125MHz) low- and mid-band enabling significantly better performance. Increasing data rates, and reducing latency, TN can fulfill the congested network limitation. Although operating range is a limitation but in urban areas this is acceptable.

2. Non-Terrestrial Networks

For truly ubiquitous connectivity, network coverage must be expanded beyond the reach of existing TN capabilities. The solution is non-terrestrial network (NTN) that offers a satellite based connection. The satellite communication can provide coverage for 100s of kms making connectivity available in rural and remote areas as well as in challenging environments like oceans, deserts and mountain ranges. The satellite can also be indispensable during public safety emergency when TN communication are affected. The NTN is emerging dimension in automotive connectivity, promising ubiquitous vehicle connectivity. The NTN will support connected and intelligent vehicles enabled by low latency using Low Earth Orbit (LEO) satellites. The LEO move overhead in orbit creating 'constellation' of signal sources that is always moving overhead. As each satellite move relative to the earth's surface, it creates significant Doppler shift. Also the signal and phase can experience rapid fluctuations due to atmospheric and weather related influences. The large propagation distance, high path loss, and large latency occur because of NTN links spans 500kms to LEO satellites. High latency complicates timing synchronization. Atmospheric fading and multipath reflections from surrounding distort NTN signals reduces the link quality. For LEO the relative motion between satellite and vehicle generate Doppler

shifts and time-varying propagation delays which effects sync. and RF channel challenges like beam forming to continue track fast moving LEO satellites which are visible only for a few minutes at a time. An GNSS (Global navigation satellite system) plays a central role in NTN positioning, timing, and mobility. The movement of LEO satellites causes a significant Doppler shift, so a tester is required to ensure correct frequency sync. between the satellite and the device it serves. The NTN also presents specific test challenges to verify the propagation of the signal from ground to satellite and vice versa. New fading profiles such as combination of atmospheric and terrestrial fading and the weather specific effects can be integrated into test setup, usually provided by the radio communication tester. The automotive grade SIM switching seamlessly between cellular and satellite is a milestone in the journey towards ubiquitous connectivity and will ensure uninterrupted service anywhere. Broadband NTN can provide advances in-vehicle entertainment. With this the car passengers will be able to enjoy ultra-HD (4k/8k) video streaming, immersive cloud gaming, and virtual reality (VR) experiences, even in remote or rural areas where TN are weak or unavailable. As the automotive industry increasingly embraces electric vehicles (EV), the need for connectivity grows even further. Connectivity in EVs allow drivers to easily adapt journeys to their vehicles through use of navigation services to direct them to the nearest available charging station or schedule of charging.

3. Software Defined Vehicles

Software defined vehicle (SDV) updates over-the-air (OTA) by centralizing software, enabling the flexibility to add new feature through software by decoupling the vehicle hardware from higher-layer application software and offering more cost effective scalability across vehicle models. From OTA software updates to autonomous driving capabilities, continuous low latency communication is a backbone of SDV. The promise of UC delivered by both satellite and cellular technologies, enables car manufacturers to ensure that every vehicle, regardless of location, remain connected to the network, offering benefits like predictive maintenance, safety features, and access to real-time traffic data. As the landscape for SDV continues to transform, connectivity has become a cornerstone of functionality, safety, and user experience. Considering the connected SDV, the growth in the number of cellular enabled cars, trucks, motorbikes, and other vehicles, is one of the primary drivers behind the heightened demand for seamless reliable, and global connectivity. The connectivity has become essential in delivering critical services, such as emergency call system (eCall) and breakdown assistance, both of which are integral to ensuring safety and compliance with regulatory requirements in many regions.

Edge computing is crucial for connected cars because it enables real-time data processing closer to the vehicle, reducing latency and enhancing performance of applications like autonomous driving safety features, and negotiations. Edge computing supports real-time traffic updates and vehicle diagnostics, ensuring reliable and efficient operation even in remote areas with limited connectivity. This enhances the overall driving experience and safety. The artificial intelligence (AI) can quickly analyze vehicle sensor data such as camera feeds, radar, and LiDAR to support applications like autonomous driving, collision avoidance, and driver assistance.

4. Conclusions

The ubiquitous connectivity is not a static goal. It is continually evolving frontier that blends TN and satellite communication (NTN) into seamless, resilient network fabric. For automotive OEMs, it underpins the transition from selling cars to delivering mobility services. The connected vehicles are the future, and future is defined by the ability to connect everywhere, all the time. The ubiquitous connectivity is a journey, not destination with constantly evolving and improving capabilities reducing the barriers to a hyper connected world.

V2X Security, Trust, Privacy and Safety: Impact of AI, GenAI and Agentic AI

N. Sarat Chandra Babu

Technology Advisor, C-DAC, Bangalore & Former ED-SETS & CDAC, Bangalore



1. Connected Mobility and the AI Dimension

Vehicle-to-Everything (V2X) communication links vehicles with other vehicles, roadside infrastructure, pedestrians, networks and backend systems, so a false or manipulated message can affect the physical transport environment. V2X security therefore rests on four interdependent foundations — Safety, Security, Trust and Privacy (SSTP). Artificial Intelligence (AI), Generative AI (GenAI) and Agentic AI can strengthen all four, but also introduce new attack surfaces. The governing principle is two-sided: AI must secure V2X, and V2X must be protected from AI-enabled attacks and from vulnerabilities in the AI components themselves.

2. Impact on V2X Security

AI/ML can analyse vehicle, roadside and network data to flag abnormal Basic Safety Message patterns, authentication failures, inconsistent trajectories and coordinated multi-node activity, supporting intrusion and misbehaviour detection, threat hunting and predictive risk analysis. Its key advantage is correlation: a cryptographically valid message may still be behaviourally abnormal when checked against neighbouring vehicles, sensors and traffic-control data.

GenAI can summarise logs, correlate alerts and generate detection rules, but introduces prompt injection, data leakage, model/data poisoning and AI supply-chain risk; untrusted input must never convert directly into safety-critical commands without validation, provenance checks, access control and human oversight.

Agentic AI extends this by planning tasks and calling tools and APIs, so the attack surface extends to the agent's credentials, permissions and action pathways. Agentic systems should use least privilege, strict tool/API allow-lists, sandboxing, action limits, comprehensive logging and human approval for safety-critical operations.

3. Impact on Trust, Privacy and Safety

Trust depends on confidence that a message is authorised, unaltered and credible; AI adds behavioural trust to the cryptographic trust model by checking signed messages for consistency with other observations, though AI decisions must remain traceable and validated. Privacy is at risk because AI can correlate large volumes of location and mobility data even under pseudonymous credentials, so data minimisation, purpose limitation, controlled retention and privacy-enhancing technologies must accompany AI analytics, with GenAI systems requiring added controls against data exposure through prompts and logs. Safety demands the strongest separation between AI assistance and control: AI can predict hazards and support decisions, but safety-critical actions must stay within deterministic, validated, auditable boundaries with defined fail-safe and rollback behaviour, and agentic systems should not hold unrestricted authority over vehicle or signal control.

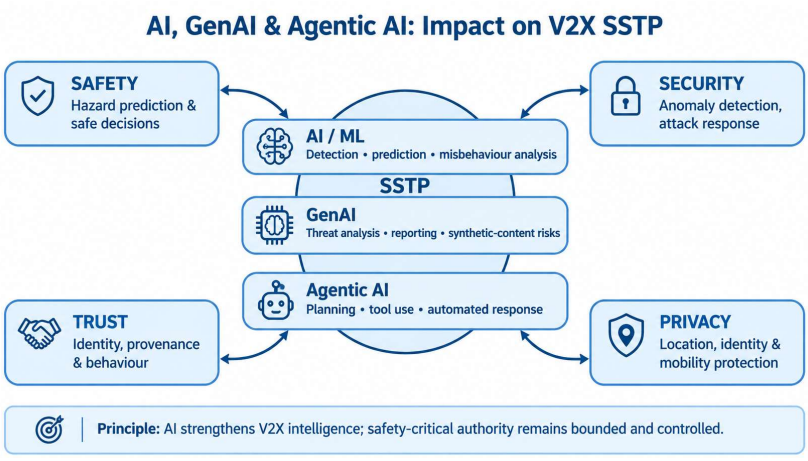


Figure 1. AI, GenAI and Agentic AI viewed through the V2X SSTP framework.

4. AI-Enabled Attacks and the Emerging Threat Landscape

AI is increasingly used to enhance conventional cyberattacks — phishing and social engineering, automated reconnaissance, malicious-code assistance, deepfake impersonation, prompt injection against GenAI applications and AI supply-chain compromise. Transport organisations, vehicle manufacturers, infrastructure operators and suppliers are potential targets. Public examples of autonomous agents compromising V2X systems remain limited, but these capabilities should be treated as emerging threats within V2X threat modelling and security testing.

5. Recommended Controls for V2X

Table 1 summarises the recommended safeguards across the SSTP dimensions, together with specific measures for Agentic AI and overall governance, as a concise reference for embedding AI security into V2X design, deployment, operation and lifecycle management.

Area	Recommended Direction
Security	AI-assisted anomaly/misbehaviour detection; secure models, APIs and data; continuous monitoring.
Trust	Combine PKI and pseudonymous credentials with behavioural validation and data provenance.
Privacy	Minimise mobility data; protect prompts/logs; use privacy-preserving analytics and controlled retention.
Safety	Keep AI/agentic decisions within validated boundaries; human approval for safety-critical actions.
Agentic AI	Least privilege, tool allow-lists, sandboxing, action limits, audit trails and rollback.
Governance	AI-aware threat modelling, adversarial testing, lifecycle assurance, incident response and accountability.

Table 1. Recommended AI-security controls across the V2X SSTP framework.

These controls apply across the AI lifecycle — from data collection and model development through deployment, continuous monitoring, incident response and secure updating — as illustrated in Fig. 2.

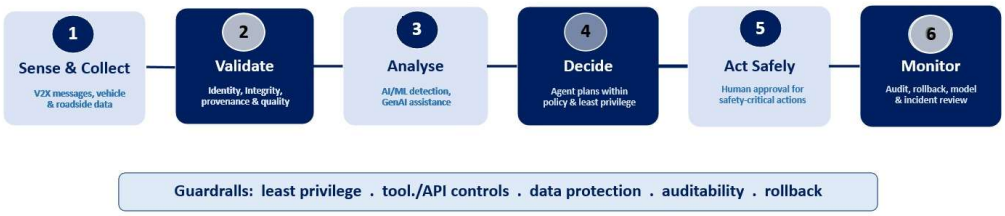


Fig 2. Secure AI lifecycle and associated safeguards for connected mobility

6. The Indian Context

India recorded about 5.14 lakh road accidents and 1.83 lakh fatalities in 2025 (MoRTH, Road Accidents in India 2025), with the annual economic cost of crashes estimated at nearly 3% of GDP. As connected-mobility programmes scale under Viksit Bharat 2047 — Bharatmala corridors, the National Logistics Policy and city-level ITS rollouts — V2X is moving from trial to policy: TRAI's April 2026 consultation paper proposes a Cellular-V2X framework in the 5.9 GHz band, and test facilities such as NATRAX, Indore, are already validating connected and automated vehicle technologies. AI-secured V2X can directly support India's fatality-reduction and logistics-efficiency goals, provided SSTP safeguards keep pace with deployment.

7. Conclusion

The impact of AI, GenAI and Agentic AI on V2X is a dual transformation: AI can make security more intelligent, adaptive and predictive, while also creating new risks around models, data, prompts, agents and autonomous actions. A future-ready V2X cybersecurity framework should adopt the principle “Secure AI for V2X and Secure V2X against AI” within the SSTP framework, so that connected mobility remains safe, secure, trusted and privacy-respecting as India's transportation system becomes increasingly intelligent.

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Next-Generation Platform for Fleet Safety and Operations: Introducing Netradyne Intelligence

Pramod Akkarachittor

Chief Product Officer



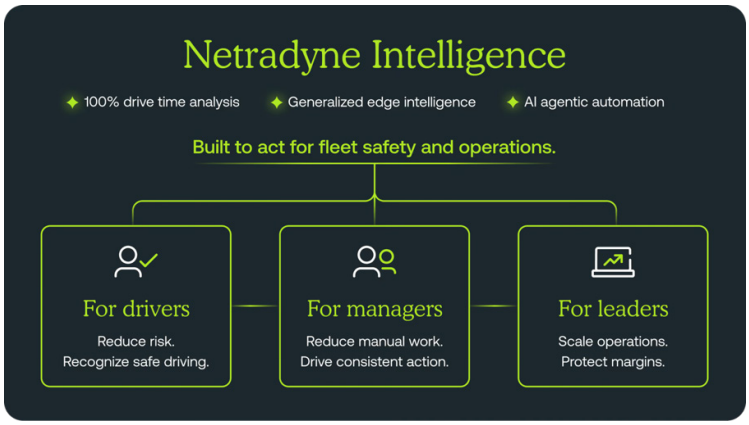


I am excited to announce Netradyne Intelligence, the next-generation fleet AI platform that de-livers real-time prevention and recognition for drivers, dramatically more productivity for safe-ty and operations teams, and lower operating costs for fleets at scale. Built on more than 30 bil-lion miles and 150 billion minutes of real-world driving, Netradyne's physical AI technology continuously analyzes patterns, identifies risk, and determines the most effective intervention. Now, it initiates and executes the follow-through automatically, marking a fundamental shift from systems that report to systems that act.

The Challenge Visibility Alone Can't Solve

Legacy fleet management systems have been solving the challenge of visibility, capturing events, surfacing alerts, and generating reports. Visibility is valuable, but the bottleneck re-mains in the follow-through — the volume of insights that still require a human to act on. As fleets grow, driver counts rise, and operational pressures compound, the gap widens. Critical workflows like coaching, incident response, and program reporting still fall entirely on the op-erations and safety team. At the same time, drivers are navigating longer hours, more demand-ing routes, and increasingly complex road conditions where every decision happens in seconds. Netradyne Intelligence is built to close that gap.

The Platform Behind Every Deci-sion



Netradyne Intelligence represents a category-defining shift in fleet AI that transforms what is possible for the people closest to fleet operations, drivers at the point of risk and managers at the point of decision. It is built on a foundation that has always set Netradyne apart: generalized edge intelligence that processes 100% of drive time on the device, to understand the full opera-tion, across drivers, vehicles, and the physical world they operate in. Now, it combines general-ized edge intelligence with agentic automation to create a unified intelligence layer that closes the gap between insight and action. Agentic automation enables the system to act on that under-standing, proactively and autonomously, based on organizational policies and guidelines.

What that means in practice: fewer incidents, drivers who improve through a system they trust, fleet programs that scale without adding headcount, and lower operating costs across every mile.

For Drivers: Prevention, Coaching, and Recognition That Builds Trust

For drivers, that intelligence means fewer incidents, more consistent behavior, and a coaching experience that feels fair and trustworthy. In-cab correction happens at the exact moment risk appears — in real time, grounded in the full picture of what actually happened. And because Netradyne Intelligence recognizes good driving alongside risky behavior,

it builds driver trust that creates lasting behavior change. Going forward, Netradyne Intelligence will continue to expand the risky and inefficient behaviors it identifies — while deepening its recognition of safe driving — keeping drivers and fleets safer and more efficient with every mile.

For Managers: From Execution Burden to Strategic Focus

For managers, Netradyne Intelligence means effective fleet programs run consistently, coaching reaches every driver without adding to manager workload, and investigations close in minutes. Netradyne Intelligence already delivers full-context GreenZone scoring that captures safe and risky driving, AI-recommended coaching for improved effectiveness, and Video LiveSearch that retrieves the right footage in seconds. Now it goes further, delivering exponential produc-tivity for safety and operations teams. For fleet managers, the work never stops: coaching, inci-dent response, reporting, and driver recognition, across every driver, every day. With agentic AI, these critical workflows execute automatically based on the policies managers set. Same team. Exponential output. Safety teams freed to focus on strategic decisions and coaching con-versations that only they can make.

For Leaders: Scale Operations, Protect Margins

Scaling operations while protecting margins is a constant concern for fleet leaders. Netradyne Intelligence significantly alleviates that burden, moving from reactive incident management to proactive prevention, from programs limited by team capacity to programs that execute auto-matically at any scale, and from unpredictable incident-driven costs to operating costs con-trolled by a platform that acts before they compound.

Exponential Output, Powered by Agentic AI

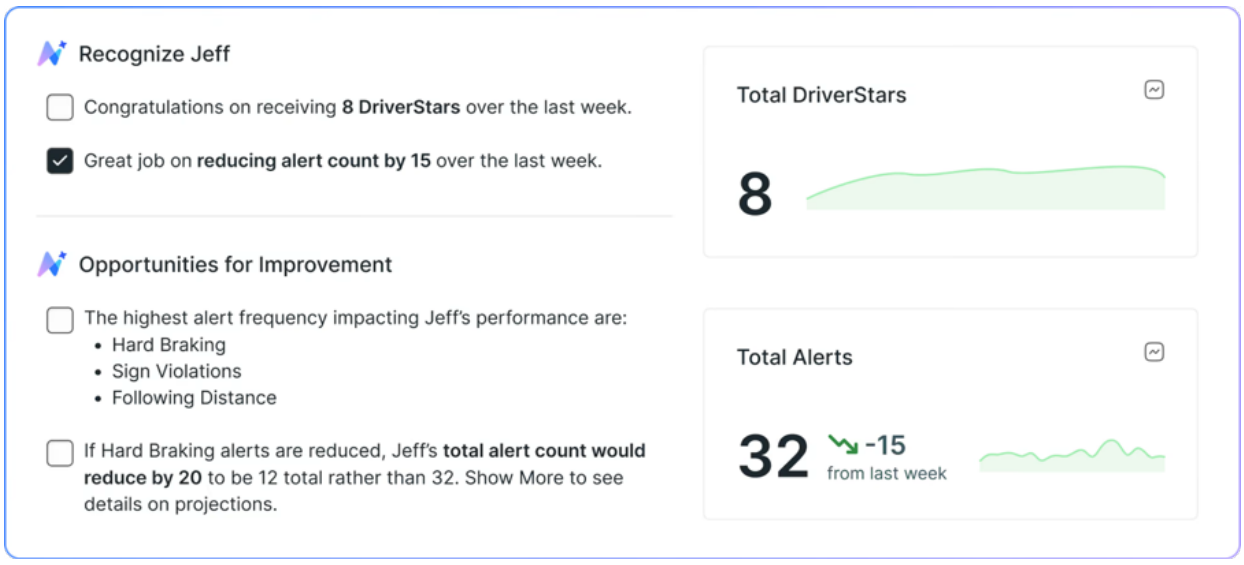
Netradyne Intelligence powers a new class of AI agents that reason over real-world context and execute critical workflows based on the policies your team sets, eliminating the delays and manual coordination that slow safety teams down.

Coaching That Scales Without Adding Workload

The burden of preparation and prioritization disappears. The Coaching agent identifies which drivers need attention based on manager-defined goals and prepares each session with driver history, top alerts, and a recommended improvement plan, so managers spend their time on the conversations that matter most.

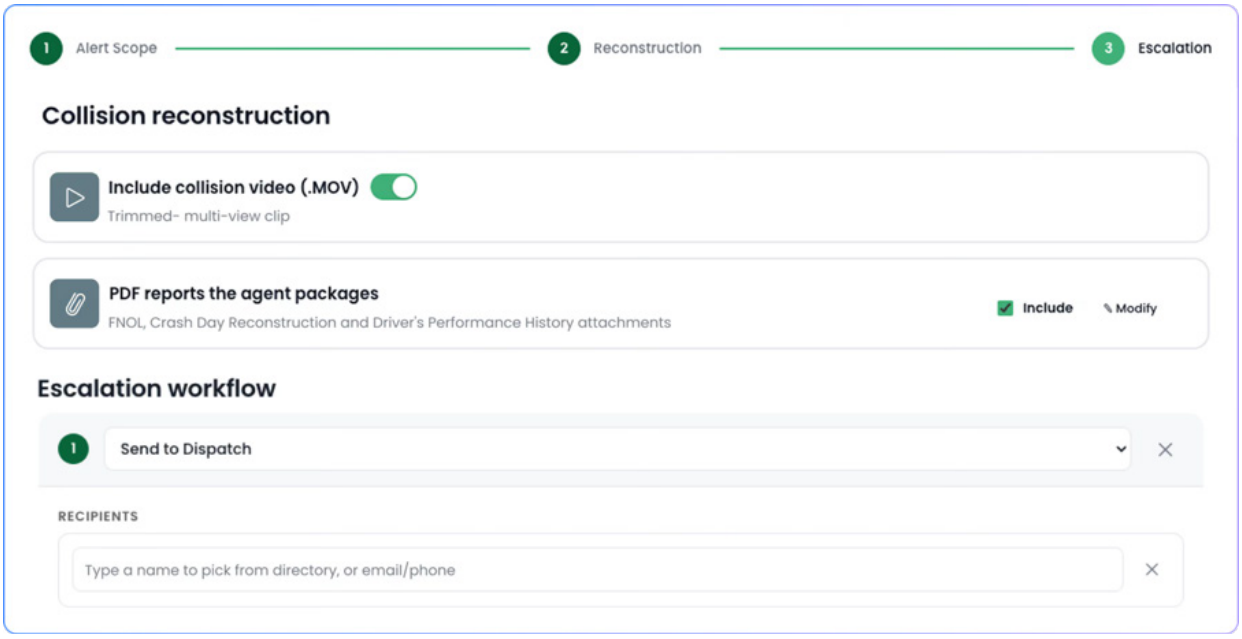
Incident Response in Minutes

When a collision occurs, every minute of delay is a liability. The Incident Response agent can start immediately, automatically compiling the full collision record: video, FNOL details, crash reconstruction, and driver history, and routing it to the right stakeholders without manual pack-aging. Safety, dispatch, claims, legal, or an adjuster gets exactly what they need, when they need it.



Recognition and Reporting, Running at Scale

As part of coaching workflows, the Rewards agent can deliver consistent DriverStars acknowl-edgment across every driver. The Reporting agent generates the KPIs, dashboards, and leader-ship narratives that keep programs aligned and stakeholders informed, saving hours of manual work every week.



Availability

The Coaching and Incident Response agents, powered by Netradyne Intelligence, are available now. The rewards and reporting agents will be available in Q3 2026

A New Standard for Fleet Intelli-gence

Fleets have invested in visibility, and Netradyne Intelligence takes it further. Prevention in the cab. Execution that runs automatically. Programs that scale without limits. Safety teams freed to focus on the decisions that actually require them.

And this is just the beginning. At its core, Netradyne Intelligence is built on generalized intelli-gence at the edge, giving it the ability to understand the real world as fleets operate in it, across driver workflows, vehicle condition, operational activity, and proof-of-service verification. That foundation is what enables agentic automation to expand from critical safety workflows to fuel management, maintenance, and broader operational priorities that affect every mile a fleet runs.

To learn more about Netradyne Intelligence, reach out to our team.



Transforming Road Safety Through Active Connected Infrastructure and Real-Time Intelligence



Vijay Kumar

Director, Appinfoinc Traffic India Pvt. Ltd. / Applied Information, Inc.

Executive Perspective: Scaling Road Safety Without Rebuilding the Road

Road safety remains one of the most urgent challenges facing India's cities and highways. The technology to prevent crashes already exists, but the traditional way of deploying it has held it back. Conventional methods depend on trenching roads, laying fiber, building on-premise server rooms, and sending crews from intersection to intersection for every adjustment or repair. Each new corridor becomes a construction project, and agencies are left choosing between expanding coverage and maintaining what they already have. As India builds out its highways and smart cities at record pace, that model cannot keep up.

Applied Information was built to keep up with the rapid pace of change faced by today's traffic agencies. Our core mission is to turn passive transportation infrastructure into an active, self-governing ecosystem, saving agencies time and improving roadway safety. By leveraging Cellular Vehicle-to-Everything (C-V2X), Internet of Things (IoT) sensors, and cloud computing, we connect traffic signals, emergency vehicles, school zones, and vulnerable road users directly to drivers in real time.

Core Innovations & Technological Breakthroughs

1. **Glance® Smart City Supervisory System:**
   A unified, cloud-based platform allowing transportation authorities to manage traffic signals, school beacons, and emergency response systems from a single master dashboard. Powered by C-V2X and 4G LTE/5G communications, it eliminates the need for expensive on-premise server infrastructure and costly road trenching.
2. **Next-Generation Emergency Vehicle Preemption (EVP):**
   The first sixty minutes after a traumatic injury are vital: the sooner a patient receives medical care, the better the survival rate. We help first responders make the most of this "golden hour." Our C-V2X On-Board Units (OBUs) allow emergency vehicles and ambulances to communicate directly with traffic controllers. Systems switch upcoming traffic signals green and bring cross-traffic to a safe halt, reducing response times by approximately 11 seconds per intersection and preventing secondary intersection collisions.
3. **Connected School Zone Safety Networks:**
   Protecting vulnerable students, solar-powered intelligent flashing beacons automatically alert approaching drivers when entering active school zones or exceeding safe speed limits. Centralized schedule control enables easy management across thousands of schools.
4. **Glance TravelSafely™ Connected Driver Application:**
   Bridging infrastructure to citizens, the TravelSafely™ app delivers audible, contextual safety alerts directly to motorists, cyclists, and pedestrians via smartphones and in-vehicle displays—warning drivers of active work zones, approaching emergency vehicles, wrong-way drivers, or red-light violations before a collision can happen.

Proven Global Impact & Road Safety Outlook

With deployments across 1,950+ transportation agencies worldwide and over 60,000 connected traffic devices, Applied Information's technologies have handled over 15 Lakh emergency priority trips in 2025 alone and saved thousands of hours for first responders.

As India accelerates its modern highway expansion and smart city initiatives, deploying active, connected transportation ecosystems will ensure safer corridors, smoother traffic management, and measurable service delivery for citizens nationwide.

Sego Automobile Solutions Pvt Ltd

Sego Automobile Solutions submits iBrake for national evaluation on the strength of granted Indian patents, a completed and independently-analyzed field pilot, and a connected hardware platform already engineered for India's smart and safety transportation future—not a concept or prototype, but a deployed, measured, and scalable system.

1. The Technology

iBrake is a retrofit electronic system, protected by two granted Indian patents, that detects the release of the accelerator pedal—the earliest physical signal that a vehicle is decelerating—and instantly activates the brake light, well before the driver's foot reaches the brake pedal. This closes a critical warning gap present in every vehicle on Indian roads today, where the brake light illuminates only once the pedal is pressed and the trailing driver's reaction window has already been consumed. Rear-end collisions account for 23% of India's road crashes and are a leading contributor to the country's 1.77 lakh annual road deaths, with heavy vehicles causing a disproportionate share via underride crashes.
What is iBrake?

Developed by Sego Automobile Solutions Pvt. Ltd., iBrake is an affordable, retrofittable safety technology designed to reduce preventable heavy-vehicle collisions. It works via two integrated components:
Advanced Deceleration Indicating System (ADIS): Provides enhanced early warnings to trailing vehicles during deceleration.

Advanced Driver Monitoring System (ADMS): Monitors driver behavior (hard braking, tailgating, over-speeding) using GPS and outward-facing cameras to provide real-time coaching.

Connected Hardware & V2X-Ready Platform: iBrake runs on a rugged ESP32-class microcontroller with integrated WiFi/BLE connectivity, so every deceleration event is sensed and timestamped digitally—not just mechanically relayed. This gives the installed base an in-built, no-new-hardware upgrade path to Vehicle-to-Everything (V2X) communication: as India's connected corridor and roadside unit (RSU) infrastructure matures, the same units can broadcast deceleration/braking state to trailing vehicles, RSUs, and traffic management systems via a firmware update alone.

