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November 2022 | Volume Yr 22 | Issue 11

Telematics Wire

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Editor
Maneesh Prasad
maneesh.prasad@telematicswire.net

Directors
Maneesh Prasad
Mohan Chandra Verma
Sinha Anuj Ranjan

GM- Corporate Communication
Yashi Mittal
M: +91 98103 40678
mgr_corpcomm@telematicswire.net

DGM- Corporate Sales
Poonam Mahajan
M: +91 9810341272
mgr_corpsales@telematicswire.net

Editorial Executive
Richa Tyagi
editorial.team@telematicswire.net

Designer
P K Gupta

Publication Address
Telematics Wire Pvt. Ltd.
D-98 2nd Floor, Noida Sec-63
Uttar Pradesh-201301
Email: info@telematicswire.net

Printed and Published by
Maneesh Prasad on behalf of
Telematics Wire Pvt. Ltd.

Telematics Wire Pvt. Ltd.
D-98, 2nd Floor, Noida Sec-63
Uttar Pradesh-201301
Email: info@telematicswire.net

Airtel launches "Always On" IoT connectivity solution for vehicle tracking

Bharti Airtel announced the launch of the "Always On" IoT connectivity solution in India. Airtel's "Always On" solution comprises dual profile M2M eSim which allows an IoT device to always stay connected to a mobile network from different Mobile Network Operators (MNOs) in the eSIM.

The Airtel 'Always On' solution complies with the Automotive Research Association of India (ARAI)'s AIS-140 standard implemented by the Ministry of Road Transport and Highways (MoRTH). It lays down mandatory requirements related to connectivity and GPS tracking capabilities for devices in all passenger-carrying buses, private fleets and other public transport vehicles for tracking, safety and security purposes.

As per law, all registered buses and taxis have to mandatorily install this device. The Government of India recently made it mandatory for vehicles carrying hazardous goods also to have a tracker installed that complies with AIS-140 standards. In addition to these, there are emergency vehicles such as ambulances, vehicles from the mining and construction industry working in remote locations and other mission-critical and intelligent communication use cases which need higher availability and reliability of the network.

With Airtel's future-ready, GSMA-compliant platform, flexible API-based eSim lifecycle management on feature-rich Airtel IoT Hub, and full compliance with Department of Telecom (DoT) M2M guidelines. Airtel is looking to acquire market leadership in this segment in the next few years.

Speaking about the launch of the "Always On" AIS-140 Connectivity solution, Mr Ajay Chitkara, Director and CEO, of Airtel Business said, "We are delighted to bring Always on connectivity solution to our customers. We believe this is the next big opportunity in the IoT segment. Our strengths in the network, modern and GSMA compliant platform offering real-time access to data and flexibility to integrate the solution with custom APIs will make Airtel Business stand out in the market."

The AIS140 solution has already been tested and adopted by some of the leading companies in the industry like Lumax ITuran, Loconav and e-Trans. Lumax ITuran Telematics is a renowned name in advanced telematics technology and offers telematics products & services to the Indian automotive industry. LocoNav is the fleet-tech company with over 5 million+ vehicles on road in over 50 countries. While e-Trans is one of the leading vehicle tracking solution providers with a Pan-India network.

Hyundai Motor Group announces future roadmap for Software-Defined Vehicles

Hyundai Motor Group announced a new global strategy to transform all vehicles into Software Defined Vehicles (SDVs) by 2025. The initiative, presented during the Group's Unlock the Software Age global online forum, will deliver an unprecedented era of mobility, giving customers the freedom to remotely upgrade the performance and functionality of their vehicles anywhere at any time.

The Group also shared plans to transform the customer experience throughout the vehicle's entire lifetime and deliver a new era of mobility via constantly evolving software technology.

Hyundai Motor Group's constantly evolving mobility and software technology will ensure that all models, including those already purchased, remain up to date. This will enable vehicle functions, including safety, convenience, connectivity, security, and driving performance, to be upgraded via Over-The-Air (OTA) software updates. Based on the Group's next-generation EV platform, integrated controller, and an internally developed Connected Car Operating System (ccOS), all Group vehicles will be equipped to receive OTA software updates by 2025.

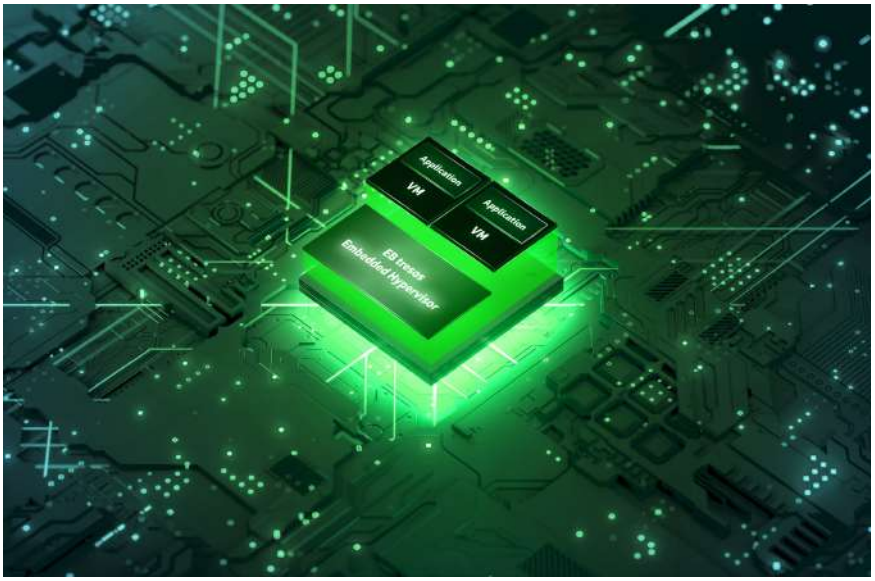
The Group expects 20 million vehicles to be registered to its connected car service worldwide by 2025. Connected vehicles equipped with telecommunication features will create unprecedented value and possibilities and provide customers personalized services, such as software subscriptions.

Furthermore, connected car data will network with future Group mobility solutions, including Purpose Built Vehicles (PBVs), Advanced Air Mobility (AAM), robotaxis and robots. By establishing a new data platform, innovative services will be provided through connecting and processing the various data generated throughout the car life cycle, as well as promoting the creation of an open ecosystem in partnership with diverse industries such as logistics and accommodation.

The Group will also invest heavily in software technology to integrate hardware and software technologies and enhance and internalize mobility technology capabilities. By 2030, the Group plans to invest 18 trillion won in resources, including the establishment of a new Global Software Center to bolster its software capabilities and accelerate Software Defined Vehicle development.

"By transforming all vehicles to Software Defined Vehicles by 2025, Hyundai Motor Group will completely redefine the concept of the automobile and take the lead in ushering in a never-before-experienced era of mobility," said Chung Kook Park, President and Head of R&D Division, Hyundai Motor Group. "Creating visionary vehicles empowered with the ability to evolve through software will enable customers to keep their vehicles up to date with the latest features and technology long after they have left the factory."

Elektrobit announces automotive-grade embedded OS and hypervisor for Infineon AURIX TC4x microcontrollers

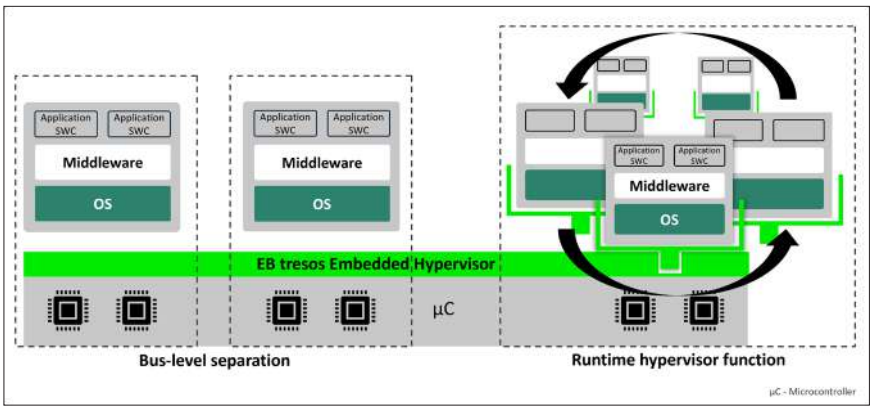


Classic AUTOSAR and EB tresos Embedded Hypervisor

Elektrobit announced the automotive-grade, embedded, real-time operating system (OS) and hypervisor for the new AURIX TC4x microcontroller (MCU) from Infineon Technologies AG. The EB tresos AutoCore OS and new EB tresos Embedded Hypervisor enable OEMs and Tier 1s to more easily develop and deploy automotive E/E architectures based on the AUTOSAR Classic standard, helping accelerate the development of next-generation vehicles.

The transformation to domain and zone-based E/E architectures is driving car makers to consolidate ECUs, keeping the total number low to save energy, while adding more functionality and applications. Applications can be combined using EB tresos Embedded Hypervisor across multiple virtual machines on a single MCU. Thus, accelerating innovation and satisfying the emerging consumer demands.

The EB tresos AutoCore OS is an embedded, multi-core, real-time operating system that implements the AUTOSAR standard and all its scalability classes. The EB tresos Embedded Hypervisor allows multiple OS and AUTOSAR stack instances to be executed in parallel on a single MCU using new virtualization features of the Infineon AURIX TC4x MCU, saving costs and reducing update efforts. It enables an application—such as on-board diagnostics (OBD)—to be run separately from other applications on the MCU to avoid repeated homologation costs and delays should updates be required for that application.