Vision Analytics & YOLO-Based Driver Monitoring: Alongside the patented deceleration module, Sego has developed its own dashboard-integrated vision analytics stack—forward- and driver-facing cameras running YOLO based realtime object and behaviour detection. This computes following-distance and forward-collision risk, flags drowsiness/distraction, and feeds a live fleet-manager dashboard extending the platform from a single warning signal into a full vehicle and driver-risk analytics system, built entirely in-house.

Universal Vehicle Compatibility: iBrake integrates with both legacy mechanical-throttle vehicles and modern ECM equipped vehicles including passenger cars, ride hailing and last mile citizen fleets, school buses, and ambulances, not just heavy commercial trucks. One hardware-software platform therefore scales across the entire national vehicle parc, from mining and logistics fleets to everyday citizen vehicles.

Granted IP: (1) “Vehicle Deceleration Indicating System” — a deceleration module between accelerator pedal and throttle valve signalling deceleration before brake light onset; (2) “A Brake Light Functioning System and Method” — a sensor-and-relay system triggering the brake light on pedal release, ECM-compatible across 2W/3W/4W vehicles including EVs. Both patents are held by Sego's founder.



2. Deployment

Partner	Telangana Mineral Development Corporation (TGMDC), Government of Telangana
Location	Hyderabad, Telangana mining haul roads, highway and rural corridors
Vehicle type	Heavy mining trucks, in normal commercial service

Duration	8-week field pilot, Q4 2025
Scale	67,200+ km cumulative driving; 1,850+ hours of real-time GPS and 4K (30fps) forward-video data captured and independently analyzed.
Ecosystem support	STPI Pune MOTION CoE, AIC T-Hub, ITS India Forum, IIM V

3. Results – Verifiable Numbers

Time-to-Collision (TTC)—the reaction time available to a following driver before a collision—was the primary safety metric, computed frame-by-frame from video and compared across baseline (iBrake off) and enabled (iBrake on) operations:

4. Pilot Study Scope & Data Collection

During the conducted 8-week real-world pilot during Q4 2025 in partnership with the Telangana Mineral Development Corporation (TGMDC) in Hyderabad.

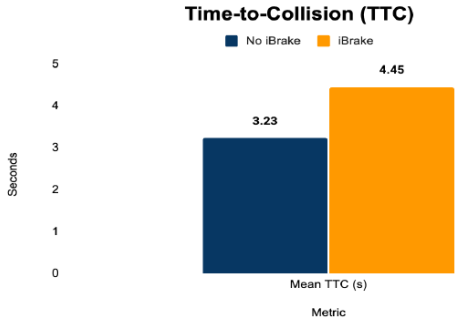
Scope: Mining trucks operating in normal service across highway and rural road environments.

Scale: Accumulated 67,200+ km of driving distance and 1,850+ hours of data (GPS logs and 4K, 30 FPS forward-facing video).

Primary Metric: Time-to-Collision (TTC) the temporal margin available for a trailing driver to react and avoid a crash.

Table 1: Change in mean TTC when using iBrake.

Metric	Without iBrake	With iBrake	% Change
Mean TTC	3.23	4.45	+38%
TTC <2 s	22%	9%	↓59%
TTC <3 s	56%	17%	↓70%



5. Scalability

Vehicle-side, not infrastructure-side: no dependency on road/junction capex, sensors, or municipal investment—deployable immediately across any state or national heavy vehicle fleet.

ECM compatibility extends the addressable base beyond commercial trucks to ride-hailing and taxi fleets, school transport, ambulances, and private citizen vehicles—one platform, one national vehicle parc.

V2X upgrade path: the ESP32 class connected hardware already in the field can be enabled via firmware update, not new hardware to transmit deceleration/braking state to RSUs and surrounding traffic as India's connected corridor infrastructure is funded, positioning the installed base as a ready-made foundation for national V2X rollout.

Clear adoption pathway: State transport corporations and PSU/mining fleets → national logistics, ride hailing and citizen fleets → national mandate via BIS/AIS retrofit norms for commercial and passenger vehicles.

6. Make in India Status

Indigenous IP: two patents granted in India, both invented and held by Sego's founder, Chaitanya Bhavaraju.

Indigenous software: vision analytics and YOLO-based detection models developed and trained in-house, alongside the connected ESP32-class hardware platform.

Manufacturing: fully in-house at Sego's own facility—no dependence on imported subsystems.

Additional information

Data ownership: all fleet, GPS and video analytics data generated during deployment is retained by Sego and the deploying fleet operator, on Sego-controlled infrastructure.

Company base: incubated at T-Hub, Hyderabad, Telangana—built within, and for, the Indian innovation and road-safety ecosystem.

New age Vehicle Emission enforcement using thermal image IR ANPR Camera (IRCAM) system

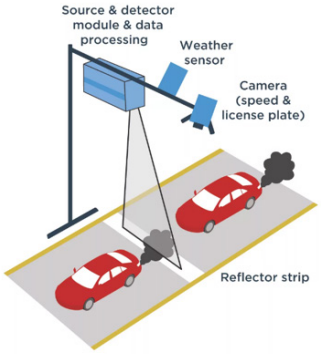


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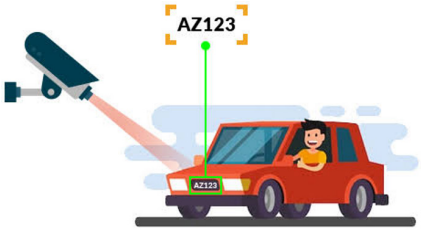
IRCAM a new dimension in Vehicle emission checking systems using a combination of **Automatic Number-Plate Recognition (ANPR) cameras, physical/laser-based emission sensors, and IR thermal cameras** for comprehensive monitoring. Thermal cameras do not directly measure the chemical composition of the exhaust plume, but are used for related purposes like detecting the thermal signature of the exhaust system or engine to measure **"hot body"** thus higher emitting due to VOC or SOOT) vehicles.

System Components and Function

The system integrates several technologies at a roadside location:



- **Thermal IR Camera:** The thermal camera is used to capture the heat signatures of the vehicle's components, particularly the exhaust system and engine area. This helps determine if the vehicle is fully warmed up (**"hot body"**) and release un brunt soot and VOC at tail pipe exhaust in case of Diesel / Petrol / CNG fuelled engine . Every mass of exhaust which ranges between a temperature 200 degree to 900 degree or more emit various color pattern infra red rays which is directly proportional to emission concentration of the vehicle . This pattern creates a thermal image to the camera variable with respect to hotness pattern . The concentration of such hot body is real smoke density . This phenomena differentiate between polluted vehicle or non polluted vehicle . This instant information will alert the enforcement agencies so the later smoke meter or gas anaylzer can measure the actual values of exhaust pollutants . The image in case of cold exhaust will also indicate the high concentration of **cold body** where after treatment of tail pipe emission not treated and unbrunt .



- **ANPR Camera:** A high-resolution camera with IR capabilities captures an image of the vehicle's license plate as it passes. This image is processed using Optical Character Recognition (OCR) software to identify the plate number. The ANPR camera typically uses built-in infrared illumination for reliable performance in all lighting and weather con-ditions.

Data Integration and Analysis

1. **Data Capture:** As a vehicle drives past the monitoring station, all sensors are triggered simultaneously. The ANPR camera captures the plate number, the emission sensors an-alyze the exhaust plume, and the thermal camera records heat signatures.
2. **Data Linkage:** The collected data (emission readings, plate number, speed, temperature data) are linked together into a single record for that specific vehicle.
3. **Database Matching:** The ANPR data (license plate number) is cross-referenced with a central vehicle registration database to retrieve details like vehicle make, model, fuel type, engine size, and official emission standard (e.g., Euro class).
4. **Anomaly Detection:** The real-world emission data is compared against expected values for that specific type of vehicle and operating condition . Vehicles with abnormally high emissions for their type and condition are flagged as potential "high emitters," which may have a fault that needs repair. Also prosecution based upon these indicators may also get in sequence where the vehicle travel further .
5. **Futuristic ITS incorporation:** In case an elaborative studies are carried out and a substantial data is generated the AI may report the amount of emission based upon the data of smoke meters or gas analyzers . The OBD sensors tagged with GPS will be able share the emission , location , speed in real time which will make the self governed re-gime .

Purpose

This combined system provides a non-intrusive, real-world method for monitoring large fleets of vehicles, identifying specific high-polluters, and enforcing low-emission zones (LEZs) without stopping traffic. It allows authorities to target vehicles that

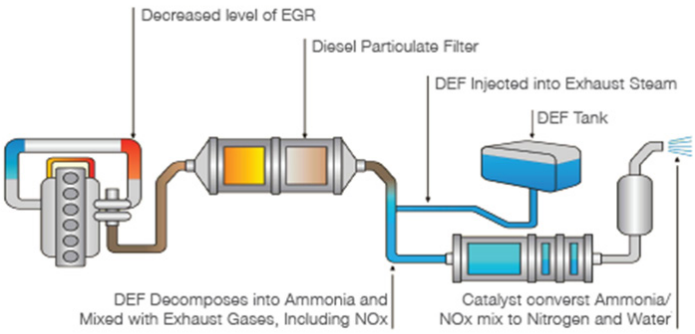
genuinely need inspection or repair, rather than relying solely on periodic mandatory inspections that may not reflect real-world performance. The IRCAM technology will be able to identify the gross emission exhausting vehicles and innocent vehicles may be allowed to ply in Delhi Metro city and the conflict between govt and transporters could be resolved through the ITS based emission control screening.

An Outlook on Delhi impact of Truck and Bus Industry and early end of life of private vehicles due to sudden dictates

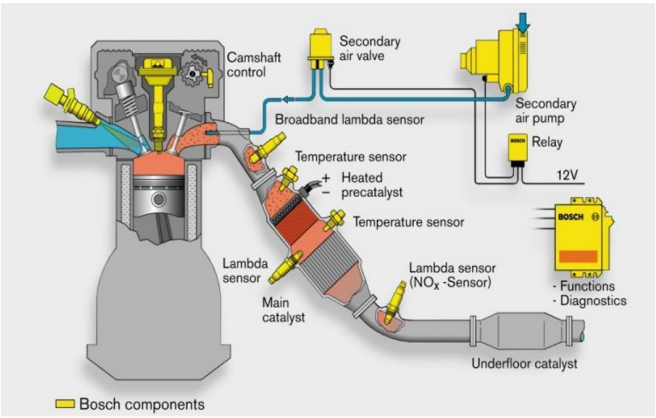
The **CAQM** ban on BS-IV diesel vehicles wef 01 Nov 2026 in Delhi will be causing major issues for the trucking and Bus industry and consumers. This leads to logistical problems, forcing transporters to replace and use extra vehicles, which increases costs and raises consumer prices for goods. Earlier the life of diesel engine vehicle was curtailed to 10 years instead of 15 years . The re-registration of petrol vehicles were forbidden after 15 years . However under the provision of CMVR Rule 52 (2) the re – registration of vehicle is permitted based upon the roadworthiness condition of vehicle in entire country except Delhi .

Impacts and concerns

Economic hardship: The ban financially strains BS-IV vehicle owners, who must continue loan payments despite losing income. This particularly affects small-scale operators and their families and tourism and passengers , householders and all .
Regulatory conflict: Transporters argue the ban prematurely side-lines their BS-IV vehicles, violating the 10-year operational lifespan mandated by prior Supreme Court and NGT norms.
Questionable effectiveness: A key point of contention is whether BS-IV engines, especially at low speeds typical in Delhi, contribute significantly hardly more pollution than BS-VI engines. Also these vehicles operating temperature not reaches above 500 degree temperature so NOx creations are not existing .
Common Clean Fuel : The fuel supplied by oil companies are BS 6 in entire country which has lower pollutants like sulphur reduced by 5 times and tailpipe emission level is also proportionally declined so BS 4 and BS 6 vehicles emits clean exhaust .
Similar tailpipe emission limits: Exhaust tailpipe limits for BS-IV and BS-VI diesel engines are the same at 50 HSU. The main difference lies in mass emission tests, which simulate heavy-load, high-speed scenarios not common in Delhi.
Low-load performance: With Delhi's average speed around 40 km/hr, low-load operation may show hardly difference in actual emissions between BS-IV and BS-VI engines, according to some PUCC data.
Basis for ban: The CAQM has admitted in RTI responses that it conducted no independent study showing that BS-IV and other end-of-life vehicles were uniquely polluting. The policy is instead based on judicial directives.



Diesel Engines



Gasoline Common exhaust after treat in BS 4 and BS 6 engine

Request for reconsideration

Given these issues, a detailed study on the actual, low-load emission difference between BS-IV and BS-VI diesel vehicles is requested. Based on the findings, the ban on BS-IV ban and end of life vehicles should be reviewed on its merits.

The Silent Pandemic: Bridging the Awareness Gap and the AI-Driven Future of Mobility in Jammu & Kashmir

S. Umar Bhat

Mobility Expert & Social Reformer



I. The Crisis of Conscience: Why Roads are Our Deadliest Habitats

For decades, we have viewed road accidents in Jammu and Kashmir as "incidents of fate" or "geographical inevitabilities." As a mobility expert navigating the unique terrains of our Union Territory, I must challenge this narrative. We are currently facing a silent pandemic, one that claims more young lives in the Himalayan belt than many viral outbreaks combined.

The root of this crisis is not just the winding curves of the National Highway (NH-44) or the steep gradients of the Mughal Road; it is a profound deficiency in Information, Education, and Communication (IEC).

1. The Awareness Deficit

In our common masses, "Road Safety" is often reduced to a seasonal ritual—a "Road Safety Week" where banners are hung and flyers distributed. However, authentic safety is a 365-day cognitive process. We see a significant gap in:

- **Risk Perception:** A large segment of our population fails to perceive the exponential increase in risk when speeding or driving under fatigue.
- **The "Invincibility" Complex:** Particularly among the youth, there is a lack of understanding that a vehicle is a kinetic weapon if not handled with scientific precision.
- **Pedestrian Ignorance:** Road safety isn't just for drivers. Our masses lack awareness of pedestrian rights, zebra-crossing protocols, and the "Share the Road" philosophy.

II. The Future of Mobility: AI as the New Guardian

As we transition into 2026, the traditional "man with a whistle" approach to traffic management is reaching its threshold. The future of mobility in J&K lies in the seamless integration of Artificial Intelligence (AI) and Machine Learning (ML).

AI is no longer a futuristic concept; it is a functional necessity to manage the 11.19% nominal GSDP growth-driven surge in vehicle ownership in our region.

1. Predictive Analytics vs. Reactive Enforcement

Traditional systems react after a crash. AI-driven mobility enables us to:

- **Identify Accident Hotspots:** By analyzing years of spatial data, weather patterns, and traffic density, AI can predict where a crash is likely to occur before it happens.
- **Drowsiness & Distraction Detection:** AI-powered cabin sensors can alert commercial drivers before they succumb to fatigue—a major killer on the long Jammu-Srinagar stretches.

2. The ITMS Revolution (Intelligent Traffic Management System)

The introduction of the ITMS Program in Srinagar and Jammu is a watershed moment. This isn't just about "Smart Lights"; it's about a living, breathing digital nervous system for the city.

- **Adaptive Signal Control (ASCT):** Reducing idling time at intersections based on real-time vehicle queues, thereby cutting down carbon emissions and driver frustration.
- **Automatic Number Plate Recognition (ANPR):** Ensuring that the law is blind and consistent. When enforcement is automated, the "influence" culture dies, and a culture of compliance begins.
- **RLVD (Red Light Violation Detection):** Creating a psychological deterrent for chronic offenders.

III. The Role of Experts, Researchers, and Institutions

Creating the "Best Transport System" in the world's most challenging terrain requires a Triple Helix Model of collaboration between the Government, Industry Experts, and Academic Institutions.

1. Moving from "Intuition" to "Data-Driven" Research

Institutions like NIT Srinagar, IIT Jammu, and our various engineering colleges must lead the charge. We need indigenous research on:

- **Pavement Engineering for Hilly Terrains:** Developing road materials that withstand the freeze-thaw cycles of J&K.
- **Stochastic Analysis of Traffic:** Researchers must provide the government with data on how "Peak Hours" in the Valley differ from the plains of Jammu, allowing for customized transit policies.

2. The Expert Intervention

As experts, our role is to bridge the gap between policy and the grassroots. We must advocate for:

- **Driver Welfare and Social Security:** At AIMTC, we believe a safe road starts with a secure driver. Professionalizing the driving sector through certification and health insurance is non-negotiable.
- **Integrated Logistics:** Aligning with the J&K Logistic Policy 2025, we must ensure that the movement of goods doesn't compromise the safety of people.

IV. A Strategic Roadmap for Jammu & Kashmir

To transform our Union Territory into a benchmark for mobility excellence, I propose the following interventions:

Intervention Area	Strategy	Expected Outcome
Education	Mandatory Road Safety curriculum in schools (K-12).	A generation of road-conscious citizens.
Technology	Full-scale deployment of V2X (Vehicle-to-Everything) on highways.	Real-time hazard warnings for drivers.
Engineering	AI-based bridge and tunnel health monitoring.	Prevention of structural failures in mountainous zones.
Enforcement	Zero-tolerance for "Black Spots" through 24/7 AI surveillance.	50% reduction in fatal accidents by 2030.

V. Conclusion: The Call to Action

The path to a safer Jammu and Kashmir is paved with Intelligence—both human and artificial. While AI and ITMS provide the tools, the "Soul" of road safety remains the awareness of the common man. We cannot innovate our way out of a lack of character; we must educate our way into a culture of responsibility.

It is time for our researchers to step out of the labs, for our experts to step into the policy rooms, and for our institutions to become the incubators of a New Mobility Paradigm.

VI. The Underage Driving Crisis: A Societal Failing

The most heart-wrenching challenge I face as a mobility expert is the rising tide of underage driving in the Valley and Jammu city. It is now common to see 14-year-olds maneuvering high-cc motorcycles and SUVs through congested arteries. This is not just a traffic violation; it is a pro-found failure of the "First Stakehol-er"—the Family.

1. The Role of Guardians and Parents

No AI or ITMS can replace parental supervision. We must enforce a shift where:

- **Legal Accountability:** Parents must realize that under Section 199A of the Motor Vehi-cles Act, they are legally liable for the crimes of their minor children. A vehicle in the hands of an untrained minor is an unlicensed weapon.
- **Reframing "Status Symbols":** Our society often equates a teenager driving a car with "coming of age" or "prestige." We must dismantle this dangerous narrative through com-munity-led social conditioning.

2. Fuel Stations and Schools as Gatekeepers

Stakeholder intervention must be physical. I advocate for:

- "No Helmet, No Fuel" & "No License, No Fuel" protocols at all retail outlets, strictly en-forced through CCTV and AI-based verification.
- **School Sensitivity Zones:** Educational institutions must adopt a "Zero-Vehicle Policy" for students without valid licenses. Schools should not just be centers of academic learning but the birthplaces of Civic Discipline.

VII. The Education Sector: From Awareness to "Safety Literacy"

If we are to achieve 100% adherence to traffic rules, we cannot rely on fear of the challan alone. We must cultivate a "Safety Literacy" that starts in the primary classroom.

1. Integration into the National Education Policy (NEP)

I propose that the J&K Board of School Education (JKBOSE) and higher education institutions integrate Applied Road Safety as a graded subject.

- **Role of Universities:** Research centers should move beyond theoretical engineering to Behavioral Psychology, studying why J&K road users exhibit specific patterns of risk-taking.
- **Community Organizations & NGOs:** The role of groups like SACPPE and AIMTC is to act as the "Third Eye," conducting localized workshops in Mohallas and Panchayats to reach those who are outside the formal education system.

VIII. Road Safety as a Pillar of "Viksit Bharat 2047"

Our Honorable Prime Minister's vision for a Viksit Bharat (Developed India) is not merely about GDP; it is about the Quality of Life. A nation where thousands perish on the roads annually cannot claim to be fully "Viksit."

1. The Mission of Nation Building

Road safety is a direct contributor to the national economy. Every life lost is a loss of "Human Capital" and a dent in our national productivity.

- **Zero Tolerance for Fatalities:** We must adopt the "Vision Zero" philosophy. In a civilized society, no death on the road is acceptable.
- **ITMS as an Equalizer:** Technology ensures that the law is applied equally to the VIP and the commoner. This transparency is the hallmark of a developed, democratic society.

2. The Great Goal: A Civilized Mobility Ecosystem

To reach the big goal of a $30 trillion economy by 2047, J&K must lead by example. By merging our traditional values of Kashmiriyat (empathy and brotherhood) with cutting-edge AI interventions, we can create a transport system that is:

- **Safe:** Where a child can cross the road without fear.
- **Sustainable:** Where AI optimizes traffic to reduce our carbon footprint.
- **Self-Disciplined:** Where 100% adherence is the cultural norm, not a forced mandate.

IX. Conclusion: The Roadmap to 2047

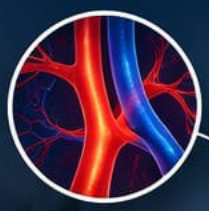
We stand at a crossroads. One path leads to further chaos, the other to a disciplined, AI-enhanced future. As a mobility expert, I call upon every citizen—from the student in Baramulla to the trader in Jammu—to recognize that Road Safety is the highest form of Patriotism. When we stop at a red light, when we refuse to let a minor drive, and when we embrace the ITMS digital transition, we are not just following rules; we are building a nation.

> ***"Our roads should be pathways to progress, not corridors of grief."***



Smooth Traffic is to a Nation
What Blood Circulation is to a Human Body.

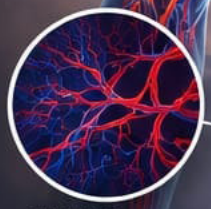
Onnyx — Keeping the Nation Moving.



MAJOR ARTERIES
(Expressways)



JOINTS
(Intersections)



SMALLER VEINS
(City Roads)



MICRO VESSELS
(Local Streets)



NATIONAL EXPRESSWAYS
(Major Arteries)



INTERSECTIONS
(Joints)



CITY ROADS
(Smaller Veins)



LOCAL STREETS
(Micro Vessels)

Smoother Flow at Junctions | Safer and More Reliable Travel | Higher Network Efficiency | Healthier, Stronger Communities

Onnyx™

KEEPING THE NATION MOVING.

Smooth Traffic Is to a Nation What Blood Circulation Is to a Human Body



Jitendra Kaushik

Founder & CEO, Onnyx Electronisys Pvt. Ltd.

I have been working in the fi elds of traffic signals, traffic management and Intelligent Transportation Systems for nearly three decades. Over the years, working across different cities, observing traffic at close quarters, spending time at intersections and working practically with traffic authorities, one thought has become increasingly clear to me:

Why do we continue to look at roads simply as roads?

I believe that a nation's entire road network has much in common with the circulatory system of the human body. Think about the human body. It has large arteries and veins, smaller blood vessels and extremely fi ne capillaries. Their sizes are different and their functions operate at different levels, but ultimately, they are all part of one interconnected network. Our road network works in much the same way. We have expressways and national highways. Then come state highways and major city roads, followed by smaller roads, sector roads, colony roads and lanes. Just as a large artery gradually branches into smaller vessels to carry blood to different parts of the body, our road network carries people and goods from the national level all the way down to an individual locality.

But there is an important distinction.

The human body does not remain healthy simply because it has blood vessels. Blood must circulate through them continuously and smoothly. I believe exactly the same principle applies to our road infrastructure. We can build wider roads, more expressways and more fl yovers. But if movement on those roads is not smooth, if traffic is unnecessarily stopping, or if congestion keeps building up at intersections, then we are not making full use of the infrastructure we have created. That is why I often express the idea in one simple line:

"Smooth Traffic is to a Nation What Blood Circulation is to a Human Body."

Roads Are Not Just Concrete and Asphalt

When we look at traffic on a road, we see cars, buses, trucks and two-wheelers. But I see something more. Inside those vehicles are employees, businessmen, students, doctors, workers and families. Trucks carry raw materials and fi nished products. Public transport carries thousands of people whose daily productivity depends on reaching their destinations. Emergency vehicles may carry something even more valuable: **time that could be critical to someone's life.** In other words, it is not simply vehicles that are moving on our roads. **A nation's economic and social activity is moving.** This is why traffic congestion is not merely a transportation problem. It affects productivity, fuel consumption, pollution, business efficiency, emergency response and, ultimately, quality of life. Every unnecessary stop, every avoidable queue and every minute spent waiting at an intersection represents more than delayed traffic. It represents time that could have been used elsewhere.

Intersections Are the Critical Points of Circulation

There is another part of this analogy that I fi nd particularly interesting: **intersections.** Roads cross, merge and divide. At intersections, multiple streams of traffic come together, often from different directions and with different demands. This is where traffic signals play a critical role. Traditionally, we have thought of a traffic signal as a machine that changes from Red to Amber to Green according to predetermined timings. But in today's environment, I believe that is no longer enough. If traffic is a form of living circulation, then a traffic signal should not remain merely a timer. **It should become an intelligent regulator of circulation.** It should be capable of understanding how much traffic is approaching from different directions, where queues are building, how demand is changing and when a particular movement may require priority. The objective should not simply be to change lights. The objective should be to **manage movement intelligently.**

From Traffic Signals to Intelligent Traffic Signals

Artificial Intelligence, real-time data, connected infrastructure and intelligent algorithms are giving us an opportunity to rethink traffic management.But there is one principle in which I strongly believe:

Every problem does not require new hardware.

Our cities already have thousands of traffic signals, controllers and other pieces of infrastructure installed. Before continuously adding more physical infrastructure, we should ask a fundamental question: **How much smarter can we make what we already have ?** If an existing traffic signal can understand traffic demand, optimise its operation according to changing conditions and respond intelligently to exceptional situations, the same physical infrastructure can become significantly more useful. For me, this is where the real transformation begins: **From Traffic Signals to Intelligent Traffic Signals.** And eventually: **From Traffic Management to Intelligent Mobility Management.**

A Good System Must Understand When Conditions Change

The human body teaches us another important lesson. Under normal conditions, the body continuously works to maintain balance. But when something unusual happens—an injury, bleeding or an infection—the body recognises that the situation has changed. More importantly, its priorities change. To me, this is an important characteristic of an intelligent system. A good system should not only manage normal conditions efficiently. **It should also recognise when the situation is no longer normal and understand that something else has temporarily become more important.** I believe our traffic systems should develop the same kind of intelligence. Under normal conditions, the objective is to manage traffic as efficiently as possible. Every vehicle matters, and available road space needs to be shared intelligently. But imagine an ambulance carrying a patient becoming part of that same traffic. That ambulance is no longer simply one more vehicle. For those few minutes, **time itself becomes critical.**

At that moment, the traffic system should be capable of recognising the emergency and temporarily changing its normal priorities. It should help create a passage for the ambulance, enable it to move through the network with minimal interruption and then return smoothly to normal operation. This is how I look at **Emergency Vehicle Priority:** For me, it is not simply about making a traffic light green. The larger idea is to build a road system that understands that **not every situation is the same—**and that some moments require a different kind of priority. The human body has been teaching us this quietly, all along.

Making Existing Infrastructure Intelligent

This philosophy also changes the way we should think about technology. We often find ourselves surrounded by terms such as AI, IoT, V2X, sensors, algorithms and data. All of these technologies are important. But for me, their ultimate purpose is simple. If technology can save the time of a person waiting in traffic, reduce unnecessary stopping, minimise fuel wastage, help reduce pollution, move goods more efficiently or give an emergency vehicle priority when it is genuinely needed, then technology is serving its real purpose. **Technology is not the destination. Technology is an enabler.** The destination is: **Safer, smoother and more efficient mobility.**

A Nation's Circulation Should Never Stop

India is growing rapidly. Our cities are expanding, vehicle populations are increasing, economic activity is growing and the demand for mobility continues to rise. Simply continuing to make roads wider cannot be the only long-term answer. We need to make more intelligent use of the road capacity we already have. We need to look at traffic signals not as isolated junction devices, but as parts of a connected network. And ultimately, we need to look at the entire mobility network as a kind of living circulatory system—one in which information continuously flows and traffic management responds intelligently to what is happening on the road. After nearly three decades in this field, my thinking increasingly comes back to one simple principle: **A healthy human body needs smooth blood circulation. A healthy, productive nation needs smooth traffic circulation.** Perhaps this is the simplest way to describe what we at Onnyx are trying to build: not merely better traffic signals, but a **smarter road network that understands movement, responds to changing conditions and ultimately serves the people who depend on it.**

Onnyx — Keeping the Nation Moving.

Innovation opportunities in Cybersecurity for Intelligent Transportation Systems (ITS)

N. Subramanian

Executive Director

Society for Electronic Transactions and Security (SETS)



India is marching ahead adopting recent advancements in Intelligent Transportation System include adoption of range of technologies for AI driven advanced traffic management, unified public mobility and precision highway planning. Also, steps are being taken towards phased implementation of Vehicle-to-Vehicle (V2V) communication systems eventually moving towards Vehicle to Everything (V2X). This opens us interesting opportunities for innovation ecosystem leveraging networked entities involving sensors, IoTs, edge computing, cloud and AI based data analytics.

Cybersecurity is one core aspect that needs to be addressed in such an advanced network environment. Ensuring security in such dynamic and high mobility environment is a key challenge and requires adoption of core cryptographic principles, privacy enhancing techniques and proactive security controls. Following are some of the open areas and opportunities for innovation:

1. Cryptographic schemes can offer effective authentication, confidentiality and integrity through standard schemes. This is essential for authenticating sensors/devices, secure communication between nodes.

2. Privacy enhancing techniques such as differential privacy, zero knowledge proof and secure multi-party computation, federated learning etc are required to ensure the privacy of user data.

3. Proactive security - technologies for monitoring and identifying anomalies in nodes, setup of security operations centres leveraging AI based analytics are important for mitigating, and neutralizing cyber and physical threats. This involves AI driven Intrusion detection, threat modelling framework, Unifying security operations.

Society for Electronic Transactions and Security (SETS) team is working in related areas of research towards implementation of Cryptographic algorithms for IoT environments, implementation of post-quantum cryptographic schemes towards future proofing, hardware security and towards implementation of national level trust framework.



SOLUTIONS

ITS 2025-26





ITS INDIA
Shaping the Future of Mobility

NRSTC 2026

NATIONAL ROAD SAFETY TECHNOLOGY CONCLAVE

25 – 26 AUGUST 2026

IIT BOMBAY, POWAI, MUMBAI

ITS INDIA
Shaping the Future of Mobility

NRSTC 2026

NATIONAL ROAD SAFETY TECHNOLOGY CONCLAVE

25 – 26 AUGUST 2026

IIT BOMBAY, POWAI, MUMBAI

THESE ARE THE SELECTED SOLUTIONS

Enforcement & Compliance

- Jio Platforms
- Prama India
- Sensen Video Intelligence
- SCITA
- Crashfree India

Vehicle-Fitted Safety Systems

- Aha Automotive
- Sego Automobile Solutions
- Gahan AI

Driver Behaviour & Fleet Monitoring

- Netradyne
- Humsafar (Goodmind)
- Cautio

Traffic & Road Network

- DataCorp Traffic
- Arcadis
- ITS Planners & Engineers
- HERE Technologies

Emergency Response & Crash Data

- Onnyx Electronisys
- Crash Scene Copilot
- Arcadis – Epath

Emerging Technologies

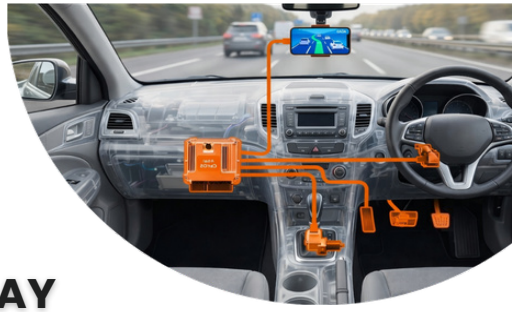
- IRSM
- Highway Saathi (Metro Infrasys)
- DigiSadak – Hanu AI
- Applied Information

Future Technologies

- Danlaw Technologies
- Zero-Sum ITS Solutions

contact@ahaauto.ai





WORLD'S FIRST UNIVERSAL PLUG & PLAY RETROFIT ADAS SYSTEM

Any vehicle, *any* fuel type, *any* model, *any* year.

India loses a life to a road crash every three minutes, 1.72 lakh a year, and road crashes cost the economy over 3% of GDP. Over-speeding alone is behind 68% of these deaths. GSR 184E brings ADAS to new trucks and buses, but 95% of the ~40 crore vehicles already on the road have neither ADAS nor a retrofit pathway. Enforcement punishes after the crash; it cannot prevent one. New vehicles will get ADAS, but **what about the other 95% already on Indian roads?**

THE **PROBLEM**

ADAS is built into the vehicle at the factory. It cannot be added later. Every vehicle already on the road is trapped: no modern safety, and no way to get it short of buying new.

OUR **SOLUTION**

- Take your existing vehicle
- Add a sensor and electronics layer
- Give it AI-powered perception
- Upgrade it with the latest ADAS features, non-intrusively.

ahaauto.ai



Cruise Control
Encourages safe & constant speed, saves fuel, reduces fatigue. (Deployed 2024).

Adaptive Cruise Control
Set your speed. It handles the gap. (2027 roadmap)

Adaptive Speed Limit
Dynamic. Stay within the limit, automatically. (Deployed 2026)





AEB, Traffic Jam Assist
Handles emergency brakings and stop & go crawl. 0 to 30 kmph (2028 roadmap)





BUILDING FOR **THE NATION**

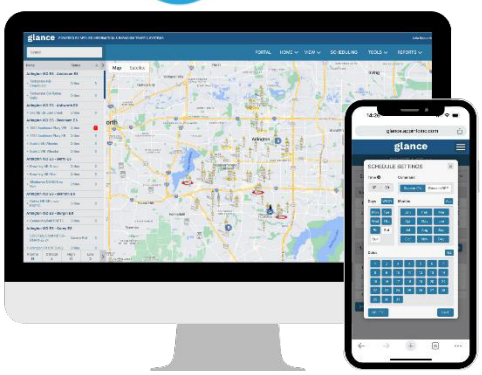
A home-grown ADAS stack. IP, data and compute stay in India. The speed control that saves lives also saves Forex, cuts national CO_2 emissions, and fulfils the vision of "Make in India, make for the World".

ICAT PATENTED **MADE IN INDIA**

2500+	125+	7	2.4 Cr+	286+ T	200+
USERS	CITIES	COUNTRIES	KMS DRIVEN	CO2 SAVED	INSTALLERS

Glance® Smart City Platform

Solution Overview



Glance, from Applied Information, Inc., is a cloud-based platform that connects traffic signals, school zone beacons, emergency vehicles and transit to a single dashboard. Instead of trenching roads, laying fiber or building server rooms, Glance links field devices over cellular networks, giving agencies real-time visibility and remote control from day one. Safety alerts can also reach road users directly through the TravelSafely™ app.

Key Features

- **School Beacon Management:** Central scheduling and live monitoring of solar school zone beacons.
- **Emergency Vehicle Preemption (EVP):** Green signals for ambulances and fire vehicles ahead of arrival.
- **Remote Intersection Management:** Diagnose and adjust signal cabinets without a site visit.
- **C-V2X Roadside Units:** SAE J2735 messaging to connected vehicles on high-risk corridors.
- **Transit Signal Priority:** Help buses stay on-schedule with green lights for late buses, even accounting for near-side stops.
- **Traffic Network Health Monitoring:** Faults detected and flagged before the public reports them.

Applications

School zones, hospital access corridors, urban arterials, national highways, bus routes, and city-wide or state-wide networks.

Benefits

- **Faster, lower-cost deployment:** No trenching, fiber or on-premise servers.
- **Fewer wasted site visits:** Crews dispatched only when truly needed.
- **Safer journeys for the most vulnerable:** Reliable school zones and faster emergency response.
- **Scales with limited staff:** One team can oversee thousands of devices.

Deployment Details

Glance is live across more than 1,950 transportation agencies, with over 60,000 connected devices, more than 15 lakh emergency priority trips in 2026 alone, and over 10% of all US school zones. One EVP customer cut first-responder travel times by roughly 43%, and one school beacon customer reported a 90% reduction in complaints from the public after implementing Glance. Much of the platform is built by Applied Information's India-based engineering team.

Contact

Vijay Kumar, Vice President of Glance Development | vkumar@appinfoinc.com | appinfoinc.com

ePath
Emergency Vehicle Priority and Green Corridor Management System



SOLUTION SUMMARY

ePath supports critical medical movements by connecting hospitals, ambulance drivers, ambulance service providers, Bengaluru Traffic Police, the Traffic Management Centre, field officers, and adaptive traffic signals through a shared digital workflow. Hospitals and authorised agencies can create an emergency movement and assign the route, ambulance, and driver. Once the journey starts, the platform tracks the ambulance through GPS and displays its live location, route, speed, estimated arrival time, and movement status to authorised users.

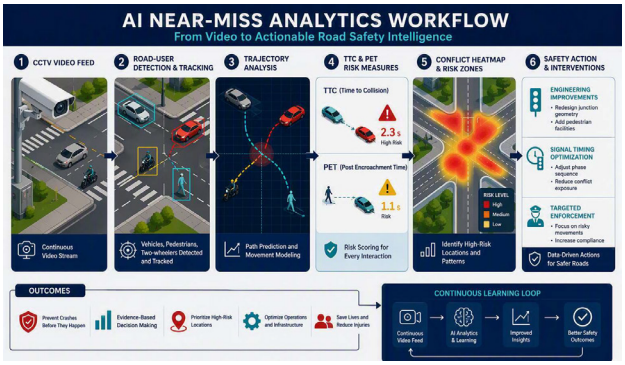
The system monitors the journey and generates alerts when the ambulance is delayed, moving at low speed, or stuck in traffic. The driver can also use the SOS feature to seek immediate traffic police support during a breakdown or other emergency. The Traffic Management Centre can monitor the route and coordinate field intervention where required. When a registered movement approaches connected adaptive signals, the signal system can provide green priority along the route. This helps create a continuous green corridor rather than relying only on manual clearance at individual junctions.

ePath replaces fragmented phone calls and junction-level coordination with one operational view. It helps hospitals, ambulance operators, drivers, and traffic police coordinate each medical movement from the initial request to hospital arrival. The platform also stores journey records, alerts, route information, and travel times for operational review and reporting.

DEPLOYMENT / STUDY HIGHLIGHTS

2,413 ambulance movements	**14 min** avg. travel time saved	**328** registered ambulances
174 registered drivers	**42** agencies onboarded	**20** active hospitals

AI-Based Near-Miss Detection
Proactive Road Safety Analytics for Indian Roads



SOLUTION SUMMARY

The solution uses AI-based video analytics to identify unsafe interactions between road users before those interactions result in crashes. It processes live or recorded feeds from existing CCTV and traffic cameras. The system detects and tracks vehicles, two-wheelers, buses, auto-rickshaws, pedestrians, cyclists, and other road users as they move through an intersection or corridor. It then reconstructs their paths and analyses where those paths approach, cross, or create a potential collision risk.

The platform measures Time to Collision, or TTC, which estimates how soon two road users would collide if their current paths and speeds continue. It also measures Post-Encroachment Time, or PET, which records the time gap between one road user leaving a conflict point and another reaching the same point. These indicators are combined with conflict frequency, severity, road-user type, location, movement pattern, and time of day to identify high-risk interactions.

The system converts the results into conflict heatmaps, movement-level analysis, safety reports, and junction or corridor risk scores. Traffic police and road agencies can use this evidence to identify unsafe turning movements, pedestrian conflict areas, aggressive merging, speed-related risks, and recurring hotspots. The findings can support junction redesign, signal timing changes, pedestrian facilities, speed management, channelisation, and targeted enforcement. Agencies can repeat the analysis after an intervention to measure whether the number and severity of conflicts have reduced. This shifts road safety planning from reacting only to recorded crashes towards detecting and treating risk before serious harm occurs.

DEPLOYMENT / STUDY HIGHLIGHTS

6,926 near misses detected	**167** person-two-wheeler events	**TTC / PET** risk indicators
Heatmaps conflict hotspots	**Risk score** junction comparison	**Before / After** intervention review

cautio

AI-Powered Fleet Safety & Mobility Intelligence

Full Stack Safety Platform for safer commercial mobility on Indian Roads



Solution Summary

Cautio combines proprietary Edge AI dashcams, Fleet OS and a 24x7 AI-Governed Command Center with Human-in-Loop to detect, verify and act on road-risk events in real time. Built for India's mixed traffic conditions, the platform converts video, GPS and driver behaviour signals into live alerts, evidence and coaching workflows for commercial fleets.

The Problem It Solves

Traditional dashcams record incidents after they happen. Cloud-only analytics add latency, generic models miss Indian road edge cases, and fleet teams often lack verified evidence or timely escalation during high-risk events.

Edge AI in Vehicle

- Sub-100 ms edge risk detection.
- DMS: fatigue, distraction, phone, smoking, seat belt.
- ADAS: collision, lane, tailgating and pedestrian risk.

Fleet OS

- Live tracking, playback and event evidence.
- Driver risk scores and coaching workflows.
- Secure, India-hosted, role-based access.

Command Centre

- 24x7 verification for high-severity events.
- Escalation support for critical incidents.
- Auditable evidence to reduce liability risk.

Photographic Representation





Deployment Highlights

22+	130+	15+ Cr	33L+	1,270+	Rs 25.6 Cr
states	cities	safe km	trips	critical incidents	liability avoided

Partners We Work With

TRUSTED BY MORE THAN 500+ OPERATORS ACROSS INDIA



+many more

CRASH SCENE COPILOT

The Missing Voice in Road Safety

AI Voice-to-eDAR Accident Reporting Assistant for Indian Law Enforcement

ITS INDIA CONGRESS 2026 SOUVENIR SUBMISSION | Featured at the National Road Safety Technology Conclave (NRSTC) 2026, IIT Bombay

SOLUTION SUMMARY

India's official crash-reporting platform, eDAR, is meant to be the single source of truth for road-crash data — yet first responders, mostly constables and sub-inspectors under acute time pressure, routinely leave critical fields (crash configuration, road geometry, weather, collision partners) blank or generic, and must file in English despite thinking and speaking in vernacular languages such as Assamese. The result: reported fatalities understate WHO estimates by roughly 31%, and policy decisions on black-spot correction, ITMS deployment and enforcement are built on incomplete evidence.

Crash Scene Copilot is an AI-powered voice assistant that lets an officer simply narrate the crash scene naturally, in his own language, at the roadside. A fine-tuned speech-recognition engine transcribes the narration; an LLM extraction layer built on Sarvam AI — an Indian, sovereign large language model — maps it structured eDAR/iRAD fields; the system then flags any missing or inconsistent field and asks a vernacular follow-up before generating a complete, upload-ready report. It is the first tool built specifically for the officer at the scene, not the form at the station.

CORE FEATURES

- Vernacular, voice-first intake — officers narrate in Assamese (or any local language) with no typing, forms or English required at the scene.
- Automated structuring — Sarvam AI, an Indian sovereign LLM, converts free narration into standardised eDAR/iRAD crash-attribute fields.
- Conversational gap-check — the system detects missing or inconsistent fields and prompts the officer in vernacular before finalising the report.
- Zero specialised hardware — runs on any Android smartphone already used by field officers, at an estimated cost of ~₹3 per accident report.

HOW IT WORKS — END-TO-END WORKFLOW



DEPLOYMENT HIGHLIGHTS

<1%	>95%	1,000+	₹3
Word Error Rate	eDAR Field Compliance	Minutes of Real Officer Audio	Cost per Accident Report

Trained on 1,000+ minutes of real crash-narration audio from serving Assam Police officers and live-deployed in selected police stations in Guwahati, Assam. Conceived, built and owned entirely by an individual Indian student innovator — indigenous IP with no foreign collaboration, running on an Indian sovereign LLM, with all data stored on Indian soil. Architecturally scalable to any Indian language and any state, at near-flat marginal cost.

Vihaan Upadhyay · Student Innovator · Guwahati, Assam
vihaanupadhyay1215@gmail.com | +91 6002790514

SATARK The enforcement co-pilot for traffic police.

An AI-powered vehicle compliance platform that links ANPR cameras to live government records (ULIP / VAHAN), turning every scan into a real-time police interception and a public challan billboard. Built by Crashfree India, CSR-funded by Cars24, and deployed at no cost to police departments.

01 Solution summary - detection without consequence is not enforcement.

56%
of India's registered vehicles are uninsured - 16.54 Cr of 30.48 Cr (SC, 2026 INSC 793).

64%
of e-challan fine value issued since 2015 is still unpaid - over ₹42,000 crore that never landed (Cars24 analysis).

"There is no uniform mechanism in place with State Police to verify insurance status."
Supreme Court of India, 4 Aug 2026 - directing ANPR + live VAHAN/insurance checks and live-data devices for police. SATARK runs this today.

1. **ANPR scan** - Camera reads the plate, 24/7
2. **Live ULIP check** - Government records per scan - no cache
3. **Rule engine** - Police set the thresholds, per city
4. **Officer alert** - App + control room + billboard, real time
5. **Interception** - Recorded, with a full audit trail

CHECKED LIVE ON EVERY SCAN: RC status · Pending challans · Insurance · PUCC · Fitness · Stolen / blacklist

Two pipelines, one camera
Public billboard for awareness; police-filtered alerts for enforcement.

Police-owned control
Control room, officer app and flagging rules configured by each city's police.

Privacy by design
Only plate + status shown; owner name, chassis and engine numbers always masked.

02 In operation - street, control room, officer's hand.



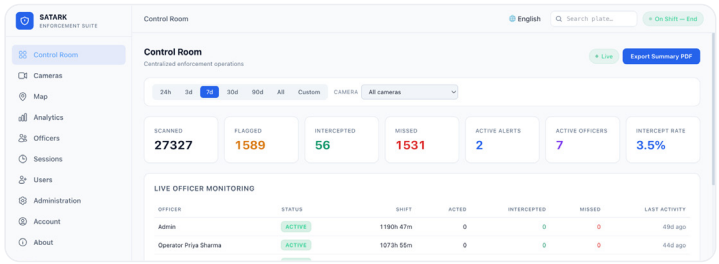
● **Jaipur** · Rambagh Circle



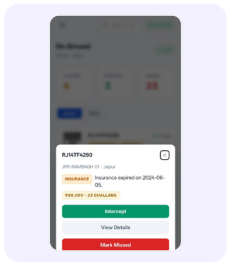
● **Bengaluru** · Trinity Circle



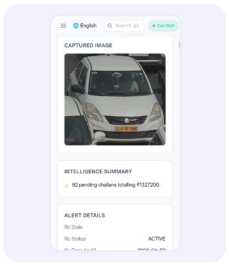
● **Gurugram** · Sohna Chowk



Control room - live shift KPIs and officer monitoring



Field alert - one-tap intercept



Capture - photo + dues

03 Deployment highlights - live since June 2026.

5.4 lakh+ vehicles screened

₹53 Cr+ pending challans identified

600+ recorded police interceptions

~1 min detection to interception (Jaipur)

- **Live in 3 cities:** Jaipur, Bengaluru and Gurugram.
- **92 challans, ₹13.27 lakh** pending on a single vehicle - flagged live as it passed the camera.
- **India's first police-owned AI challan billboard** - Gurugram; the police own the asset, the rules and the credit.
- **Installing:** Pune and Rajkot - first conversation to signed MoU in 9 days. Next: Trivandrum, Surat, Thane, Ranchi, Ghaziabad, Chennai, Kolkata.

Crashfree india

Deepanshu, Co-founder & Managing Trustee · deepanshu@crashfreeindia.org | **Yuvraj Yadav** · yuvraj.yadav@crashfreeindia.org

Mobile enforcement

DataCorp Bike Interceptor | Road safety beyond fixed cameras

Fixed-camera enforcement is concentrated at designated locations, leaving gaps across urban streets, market corridors and highways. DataCorp brings automated enforcement to the patrol vehicle, enabling authorities to move coverage between locations and reach areas beyond permanent installations. Radar, automatic number plate recognition (ANPR) and video analytics combine to detect violations, capture evidence and generate e-Challans with minimal manual intervention. This mobile approach makes enforcement less predictable and encourages compliance beyond fixed checkpoints.

01 Solution in operation



DataCorp Bike Interceptor on patrol duty

Bike Interceptor

A compact ANPR + radar system mounted on a standard patrol motorcycle detects 10+ violation types, including speeding and no-parking violations. Its mobile form factor extends enforcement into narrow lanes, congested streets and areas with limited fixed-camera coverage.

An all-day battery supports full-shift operation, with real-time evidence upload and e-Challan integration. The system is calibrated for Indian number plates and mixed traffic. It is built to operate in heat, dust and monsoon conditions.

02 How it works

01	02	03	04
Detect (radar + ANPR)	**Capture evidence**	**Auto-classify & validate**	**Generate e-Challan and command-centre alert**

03 Deployment highlights

2,78,308	>90%	±2 km/h
Cumulative e-Challans	**ANPR read accuracy**	**Certified radar accuracy**
Chennai deployment	Indian number plates	Speed detection

Performance figures reported in DataCorp's NRSTC 2026 submission.

Chennai: 3 Car Interceptors deployed with Greater Chennai Police. Car Interceptors have been in continuous enforcement use since 2023.

Bengaluru: Bike Interceptor successfully field-tested and formally recommended by Bengaluru City Police, with an approval report issued following a two-week pilot.

Made in India. Built to scale. Vehicle-based deployment needs no fixed civil works, roadside power or fibre. Integration with Parivahan e-Challan supports connected enforcement, with data retained by the respective state authority.

DataCorp Traffic Private Limited | Bengaluru
www.datacorp.tech | info@datacorp.tech | +91 80669 01800

Gahan AI

India's only production-ready
indigenous automotive-grade radar platform

DRWIG | Indigenous Radar-Camera Fusion for Road Safety & Driver-Assistance Systems

SOLUTION SUMMARY

Nearly all radar sensors used in Indian vehicles today are imported and calibrated for foreign roads and weather, not for Indian monsoon clutter, mixed traffic density, or two-wheeler-heavy corridors. MoRTH reported 4.87 lakh road accidents and 1.77 lakh fatalities in 2024 — roughly 485 deaths a day — underscoring the urgency for driver-assistance and infrastructure perception systems engineered for Indian conditions.

DRWIG is Gahan AI's indigenously designed 77 GHz FMCW mmWave radar platform, fused with camera perception, built to power road-safety and driver-assistance functions for Indian commercial and passenger vehicles. Developed with Texas Instruments as Gahan AI's only Indian automotive radar design partner, the sensor stack is engineered end-to-end — hardware, camera-radar fusion, and India-trained perception AI — and is TRL-8 certified, production-ready hardware, not a lab prototype.

Core features:

- 77 GHz FMCW radar, custom PCB, AEC-Q100 qualified — up to 250 m detection range
- Camera-radar fusion (coordinate transform, outlier filtration) at under 50 ms latency
- India-trained perception AI classifying two-wheelers, cattle, pedestrians and vehicles
- Engineered to support AIS 162 (AEB), 184 (Driver Drowsiness & Attention), 186 (Blind Spot Info), 187 (Moving Object Info) and 188 (Lane Departure Warning) functions
- Field-validated across monsoon, fog, dust, unlit rural roads and chaotic urban intersections

PHOTOGRAPHIC REPRESENTATION



DRWIG radar-camera fusion: real-time lane curvature & offset detection on Indian highway



DRWIG sensor unit In-cabin Automotive Application

DEPLOYMENT & VALIDATION HIGHLIGHTS

26 mo.	**14**	**30,000+ km**	**10+ TB**
TRL-2 to TRL-8 engineering timeline	Hardware iterations	Field-validated	India road dataset annotated

Field-validated road & weather conditions:

Monsoon	**Fog**	**Dust**	**Urban**	**Night**
Heavy rain + spray	Near-zero visibility	Rajasthan highways	Chaotic intersections	Unlit rural roads

Sensor stack engineered to AIS 162 / 184 / 186 / 187 / 188 functional requirements, with ARAI certification pathway active. Gahan AI is Texas Instruments' only Indian automotive radar design partner and holds 10 patents on its indigenous radar-camera fusion architecture.

Gahan AI Technologies Pvt. Ltd. | info@gahanai.com | +91 72049 01286 | gahanai.com

V2X Emergency Services

Above and Below Ground

02 OCTOBER 2026 | BENGALURU, INDIA





One secure emergency-response layer that reduces time-to-reach above ground and time-to-locate below ground.

Two critical environments. One V2X foundation.

ABOVE GROUND | EMERGENCY MOBILITY

Urban green corridors

Ambulances communicate directly with equipped junctions to request safe signal priority. Local V2X action supports deterministic response without depending on public mobile-network availability.

BELOW GROUND | EMERGENCY LOCATION

Mine location and mustering

GNSS-independent V2X ranging, inertial sensing and mine-map constraints locate personnel and vehicles, validate refuge or muster status and preserve last-known-location history.

Shared technical architecture

01
IDENTIFY
Authenticated ambulances, mine vehicles, personnel tags and infrastructure.

02
COMMUNICATE
Direct V2X links through vehicle units, roadside units and secure credentials.

03
ACT
Signal priority, zone events, emergency alerts, mustering and operator workflows.

04
VERIFY
Command-centre visualization, timestamps, event history and incident replay.

Measured evidence and pilot targets

URBAN PILOT
38%
Measured reduction in emergency-vehicle travel time

URBAN PILOT
7 sec
Average signal response after the priority request

MINE TARGET
<5 m
Typical vehicle-position reference for pilot validation

MINE TARGET
100%
Identity reconciliation during controlled muster drills

India deployment and data model

INDIA ENGINEERING VALUE

Danlaw Technologies India Limited leads application software, algorithms, signal-priority logic, system integration, site-specific fine-tuning, validation and lifecycle support. Urban V2X technology is provided by Danlaw and Cohda Wireless; Danlaw owns the mining RTLS platform IP.

DEPLOYMENT AND SOVEREIGNTY

Urban deployments scale corridor by corridor; mine deployments begin with a surveyed representative zone. City data remains city-owned and Danlaw-hosted. Mine location and incident data can remain fully on-premise, subject to controlled support access.

Evidence note: urban figures are verified observations from the Bengaluru green-corridor pilot. Underground figures are product references and proposed pilot acceptance targets to be validated under site-specific mine conditions.

DigiSadak™

ROAD ASSET MANAGEMENT SYSTEM

From knowing where the road is → to knowing what the road needs

HanuAI's unified, AI and GIS-powered platform — a single source of truth for road infrastructure.