Key features of the EB tresos Embedded Hypervisor

- Executes virtual machines (VMs), consisting of operating systems and middleware for hard real-time applications.
- Uses hardware-isolation features of the microcontroller and optionally, virtualization features of the processor cores to deploy VMs.
- Provides safe and controlled communication services for inter-VM communication.

"Given the growing vehicle complexity, we've placed significant focus on collaborating with best-of-breed software partners," said Thomas Schneid, Senior Director Software, Partner and Ecosystem Management, Infineon. "Elektrobit has been a long-time, respected collaborator of ours. Its expertise in AUTOSAR and in developing software for the AURIX TriCore architecture—including its new EB tresos Embedded Hypervisor—provides our customers with competitive advantage as they develop E/E architectures for their next-gen vehicles."

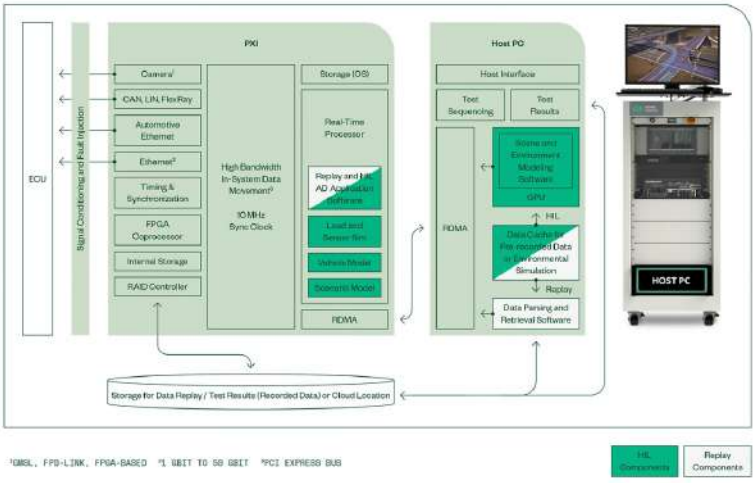
Targeting a wide range of automotive applications including the strong demand for functional integration in domain and zone-based E/E architectures, the new AURIX TC4x supports both eMobility and the advancement of automated driving through safety systems. Infineon's AURIX TC4x offers enhanced connectivity including advanced safety and security. The AURIX TC4x family of 28nm MCUs is sampling now with series production products expected to be available in Q2 2024.

"Elektrobit is proud to be the first to provide an OS and hypervisor that allow car makers and Tier 1s to benefit from the innovations in the new AURIX TC4x MCUs," said Michael Robertson, Head of Products and Strategy, Elektrobit. "EB tresos and the new AURIX TC4x are a perfect match for OEMs and suppliers looking to develop ECU software applications based on the Classic AUTOSAR standard."

NI announces replay and HIL ADAS/AD system

NI, formerly National Instruments Corporation, announced a unified test system architecture to move iteratively between data replay and hardware-in-the-loop (HIL) testing, its advanced driver-assistance systems (ADAS) and autonomous driving (AD) offering.

Validating the perception, planning and control algorithms running on ADAS electronic control units (ECUs) is key to ensuring that safe and reliable vehicles reach the market. Testing perception algorithms require data replay and injection that exactly mirrors the scenario as encountered in the vehicle. The replay system must:



- Feed the system with external data in the same way as it would be done with the vehicle during actual test drives
- Interface with the ADAS controller through multiple I/O and automotive bus signals with tight control over timing and data synchronization
- Maintain adaptability for future I/O and test requirements as systems continue to add more cameras, radar, lidar, and other ADAS sensor types
- Increase test coverage reliability and repeatability through direct injection techniques to insert faults, frame delays, and more into the sensor bitstream

NI Replay and HIL System AD

The NI Replay and HIL AD system can aggregate and inject real-world road test data or simulation scenarios to test ADAS ECUs. By providing a unified toolchain, common hardware configurations and test automation infrastructure across the ADAS workflow, NI enables companies to reduce capital equipment costs, improve test coverage and efficiency and shorten the time to market. NI's approach ensures full validation test coverage for ADAS/AD functions, making existing data more usable throughout the entire product lifecycle, maximizing performance to ultimately save lives.