WHAT DIGISADAK DOES

Converts	Field imagery and survey data into structured road and asset records
Detects	AI identifies pavement defects and road assets automatically
Locates	Every observation geo-referenced to road, chainage and coordinates
Assesses	Condition scored and compared against earlier surveys over time
Decides	Outputs feed intervention planning, prioritisation and budgeting

AI AT SCALE, PROVEN IN INDIAN ROAD CONDITIONS

190,000+ km	300+	100,000+	250+
Indian road coverage	Projects delivered	Unique roads covered	Asset & defect classes

PROVEN IN THE FIELD

Punjab

AI-led network assessment & re-assessment

32,000 km
network assessed over time

₹2,500+ Cr
maintenance programme

Detect
↓
Match
↓
Overlap check
↓
Prioritise

Indonesia · PKRMS

With CRISIL — digital transformation of road management

480,000 km
road network under PKRMS

- Fragmented databases → one central web platform
- Corridor planning (CPIT), MCA prioritisation, budgeting
- Climate-hazard exposure built into decisions



Joint Achievement Ceremony, Indonesia


Stakeholder engagement, Indonesia


Field survey with PKRMS on tablet

ONE PLATFORM FOR EVERY KIND OF ROAD

National Highways · **State Highways & MDRs** · **Urban Roads** · **Rural & Village Roads** · **Mountain & Hilly Roads**

Surfaces: asphalt · paver block · cemented · unpaved — inventoried alongside bridges, culverts and drainage.

Traditional RAMS manages road information.
DigiSadak continuously creates road intelligence.

Contact: rahul@hanu.ai; manav@roadathena.com; prerna@roadathena.com

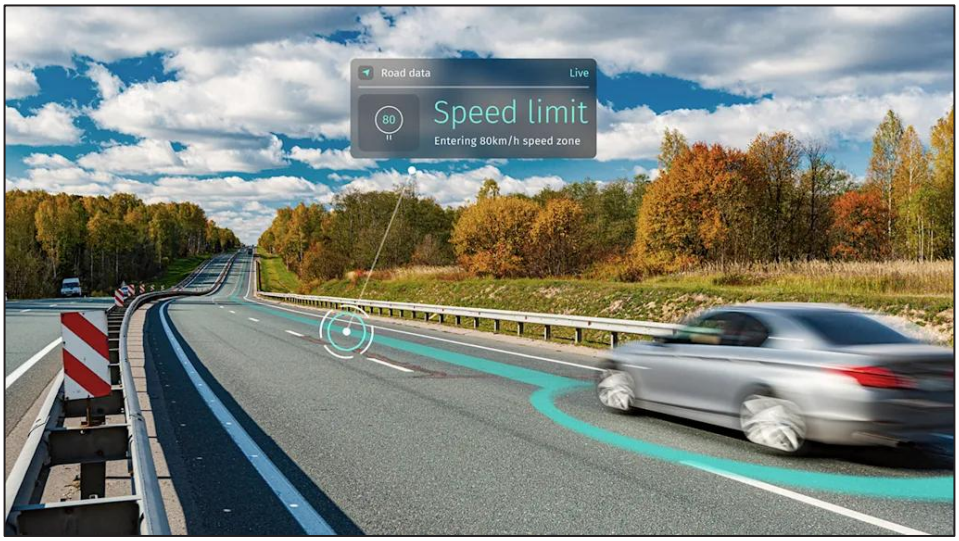
HERE Intelligent Speed Assist (ISA)

Intelligent Speed Assistance, powered by location · Proposal to NRSTC 2026

30%	**20%**	**upto 50%**
Share of all fatal crashes in EU pre 2022 caused by speeding	Potential cut in EU road accidents from ISA	Fatality reduction under mandated ISA across 6 EU nations

▪ THE TECHNOLOGY

HERE ISA Map is a map-data layer that delivers accurate, location- and time-aware speed limits including conditional, variable, and vehicle-class-specific limits directly into a vehicle's onboard or connected Intelligent Speed Assistance system. It overcomes the core limitation of camera-only sign recognition (missed, obscured, faded, or absent signage - a common condition on Indian highways and rural roads) by combining daily refreshed map data, AI/ML-based change detection, vehicle-sensor inputs, and government source data. This makes it resilient in exactly the conditions where sign-recognition-only systems fail most often: unmarked rural stretches, informal urban roads, and frequently changing construction zones.



▪ DEPLOYMENT

Proven and in continuous commercial operation since 2022: HERE ISA Map underpins Intelligent Speed Assist compliance for over 200 million vehicles across 70+ OEM brands in 180+ countries and has been the technology base OEMs rely on for compliance with the European Union's ISA mandate (mandatory on new vehicle types from July 2022; all new vehicles from July 2024).

HumSafer

Visibility down to the driver.

Good Mind Private Limited
AI driver-safety & fleet visibility · Pune / Mumbai, India
Presented at the National Road Safety Technology Conclave 2026, IIT Bombay

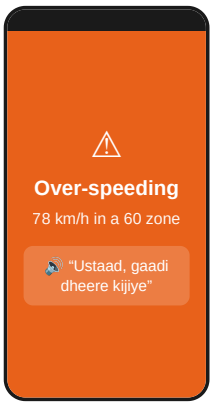
SOLUTION SUMMARY

India rates the vehicle, engineers the road and licences the driver once — for life. Nobody measures how he actually drives. HumSafer closes that gap with software alone.

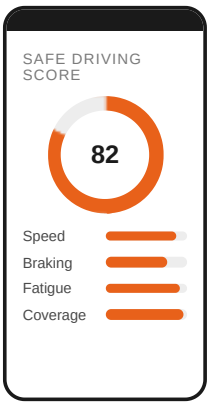
Trucks and lorries were the impacting vehicle in 32,362 road deaths in India in 2024, and over-speeding alone killed 1,24,522 people. The cause sits in the cab, but the two tools the industry offers — GPS boxes and in-cab camera DMS — either see only the vehicle or need Rs 15,000–40,000 of hardware per truck. Roughly two-thirds of Indian freight moves on market and third-party vehicles that no shipper will ever retrofit, so the risk that matters is exactly the risk that goes unmeasured.

HumSafer runs on the smartphone the driver already carries. On-device AI reads phone sensors and GPS to detect over-speeding, harsh braking, cornering, distraction and fatigue, then corrects the driver by voice in his own language within about three seconds — while he is still driving, not in a report the next morning. Every trip is scored into a Safe Driving Score; enterprises see driver-level risk, trip visibility and coverage on a live dashboard. No device, no installation, no fitment cost, and it works on owned, contracted and market vehicles alike.

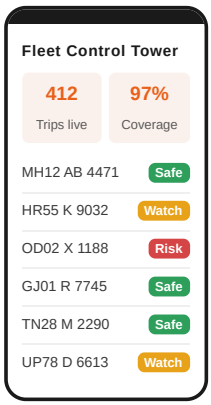
1. **Driver's own phone** — App on any Android handset. Zero hardware.
2. **On-device AI** — Sensor + GPS fusion detects the unsafe event.
3. **Voice alert in ~3 sec** — Correction in the driver's own language, mid-drive.
4. **Safe Driving Score** — Every trip scored. The driver's own portable asset.
5. **Enterprise dashboard** — Driver-level risk, trip visibility, coverage, alerts.



Real-time voice correction



Driver score & rewards



Enterprise visibility

CORE FEATURES

- **Zero-hardware deployment** — Works on the driver's existing smartphone — including third-party and market trucks.
- **Real-time voice coaching** — Correction inside ~3 seconds, in Hindi and regional languages.
- **Fatigue & distraction detection** — Drowsiness and phone-use alerts, with SOS and emergency escalation.
- **Safe Driving Score** — A portable, driver-owned rating — merit and incentives, not surveillance.
- **Trip & coverage visibility** — Shipment-level tracking with adherence and coverage reporting, not just alerts.
- **Gamified driver adoption** — Star points, family-safety features and community — 45% organic referral growth.

DEPLOYMENT HIGHLIGHTS

2 lakh+	10 crore+	~40%	3X	40%	6 years
Drivers on the platform	Kilometres of Indian highway data	Reduction in driving risk	Improvement in speed-limit adherence	Less cargo damage	Live enterprise deployment

Enterprise deployments

- **Tata Steel** — HumSafer is written into the vendor compliance circular issued to transport partners (3 July 2024); inbound and outbound movements across the vendor network.
- **Hindustan Unilever** — driver-safety and freight visibility deployment across secondary transport lanes.
- **JFK Transporters** — the origin fleet, ~150 trucks pan-India, where the approach was proven before productisation.

Recognition & policy position

- Built out of a MoRTH **Youth Transporter of the Year** winning fleet; Startup India recognised.
- Presented the **Safe Driving Score** as a national layer at NRSTC 2026, IIT Bombay — free to every driver, with a proposal for a BIS-defined open standard and state pilots.
- Commitment on record: free to every Indian driver, one lakh drivers onboarded in a state pilot within 12 months, results published quarterly.

HumSafer · Visibility down to the driver.

Jehaan Kotwal, Founder & CEO, Good Mind Private Limited · jehaan@goodmind.in · +91 98606 38871 · humsafer.info

Prepared for the
ITS India Congress 2026 Souvenir
ITS India Forum

National road-safety figures: MoRTH, *Road Accidents in India 2024*. Platform performance figures are HumSafer platform data, 2020–2026, and are not independently audited; the underlying dataset is available for evaluation on request.

Data-Based Proactive Road Safety Infrastructure Assessment

iRAP Methodology, High-Speed NSVs, T5 CFME Skid Diagnostics & Retroreflectivity Audits

Indian Road Survey & Management Pvt. Ltd.
IIT Bombay | August 25–26, 2026
National Road Safety Technology Conclave

1. SOLUTION SUMMARY: TECHNOLOGY OVERVIEW & ADDRESSED GAPS

100% Indigenous Execution • 100+ Engineers

SPECIFIC ROAD SAFETY GAP ADDRESSED

Addressing India's **1,77,000+ annual fatalities** by shifting road safety engineering from reactive crash-site fixes to network-wide predictive hazard prevention before collisions occur.

- Eliminates reliance on post-fatality blackspot identification.
- Detects invisible friction losses and faded nighttime markings.
- Shields vulnerable road users (VRUs) through objective prioritization.

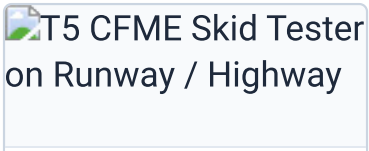
CORE TECHNOLOGY FEATURES

- **Automated NSV Imaging:** 50+ attributes/100m captured via roof laser profilometers, digital vision systems, and GiPSI Trac GPS.
- **Continuous T5 CFME Skid Testing:** percentage-slip friction measurement with 1mm self-wetting film evaluating wet braking grip.
- **IRC-35:2015 Retroreflectivity:** Continuous vehicle/handheld audits measuring night visibility (R_L) and day illumination (Q_d).
- **ViDA SRIP Cloud Engine:** Automated matching of risks with 90+ countermeasures, producing 1-to-5 Star ratings and BCR prioritization.

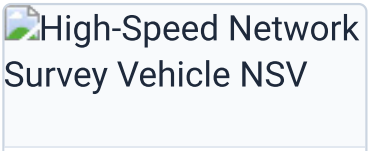
2. PHOTOGRAPHIC & VISUAL REPRESENTATION: TECHNOLOGY IN OPERATION

Full Audit Lifecycle & Field Hardware

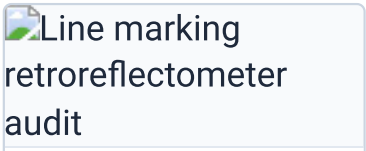
Proactive Road Safety Infrastructure Assessment and Countermeasure Planning Workflow



CFME T5 Skid Testing
Continuous friction & water-slip testing



Network Survey Vehicle (NSV)
Roof-mounted profiler & GPS asset capture



iLINE Retroreflectometer
IRC-35 nighttime marking compliance



Field Deployment Crew
Indigenous team deployed on NH/SH corridors

3. DEPLOYMENT HIGHLIGHTS: OUTCOMES & KEY CORRIDOR METRICS

Theog–Kotkhai Corridor (32.10 km, HP PWD / HPRIDC)

96.0%	511	₹ 18.93 Cr	4.0 Avg
BASELINE 1-STAR (HIGH RISK)	FATAL & SERIOUS INJURIES SAVED	20-YR PROGRAM INVESTMENT	BENEFIT-COST RATIO (BCR)

Priority Countermeasure (ViDA SRIP Blueprint)	Target Scope	20-Yr Cost (₹)	FSIs Prevented	BCR
Roadside Crash Barriers (Passenger & Driver Side)	26.20 km	₹ 9,99,78,000	338 Lives / Serious Injuries	4.0–5.0
Curve Delineation & Chevron Signage	26.60 km	₹ 1,17,35,732	98 Lives / Serious Injuries	12.0
Central Hatching Markings & Centreline Rumble Strips	14.30 km	₹ 1,64,32,974	19 Lives / Serious Injuries	1.0–18.0
Total Program Portfolio (24 Prioritized Interventions)	**32.10 km**	**₹ 18,92,73,336**	**511 FSIs Saved**	4.0 Portfolio

Indian Road Survey & Management Pvt. Ltd. (IRSM) • Contacts: abhishek@irsm.in (+91 9811418874) | sarvani@irsm.in (+91 7981423134)

FAST — Digital Twin Adaptive Signal Control

Network-level adaptive traffic signal control driven by a live Digital Twin — field-proven in Warangal to move more vehicles through the peak with no new road built.

ITS Planners & Engineers Pvt. Ltd. | ~14 years • 46 live ITS deployments • ATCS in 20+ cities | National Road Safety Technology Conclave 2026, IIT Bombay

1. THE PROBLEM

₹1.47 lakh crore lost yearly to congestion in Delhi, Mumbai, Bengaluru & Kolkata alone, while **1.77 lakh Indians** die on the roads annually — a large share at urban junctions. *(BCG-Uber 2018 · MoRTH)*

Signalised junctions are where urban traffic conflicts concentrate — and where control decisions are made blind. Today's adaptive signals optimise **one junction at a time**: they cannot see where vehicles came from or what their decision does two junctions downstream — congestion is pushed around the network, not resolved. Signal plans go unrevised for years; roadworks are permitted without modelling cumulative impact; drivers face unpredictable queues and unsafe weaving; ambulances lose minutes at every junction. The capacity already built into the road is never recovered.

2. THE SOLUTION

FAST is an adaptive signal control algorithm driven by a **live Digital Twin** — a continuously self-calibrating replica of the whole road network that models **Origin–Destination demand**, not just vehicle counts. It optimises a corridor as one system, and the same model runs offline to test schemes, diversions and roadworks *before they reach the street*.

How it works: Ingest network, detector, travel-time & O-D data → AI auto-calibrates the Digital Twin → FAST optimises signals network-wide → more vehicles cleared per peak hour, safer schemes tested first.

Make in India: wholly indigenous IP, built in-house in India; calibrated for heterogeneous, weakly lane-disciplined traffic with high two- and three-wheeler shares, and engineered for partial detector coverage. Deploys as an **add-on to ATCS already installed in 20+ Indian cities**; client retains full data ownership (on-premises or sovereign cloud).

3. EVIDENCE — WARANGAL FIELD TRIAL

MG Road corridor, Warangal — MGM and Pochamma Maidana junctions operated as one coordinated corridor. One week of continuous live operation across the morning (08:00–10:00) and evening (17:00–19:00) peaks under saturated flow, run on ITSPE's existing ATCS — **no new hardware category introduced**. Measured against fixed-time control on the same junctions:

- **+332 vehicles (+3.0%)** through the morning peak; **+182 vehicles (+1.7%)** through the evening peak
- Corridor speed held level in the morning (17.77 km/h), improved +0.21 km/h in the evening; best junction MGM **+4.1%** morning throughput
- ~22,400 vehicles served across both peaks; **₹5 lakh per junction** capital cost; scales corridor → city → state → nation with no architectural change

4. ASK FROM GOVERNMENT

- **MoHUA mandate** — cities to prioritise traffic management *operations*, not just procurement of video analytics that go unused; ATCS-equipped cities to enable network-level optimisation
- **Corridor / pilot access** — nominated saturated corridors in metro and Tier-1 cities for 3-month Digital Twin pilots, measured jointly against the current baseline
- **Data access** — institutional access to O-D and mobility datasets held by state and central agencies, lowering the recurring O-D data cost that limits city-scale rollout
- **KPI-based operations standard** — fund and assess cities on peak throughput, journey time and signal-plan currency, not hardware installed

5. COMMITMENT

- **What:** FAST Digital Twin–based network-level adaptive signal control, deployed as an add-on to the city's existing ATCS, with a KPI dashboard reporting peak throughput and journey time
- **Where:** any city in India nominated by the Committee — beginning with metros and Tier-1 non-metro cities, where saturated peak-hour conditions deliver the greatest operational gain
- **By when:** pilot corridor operational within **3 months** of approval; full nominated city network live within **9 months**. No civil works or hardware lead time — the Digital Twin layers onto ATCS already installed

Contact: Ayush Agrawal, Chief Commercial Officer | ayush.agrawal@itspe.co.in | +91 77389 24383 | ITS Planners & Engineers Pvt. Ltd.

Jio Humsafar

Connected road safety intelligence for India's commercial fleets — scoring risk before dispatch, guiding the driver in transit, and closing the loop with a 24x7 command centre.

JioThings
Jio Platforms Limited

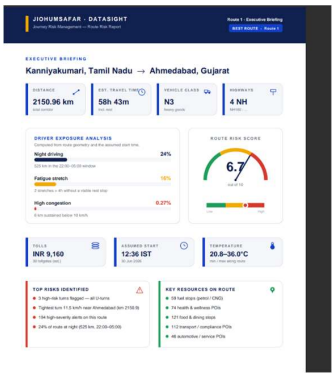
SOLUTION SUMMARY

India recorded 1.77 lakh road deaths in 2024, its deadliest year yet, and national highways, barely 2% of the road network, account for over a third of them. That is exactly where commercial fleets run every day, yet trip planning still uses generic mapping built for distance and ETA, not risk. Jio Humsafar closes that gap by scoring risk before dispatch, assisting the driver in transit, and closing the loop with a 24x7 command centre and continuous learning.

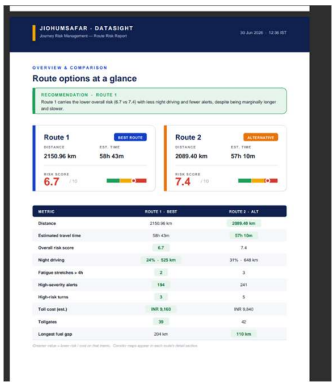
- **Pre-trip risk scoring:** a 0–10 Journey Risk Model rates the route (blackspots, night exposure, ghat sections, weather) against the assigned driver's own record before the vehicle moves, flagging known risk zones and recommending the safest route. Those risk zones are pushed to and stored on the vehicle, so on-board sensors trigger pre-emptive alerts automatically the moment it enters one.
- **In-cab, offline-capable alerts:** vision-based ADAS and driver monitoring detect drowsiness, distraction, collision risk and seatbelt/helmet non-compliance, factoring in live weather inputs, with real-time audio alerts processed on the edge, working seamlessly even in low-network conditions. A voice box (fleet call box) supports 11 regional languages and opens two-way communication between the driver and the command centre's ops team, with all sensor and driver-assistance data collected back at the command centre.
- **Automatic incident detection** (during the incident): harsh events or SOS triggers pull video evidence and notify a 24x7 command centre within seconds, putting the driver in direct contact with the command centre — no one has to dial in first.
- **Continuous learning:** the patented Jio Driver Score and the Journey Risk Model both update right after trip closure, improving the next dispatch decision.

Made in India, proven at scale. Live in continuous commercial operation since 2023. Jio Driver Score is patented; Journey Risk Management is proprietary, built in-house on Indian road and incident data.

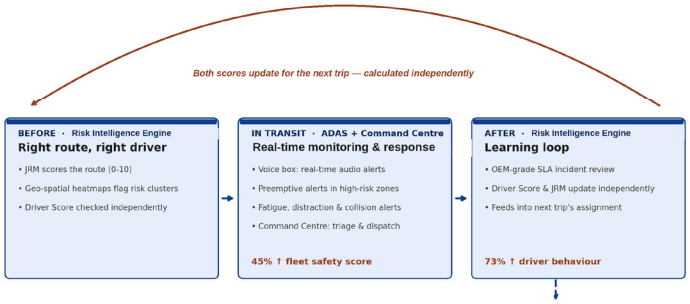
THE SOLUTION IN OPERATION



Route risk score, before dispatch. A live executive briefing scores the journey out of 10, with night-driving, fatigue and congestion exposure broken out by segment.



Safest-route recommendation. Alternate routes are compared on risk, alerts and turns, with the lower-risk option flagged automatically.



One journey, three stages, one learning loop. Risk is scored and the driver matched before dispatch, monitored by ADAS and the command centre in transit, then fed back after trip close to update both scores for the next journey.

DEPLOYMENT HIGHLIGHTS

100+ enterprise customers, paying and commercially live	**200k+** vehicles fitted across multiple industries	**10 mn+** cargo trips completed on the platform	**600 mn+** kilometres of distance covered

45% improvement in fleet safety score	**73%** improvement in driver behaviour	**23%** reduction in trip-level SLA breaches	**2 bn+** safety alerts generated to date

Where deployed: pan-India, across FMCG, retail logistics, plant & machinery, employee transport and hazardous-goods movement — 10,000+ full ADAS and voice-box units, 100% AIS-140 compliant fleet readiness, with automation driving significant manpower cost savings across the deployed base.

National Road Safety Technology Conclave 2026, IIT Bombay

"Harnessing connected intelligence in the service of safer journeys and saved lives."

HIGHWAY SAATHI

Hands-free incident capture, secure live transmission, instant SOS response and seamless ATMS integration

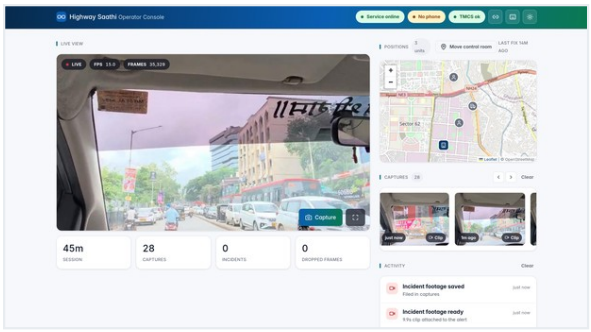
Metro Infrasys Pvt. Ltd. I September 2026 I Status: Pilot-ready, v1.0

WHAT IT IS

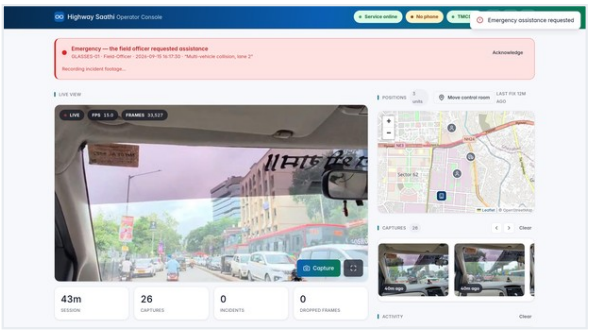
Fixed cameras only see where they are mounted — incidents happen everywhere else: at a diversion, a breakdown on the hard shoulder, a stretch no gantry covers. Highway Saathi closes that gap. A field officer wears a pair of Ray-Ban Meta smart glasses, and their point of view becomes a live camera tile in the control room. Operators watch what the officer sees, pull stills on demand, and the officer hears incident alerts spoken into their ear — hands never leave the road. The result is complete visibility of every incident, wherever it happens. Nothing in the existing TMCS changes: Highway Saathi joins through interfaces TMCS already exposes.

THE SYSTEM, LIVE

Real screenshots — not mockups

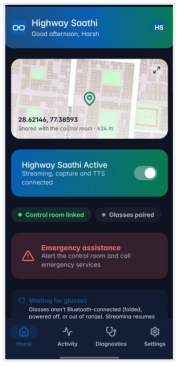


The operator console: the officer's real point-of-view feed, unit positions and recent captures, live.

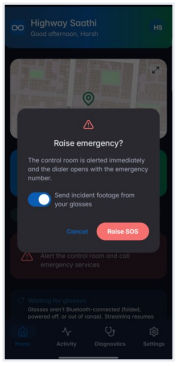


An officer's SOS reaching the console: alerted instantly, with the incident clip auto-attached and written into TMCS.

ON THE OFFICER'S PHONE



Home: one toggle controls streaming, capture and spoken alerts together.



Raising an SOS: one card, one confirmation — the officer places the final call.

Core Features

- Hands-free capture — HD video, voice & GPS via smart glasses
- Live streaming to the control room, on-site network or VPN
- One-tap SOS — control room alerted instantly, incident clip auto-attached
- Spoken alerts read into the officer's ear, no phone touch needed
- Joins existing TMCS with zero changes to TMCS itself
- Auto-resumes streaming when glasses reconnect — no restart needed

STATUS & VALIDATION

~23.5 fps	Pilot-ready	Zero
Sustained streaming rate (Samsung S25+ / Ray-Ban Meta)	Version 1.0, September 2026	Changes required to existing TMCS

Live today: streaming from the glasses, on-demand capture, emergency SOS with pre- and post-incident footage, spoken alerts, the positions map, and republishing the officer's feed into TMCS as an ordinary camera.

In progress: automatic on-glass incident detection — the pipeline is built and tested; it goes live once the metro-specific detection model is supplied. Every capability above is unaffected in the meantime.

Contact: Vandana Arora I Metro Infrasys Pvt. Ltd. I +91 9958525164 I ceo.office@metroinfrasys.com

Live from the scene, the moment your officer arrives.

Highway Saathi I Metro Infrasys Pvt. Ltd.

Netradyne is a pioneer in AI-powered fleet intelligence, helping organisations transform driver safety, risk management, and operational performance through real-time edge AI and contextual insights.



Netradyne provides AI-powered technologies for smarter fleets and safer roads. Its Driver•i® platform combines edge AI, computer vision, and contextual intelligence to help fleets reduce risk, improve driver performance, and enhance operational efficiency. By analysing 100% of drive time, Driver•i delivers real-time in-cab coaching and actionable insights that enable fleets to move from reactive incident management to proactive risk prevention. The platform's patented GreenZone® Score recognises and rewards safe driving behaviours, helping organisations build driver trust, strengthen safety culture, and achieve lasting behaviour change.

- Trusted by 3,000+ customers globally and helping protect 2 million+ drivers through AI-powered fleet safety technology.
- Analyses 48+ billion kilometres of driving data to generate contextual safety insights and support proactive risk prevention.
- Enables 100% drive-time analysis using edge AI, delivering real-time in-cab coaching and actionable intelligence to improve driver behaviour and fleet safety.
- Customer deployments have demonstrated up to 50% reductions in collisions, alongside measurable improvements in fleet-wide safety performance.
- Strategic partner of the National Highways for Electric Vehicles (NHEV) programme, supporting initiatives focused on road safety, intelligent mobility, and the adoption of advanced transportation technologies across India's transport ecosystem.
- Backed by 40+ patents spanning artificial intelligence, computer vision, edge computing, driver behaviour analysis, and fleet intelligence technologies.

Emergency Vehicle Priority (EVP) System

Automated, GPS-driven green corridors for ambulances and emergency vehicles

Onnyx Electronisys Pvt. Ltd.

Indigenous | Make in India | Aligned with National ITS Policy | In Association with IIT Bombay

Up to 40%
Reduction in ambulance Travel travel time

20+
Junctions live in Bengaluru

6 Months
Continuous, reliable field operation

Zero
Manual intervention for green corridors

SOLUTION SUMMARY

The problem: In congested Indian cities, ambulances lose critical minutes at signalised junctions, where manual green corridors depend on police coordination and cannot scale to everyday emergencies.

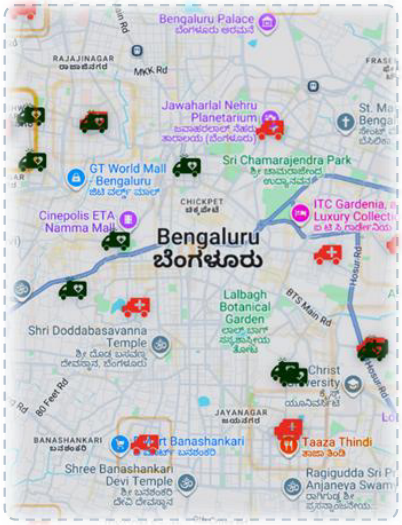
The solution: EVP is an indigenous Intelligent Traffic Management system that uses live ambulance GPS feeds, geofencing and dynamic signal-control algorithms to automatically turn signals green ahead of a moving emergency vehicle, creating a rolling green corridor with no human intervention, while keeping cross-traffic flowing safely.

CORE FEATURES

- Real-time signal prioritisation from ambulance GPS feeds
- Dynamic green corridor created ahead of the moving vehicle
- Geofencing intelligence for approach detection at each junction
- Handles dense, multi-directional traffic and real-time congestion
- Integrates with existing signal controllers; minimal civil works
- On-premises deployment for data sovereignty and security
- Fallback logic and manual override for continuous operation

SOLUTION IN OPERATION







DEPLOYMENT HIGHLIGHTS

- **Bengaluru:** Live at 20+ major junctions, operational for 6 months with high reliability
- **Kerala:** Approved and under implementation through the Kerala IT Mission, a step towards statewide ITS
- **Rajkot:** Field trials completed; proposal accepted for full-scale Smart City rollout
- **Pipeline:** In discussion with 8 major Smart Cities for implementation

OUTCOMES & IMPACT

- Up to **40% faster** ambulance travel through signalised corridors
- **Zero manual intervention** needed to run green corridors
- Faster emergency healthcare response and greater public trust
- Supports Smart City, Digital India and Make in India missions
- Aligned with National ITS Policy frameworks

Future Vision — National Emergency Mobility Grid (NEMG) scaling EVP across India's metro and tier-2 cities into a unified grid linking traffic intelligence, healthcare response and real-time data networks, so every second counts in saving lives.

Integrated Road Safety & Intelligent Transportation Solutions

PRAMA
MADE FOR INDIA - MADE BY INDIA - MADE IN INDIA

Safer Roads | Smarter Cities | A Safer India



ABOUT PRAMA

PRAMA is India's largest and one of the first OEM companies in the security and surveillance space, representing the motto of Atmanirbhar Bharat. We design and manufacture high-quality, indigenous security and surveillance products, driven by a state-of-the-art R&D Center and a commitment to India-specific innovations.

OUR VISION

- Made for India
- Made by India
- Made in India

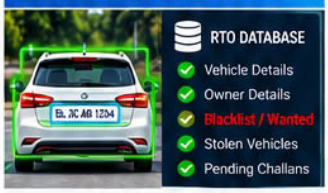
SOLUTION OVERVIEW

PRAMA's **Intelligent Transportation System (ITS) and Advanced Traffic Management System (ATMS)** integrate traffic monitoring, analytics, incident detection and enforcement through a centralized management platform, helping authorities to improve compliance, reduce violations, respond to incidents more effectively and optimize traffic flow.

KEY CAPABILITIES

- Automatic Number Plate Recognition (ANPR)
- RTO Database Integration (Blacklist/Wanted Vehicles)
- Vehicle Identification (Make, Model, Size, Color)
- Over-Speed Detection
- Red Light Violation Detection (RLVD)
- Traffic Incident Detection
- Intersection Violation Detection
- Illegal Parking Detection
- No-Helmet Detection
- Driver Behavior Analytics
- Traffic Flow Monitoring
- Mobile Enforcement Solutions

ANPR & RTO INTEGRATION



Connect with RTO database to identify blacklisted number plates, stolen vehicles and vehicles with pending challans.

VEHICLE IDENTIFICATION



AI-based vehicle identification provides make, model, type/size and color for accurate classification and enforcement.

VIOLATION DETECTION



Detects over-speeding, red light violations, no-helmet, lane violations, illegal parking and other traffic violations in real time.

REAL-TIME MONITORING & ANALYTICS



Centralized management platform with live monitoring, event alerts, analytics and intelligent reporting for better decision making.

ADVANCED TRAFFIC CAMERAS



- Designed for Indian road environments
- Recognizes two-wheelers and four-wheelers
- Supports white, yellow and green number plates
- High-accuracy vehicle identification and classification
- Real-time monitoring and enforcement
- Rugged and weatherproof design

PRODUCT PORTFOLIO



DEPLOYMENT EXPERIENCE



- Delhi-Mumbai Expressway
- Delhi-Dehradun Expressway
- Delhi-Amritsar-Jamnagar Expressway
- Rajasthan State Government
- Andhra Pradesh FiberNet
- UP Dial 112
- Telangana Social Welfare Department
- Thane ZP Schools
- Navi Mumbai Police
- BARC Mumbai
- GAIL Belapur, Oil India Limited
- Bhilai Steel Plant, HAL Bengaluru
- Punjab Second Line of Defense
- Vande Bharat Trains, Karnataka Judiciary

BUILT FOR INDIAN CONDITIONS

- High vehicle density
- Mixed & heterogeneous traffic patterns
- Diverse climatic conditions
- Urban & rural deployment
- Smart City initiatives
- National & state-level road safety programs

Sego Automobile Solutions Pvt Ltd

Sego Automobile Solutions submits iBrake for national evaluation on the strength of granted Indian patents, a completed and independently-analyzed field pilot, and a connected hardware platform already engineered for India's smart and safety transportation future—not a concept or prototype, but a deployed, measured, and scalable system.



iBRAKE — ADVANCED DECELERATION INDICATING SYSTEM

Patented retrofit safety technology that activates the vehicle brake light when the accelerator is released, providing an earlier deceleration warning to following vehicles.

THE TECHNOLOGY	KEY FACTS
iBrake is a retrofit electronic system designed for 4W and above vehicles, including EVs. It detects accelerator-pedal release—the early physical signal of deceleration—and triggers the brake light before the driver's foot reaches the brake pedal. **The system combines the Advanced Deceleration Indicating System (ADIS) with patented sensor-and-relay brake-light activation. Two granted Indian patents cover the deceleration-indication and brake-light-functioning mechanisms.**	**Partner: Telangana Mineral Development Corporation (TGMDC), Government of Telangana** **Pilot: 8 weeks • Q4 2025** **Vehicle: Heavy mining trucks** **Data: 67,200+ km • 1,850+ hours**

FIELD PILOT — VERIFIABLE RESULTS

TGMDC pilot in Hyderabad mining, highway and rural-road environments. GPS logs and 4K/30-fps forward video were independently analyzed using frame-by-frame Time-to-Collision (TTC).

Metric	Without iBrake	With iBrake	Change
Mean TTC	3.23 s	4.45 s	+38%
TTC < 2 s	22%	9%	↓59%
TTC < 3 s	56%	17%	↓70%

SCALABILITY & NATIONAL DEPLOYMENT

VEHICLE-SIDE DEPLOYMENT	BROAD VEHICLE BASE	V2X UPGRADE PATH
No road or junction infrastructure required. Suitable for immediate fleet deployment.	ECM-compatible platform extends beyond mining trucks to logistics, school transport, ambulances, taxis and other vehicles.	Connected hardware provides a pathway to transmit deceleration/braking state to future connected-road infrastructure via firmware upgrades.

MAKE IN INDIA • INDIGENOUS IP • CONNECTED PLATFORM

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www.segoauto.com
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SCITA SOLUTIONS
INTELLIGENT TRAFFIC ENFORCEMENT MANAGEMENT SYSTEM FOR SAFER ROADS

From Vehicle Detection to Evidence-Based Enforcement and Road Safety Outcomes

Scita Solutions AI-powered, end-to-end IEMS integrates roadside sensing, edge intelligence, traffic violation detection, evidence management, centralized monitoring, and enforcement workflows to transform enforcement efficiency and road safety outcomes.

DETECT	IDENTIFY	VALIDATE	MANAGE	ENFORCE	ANALYZE
Roadside sensors capture vehicles and events.	ANPR and analytics identify vehicles and attributes.	AI-powered rules validate vehicles and evidence.	Centralized platform manages evidence, cases, and records.	Enforcement workflows generate and issue notices efficiently.	Analytics deliver insights for safer roads and policy.

TECHNOLOGY ECOSYSTEM



ANPR & ENFORCEMENT CAMERAS



4D Speed Radars



LPUS



Central IEMS

DEPLOYMENT AT A GLANCE

700+	1500+	600+	1200+	500+
Enforcement/ITS locations	ANPR deployments	Traffic Violation Detection System deployments	Speed Violation Detection System deployments	Vehicle Actuated Speed Display System deployments

REPRESENTATIVE LOCATIONS

Cities: Bengaluru, Mysuru, Hyderabad. **States:** Odisha, Maharashtra, Gujarat, Rajasthan, Uttar Pradesh, Tamil Nadu, Jharkhand, Chhattisgarh, Haryana.

OPERATIONAL SCALE - JULY 2026

79.54	11.40	2.57
million vehicle detections	million vehicles associated with violations	million vehicle detections/day

IEMS AT SCALE - JULY 2026

Bengaluru ITMS – 52.02 million vehicle detections,
8.39 million vehicles with violations,
876,654 events audited and sent for challan

Odisha IEMS – 27.52 million vehicle detections,
3.01 million vehicles with violations

RELIABLE DETECTION → EVIDENCE-BASED ENFORCEMENT → ANALYTICS → CONTINUOUS IMPROVEMENT → SAFER ROADS

FROM INTELLIGENT ENFORCEMENT TO SAFER ROADS

Intelligent Transportation • Safer Roads • Smarter Mobility

ROAD SAFETY NET

Turn every black spot into an AI-managed safety net.

Fewer crashes. Faster rescue. No manpower needed on site.

13,795 black spots on our National Highways. Fewer than 40% fixed. Every day is a risk.



Portable. Self-powered. Live in the field.

ONE STATION. FOUR JOBS.

DETECT Wrong-side driving, speeding, rash driving, phone use, illegal turns, cattle and crossings – caught by on-device AI, 24×7.

ENFORCE ANPR linked to VAHAN / e-Challan. Certain enforcement changes driver behaviour for good.

RESPOND Accidents flagged instantly and escalated to emergency services, so help reaches victims in time.

PREVENT Near-miss analytics expose tomorrow's crash today and feed engineering fixes.

Self-powered	Edge AI	Works remotely	Tamper alert
No grid needed	Detection & ANPR on device	Own connectivity	Alerts if anyone interferes

PROVEN in the field

~70%	<5%	42
fewer violations in a 100-day Pune trial	repeat offenders after enforcement	heavy-vehicle sites live on Australia's NHVR network

For Transport Commissioners & DGPs

Enforcement you can count on

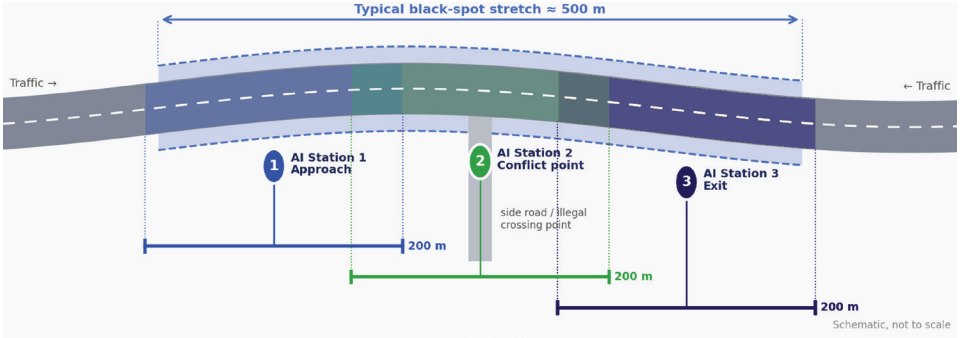
- **Force multiplier.** Round-the-clock enforcement without posting personnel at every stretch.
- **Evidence-ready challans.** ANPR + VAHAN / e-Challan, with every intervention audited against ground truth.
- **A KPI you can report.** Challans fall over time – proof that behaviour is changing.

For NHAI & MoRTH

Safer corridors, measurable results

- **Faster emergency response.** Real-time alerts for accidents, breakdowns and stopped vehicles.
- **Evidence-led fixes.** Near-miss data shows which engineering fixes to do first.
- **One SenBOS dashboard.** Monitoring, evidence and periodic analytics reports.

DEPLOYS FAST, ANYWHERE. One station covers 200 m. A typical 500 m black spot needs just 2–4 stations.



Request a pilot at your black spots.

Includes 2–4 stations per site · ANPR enforcement · real-time alerts · SenBOS dashboard · analytics reports

Vijay Khuspe, Director, SenSen Networks | vijay.khuspe@sensen.ai | +91 9850832302

V2X Road Safety Broadcast Service for Indian Highways

ZERO-SUM ITS SOLUTIONS INDIA PVT. LTD.

Featured as a Future Technology solution at NRSTC 2026
Trialed with Cube Highways Technologies Pvt. Ltd. and Maruti Suzuki India Limited



Turning safety vehicles into digital beacons — warning drivers of work zones ahead, through fog, night and traffic.

THE PROBLEM

India recorded **1,77,175 road deaths in 2024**. National Highways are just 2.1% of the network but account for **36.6% of all fatalities**. Road works are the fastest-worsening location: **5,389 deaths, up 38.0% in a single year** against 2.5% nationally. Fog and mist killed **15,115**, rising while most categories fell.

Cones, barriers and signboards work only when the driver can see them. A variable message sign becomes legible at about **250 m** — seconds away at highway speed, and never at all in fog, at night, or behind a truck. Crews, patrol staff and approaching drivers stay exposed every day.

THE SOLUTION

A ruggedised **C-V2X on-board unit (OBU)** — LTE-V2X, 3GPP Release 14/15, PC5 sidelink, 5.9 GHz — is fitted to the road safety vehicles highway operators already run: route patrols, work-zone and maintenance vehicles, incident response. It continuously broadcasts standardised hazard warnings — roadwork ahead, slow or stationary safety vehicle, lane closure — received by any V2X-equipped vehicle and rendered as an **in-cabin alert well beyond visual range**.

- **Works when eyes cannot** — radio broadcast is unaffected by fog, smog, dust, rain, darkness or glare.
- **No cellular dependence** — the PC5 sidelink links vehicles directly, even in network dead zones.
- **Zero civil infrastructure** — no gantries, roadside power or trenching. Deployment is an installation, not a construction project.
- **Designed to IRC:SP:55-2014** — portable, battery-powered and one-person-operable, for temporary work-zone layouts.
- **Standards-based** — interoperable with any compliant OEM or roadside implementation; conforms to AIS-230 without redesign.

MAKE IN INDIA

Core IP is Indian and government-developed: the OBU is built on the **C-V2X platform of C-DAC (MeitY)**, licensed to Zero-Sum ITS Solutions under a signed Transfer of Technology agreement. Units are **manufactured in India**, with application software, integration and calibration engineered by our Bengaluru team for Indian roads and traffic behaviour. All safety-message and operational data is generated, hosted and **owned within India**, with operating agencies retaining ownership of their deployment data.

REGULATORY READINESS

NFAP-2025 reserves 5875–5925 MHz for ITS; **G.S.R. 466(E)** (June 2026) exempts vehicle-mounted OBUs from licensing; and MoRTH's draft mandate requires AIS-230 V2V systems on new vehicles from **1 October 2028** — a receiving fleet arriving by regulation.

DEPLOYMENT — FIELD TRIAL

Nelamangala–Devihalli Expressway, Bengaluru–Mangaluru corridor, Karnataka · **January–March 2026**. A high-volume industrial and port-traffic route operated by the Cube Highways Group. Conducted with **Cube Highways Technologies** (highway operator), **Maruti Suzuki India** (test vehicles and driver evaluation) and **Nagoya Electric Works** (variable message signs) at live roadwork sites, laid out per IRC:SP:55-2014, antenna at 4 m, under an experimental radio licence from the WPC Wing of the DoT.



Live work zone on the trial corridor



In-cabin V2X roadwork alert

MEASURED OUTCOMES

950 m effective communication range at a 95% packet-reception-ratio threshold — stricter than the conventional 90% — with ≥97% PRR at every 50 m interval and 100% reception still at 1,200 m.

+200 m additional warning distance over the physical VMS: the alert fires at the designed 450 m trigger point against 250 m VMS legibility — **9.0 seconds** of extra reaction time at 80 km/h, **7.2 seconds** at 100 km/h.

20 of 20 runs held reception with large trucks fully obstructing the line of sight between transmitter and receiver — a daily reality on Indian highways.

50+ drivers and trial participants interviewed confirmed the alert extended hazard awareness beyond visual range; at 450 m the work zone was frequently still invisible behind traffic. As designed, no alert was raised on the opposite carriageway.

These are measured results from live traffic, not simulation. The service requires **no per-km or per-junction civil cost** — no gantries, roadside power or trenching — and carries no monthly connectivity charge in normal operation.



C-V2X On-Board Unit — built on the C-DAC platform

SCAN: TRIAL VIDEO

ONE PLATFORM, THE FULL V2X ROADMAP

Work-zone warning is the first service, not the limit of the hardware: further applications are enabled in software on the same installed unit. The OBU is built to serve the phased Day-0 / Day-1 / Day-2 roadmap prioritised for India by the MoRTH Task Force in TRAI's V2X consultation paper of 30 April 2026:

DAY-0 IMMEDIATE

V2V-based, minimal infrastructure — Emergency Electronic Brake Light, Forward Collision Warning, Hit from Behind Warning, Intersection Movement Assist, Queue Warning.

DAY-1 MEDIUM TERM

Moderate infrastructure — Queue Warning with traffic monitoring, Traffic Signal Priority for Emergency Vehicles, Cooperative Collision Avoidance, Do Not Pass Warning.

DAY-2 LONG TERM

Advanced networks and roadside sensing — Hazardous Location Notifications, Dynamic Traffic Flow Optimisation, Vulnerable Road User Protection, autonomous driving support.

Zero-Sum ITS Solutions India Pvt. Ltd.
#254, 1st Floor, 6th Cross, Indiranagar 1st Stage, Bengaluru – 560038
Mallesh Boggarapu, Director · mallesh@zero-sum.co.in · +91 99109 93197
www.zero-sum-its.co.in

Casualty data: MoRTH, Road Accidents in India 2024. · Trial data: Zero-Sum ITS field trial, Jan–Mar 2026.

REPORTS

ITS 2025-26







ITS INDIA FORUM REPORTS

S. No.	REPORT	PRIMARY FOCUS
1	Enhancing Road Safety in India	ADAS, Road Safety 2.0 and safer vehicle technol-ogies
2	National Mission on AI in Mobility	AI strategy, governance, infrastructure, applica-tions and assurance
3	Smart Mobility Blueprint for India	ITS Roadmap 2032, architecture, standards and interoperability
4	Neighbourhood Parking Policy	Parking planning, pricing, technology, enforcement and revenue use
5	UrbanAI: Navigating Tomorrow	AI-enabled urban mobility and responsible city-scale deployment
6	Charging Ahead: Global Insights and India's Roadmap for ERS	Electric Road Systems for freight and high-utilisation electric mobility
7	Priority By Design	C-V2X emergency vehicle priority in Telangana and India
8	Monitor, Model, Mitigate	AI-enabled vehicular emissions monitoring and enforcement
9	AI for Public Transport Optimisation	AI Throughput Framework for efficient and sus-tainable bus operations
10	Predict, Prevent, Protect	AI roadmap for predictive and preventive road safety
11	Breaking the Gridlock	AI roadmap for urban congestion management and adaptive mobility



ENHANCING ROAD SAFETY IN INDIA

Advanced Driver Assistance Systems (ADAS) as a Game-Changer

461,312 road accidents in 2022	**168,491** fatalities in 2022	**≈84%** incidents attributed to driver behaviour	**2025→** proposed phased ADAS adoption

REPORT OVERVIEW:

WHY ADAS?

- The report proposes "Road Safety 2.0": data-driven, integrated, collaborative and digital.
- ADAS uses sensors, cameras and AI to assist drivers and reduce the impact of human error.
- The approach complements safer infrastructure, enforcement, driver monitoring and connected mobility.
- The report highlights urban and rural applications, including accident-prone-zone alerts and behavioural monitoring.

KEY TECHNOLOGIES & REPORTED EFFECTS

- Collision Warning & Automatic Braking: 50–60% reduction in rear-end collisions.
- Lane Departure Warning / Lane-Keep Assist: 30–50% reduction in lane-change accidents.
- Blind Spot Detection: 14% reduction in crashes.
- Speed Alerts / Driver Monitoring: 30–40% reduction in speed-related accidents; V2X cited as preventing up to 80% of crashes involving unimpaired drivers in NHTSA studies.

IMPLEMENTATION & ECONOMICS

- Two-wheeler 2023 sales: 15.86 million; proposed CAPEX ₹31,720 crore and operational cost ₹23,790 crore.
- Four-wheeler 2023 sales: 4.10 million; proposed CAPEX ₹6,150 crore and annual operational cost ₹10,250 crore.
- Funding mechanisms include cross-subsidy, insurance rebates, CSR, PPPs and regulatory incentives.
- The roadmap advocates phased adoption across vehicle categories rather than a single-step rollout.

POLICY RECOMMENDATIONS

- Mandate ADAS including Driver Monitoring Systems across vehicle categories, with phased implementation.
- Integrate ADAS compliance into Bharat ratings and standardise specifications with relevant agencies.
- Use AI cameras, LiDAR, ANPR and V2X for automated enforcement and evidence collection.
- Provide incentives linked to Safe Driving Scores, insurance, registration and Bharat NCAP; enable con-trolled access to e-DAR/IRAD data and encourage domestic safety-tech manufacturing.

The report presents Advanced Driver Assistance Systems (ADAS) as a practical component of a broader Road Safety 2.0 approach for India. It links collision warning and automatic braking, lane support, blind-spot detection, driver monitoring, speed alerts and V2X with the need to reduce crashes associated with human error. Its recommendations combine phased adoption, standardi-sation, data-enabled enforcement, incentives, awareness, financing mechanisms and domestic capability development.

CORE MESSAGE- ADAS is presented as one component of a broader Road Safety 2.0 model—combining safer vehicles, safer driving, intelligent enforcement, data and policy to reduce crashes and improve road-user safety.

NATIONAL MISSION ON AI IN MOBILITY

A coordinated framework for applying artificial intelligence to road safety, congestion, logistics, public transport, sustainability, inclusion and innovation.

7 strategic objectives	**5** strategic pillars	**5 lakh+** professionals targeted for training by 2030r	**~10,000 cr** central funding scale proposed

REPORT OVERVIEW:

SEVEN NATIONAL OBJECTIVES

- Enhance road safety: cut fatalities by 50% by 2030 and move toward Vision Zero by 2047.
- Reduce congestion through adaptive traffic control, predictive analytics and congestion-management tools.
- Optimise logistics: ≤10% of GDP by 2030 and ~8% by 2047.
- Modernise public transport, promote sustainable/ connected mobility, extend inclusion to rural areas, and foster innovation and jobs.

FIVE STRATEGIC PILLARS

- Sovereign AI infrastructure: AIRAWAT 2.0, secure data centres, 5G/6G, V2X, IoT and indigenous semi-conductor capacity.
- Open data & digital ecosystem: India Mobility Data Platform integrating ULIP, PM Gati Shakti and ICCCs.
- Innovation & industry collaboration through CoEs, PPPs, Generative/Agentic AI and supervised automa-tion.
- Skilling and capacity building; governance and standards through Safe & Trusted AI and AEP v1.0.

PRIORITY PROGRAMMES

- AI-based ATMS, adaptive signals and enforcement cameras integrated with e-Challan.
- Predictive black-spot detection, smart ambulance corridors and AI-assisted emergency dispatch.
- AI-enhanced ULIP dashboards, multimodal logistics optimisation and smart trucking corridors.
- Dynamic public transport scheduling, MaaS, smart EV charging, C-V2X pilots, telematics, rural route planning and disaster-response platforms.

GOVERNANCE, PHASES & KPIS

- A National AI in Mobility Council, co-chaired by MeitY and MoRTH ministers, with a Mission Secretariat, state councils and expert groups.
- Phase 1 (2025–27): governance, pilots in 10 cities/5 highways, data-platform beta and 3 CoEs.
- Phase 2 (2028–35): 50% fatality reduction, 20% congestion reduction, logistics ≤10% GDP and AI traffic in 100 Smart Cities.
- Phase 3 (2036–47): Vision Zero progress, ~8% logistics cost, full rural/EV integration; 100% major inter-sections AI-enabled by 2030 and 5 lakh people trained.

The roadmap identifies practical applications including AI-enabled traffic management, enforce-ment, blackspot prediction, emergency response, logistics optimisation, public transport intelli-gence, EV charging and connected mobility. It also proposes assurance mechanisms, human oversight, institutional structures, phased pilots and long-term national integration.

CORE MESSAGE- The report proposes moving AI in mobility from isolated pilots to a coordinated national pro-gramme that integrates technology, transport, data, skills and governance.

A Roadmap for Intelligent Transport Systems — ITS Roadmap 2032

SMART MOBILITY BLUEPRINT FOR INDIA

2030	70%	100%	Top 3
National ITS Architecture target	projects aligned with standards by 2035	alignment target by 2047	global ITS position envisioned for India

REPORT OVERVIEW:

STRATEGIC FOUNDATION

- ITS is positioned as the digital backbone for traffic, public transport, freight, safety, environment and connected mobility.
- The roadmap calls for a cohesive strategy that transcends institutional silos and enables interoperabil-ity.
- Integration with PM Gati Shakti, Digital India, Smart Cities, Make in India and Viksit Bharat 2047 is high-lighted.
- Core deployment levels span community, individual and city-scale systems.

CORE TECHNOLOGIES

- ATMS for highways, ATCS/adaptive signals for cities, ATIS for real-time travel information and APTS for public-transport tracking/e-ticketing.
- ADAS, V2X, telematics/connectivity, AI/ML, smart parking, ITMS and command centres.
- Electronic tolling / MLFF, multimodal hubs, IoT, cloud platforms, 5G and edge computing.
- Open APIs and common standards are treated as essential for system-to-system interoperability.

KEY BARRIERS IDENTIFIED

- Fragmented legacy systems, inconsistent standards and the need for a National ITS Architecture.
- Financing and high CAPEX/O&M requirements, along with limited technical and institutional capacity.
- Data governance, privacy and cybersecurity challenges.
- Need to extend ITS beyond major metropolitan areas to intercity, peri-urban and rural networks.

2030–2047 ROADMAP

- Publish the National ITS Architecture and phased urban/intercity/rural rollout with monitoring.
- Adopt open ITS standards, indigenous technology, standardised APIs and certification programmes.
- C-V2X pilots in 10 states by 2030; 100% new vehicles V2X-enabled by 2035 and universal adoption envi-sioned by 2047.
- Create a National ITS Financing framework/Fund, strengthen institutional capacity and support R&D, startups and PPPs.

VISION 2047 OUTCOMES

The roadmap envisages AI-enabled real-time traffic management and connected vehicles reducing con-gestion, accidents and travel time; certified professionals and aligned mandates; stronger indigenous R&D and exports; lower emissions; diversified financing; and inclusive, multimodal and climate-resilient mobility.

CORE MESSAGE- The roadmap's central direction is architecture-led ITS: establish common standards, institutional capacity, digital infrastructure and financing so that intelligent transport systems can scale across India.

NEIGHBOURHOOD PARKING POLICY

Parking as part of neighbourhood mobility management rather than simply vehicle storage

250 m	1.5–3×	>95%	2.5 yrs
around intense commercial areas for higher on-street pricing where applicable	indicative on-street vs off-street pricing	occupancy threshold cited for action	suggested base-fee review cycle

REPORT OVERVIEW:

NEIGHBOURHOOD PARKING PLAN

- Delineate the area; study land use, activity and existing conditions; identify parking supply and black-spots.
- Study accumulation, occupancy, turnover and duration; estimate demand and prepare the parking lay-out.
- Integrate MLCP/mechanised parking, NMT, transit, pedestrian space, loading/unloading and street vending.
- Parallel parking is identified as the preferred car layout; each four-wheeler slot should be no more than 5.0 m × 2.5 m.

PRICING PRINCIPLES

- Public parking should not generally be free; pricing should reflect the true cost of scarce urban space.
- On-street parking may be priced 1.5–3 times higher than off-street to shift demand away from congested streets.
- Differential pricing can distribute demand across commercial/business districts; long-duration on-street parking should be discouraged.
- Park-and-ride users may receive subsidised long-duration off-street rates; residential permits may be piloted.

WHEN PARKING IS HIGHLY OCCUPIED

- If annual average occupancy in a zone exceeds 95% for more than 5 hours/day, the framework suggests considering higher fees and/or increased turnover.
- Civic agencies should pursue additional off-street capacity envisaged in the neighbourhood plan.
- Multi-level and automated parking can be explored to increase capacity.
- Parking beyond 48 hours may be charged up to twice the normal off-street price; beyond 96 hours may be treated as abandonment subject to the framework.

TECHNOLOGY, ENFORCEMENT & REVENUE

- Meters, RFID, boom barriers, CCTV, timed slips, mobile payments, VMS and open APIs can support management.
- A Central Parking Portal can provide real-time parking status, pricing and restrictions.
- Zonal task forces, parking agencies, resident/business associations and citizen reporting support moni-toring.
- A dedicated Parking Fund Account is proposed for pedestrian/road safety, NMT, footpaths, public realm, transit infrastructure, public transport support and awareness.

The framework provides a practical approach for assessing demand, occupancy, turnover, park-ing layouts, pricing levels, residential permits and areas requiring additional capacity. It also pro-poses digital payment and monitoring systems, coordinated enforcement and a ring-fenced Park-ing Fund so that parking revenues can support pedestrian infrastructure, road safety, public transport and other mobility improvements.

CORE MESSAGE- Effective parking management combines planning, pricing, technology and enforcement—and us-es parking revenue to strengthen walking, cycling, public transport and safer public space.

URBANAI: NAVIGATING TOMORROW

AI-enabled urban mobility for smarter, more inclusive and sustainable cities

5	4	3	9
AI application areas	Global benchmark cities studied	Indian city contexts exam-ined	Policy & way-forward framework

REPORT OVERVIEW:

The report draws on global and Indian city contexts to identify practical application areas and im-plementation considerations. Its way forward emphasises adaptive traffic control, predictive moni-toring, digital twins, open data, appropriate regulation, public-private collaboration and responsi-ble AI deployment.

WHY AI IN URBAN MOBILITY

The report identifies congestion, bus bunching, EV-charging bottlenecks and inefficient road use as interconnected problems that require real-time prediction, optimisation and behavioural re-sponse.ler slot should be no more than 5.0 m × 2.5 m.

FIVE APPLICATION AREAS

AI is proposed for smarter infrastructure planning; public-transport optimisation; traffic-flow man-agement; predictive EV charging; and dynamic tolling/congestion pricing.

INDIA OPPORTUNITY & RISKS

India's digital platforms and mobility initiatives provide an enabling base, but deployment must address data availability, interoperability, cybersecurity, privacy, institutional capacity, algorithmic bias and equity.

POLICY & IMPLEMENTATION

The roadmap calls for standardised adaptive traffic control, predictive congestion monitoring, AI enforcement, urban mobility digital twins, AI-specific regulations, structured pilots/PPPs and ethi-cal AI oversight.

WAY FORWARD

Pilot AI mobility solutions in high-density corridors; strengthen open mobility-data ecosystems; integrate AI with public transport, EV and digital infrastructure programmes; establish transparent, explainable and auditable decision systems; and scale proven use cases through coordinated government, industry, academia and civil-society partnerships.

CORE MESSAGE- AI is presented not as an add-on, but as a strategic intelligence layer for urban mobility—helping cities predict demand, optimise existing infrastructure, improve public transport, manage charging and road use, and deliver safer, cleaner and more equitable journeys.

CHARGING AHEAD: GLOBAL INSIGHTS AND INDIA'S ROADMAP FOR ELECTRIC ROAD SYSTEMS (ERS)

Dynamic charging infrastructure for freight, public transport and future electric mobility

3	TRL 6–8	Up to 97%	30–87%
ERS technologies as-sessed	reported technology ma-turity	conductive energy-transfer efficiency	potential CO_2 reduction vs diesel

REPORT OVERVIEW:

Charging Ahead examines Electric Road Systems (ERS) as a potential complement to conven-tional charging for freight, public transport and other high-utilisation electric vehicles. It compares conductive ground-based, inductive wireless and overhead or catenary approaches, considering technology maturity, energy-transfer performance, emissions potential, infrastructure requirements and operating models. The report argues that India should assess ERS through technology-neutral pilots and route-level techno-economic studies rather than adopting a single technology prematurely.

TECHNOLOGY OPTIONS

In-road conductive, inductive wireless and catenary systems are compared on readiness, efficien-cy, installation, maintenance, safety and scalability. The report stresses that technology choice should remain context-specific and outcome-focused.

INDIA CASE FOR ERS

With about 70% of freight dependent on diesel trucks, dynamic charging can address battery size, range and charging downtime. ERS can be integrated with Bharatmala, PM Gati Shakti, smart grids and renewable energy.

SYSTEM-LEVEL BENEFITS

The report cites 5–7% potential logistics-cost reduction, nearly 35% lower critical-mineral demand through right-sized batteries, and additional efficiency/emissions benefits compared with conven-tional EV pathways.

PILOT & GOVERNANCE MODEL

Recommended pilots focus on urban freight, logistics corridors, BRT/public transport and high-density expressways. NATRAX is identified as a key testing and validation institution, supported by PPP/SPV models.

STRATEGIC ROADMAP

Use technology-neutral pilots; undertake route-level techno-economic analysis; integrate ERS with renewable generation, BESS and smart grids; establish EMI, cybersecurity and vulnerable-road-user safety standards; create clear regulatory pathways; and use blended finance, VGF, PPPs and diversified revenue models to de-risk deployment.

CORE MESSAGE- ERS is positioned as a systems opportunity—linking roads, electricity, vehicles, freight economics and digital infrastructure to enable continuous charging, smaller batteries and lower-carbon road transport.

PRIORITY BY DESIGN

Advancing Emergency Mobility with Cellular Vehicle-to-Everything (C-V2X) in Telangana & India

>95%	400+	9.5 km	₹54.5–63 cr
5G readiness cited for Hyderabad	ATCS-upgraded junctions	proposed pilot corridor	estimated citywide CAPEX

REPORT OVERVIEW:

Priority By Design proposes Cellular Vehicle-to-Everything (C-V2X) as a connected-mobility mechanism for giving emergency vehicles priority at signalised intersections. The report combines vehicle connectivity, roadside units, edge computing, AI-based arrival-time prediction and traffic-signal optimisation to create a coordinated emergency-mobility corridor. It uses Hyderabad and Telangana as the principal implementation context, building on existing connectivity, adaptive traf-fic-control infrastructure and traffic management capabilities.

EMERGENCY MOBILITY CHALLENGE

Ambulance delays of 20–30 minutes across 10 km stretches are identified as a critical response problem. Existing adaptive signals and control centres lack real-time emergency prioritisation.

HYDERABAD READINESS

The report cites >95% 5G coverage, 400+ upgraded ATCS junctions, TiHAN at IIT Hyderabad for V2X testing, and ICCC capability for signal override and dispatch integration.

PILOT DESIGN

A proposed 9.5 km corridor links major hospitals via AIG Gachibowli, using OBUs in 100+ ambu-lances, RSUs at 17 intersections, MEC nodes and AI for ETA prediction and green-wave optimisation.

PROJECTED BENEFITS

The report projects 25–30% travel-time reduction from the pilot approach and up to 47% faster response times at city scale, with 10–20% lower emissions and an estimated ₹1,500 crore annual lives-saved impact.

NATIONAL & STATE PATHWAY

Adopt a C-V2X Telangana 2030 vision; fast-track RSU approvals and spectrum coordination; mandate OBUs for emergency fleets; upgrade legacy traffic controllers; integrate ICCCs with green-wave logic; develop interoperability and safety standards; validate through simulation and dispatch data; and establish a national task force to audit outcomes.

CORE MESSAGE- The report frames C-V2X as a public-purpose connected mobility layer that can give ambulances priority by design—coordinating vehicles, signals, roadside units and command centres in real time.

MONITOR, MODEL, MITIGATE

Harnessing AI for Vehicular Emissions Control

>12 million	5–10×	90%+	2030
vehicles referenced for Delhi	WHO safe-limit compari-son for $PM_{2·5}$	alignment reported in Kherki Daula pilot	vision for predictive air intelligence

REPORT OVERVIEW:

Monitor, Model, Mitigate proposes an AI-enabled approach to vehicle-emission control that moves enforcement from periodic and largely reactive inspection towards continuous monitoring and tar-geted intervention. The framework combines thermal and infrared sensing, ANPR, vehicle and pollution databases, edge AI and predictive analytics to identify potentially high-emission vehicles and locations.

CLEAN AIR INTELLIGENCE SYSTEM

Thermal/IR cameras detect emission signatures; ANPR identifies vehicles; VAHAN and PUC pro-vide registration/compliance data; edge computing enables rapid inference; and a central dash-board supports enforcement and analytics.

PILOT FINDING

The Kherki Daula Toll Plaza pilot captured real-time emissions from heavy and light vehicles and classified them into Normal, High and Critical bands. The report highlights over 90% alignment between AI-predicted and actual emission readings.

POLICY APPLICATIONS

AI can guide Low/Ultra-Low Emission Zones, fleet-modernisation incentives, scrappage prioritisa-tion, BS-VI/EV transition strategies and automated alerts linked to inspection, penalties or route-management actions.

SCALING REQUIREMENTS

Expand monitoring points at toll plazas, intersections and industrial approaches; integrate real-time databases; continuously calibrate models; and connect AI alerts with enforcement, public dashboards and citizen engagement.

RECOMMENDED ACTIONS

Create a National Clean Air Intelligence Network; use predictive analytics for pollution hotspots; expand AI-enabled monitoring across major urban centres; strengthen data-sharing between transport and environmental agencies; and develop governance that keeps automated enforce-ment accurate, transparent and accountable.

CORE MESSAGE- The report's central shift is from reactive pollution control to predictive prevention—using continu-ous vehicle intelligence to detect, anticipate and mitigate emissions before they become larger urban air-quality events.

AI FOR PUBLIC TRANSPORT OPTIMISATION

Enhancing Throughput, Efficiency, and Sustainability in Telangana

5	Scan → Pilot → Scale → Sustain	Up to 30%	Up to 45%
AI Throughput domains	implementation pathway	maintenance-cost reduction cited	unplanned-downtime reduction cited

REPORT OVERVIEW:

AI for Public Transport Optimisation presents an AI Throughput Framework for improving the effi-ciency, reliability, sustainability and passenger experience of public bus operations in Telangana. It organises the opportunity into five domains: route and schedule optimisation, fleet and asset management, passenger experience intelligence, institutional decision-making, and environmental and energy management. The framework connects data from operations, passenger demand, ve-hicle condition and energy use to support more informed decisions. Its implementation pathway moves from readiness assessment and focused pilots to scale and institutionalisation, supported by governance roles, workforce capability, partnerships and appropriate financing.

ROUTE & SCHEDULE OPTIMISATION

AI uses origin-destination analysis, demand forecasting, route clustering, dynamic scheduling, dynamic pricing and multimodal-hub integration to align supply with passenger demand and re-duce waiting and underutilisation.

FLEET & ASSET OPTIMISATION

IoT and ML support vehicle-health monitoring, predictive maintenance, digital inspections and driver-behaviour analytics. The report cites potential reductions in maintenance cost and un-planned downtime from predictive approaches.

PASSENGER & DECISION INTELLIGENCE

Mobile/QR ticketing, conductor devices, AI-enabled feedback and dashboards can improve board-ing, reduce leakage, surface service problems and support proactive management at central, de-pot and zonal levels.

ENVIRONMENT & GOVERNANCE

AI can monitor emissions, optimise fuel/energy use, manage EV charging and support low/zero-emission fleets. Proposed institutional roles include a Chief Data Officer, Data Protection Officer and AI Ethics Board.

IMPLEMENTATION MODEL

Begin with an institutional readiness assessment across people, processes, data, technology and governance; build staff capability; implement pilots with measurable KPIs; scale proven use cas-es; and use PPPs, multilateral funding and climate-linked instruments to support long-term de-ployment.

CORE MESSAGE- The report defines throughput as the practical measure of how effectively buses, drivers, depots, time and energy are converted into passenger movement—and positions AI as the intelligence layer connecting data, decisions and service improvement.

AI Roadmap for Safer Roads

Predict, Prevent, Protect

150,000–170,000	21,619	7,559	200 buses
annual road deaths cited for India	Telangana crashes in 2022	Telangana fatalities in 2022	iRASTE ADAS pilot cited

REPORT OVERVIEW:

Predict, Prevent, Protect sets out an AI roadmap for moving road-safety management from pre-dominantly reactive response towards prediction, prevention and continuous risk reduction. It brings together CCTV, ANPR, red-light detection, behavioural analytics and e-challans with acci-dent databases, ADAS, telematics and other data sources to identify dangerous behaviour and locations. The report also considers real-time driver-risk indicators such as speeding, drowsiness and lane departure, alongside safety incentives and insurance applications. Its governance pro-posals include an integrated safety-data platform, a lead coordinating agency, inter-agency mechanisms, regular performance audits and a national centre for AI in road safety.

AI-ENABLED ENFORCEMENT

CCTV, ANPR, red-light violation detection, behavioural analytics and automated e-challans can provide 24/7, consistent enforcement across cities and high-fatality corridors, reducing reliance on manual policing alone.

PREDICTIVE RISK IDENTIFICATION

iRAD accident data, ADAS telematics and crowdsourced information can identify blackspots and emerging “grey spots” before repeated crashes. AI insights should be paired with physical safety countermeasures.

REAL-TIME RISK & DRIVER SCORING

ADAS and Driver Monitoring Systems can detect collision risk, drowsiness, speeding and lane departure. Driver scoring and reward frameworks can connect safe behaviour with insurance and fleet incentives.

DATA, GOVERNANCE & ASSURANCE

A unified road-safety data platform should integrate iRAD, ITMS, ADAS telemetry and citizen re-ports. The roadmap calls for a lead state agency, inter-agency task force, audits, public report cards and adaptive learning.

TELANGANA → INDIA ROADMAP

Scale AI enforcement to cities and highways; mandate or incentivise ADAS in public and freight fleets; institutionalise predictive blackspot/grey-spot management; establish integrated safety data infrastructure; develop national standards; create a National Centre for AI in Road Safety; and link AI adoption to Vision Zero objectives.

CORE MESSAGE- The report shifts road safety from reactive enforcement toward prediction and prevention—combining digital intelligence with safer infrastructure, responsible governance and incentives for safer driving.

An AI Roadmap for Urban Decongestion

BREAKING THE GRIDLOCK

535 million	~70%	25–30%	2025–30
urban residents cited	GDP generated by urban residents cited	arterial-delay reduction in cited benchmark	Hyderabad phased roadmap

REPORT OVERVIEW:

Breaking the Gridlock frames urban congestion as a systems problem that requires coordinated action across traffic signals, public transport, infrastructure, enforcement and travel demand. The report proposes AI for congestion prediction, adaptive signal control, intelligent enforcement and better public-transport operations, using Hyderabad as a practical implementation context. It iden-tifies existing assets such as IoT infrastructure, adaptive signals and traffic-management capabili-ties while highlighting gaps in multimodal data, analytics, institutional coordination and scalable PPP models. The roadmap moves from targeted deployments and data exchange to citywide intel-ligent traffic management and, ultimately, adaptive networks and dynamic demand-management systems.

FROM CONCRETE TO CODE

AI can forecast congestion, optimise signals and routes, detect violations and balance network loads. The report uses global benchmarks from Singapore, Stockholm and Los Angeles to illus-trate the potential of intelligent traffic management.

HYDERABAD READINESS

Existing IoT infrastructure, adaptive signals, a central Traffic Management Center, Hyderabad ITS, GHMC, Traffic Police and TGSRTC provide a base. Gaps include multimodal data integration, AI analytics capacity and structured PPP frameworks.

2030 ROADMAP

2025–27: expand adaptive signals, AI-CCTV, Hyderabad Mobility Data Exchange and institutional capacity. 2027–30: citywide AI ITMS, PPP sandbox and AI public transport. Post-2030: fully adap-tive network and dynamic demand management.

NATIONAL BLUEPRINT

Scale from Hyderabad to Tier-1 metros and Smart Cities; establish a National AI Mobility Mission; create a Mobility India Grid; build AI-mobility fellowships and innovation labs; use outcome-based PPPs; and support export of Indian solutions.

EXPECTED SYSTEM EFFECTS

Predictive congestion management can reduce delay, fuel waste and emissions while improving public-transport reliability and multimodal integration. The report emphasises that AI must be em-bedded in policy, supported by shared data and institutional capacity, and scaled through meas-urable pilots and partnerships.

CORE MESSAGE- The roadmap reframes decongestion as a coordination and intelligence challenge: predict before gridlock, optimise existing capacity, enforce consistently, integrate modes, and use data to build cleaner, more inclusive urban mobility.

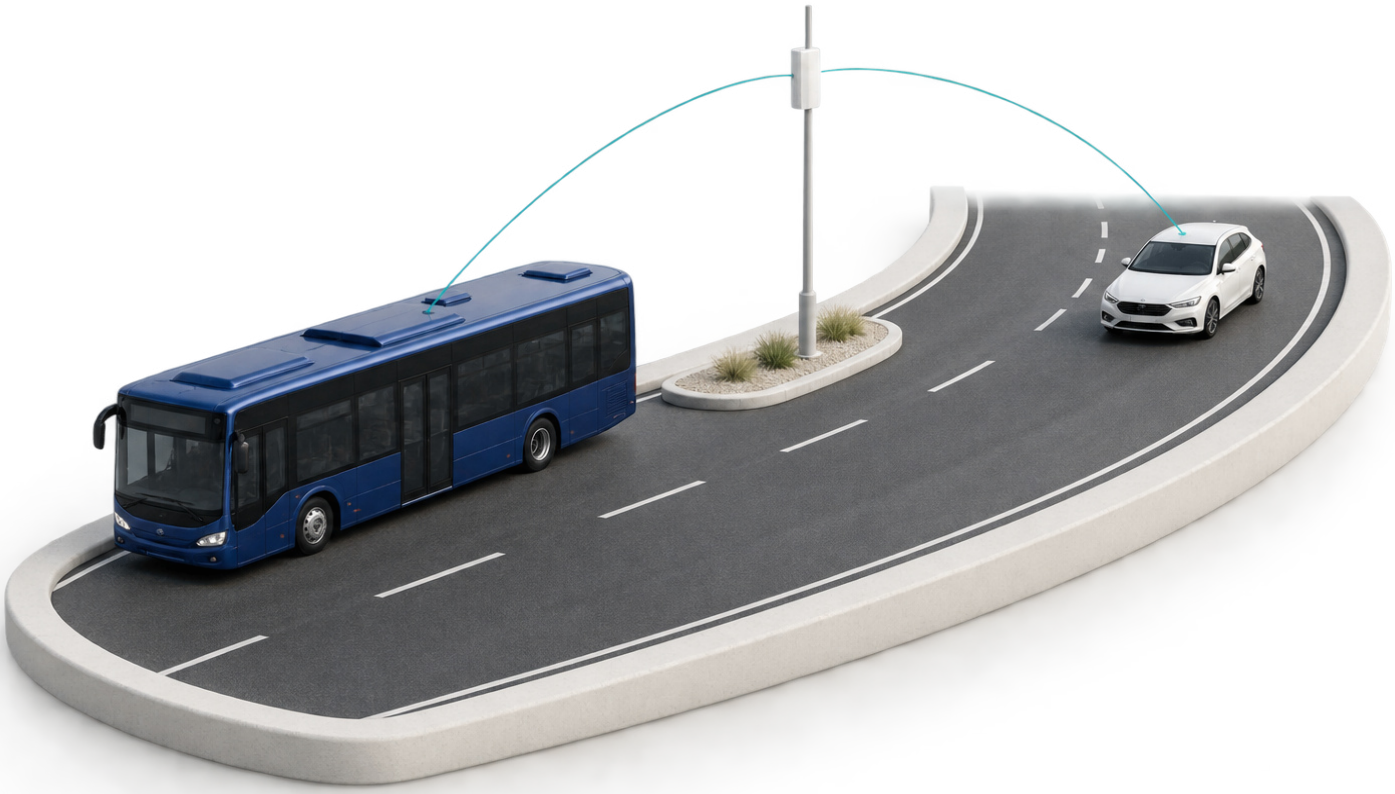
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Concept illustration

EVENTS

ITS 2025-26





The First Edition of

ITS India Congress 2025

The ITS India Congress was conceived as India's annual flagship platform on intelligent transportation, mod-elled on the ITS World Congress and the national congresses run by ITS America, ITS Asia-Pacific and their counterparts. Its first edition was held at a moment of rapid growth across national highways, metro rail, ur-ban mobility systems and digital infrastructure — and against persistent challenges of congestion, logistics inefficiency, road safety and environmental sustainability.

The Congress served as a national convergence platform, bringing together government representatives, in-dustry leaders, academia, startups and innovators to shape India's ITS roadmap. Its programme carried minis-terial plenary sessions, policy roundtables, innovation showcases, technology exhibitions, academic and re-search sessions, a hackathon and dedicated platforms for international collaboration.





The first ITS India Congress, held at IIT Hyderabad on 6–7 November 2025.

ITS INDIA CONGRESS 2025 — AT A GLANCE	
6–7 Nov	Held at the Indian Institute of Technology Hyderabad
3 hosts	ITS India Forum, IIT Hyderabad and the OMI Foundation
Pre-summit	Recognised as an official Pre-Summit Event of the India–AI Impact Summit 2026
Theme	AI in Mobility — for safer, sustainable and connected roads

02	05	09	03
PLENARY SESSIONS	TECHNICAL SESSIONS	NATIONAL REPORTS LAUNCHED	JOINT HOSTS

PLENARY ONE

Roadmap for electronic enforcement in India

The Congress opened its policy agenda with the session that would prove its most consequential. Chaired by Hon'ble Justice (Retd.) Abhay Manohar Sapre, Chairman of the Supreme Court Committee on Road Safety, the plenary examined MoRTH's newly released National SOP on Electronic Enforcement — the first national stakeholder discussion held after its issue in October 2025.

> **"Road accidents are not acts of fate — they can and must be prevented. India's road-safety transformation begins with enforcement that is electronic, transparent, and data-driven."**
>
> ***—HON'BLE JUSTICE (RETD.) ABHAY MANOHAR SAPRE***
> ***CHAIRMAN, SUPREME COURT COMMITTEE ON ROAD SAFETY***

Panellists identified integration of the e-Challan, Vahan and Sarathi platforms as central to an evidence-based deterrence ecosystem, and called for robust performance indicators, behavioural metrics and indigenous AI systems tailored to Indian road conditions. Its insights were directed into the ongoing work of the Supreme Court Committee.

PLENARY TWO

AI in mobility: Hyderabad leading the future

The second plenary examined how Hyderabad has applied AI to build safer and more efficient mobility sys-tems, showcasing applications across traffic management, transit optimisation and data-driven urban plan-ning, and positioning the city as a national benchmark for AI-enabled mobility.

TECHNICAL SESSIONS

Five sessions across the ITS agenda

SESSION	FOCUS
Barrier-less tolling and the way forward	India's transition to MLFF-based tolling, congestion pricing, and the roadmap toward GNSS-based tolling.
Connected vehicle ecosystem	Innovations in connected mobility, intelligent surveillance and electric transport systems.
ITS solutions for advancing the SDGs	Electric Road Systems, ADAS-based road safety, digital tools for construc-tion zone safety, and smart traffic management.
Emerging ITS technologies and policy push	Innovations, research trends and the policy momentum shaping smart mobility in India.
Emerging ITS technologies for highway design	Smart sensors, digital twins, traffic prediction tools and safety-focused design technologies.





What the first edition established

- ITS as foundational infrastructure. The Congress reaffirmed intelligent transport systems as a foundational element of India's mobility ecosystem — critical to road safety, traffic efficiency, enforcement effective-ness and citizen-centric service delivery.
- Enforcement as governance. Electronic enforcement was positioned as the backbone of transparent, ob-jective and accountable traffic governance, with end-to-end digitisation covering detection, e-challan is-suance, adjudication and performance analytics.
- Barrier-less tolling. Recognised as a transformative route to congestion-free highway operations, with ANPR, GNSS and integrated back-end platforms judged ready, subject to robust legal and grievance re-dressal frameworks.
- Connected and automated mobility. Positioned as foundational to future mobility, requiring common communication standards, cybersecurity frameworks and collaboration across OEMs, infrastructure pro-viders, telecom operators and regulators.
- Sustainability. ITS established as a key enabler for the Sustainable Development Goals, supporting emis-sion reduction, fuel efficiency, accessibility and safer transport.
- City-level demonstration. Hyderabad emerged as a scalable and replicable model for integrated traffic and mobility management.

ROUNDTABLES AND NATIONAL ENGAGEMENTS

The ATMS roundtable series

Advanced Traffic Management Systems formed the spine of the Forum's convening work through the year. In April 2025 a webinar on ecosystem readiness brought IHMCL, IIT Bombay and TTS Italia into a discussion of the shift from hardware-centric procurement toward functionality- and outcome-based approaches. In May, the national roundtable on scaling ATMS gathered C-DAC on adaptive traffic control platforms, the Ola Mobil-ity Institute on AI-based public transport prioritisation, and BIS on forthcoming standardisation protocols. By September, the fourth roundtable was feeding directly into the national architecture white paper being de-veloped with MoRTH and NHAI.

The MLFF webinar series

On 30 September 2025 the Forum opened a dedicated webinar series on multi-lane free flow tolling with a session themed “Next Gen Tolling.” IHMCL presented India's MLFF roadmap, proposing nationwide rollout by 2029 with initial deployment in FY 2025–26, underpinned by VAHAN-linked electronic notices, annual passes and standardisation.



National platforms

Traffic Infratech Expo 2025, October. Bharat Mandapam, New Delhi. The thirteenth edition drew over 300 brands. The President's address on “ITS for the Future” concentrated on data security and privacy frameworks, interoperability and standardisation, and bankable PPP structures supported by blended financing.

Ador summit

The **Ador Summit 2025, themed “Innovative Mobility: Smarter Traffic & Safer Roads,”** brought together policymakers, industry leaders, technology experts, and mobility practitioners to explore innovative solutions for transforming India's transport ecosystem. The summit addressed key areas such as intelligent traffic management, digital tolling, technology enabled enforcement, emergency response, Advanced Traffic Management Systems, connected vehicles, and sustainable mobility. **Mr.**



Akhilesh Srivastava, President, ITS India Forum, shared valuable insights on *"Barrierless Tolling in India: The Next Leap in Highway Management,"* highlighting the potential of high speed, MLFF, and integrated mobility platforms to improve the efficiency and safety of India's highways.

The summit further featured a high level panel discussion on **"Future of Smart Roads in India: Safety, Sustainability & Resilience,"** with participation from senior leaders across government, industry, infrastructure, academia, and technology. Discussions emphasised the importance of real time data, advanced traffic model-ling, digital infrastructure, and stronger public private collaboration in developing resilient and future ready roads. The event reinforced a shared vision of using innovation, technology, and cross sector partnerships to build a safer, smarter, more sustainable, and people centric mobility ecosystem for India.

MargShakti Industry Conclave, November.

MargShakti 2025, hosted at IIT (BHU), Varanasi, brought together policymakers, industry leaders, academia, researchers, and students to explore India's evolving transportation and logistics ecosystem. The two day conclave focused on roads, railways, logistics, urban mobility, road safe-ty, electric mobility, and the role of industry academia collaboration in driving resilient and sustainable infra-structure.

Mr. Akhilesh Srivastava, President, ITS India, shared key insights during the technical sessions on integrated mobility and logistics planning. He highlighted the importance of connected transport corridors, multimodal planning, data driven solutions, and PM GatiShakti in improving logistics efficiency, supporting economic growth, and building faster, cleaner, and more resilient mobility networks.



8th NHEV Working Group Meeting, December.

The 8th NHEV Working Group Meeting on the Connected Commercial Vehicle (CCV) Protocol brought together policymakers, industry leaders, technology experts, and mobility innovators to advance India's vision for safer, smarter, and more connected road transport. The meeting focused on interoperability, standardisation, AI enabled mobility solutions, digital infrastructure, and real time communication between vehicles and transport systems, while highlighting the role of technology and cross sector collaboration in reducing road accidents and improving freight and passenger safety. In his address, Mr. Akhilesh Srivastava, Co Chair of the Working Group and President of ITS India and Road Safety Ambassador at the International Road Federation, emphasised the transformative potential of connected mobility networks and the importance of robust digital frameworks, innovation, and evidence based policy in building a resilient, secure, and sustainable transport ecosystem.



The 8th NHEV Working Group Meeting.

AI IMPACT SUMMIT — FEBRUARY 2026

Leadership Dialogue on AI in Mobility

The **AI Impact Summit 2026** featured the ITS India Forum-led **"Leadership Dialogue on AI in Mobility: Accelerating the Future of Intelligent Transport"** on 20 February 2026 at Nalanda Banquet, Sushma Swaraj Bhawan. The session brought

together policymakers, industry leaders, technology experts, and academia to explore the transformative potential of AI in mobility, with discussions centred on **road safety, predictive analytics, intelligent traffic management, real-time decision-making, and digital transformation.** The dialogue highlighted the need to integrate AI with existing transport infrastructure and strengthen collaboration among government, industry, and academia to develop scalable, adaptive, and sustainable mobility solutions.



The AI in Mobility Summit at IIT Bombay, the Global Road Infratech Summit and Expo, and the Leadership Dialogue at the AI Impact Summit — January to March 2026.

AI IN MOBILITY: FROM IDEA TO IMPACT — 25 MARCH 2026

Translating AI innovation into practice

The **"AI in Mobility: From Idea to Impact"** conference, held on 25 March 2026 at Dr. Ambedkar International Centre, New Delhi, focused on translating AI innovation into practical mobility solutions. Bringing together policymakers, industry leaders, researchers, technology experts, and international stakeholders, the conference explored three key priorities: **AI for saving lives on roads, AI for solving urban congestion, and AI for sustainable and green mobility.** Discussions also addressed enabling policy frameworks for ITS, coordinated implementation, and opportunities for cross-sector collaboration, reinforcing the role of AI and intelligent technologies in building a **safer, smarter, more efficient, and sustainable mobility ecosystem in India.**







Suwon: induction to the Asia-Pacific association

At the 20th ITS Asia-Pacific Forum, held in Suwon, South Korea from 27 to 30 May 2025, the ITS India Forum was officially inducted as the twelfth member of the ITS Asia-Pacific Association. The Forum's reporting de-scribes this as opening participation in the development of international ITS standards and regulatory frame-works, avenues for collaborative pilot projects and bilateral knowledge exchange, and a platform to influence regional strategy on smart mobility.

Leading the Indian delegation, the President delivered a keynote address and presented the India Report on Intelligent Transportation Systems, spotlighting the C-V2X-enabled green corridor for emergency response, the Safe Driving Score platform and the national road user charging framework.



India's induction as the twelfth member of the ITS Asia-Pacific Association, Suwon, May 2025.

The Road User Charging Alliance

The same period saw the Forum join a regional road user charging alliance alongside ITS Taiwan, ITS Thailand and ITS New Zealand — an alliance intended to advance next-generation road user charging mechanisms through policy recommendations.



ITS World Congress 2025: Atlanta

The ITS World Congress 2025 in Atlanta marked the Forum's most prominent international presence of the year. The Forum hosted the official India Pavilion at the Georgia World Congress Center, showcasing live demonstrations of AI enabled road safety systems, connected and sustainable mobility solutions, and digital tolling innovations.

The Congress also featured a dedicated session on intelligent transport in India, which the Forum's reporting described as the first session of its kind in the history of the ITS World Congress. In his address, the President highlighted India's transformation from a technology adopter to a global innovator, with particular emphasis on the world's largest FASTag network and the country's transition towards multi lane free flow tolling.



The ITS India Forum delegation at the ITS World Congress 2025 in Atlanta, and the exhibition floor at the Georgia World Congress Center.

International Partnerships & Global Engagement 2025–26

Through the year the Forum maintained collaborations with ITS United Kingdom, ITS Germany, TTS Italia, 5GAA, ITS Asia Pacific, ITS America and ERTICO. In the final quarter, contributions from ERTICO – ITS Europe, ITS America, ITS Australia and ITS China appeared in the Forum's publications, setting out their strategic prior-ities for 2026 and their points of alignment with India's ITS agenda.

Key Events At a Glance (2025-2026)

DATE	KEY TOPIC	VENUE
Q1 April – June 2025 POLICY & PARTNERSHIPS · 05 ENGAGEMENTS		
17 Apr 2025 *POLICY*	**Advanced ATMS Webinar** *"Ecosystem Readiness in the Era of AI and Connected Vehicles"*	Online — in association with Ride Asia EV 2025
18–20 Apr 2025 *INDUSTRY*	**Ride Asia EV 2025** *DANLAW connected-vehicle pilot exhibited*	Pragati Maidan, New Delhi
26–27 Apr 2025 *KNOWLEDGE*	**International Conference on Smart Mobility Systems** *ICSMS 2025*	Ambedkar International Centre, New Delhi
20 May 2025 *POLICY*	**National Roundtable on Scaling ATMS** *"Challenges in Scaling ATMS and the Way Forward"*	Online
27–30 May 2025 *INTERNATIONAL*	★ **20th ITS Asia-Pacific Forum** *India inducted as the twelfth member of the ITS Asia-Pacific Association*	Suwon, Republic of Korea
Q2 July – September 2025 TECHNOLOGY & DEPLOYMENT · 05 ENGAGEMENTS		
Aug 2025 *INTERNATIONAL*	★ **ITS World Congress 2025** *ITS India Forum hosted the official India Pavilion*	Georgia World Congress Center, Atlanta, USA
Sep 2025 *POLICY*	**4th National Roundtable on Data-Driven ATMS**	
Sep 2025 *INDUSTRY*	★ **NATRAX Sustainable Mobility Conclave 2025** *Charging Ahead released; ITS India–NATRAX MoU signed*	Indore, Madhya Pradesh
19 Sep 2025 *KNOWLEDGE*	**AITD Online Training Session** *Three modules across challenges, safety technology and AI-based enforcement*	Online
30 Sep 2025 *POLICY*	**1st MLFF Webinar Roundtable** *"Next Gen Tolling" — IHMCL presented the national MLFF roadmap*	Online
Q3 October – December 2025 NATIONAL CONVERGENCE · 07 ENGAGEMENTS		
7–9 Oct 2025 *INDUSTRY*	**Traffic Infratech Expo 2025** *Thirteenth edition, over 300 brands*	Bharat Mandapam, New Delhi
6–7 Nov 2025 *KNOWLEDGE*	★ **First ITS India Congress** *Pre-Summit Event of the India–AI Impact Summit 2026; nine reports launched*	Indian Institute of Technology Hyderabad, Telangana
Nov 2025 *KNOWLEDGE*	**MargShakti 2025 Industry Conclave** *Two technical sessions on integrated mobility and PM GatiShakti*	IIT (BHU), Varanasi, Uttar Pradesh

	DATE	KEY TOPIC	VENUE
	Nov 2025 *INDUSTRY*	**Ador Summit 2025** *"Innovative Mobility: Smarter Traffic & Safer Roads"*	Ador Powertron campus, Pune, Maharashtra
	2–4 Dec 2025 *INDUSTRY*	**GeoSmart India 2025** *ITS India Forum served as Knowledge Partner*	Bharat Mandapam, New Delhi
	Dec 2025 *INDUSTRY*	**IFSEC India 2025** *The President addressed the inaugural session*	Bharat Mandapam, New Delhi
	Dec 2025 *POLICY*	**8th NHEV Working Group Meeting** *On the Connected Commercial Vehicle (CCV) Protocol*	Le Meridien, Janpath, New Delhi
	Q4 January – March 2026 INSTITUTIONAL SCALE · 05 ENGAGEMENTS		
	30 Jan 2026 *KNOWLEDGE*	★ **AI in Mobility Summit** *Co-hosted with IIT Bombay*	Indian Institute of Technology Bombay, Mumbai
	5–6 Feb 2026 *INDUSTRY*	**Global Road Infratech Summit & Expo 2026** *ITS India Forum served as Knowledge Partner*	Hotel The Ashok, New Delhi
	20 Feb 2026 *POLICY*	**Leadership Dialogue on AI in Mobility** *The Forum's session at the AI Impact Summit 2026*	Nalanda Banquet, Sushma Swaraj Bhawan, New Delhi
	Feb 2026 *RECOGNITION*	**Build India Infra Awards 2026** *New ITS category; awards presented by the Hon'ble Minister of Road Transport & Highways*	The Ashok Hotel, Chanakyapuri, New Delhi
	25 Mar 2026 *KNOWLEDGE*	**AI in Mobility: From Idea to Impact** *Closing conference of the year*	Dr. Ambedkar International Centre, New Delhi

WEBINAR · MAY 2026

Regulatory Framework for V2X Communication

ORGANISED BY ITS INDIA FORUM 28 MAY 2026 · VIRTUAL

Organised by the ITS India Forum on 28 May 2026, this virtual session convened professionals from govern-ment, industry, academia and the wider intelligent-transport ecosystem to deliberate the policy and regulato-ry landscape needed to accelerate Vehicle-to-Everything (V2X) adoption in India. Akhilesh Srivastava, Presi-dent, ITS India Forum, delivered the Opening Remarks and chaired the session. Discussions centred on build-ing an enabling ecosystem for connected vehicles through policy support, technology standardisation, institu-tional collaboration and capacity building — reinforcing V2X's role in safer roads, smoother traffic and richer mobility services. The session reinforced the significance of continued engagement between policymakers, industry leaders, technology providers, and research institutions to accelerate the deployment of connected mobility solutions. By encouraging

knowledge sharing and constructive dialogue, the webinar contributed to the ongoing efforts towards build-ing a future-ready transportation ecosystem in India.

ROUNDTABLE · 01 JUNE 2026

Active Travel Roundtable

CSOI,NEW DELHI · 01 JUNE 2026

Held at CSOI, New Delhi, The Active Travel Roundtable 2026 convened on 1 June 2026 at the Civil Services Officers' Institute (CSOI) in New Delhi, bringing together senior policymakers, urban planners, transport spe-cialists, and technology leaders to integrate active mobility— specifically walking, cycling, and non-motorised transport (NMT)— into mainstream urban transit architecture. Moving away from vehiclecentric municipal models toward human-centric networks directly supports key public sector goals: reducing urban vehicular emissions, easing traffic congestion, and improving public health standards across metropolitan centers. The proceedings featured authoritative representation across administrative, industry, and academic spheres. Key addresses were delivered by Sri Durga Shankar Mishra, IAS (Retd.), former Chief Secretary to the Government of Uttar Pradesh and former Secretary of the Ministry of Urban Development, alongside Sri Ashish Kumar Sri-vastava, IAS, Regional Director at SSC Prayagraj. Industry advocacy was led by Akhilesh Srivastava, President of the ITS India Forum, who emphasized human-centric, smart mobility frameworks. Technical evaluations and framework assessments were spearheaded by senior researchers and planners from premier institutions, including NITI Aayog, IIT Delhi, and the Central Road Research Institute (CRRI). Deliberations focused on three foundational strategic pillars required for operational efficiency. First, regarding policy execution, delegates analyzed implementation roadmaps for national active travel visions, focusing on standardized cycling corri-dors and pedestrian safety protocols. Second, on technological integration, the panel explored utilizing Direct-to-Mobile (D2M) broadcasting to deliver real-time commuter communications, optimize route safety, and support broader smart mobility systems. Third, regarding infrastructure restructuring, the assembly stressed that widespread civic adoption depends on dedicated NMT routes, universal accessibility metrics, and strict road safety policy enforcement. The roundtable concluded with a multi-sector consensus establishing that coordinated multi-agency frameworks among municipal bodies, academic institutions, and industry stake-holders are mandatory to accelerate active transit adoption. The directives and insights established during this session will serve as a foundational roadmap for upcoming national policy interventions and municipal transit upgrades.





SPACE CONGRESS · 15–17 JUNE 2026

5th India Space Congress 2026

LE MÉRIDIEN, NEW DELHI

At the 5th India Space Congress 2026, held from 15–17 June 2026 at Le Méridien, New Delhi, provided a prestigious platform for discussions on emerging technologies, innovation, and the growing convergence of the space and digital technology sectors. The event brought together policymakers, industry leaders, technol-ogy experts, researchers, and innovators to explore new opportunities for collaboration and technological advancement.

ITS India Forum's participation reflected the increasing significance of space-based technologies in enabling intelligent transportation systems and future mobility solutions.

Akhilesh Srivastava, President, ITS India Forum, participated in the Congress as a Special Guest and Panel Speaker, highlighting the transformative role of satellite technologies, digital infrastructure, and data-driven solutions in enhancing transportation efficiency, connectivity, and public safety.

The Congress encouraged dialogue on innovation, technology integration, and cross-sector collaboration to address future mobility challenges. Discussions emphasized the importance of leveraging advanced technolo-gies to strengthen infrastructure, improve connectivity, and support sustainable development across multiple sectors.

The event successfully reinforced the value of collaboration between government, academia, industry, and technology leaders in shaping a resilient and innovation-driven future. The participation of ITS India Forum further reflected its continued commitment to promoting intelligent, connected, and sustainable mobility through technological excellence and strategic partnerships.

CONFERENCE · 30 JUN – 01 JUL 2026

Smart Mobility Systems — ICSMS 26

IETE, NEW DELHI & OSMANIA UNIVERSITY, HYDERABAD

Jointly hosted by IETE New Delhi and Osmania University, the two days conference brought together leading academic and industry minds around Artificial Intelligence, Quantum Computing and Vehicle-to-Vehicle (V2V) communication. Dr. Akhilesh Srivastava (President, ITS India) called for intelligent road infrastructure — camera-enabled streets and smart signage that communicates directly with vehicles — to reduce fatalities.

Key Takeaways from the Conference

The conference highlighted critical imperatives for advancing India's smart transit and research land-scape. IETE President Dr. Sunil emphasized building India-first infrastructure, advocating for scalable solutions tailored specifically to Indian road conditions, notably using Direct-to-Mobile (D2M) com-munication to deliver critical traffic and emergency alerts independent of internet connectivity. Building on smart mobility, Dr. Akhilesh Srivastava (President, ITS India) underscored the urgent need for intelligent, safety-focused road infrastructure, such as camera-enabled streets and smart signage that communicate directly with vehicles to curb traffic fatalities. Beyond physical and digital transit networks, experts across sessions stressed the strategic importance of protecting local innovation by retaining intellectual property rights within India to drive national economic growth. Finally, reinforc-ing academic rigor, General Chair Dr. J.K. Mondal detailed the conference's strict quality standards, noting that out of 280 submitted papers, only 20 survived the peer-review process for publication by Springer Nature, while issuing an explicit advisory to researchers against leveraging AI tools like ChatGPT for content generation.





V2X ROUND TABLE DISCUSSION

Regulatory & Implementation Pathway for Connected Mobility

10 July 2026 · DAIC, New Delhi | Organised by ITS India Forum

The V2X Round Table Discussion, organised by the ITS India Forum, brought together stakeholders from Government, industry, technology, academia and the intelligent mobility ecosystem to deliber-ate on the regulatory and implementation pathway for Vehicle-to-Everything (V2X) technology in In-dia.

The discussion focused on how V2X can support the transition towards a connected, intelligent and safer transportation ecosystem by enabling communication between vehicles, roadside infrastruc-ture, traffic management systems, networks and other elements of mobility. Participants examined the practical requirements for moving from technology development and pilot initiatives towards scalable deployment across diverse Indian road environments.

A key area of discussion was the need for a clear and enabling regulatory framework that supports interoperability, communication reliability, safety, affordability and scalability. Given India's highly diverse and mixed-traffic environment, the importance of developing solutions suitable for two-wheelers, three-wheelers, passenger vehicles, commercial vehicles, buses and other road users was highlighted.

The Round Table also emphasised that V2X adoption is not only a technology challenge. Successful deployment requires coordination across policy, standards, communication networks, infrastructure, vehicles, data systems and road authorities. Interoperability was recognised as an important founda-tion for enabling different technologies and systems to communicate effectively.

Road safety remained a central focus, with discussions highlighting the potential of V2X to support timely warnings, improved situational awareness, responsive traffic management and emergency ser-vices.

The dialogue reinforced the importance of collaboration among Government, industry, technology providers, infrastructure stakeholders and knowledge institutions. The Round Table provided a plat-form to bring these perspectives together and contribute towards a practical roadmap for India's transition to connected, intelligent and safer mobility.



GLOBAL ITS SUMMIT – GOA

Building a Robust Intelligent Transportation Ecosystem

15–16 July 2026 · Goa | Organised by ITS India Forum

The Global ITS Summit–Goa brought together Government, industry, academia and technology stakeholders to explore the development of a robust Intelligent Transportation Systems (ITS) ecosys-tem for Goa and its potential as a model for safe, sustainable and connected mobility.

The Summit witnessed high-level Government participation, stakeholder interactions and discussions around smart mobility, road safety, V2I, AI, IoT, intelligent traffic management and sustainable transportation. The programme also highlighted Goa's opportunity to develop a statewide ITS roadmap, with priority pilot projects, connected infrastructure and stronger Government–industry partnerships.

A key milestone was the signing of an MoU between ITS India Forum and the Directorate of Skill De-velopment & Entrepreneurship, Government of Goa, aimed at strengthening collaboration in skill development, capacity building and emerging technology domains relevant to the future mobility ecosystem. The collaboration was showcased during the World Youth Skills Day 2026 programme, reinforcing the importance of developing a skilled workforce for technology-driven transportation.

The Summit also explored opportunities around a Centre of Experience, integrated mobility solutions and Command & Control infrastructure, while emphasising collaboration with knowledge institutions and industry.

The initiative reinforced Goa's potential to serve as a model for safe, smart, connected and sustaina-ble mobility, while creating stronger linkages between technology, skills, Government and industry.



National Road Safety Technology Conclave 2026

Date: 25–26 August 2026
Venue: IIT Bombay, Powai, Mumbai
Organised by: ITS India Forum, in collaboration with IIT Bombay
Theme: Best, Most Promising and Proven ITS Technologies for Road Safety

India recorded over 1.83 lakh road deaths in 2025, the highest toll of any country. The National Road Safety Technology Conclave 2026 (NRSTC 2026) was held to move the conversation from discussion to deployment, by bringing technology developers face to face with the officials who can put their solutions on the road.

More than 250 delegates took part, including police officers, transport commissioners and senior officials from 16 state governments, along with representatives of central ministries, the IITs and in-dustry. Justice Abhay Manohar Sapre, Chairman of the Supreme Court Committee on Road Safety, and committee member Shri Sanjay Bandyopadhyay were present on both days. In the inaugural ses-sion, the speakers stressed a shift from reactive to predictive, data-led road safety.

Day 1: Technology Showcase. Twenty-eight indigenous technologies were presented across four moderated sessions before a jury. Each developer had eight minutes to present and four minutes for questions. Everyone answered the same

five questions: the problem they address, their solution, the evidence behind it, what they need from government, and what they will commit to deploy if they get it.

Day 2: Manthan. Manthan means "deep churning." In this closed-door session, state officials from transport, police and highways departments questioned 16 shortlisted developers on how ready their solutions were for deployment and what pilot they could begin immediately. A valedictory ses-sion closed the conclave.

Types of technologies showcased

- Enforcement and compliance: AI cameras, ANPR, speed and red-light enforcement
- Vehicle-fitted safety systems: retrofit driver assistance (ADAS) and brake alerts
- Driver behaviour and fleet monitoring: driver monitoring, fatigue detection, AI dashcams
- Traffic and road network: adaptive signals, V2X, variable message signs











- Emergency response and crash data: emergency-vehicle priority, near-miss and crash analyt-ics

Outcome. The states showed strong interest. Pilot or procurement interest was recorded for 14 of the 16 evaluated solutions, from at least seven states, including Rajasthan, Uttarakhand, Tamil Nadu, Gujarat, Madhya Pradesh, West Bengal and Bihar. Most developers offered free pilots and asked on-ly for a test corridor, a nodal officer, basic operational access and standardised data access.

In return, the panel set a readiness standard: medical and automotive certification, cybersecurity, published pilot evidence, affordable pricing and interoperability. One gap stood out as well. Most innovation targets fleets, four-wheelers and city junctions, while two-wheelers, pedestrians and rural roads account for the largest share of deaths.

The conclave concluded that India's main obstacle is no longer technology but administration: the nodal officers, test corridors, data access and procurement rules that turn interest into action on the road.

Innovate. Collaborate. Save Lives.

INTERNATIONAL WEBINAR ON TOOLING & MOBILITY TECH-NOLOGY

KNOWLEDGE EXCHANGE ACROSS THE GLOBAL MOBILITY ECOSYSTEM

6 AUGUST 2026 · ONLINE

ITS INDIA FORUM – INTERNATIONAL KNOWLEDGE ENGAGEMENT

Sharing Perspectives on Emerging Mobility Technologies

The International Webinar held on 6 August 2026 provided a platform for knowledge exchange around emerging tooling and mobility technologies.

As transportation systems become increasingly connected and technology-driven, international knowledge sharing has become an important component of building a future-ready mobility ecosys-tem. The session provided an opportunity for stakeholders to engage with developments in mobility technology and explore perspectives emerging from the wider international ecosystem.

TECHNOLOGY, KNOWLEDGE & COLLABORATION

The webinar highlighted the importance of continuous technology exchange in a sector where devel-opments in digital systems, connected mobility and intelligent transportation are progressing rapidly.

International engagements such as these enable stakeholders to understand evolving approaches, exchange experiences and identify opportunities for future collaboration.

BUILDING GLOBAL CONNECTIONS

For ITS India Forum, international knowledge exchange forms an important part of strengthening India's engagement with the global ITS community.

Such platforms contribute to a wider dialogue around innovation, technology deployment and the development of transportation systems that are safer, smarter and more connected.

Driver Dignity Day / National Convention on Future Mobility & Sustainability

Putting People at the Heart of Future Mobility

Date: 16 September 2026

Venue: Srinagar

Organised by: ITS India Forum (Mobility Stakeholder Engagement)

The National Convention on Future Mobility & Sustainability, held in Srinagar on 16 September 2026, turned the spotlight on the people who keep transportation moving. The programme focused on driver dignity, road safety and sustainable

mobility, with one idea at its core: the transformation of transport must improve the lives of the people who operate and use it every day.

Driver dignity and road safety. Drivers are central to India's public transport, logistics, commercial mobility and passenger travel. The discussions made the point that road safety depends not only on vehicles and infrastructure, but also on the working environment, safety and dignity of the driver. Driver dignity was linked to the larger goal of a safer, more sustainable transport system.

Technology that serves people. Connected vehicles, intelligent infrastructure, AI, automation and digital systems will shape the future of mobility. The convention stressed that this technology must turn into real improvements on the ground, making transport safer, more efficient and more digni-fied.

Sustainability and future mobility. The convention tied human-centric mobility to the wider sustaina-bility agenda. As India moves towards cleaner, smarter and more connected transport, the transition has to consider the whole ecosystem: drivers, passengers, pedestrians, infrastructure and technolo-gy.

Focus areas: Driver dignity · Road safety · Sustainable mobility · Future transportation · Human-centric mobility

Mobility technology must ultimately serve people and improve real-world mobility outcomes.





SOUTH ASIAN UNIVERSITY
KNOWLEDGE FOR A SHARED TOMORROW

ITS INDIA
SHAPING THE FUTURE OF MOBILITY



GLOBAL PROGRAMMES IN ITS & SUSTAINABLE MOBILITY

Three pathways. A global perspective. A sustainable future.

Global MS in ITS & Sustainable Mobility

2 YEARS

Advanced interdisciplinary learning combining technology, policy, sustainability, data and real-world mobility applications.

Executive PhD in ITS & Sustainable Mobility

3 YEARS

Practice-informed doctoral research addressing real-world mobility challenges and creating implementable solutions.

Integrated Programme (MS + PhD) ITS & Sustainable Mobility

5 YEARS

A seamless pathway from advanced professional learning to original research, innovation and mobility impact.

Programme Highlights

GLOBAL CURRICULUM
Technology, policy, data, sustainability and management.

WORLD-CLASS FACULTY
Learn from leading academics and industry experts worldwide.

HANDS-ON EXPERIENCE
Case studies, simulations, industry projects and innovation labs.

GLOBAL EXPOSURE
Industry visits, study tours and international collaborations.

RESEARCH & INNOVATION
Access to leading labs, networks and real-world projects.

CAREER & LEADERSHIP IMPACT
Build skills for leadership roles in a rapidly growing global sector.

Who Should Apply?

- Professionals from transport, urban planning, infrastructure, automotive, technology and environment sectors
- Government and policy professionals
- Researchers and academicians
- Entrepreneurs and innovation leaders
- Anyone passionate about building sustainable and inclusive mobility solutions

Be the Change. Lead the Mobility Revolution.



Three Years.

One Mission.

A Smarter, Safer India in Motion.

ITS India: Three Years of Transformational Journey

September 2023 – September 2026

From Institution Building to National Impact and Global Leadership

Reshaping the Future of Mobility

50+ Members	**10** IIT Knowledge Partners	**20+** Study Reports Published	**16** States at NRSTC 2026
12+ Global Partnerships	**3** Global Boards	**5** MoUs with States & Organisations	

FROM THE PRESIDENT'S DESK

A Platform Built for the Road Ahead

> *When we began in September 2023, we set ourselves one honest test: will India's roads be safer, smarter and better connected because ITS India exists? Three years on, the answer is taking shape — in policy rooms, on pilot corridors, in classrooms, in researches and on the world stage. And we are only getting started.*
>
> — **Akhilesh Srivastava**, President, ITS India Forum

India is building transport infrastructure at a scale and speed few nations have ever attempted. Yet concrete and steel alone cannot deliver the outcomes a growing nation demands. The next leap in safety, efficiency and sustainability will come from **intelligence** — from data, connectivity, automation and AI woven into every corridor, junction and vehicle.

ITS India Forum was created to make that leap a national, coordinated and accountable effort. This Year Book records how a founding vision became a working ecosystem: one that convenes, evidences, educates and now increasingly **delivers**.

From Founding Vision to National Force

Established in September 2023, **ITS India Forum has evolved in just three years from a founding vision into India's national platform for Intelligent Transport Systems (ITS), smart mobility and sustainable transportation.** What began as an institution-building initiative is today a collaborative ecosystem uniting Government, industry, academia, research institutions, international organisations and civil society around a single purpose: shaping the future of mobility in India.

The Forum's journey reflects a deliberate and disciplined progression — **from convening stakeholders to shaping policy, from promoting innovation to enabling deployment, and from national engagement to global representation.**

50+	10	20+	12+
Members	IIT Knowledge Partners	Study Reports in 3 Years	International Organisations

India's First Comprehensive ITS Market Survey & Report

The Journey at a Glance

2023	2024	2025	2026	NEXT
BUILD	**CONNECT**	**EXPAND**	**IMPACT**	**SCALE**
Establish the Institution	**Build the Ecosystem**	**Take India to the World**	**Convert Knowledge into Action**	**Accelerate Deployment**
The national ITS platform is founded with a clear four-point mandate.	Policy Roundtables, Bengaluru Pilot, ITS Digest and the first ITS India Pavilion in Dubai.	First ITS India Congress, Atlanta World Congress and a Board seat at ITS Asia-Pacific.	AI Impact Summit, NRSTC with IIT Bombay, ITS LMS, Executive MS & PhD, ITS World Congress Board.	Standards, adoption, research and partnerships for nationwide intelligent mobility.

Behind the milestones sits a formidable knowledge engine: **10 IITs as Knowledge Partners**, leading institutions such as IISc Bengaluru, BITS Pilani and South Asian University, research partners CSIR–CRRI and AITD, and **20+ study reports published in three years** — including **India's first comprehensive ITS Market Survey and Report**.

Three Defining Shifts

2024 — Laying the Foundation. The first full year established ITS India as a credible platform for policy dialogue. Two Policy Roundtables, the Bengaluru ITS Pilot, the launch of ITS Digest and the ITS India Pavilion at the ITS World Congress in Dubai put both the Forum and Indian ITS capability on the map.

2025 — Expanding the National and Global Footprint. A year of accelerated growth and recognition. The first ITS India Congress at IIT Hyderabad, engagements in South Korea and Atlanta, Government-sponsored training and new research partnerships widened the Forum's reach, while its induction onto the **Board of the ITS Asia-Pacific Forum** gave India a stronger voice in regional ITS leadership.

2026 — Advancing Impact, Innovation and Leadership. A decisive shift from dialogue to delivery. The AI in Smart Mobility session at the Government of India's AI Impact Summit, the ITS Learning Management System, the National Road Safety Technology Conclave with IIT Bombay, recognition of promising road-safety technologies, and Executive Global MS and PhD programmes with South Asian University mark a Forum now producing measurable outcomes. Induction onto the **ITS World Congress Board** completes India's rise from participant to global agenda-setter.

THE STORY IN ONE LINE

Three years in, India's ITS Forum has moved from the conference room to the corridor — and from the audience to the boardroom of global mobility.

As India advances towards **Viksit Bharat @2047**, ITS India stands committed to accelerating mobility that is **smarter, safer, more sustainable, connected and inclusive**.

Three years of building foundations. Three years of creating partnerships.
Three years of turning vision into action.
The journey has only begun.

Reshaping the Future of Mobility

2023 | BUILD

Establishing the National ITS Platform

Every movement begins with a meeting of minds.

SEPTEMBER 2023

ITS India Is Established

ITS India was founded with a bold yet practical ambition: to create, for the first time, a **single national platform** where Government, industry, academia, research institutions and international organisations could work together to accelerate the adoption of Intelligent Transport Systems and sustainable mobility.

The Forum was built on four foundational objectives:

- **Policy and standards development** — giving India a coherent, future-ready ITS framework
- **Technology adoption and deployment** — moving proven solutions from labs to live roads
- **Government–industry–academia collaboration** — one table, every stakeholder
- **International cooperation and knowledge exchange** — learning from the world, and contributing to it

IN THE HEADLINES

A national home for Intelligent Transport Systems is born — and India's mobility future gets a common address.

> *India did not lack technology, talent or intent. What it lacked was a common table. ITS India was created to build that table — and to make sure every seat at it was accountable for outcomes on the road.*
>
> — **Akhilesh Srivastava**, President, ITS India Forum

2023 MILESTONE

A Founding Vision → A National Ecosystem in the Making

2024 | CONNECT

Building Partnerships, Policy Dialogue and Global Visibility

Evidence first. Policy follows. The world takes notice.

JULY 2024

First ITS Policy Roundtable

ITS India convened its first **Policy Roundtable on Intelligent Transportation Systems**, bringing policymakers, industry leaders, experts and academia together to begin a structured national conversation on what ITS adoption truly requires — in policy, regulation and institutional design.

SEPTEMBER 2024

Second Policy Roundtable

The second Roundtable deepened the **Government–industry–academia dialogue** and firmly established ITS India as the go-to platform for policy discussion on emerging mobility technologies.

2024

The Bengaluru ITS Pilot

ITS India undertook an **ITS pilot in Bengaluru**, generating practical technology and policy inputs — particularly on **connected mobility and spectrum requirements**. More than a project, the pilot defined the Forum's signature operating model:

Pilot ▶ Evidence ▶ Policy Dialogue ▶ Standards / Spectrum ▶ Government Notification

2024

ITS World Congress, Dubai — The First ITS India Pavilion

ITS India participated in the **ITS World Congress 2024 in Dubai** with **12 industry partners**, establishing the first-ever **ITS India Pavilion**.

The Pavilion gave Indian companies and the wider Indian ITS ecosystem a shared international stage to showcase **Indian technologies, capabilities and solutions** — signalling that India arrives not only as a market, but as a maker.

IN THE HEADLINES

Made-in-India mobility tech steps onto the world stage: 12 partners, one Pavilion, one national story in Dubai.

2024

Launch of ITS Digest

ITS India launched **ITS Digest**, a regular platform for knowledge sharing, technology developments, policy discussions and industry perspectives — the Forum's voice to the ecosystem.

2024

Building Institutional Partnerships

ITS India began formalising collaborations with **premier academic institutions, professional bodies, research organisations and international ITS institutions**, laying the groundwork for long-term cooperation in research, standards, capacity building and technology development.

2024 MILESTONE

From Institution → Connected Ecosystem

2025 | EXPAND

Expanding India's ITS Ecosystem at Home and Globally

From a national conversation to a seat at the regional high table.

2025

Government-Sponsored ITS Training & Capacity Building

ITS India scaled up capacity building through **Government-sponsored ITS courses and training programmes during 2025–26**, including programmes conducted with the **Asian Institute of Transport Development (AITD)** for stakeholders associated with the Ministry of Road Transport and Highways.

Training covered **ITS, traffic management, road safety and enforcement technologies** for stakeholders from multiple States — because smart infrastructure needs smart institutions to run it.

2025

ITS Asia-Pacific Forum, Suwon, South Korea

ITS India led an Indian delegation to the **ITS Asia-Pacific Forum in Suwon, South Korea**, one of the world's most advanced ITS ecosystems. The President of ITS India delivered a keynote on **safe, sustainable and inclusive mobility**, outlining how connected vehicles, Mobility-as-a-Service, next-generation Road User Charging and green fuels will reshape transportation. The delegation engaged with governments, industry, technology companies and ITS institutions, opening new avenues for cooperation.

> *India, with the second largest road network and third largest vehicle market, is a dominant global leader in the mobility economy.*
>
> —ITS India Forum (Suwon, 2025)

2025

ITS World Congress, Atlanta

At the **ITS World Congress 2025 in Atlanta, USA** — which drew over 5,600 delegates, 224 exhibitors and representatives from 57 countries — ITS India took centre stage with an **India Pavilion** showcasing Indian companies and an **exclusive India panel discussion**, further expanding India's presence in the global ITS community and strengthening institutional relationships across continents.

2025

Board Member, ITS Asia-Pacific Forum

In a landmark institutional achievement, **ITS India was inducted onto the Board of the ITS Asia-Pacific Forum**, strengthening India's role in regional ITS cooperation and policy dialogue — and giving the world's fastest-growing major mobility market a voice where regional priorities are shaped.

IN THE HEADLINES

India takes its seat at the Asia-Pacific ITS high table — within two years of the Forum's founding.

2025

First ITS India Congress, IIT Hyderabad

ITS India organised its **First ITS India Congress at IIT Hyderabad**, bringing Government, industry, academia, technology providers and other stakeholders together under one roof. The Congress established a national platform for dialogue across five frontiers:

AI ▶ ITS ▶ Connected Mobility ▶ Road Safety ▶ Sustainable Transport

2025

Strengthening Academic and Research Partnerships

ITS India expanded formal collaborations through **MoUs with IITs, professional bodies and research institutions**, including **CSIR–CRRI** and **AITD** — building towards a national knowledge alliance that today includes **10 IITs as Knowledge Partners**, supporting cooperation in research, technology, road safety, standards and knowledge development.

2025–26

Government and Institutional Education Programmes

ITS India broadened its role in **professional education and capacity building**, delivering structured programmes for government and mobility stakeholders and laying the foundation for specialised executive education in ITS and sustainable mobility.

2025 MILESTONE

Connected Ecosystem → National & Global Platform

2026 | IMPACT

From Dialogue to Demonstration, Policy, Education and Global Leadership

The year ideas met the road.

FEBRUARY 2026

AI in Smart Mobility at the AI Impact Summit

ITS India was invited to conduct a dedicated session on **AI in Smart Mobility** as part of the Government of India's **AI Impact Summit** — placing mobility firmly within the national AI agenda and marking a defining contribution to India's dialogue on **AI, mobility and transportation**.

IN THE HEADLINES

When India talked AI, mobility had a seat at the table — and ITS India held it.

2026

Launch of the ITS Learning Management System

ITS India launched its **Learning Management System (LMS)**, a digital platform for **ITS courses, professional training and continuous capacity building** — making structured ITS learning accessible to professionals anywhere in the country.

2026

ITS Capacity Building Across States

Training and knowledge programmes on **ITS, traffic management, road safety and enforcement technologies** continued for stakeholders across States, steadily widening India's professional ITS talent base.

AUGUST 2026

National Road Safety Technology Conclave (NRSTC 2026), IIT Bombay

In collaboration with **IIT Bombay**, ITS India organised the **National Road Safety Technology Conclave (NRSTC 2026)** — a significant evolution from *discussing* technologies to **identifying, presenting, evaluating and recognising** promising road-safety solutions.

The Conclave brought together **Government stakeholders, 16 State Governments, academia, industry and technology developers**, creating a clear pathway from innovation to adoption:

Identify ▶ Evaluate ▶ Validate ▶ Pilot Deployment ▶ Wider Adoption

> *Technology does not save lives by being invented. It saves lives by being validated, adopted and scaled. NRSTC is the bridge between a promising innovation and a safer road.*
>
> —ITS India Forum

IN THE HEADLINES

16 States. One road-safety mission. India's best safety tech gets a national proving ground.

2026

NRSTC Recognition and Awards

Recognition certificates and awards were instituted for outstanding ITS technologies and innovators contributing to **road safety, enforcement and scalable intelligent mobility** — rewarding solutions built not just to impress, but to deploy.

SEPTEMBER 2026

Executive Global MS & Executive PhD in ITS and Sustainable Mobility

A landmark education milestone was achieved in collaboration with **South Asian University**, an international public university. The **Executive Global MS and Executive PhD programmes in ITS & Sustainable Mobility**, launched in September 2026, open a new pathway for working professionals and researchers to build advanced expertise in ITS, sustainable mobility and emerging transportation technologies.

IN THE HEADLINES

From training rooms to doctoral research: India now builds the leaders who will run its intelligent roads.

2026

International Collaboration and Institutional Partnerships

ITS India continued to expand cooperation through **MoUs and collaboration agreements** with premier academic institutions, professional bodies, research organisations and international ITS organisations, spanning:

- Research and innovation
- ITS standards and policy
- Technology development

- Road safety
- Capacity building
- Higher and executive education
- International knowledge exchange

2026

ITS World Congress, South Korea

ITS India is leading a **strong Government–Industry delegation to the ITS World Congress 2026 in South Korea**, showcasing India's growing ITS capabilities and strengthening global partnerships, policy dialogue and technology collaboration.

2026

Inducted onto the ITS World Congress Board

ITS India's induction onto the **Board of the ITS World Congress** marks a defining step in India's participation in the global institutional leadership of the ITS community — completing the journey from first-time Pavilion to global boardroom in just two years.

> *"India does not seek a seat at the global ITS table merely to listen. We are there to contribute solutions shaped by the scale, diversity and ambition of the Global South — solutions the world increasingly needs.*
>
> — **Akhilesh Srivastava**, President, ITS India Forum

OCTOBER 2026

Second ITS India Congress

ITS India is organising its **Second ITS India Congress** on **7–8 October 2026 at Bharat Mandapam, New Delhi**, powered by **Transport + Traffic Infratech Expo** in collaboration with **VIS Group and Messe Frankfurt**, under the theme **"Connected, Integrated and Intelligent Mobility for Viksit Bharat 2047"**. The Congress brings together:

International Experts ▶ Central Government ▶ State Governments ▶ Academia ▶ Public Institutions ▶ Industry

on a common platform for advancing **connected, integrated and intelligent mobility for Viksit Bharat @2047**.

2026 MILESTONE

National Platform → Impact, Leadership & Global Scale

Four Pillars, One Purpose

Behind every milestone sit four strategic pillars that give ITS India its depth, credibility and staying power.

1. Policy & Standards: From Advocacy to Impact

Engagement in **policy, standards and regulatory discussions** has been central to ITS India's journey. The Forum has engaged with policymakers and expert bodies, including the **Supreme Court Committee on Road Safety**, on road safety and intelligent transportation.

On connected vehicle technologies, ITS India participated in the **ITS Task Force** and presented findings from the Bengaluru pilot — contributing to the wider policy dialogue on **spectrum requirements for vehicle connectivity**, followed by subsequent government action and continuing regulatory and consultation processes on **V2X and connected mobility**.

Pilot ▸ Evidence ▸ Policy Dialogue ▸ Standards / Spectrum ▸ Government Action ▸ Deployment

The momentum is now visible in national decisions. On **30 September 2026**, the Union Cabinet approved a **₹1,789.52 crore Intelligent Traffic Management System (ITMS) for Delhi**, covering 42 corridors with AI-enabled adaptive signals, automated enforcement and an integrated command-and-control system — the kind of integrated, intelligent traffic management that ITS India has consistently championed. The Forum's next agenda is clear: **one nation, one standard; vehicles that talk and roads that listen; AI on duty 24/7; and skilled hands to run smart systems.**

PUNCHLINE

Pilot. Prove. Propose. Progress. — how evidence from Bengaluru's streets entered India's connected-mobility policy conversation.

2. Research, Knowledge & Innovation

As a **think tank on Intelligent Transportation Systems**, ITS India has cultivated a knowledge ecosystem that turns insight into evidence and evidence into action.

20+

STUDY REPORTS PUBLISHED IN THREE YEARS

Including India's First Comprehensive

ITS Market Survey & Report

The **ITS Market Survey and Report** — the first study of its kind for India — gives policymakers, investors and industry a common, evidence-based picture of the Indian ITS landscape. Alongside it, the Forum's knowledge assets include:

- **20+ study reports** on ITS technologies, markets and policy
- **ITS Digest**, launched in 2024
- Monthly webinars, seminars, workshops and podcasts
- Technical webinars and knowledge sessions
- Industry–academia technology discussions
- **ITS Practitioners Research Journal**
- Research collaborations with **10 IIT Knowledge Partners** and leading institutions
- Collaboration with **CSIR–CRRI**, **AITD** and other research organisations
- Technology evaluation and recognition throzgh **NRSTC**

Together, these assets underpin evidence-based policy, faster technology adoption and stronger professional development.

PUNCHLINE

20+ reports. One first-of-its-kind market survey. India's ITS conversation now runs on evidence.

3. Education & Capacity Building

Infrastructure is only as intelligent as the people who plan, build and operate it. ITS India's education journey has advanced step by step — from short courses to doctoral research:

2025–26	Government-sponsored ITS and enforcement training programmes
2026	Launch of the **ITS LMS** for structured ITS courses
2026	Training and capacity-building programmes for State and Government stakeholders
Sept 2026	**Executive Global MS and Executive PhD in ITS & Sustainable Mobility** with South Asian University
Future	A wider professional and research ecosystem for ITS and sustainable mobility

PUNCHLINE

Building the people who will build India's smart roads.

4. Building the ITS India Ecosystem

In three years, ITS India has grown from a small founding base into a broad, multi-stakeholder ecosystem:

50+	10	15+	12+	10+
Members	IIT Knowledge Partners	Academic & Research Partners	International Organisations	Professional & Institutional Partners

This ecosystem is anchored by **MoUs, collaboration agreements, research partnerships, international cooperation and institutional representation** — and by a shared conviction that no single actor can deliver intelligent mobility alone. Its work is powered by **more than 15 specialised committees drawing on 100+ domain experts and policymakers**.

OUR KNOWLEDGE ALLIANCE

Where India's Finest Minds Meet Mobility

ITS India's credibility rests on the strength of its knowledge partners. Together, they form one of the country's most powerful academic and research alliances dedicated to intelligent and sustainable mobility — spanning every region of India.

KNOWLEDGE PARTNERS

10 IITs. One national mission: Reshaping the Future of Mobility.

IIT KNOWLEDGE PARTNERS

IIT Hyderabad	IIT Bombay	IIT Madras	IIT Delhi	IIT Roorkee
IIT (BHU) Varanasi	IIT Indore	IIT Gandhinagar	IIT Palakkad	IIT Tirupati

ACADEMIC PARTNERS

IISc Bengaluru Indian Institute of Science	**BITS Pilani** Birla Institute of Technology & Science	**South Asian University** International Public University

RESEARCH PARTNERS

CSIR–CRRI Central Road Research Institute	**AITD** Asian Institute of Transport Development

From hosting the **First ITS India Congress (IIT Hyderabad)** and the **National Road Safety Technology Conclave (IIT Bombay)** to launching **Executive Global MS and PhD programmes with South Asian University**, these partnerships turn research into deployable solutions and build the talent India's intelligent roads will need.

NEXT | SCALE

The Road Ahead: From Platform to National Movement

The next three years are about scale.

Having built the institution, the ecosystem and the global standing, ITS India now turns to its most important task: **accelerating deployment at national scale**. The Forum's strategic priorities for the next phase are designed to compound the gains of the last three years.

01 Standards & Connected Mobility

Advance India-relevant ITS standards and support readiness for V2X and connected-vehicle deployment, building on the Bengaluru pilot model of evidence-led policy.

02 Technology Validation at Scale

Grow NRSTC into a recurring national proving ground that moves validated road-safety and enforcement technologies from pilot to State-wide adoption.

03 AI-Driven Mobility

Deepen the Forum's role in AI for traffic management, safety analytics and enforcement, aligned with India's national AI priorities.

04 State Partnerships

Extend structured engagement and capacity building with State Governments, where most mobility outcomes are ultimately delivered.

05 Talent & Education

Scale the LMS, executive programmes and research pipeline to create a deep national bench of ITS professionals and researchers.

06 Global Leadership

Use India's Board roles at ITS Asia-Pacific and the ITS World Congress to champion solutions for high-growth, high-diversity markets of the Global South.

> *"The first three years were about earning trust. The next three are about earning impact — measured in lives saved, minutes returned to commuters and emissions avoided. That is the scorecard we intend to be judged by."*
>
> — **Dr Siv Kumar, Director General**, ITS India Forum

As India marches towards **Viksit Bharat @2047**, ITS India will remain the connective tissue between policy and practice, innovation and adoption, India and the world — ensuring that the nation's historic investment in roads and transport delivers mobility that is **smarter, safer, greener, connected and inclusive**.

THREE YEARS. A TRANSFORMATIONAL JOURNEY.

From a Few Members **to a National Platform.**

From Dialogue **to Demonstration.**

From Demonstration **to Policy.**

From Policy **to Technology Adoption.**

From Knowledge **to Education.**

From India **to the World.**

And next — from Platform to National Movement.

ITS INDIA FORUM

Reshaping the Future of Mobility

Connecting Technology, Policy, People and Possibilities for Intelligent and Sustainable Mobility.

OUR MEMBERS

INTERNATIONAL COLLABORATIONS



ACADEMIC COLLABORATIONS / KNOWLEDGE PARTNERS



STRATEGIC PARTNERS



PREMIUM MEMBER



CORPORATE MEMBER



TrafficSenz™

e-con Systems®
Think Vision. Think e-con.

Edge-AI ANPR & Traffic Intelligence Camera



- 5 MP Sony Pregius S Global Shutter
- Auto Exposure Bracketing (AEB)
- Pixel-Based Vehicle Triggering
- Edge AI Processing
- Pulsed IR Technology
- Deployment-Ready Design

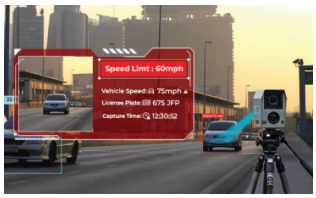
Applications



MLFF TOLLING



HIGHWAY ATMS & VIDS



TRAFFIC ENFORCEMENT



URBAN ITS & SMART MOBILITY

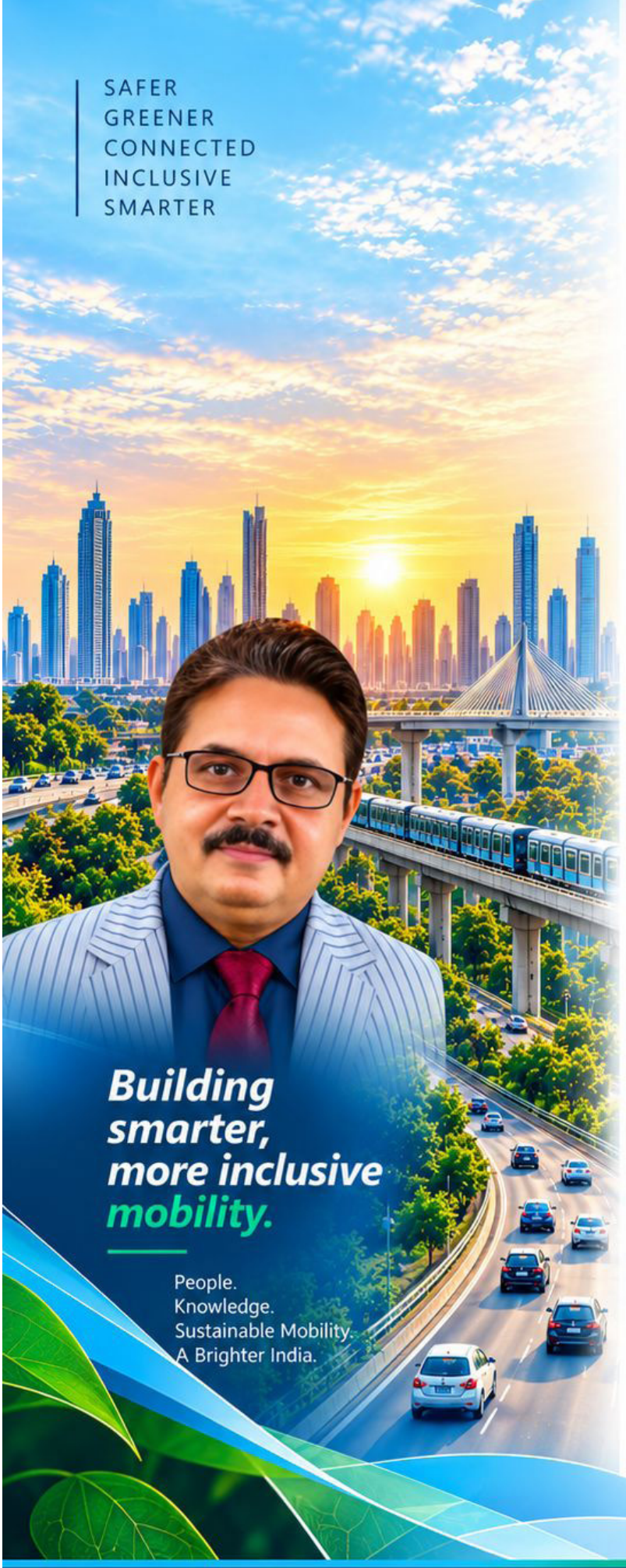
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SAFER
GREENER
CONNECTED
INCLUSIVE
SMARTER



A Year of Evolution, Collaboration and Capability Building

From Intelligent Transportation Systems to a National Mobility Ecosystem

The past year has been a defining chapter. We have seen the ideas, partnerships and initiatives of previous years gain momentum and translate into meaningful action. What is most encouraging is the growing recognition that intelligent mobility is not a distant aspiration, but a national imperative—essential for safer roads, more liveable cities, a stronger economy and a more sustainable future.

Our engagements with government, industry, academia, researchers and international partners have deepened through policy advocacy, knowledge creation, flagship events and capacity-building programmes. The ITS community continues to come together to deliberate on real-world solutions. Focused events on AI in Mobility, Connected Vehicles, Road Safety and Sustainable Mobility have enabled deeper technical discussions and stronger collaboration across sectors.

The year also saw significant progress in our knowledge initiatives. We expanded our research work, brought out new publications and developed practical guidance on emerging themes such as AI in transportation, connected mobility, urban decongestion and road safety. These knowledge products are designed to inform policy, support implementation and stimulate further innovation across India's mobility ecosystem.

A major milestone this year has been the launch and development of the **Executive Global MS in Intelligent Transportation Systems (ITS) & Sustainable Mobility,** in collaboration with IIT Kharagpur. This programme reflects our commitment to building the next generation of mobility leaders who can bring together technology, policy, system design and sustainability thinking. It has already attracted strong interest from professionals, government officials and international participants, and we see it as a long-term investment in the human capital needed for India's mobility transformation.

Our growing partnerships — with government agencies, academic institutions, industry players, startups and international organisations — have strengthened our collective ability to address complex mobility challenges. The Forum continues to serve as a trusted platform where ideas are exchanged, capabilities are built and collaborations are nurtured for real-world impact.

As we look ahead, our focus will remain on deepening collaboration, scaling knowledge and skills, supporting the adoption of innovative solutions and ensuring that mobility remains people-centric, inclusive and sustainable.

I thank all our members, partners, colleagues and well-wishers for their continued support. Together, we can build an intelligent, sustainable and inclusive mobility ecosystem for a Viksit Bharat @ 2047.

> *"The future of mobility is not just about moving faster, but about moving better — for people, for communities and for generations to come."*

Dr. Shiv Kumar
Director General

APPLIED INFORMATION

Smart City Solutions

Save Lives. Improve Traffic. Drive Commerce. Help the Environment



School Zone Flashing Beacon Monitoring



Next Generation Priority & Preemption



Glance Travelsafely



Connected Vehicle Solutions (C-V2X)

Connected Traffic Cabinet System



Glance Smart City Supervisory System



Pedestrian Safety Solutions



Connected School Bus



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