- Replay and HIL AD software for data throughput, timing and synchronization, direct interface with ECU, full customization, data repositories, and simulation interfaces.
- PXI technology provides hardware and software faulting capabilities—down to nanosecond synchronization and timing control for a reliable execution of test cases.
- Modular hardware generates signals to emulate radar objects, camera interfaces, vehicle bus traffic, and general purpose I/O to test sensor fusion on the ADAS controller.
- An open software-centric approach that enables interfaces and sourcing data from IT infrastructure and cloud service providers like Microsoft Azure, AWS, Seagate, and more.
- A unified test system architecture to move back and forth between data replay and HIL test with the same system and a single toolchain for data record, SIL, and test coverage.

"NI is working with leaders in autonomous vehicle (AV) testing technology to provide the system-level capabilities our customers need to quickly and efficiently test the complex algorithms and AI-based software embedded within today's AVs," said Drita Roggenbuck, senior vice president of NI's Transportation Business Unit. "Our customers, such as ZF Mobility Solutions, rely on our efficient connected workflow and expertise to help them achieve their goals at their pace."

ZF Mobility Solutions, a subsidiary of ZF Group, aims to provide clean, efficient, comfortable, and affordable mobility by implementation of autonomous transport systems. At ZMS' Test System Development Department innovative, high quality and cost-efficient test systems are developed, tailored to the specific demands of verification and validation of complex autonomous transport systems and ADAS functions.

"AD and ADAS require the combination of different test methodologies which is challenging but essential to provide driver and passenger safety and ultimately for AVs to become a reality. With NI solutions, we can build up systems and move one step closer to a comprehensive test strategy consisting of both real-world and virtual test efforts," said Dr. Thomas Herpel, senior manager at ZF Mobility Solutions.

Included among this vast ecosystem is Konrad Technologies (KT). Combining NI's ADAS software-connected test solutions with KT's expertise in system integration and solution delivery provides customers with an open turnkey system. This is achieved by delivering a fast, ready-to-use solution while maintaining the flexibility, test reuse and customizability of the test system that is needed to accelerate the shift to self-driving cars.

"NI's open and extensible platform gives us the opportunity to solve our customers' challenges by offering customized and standardized solutions based on the NI toolchain," said Michael Konrad, President & CEO from Konrad Technologies.

Toyota and Google Cloud partner to bring AI-powered speech services to Toyota and Lexus vehicles

Toyota and Google Cloud announced a partnership that brings together Toyota and Lexus next-generation audio multimedia systems and Google Cloud's AI-based speech services. The results of the partnership are being seen in the latest generation Toyota Audio Multimedia and Lexus Interface infotainment systems, including in 2023 models like the Toyota Corolla family, Tundra, Sequoia and Lexus NX, RX and all-electric RZ.

Vehicles equipped with Toyota's latest-generation Automotive Grade Linux-based Audio Multimedia and Lexus Interface infotainment systems already leverage Google Cloud's Speech-to-Text service to accurately perform automatic speech recognition for in-vehicle queries. Toyota's Voice Assistant, which leverages technology from Google Cloud, was co-developed by Toyota Motor North America Connected Technologies and Toyota Connected organizations since 2018. The partnership highlights the AI and machine learning innovation brought forth in the latest Toyota and Lexus infotainment systems.

The strength of the partnership is that Toyota's next-generation system will no longer require an internet connection for natural-speech functions.

Driving Future Innovation Together

Expanding the collaboration between Toyota and Google Cloud, the partnership aims to drive future innovation with the addition of Speech On-Device–a new Google Cloud AI product that equips embedded devices with the same powerful, AI-based speech recognition and synthesis available in the cloud, regardless of internet connectivity–to future Toyota and Lexus vehicles.

The future vehicle-native Speech On-Device will enable voice requests to be served directly by vehicles' multimedia system processors, without the need for internet connectivity, to power voice queries in select vehicles. Now, with voice interactions served locally instead of by the cloud, drivers will not have to worry about a tunnel or dead zone affecting voice commands.

Google's Speech On-Device Technology

Speech On-Device builds on innovations from Google Assistant and Google Pixel that enable fully featured speech models–comparable in quality to those hosted in the cloud–to run locally on small devices at the edge with only a fraction of the model size and computing requirements. The new product makes it possible for Google Cloud customers to bring high-quality speech services to disconnected environments, presenting new opportunities across a variety of use cases, from cars to televisions and even kiosks.

With Toyota's next-generation multimedia system in development upon the brand's native platform, vehicle-embedded Speech On-Device will be used as a component of the next-gen Toyota Voice Assistant. These technologies combined allow voice requests to be served directly by vehicles' multimedia system processors, without the need for internet connectivity, to power voice queries in select vehicles. Speech On-Device is available for select Google Cloud customers.

Honda to invest in Ohio for electric vehicle production, including new battery plant with LG Energy Solution

Honda announced two major investments in Ohio, including $700 million to re-tool several of its existing auto and powertrain plants for production of electric vehicles and $3.5 billion with LG Energy Solution (LGES) to establish a previously announced joint venture facility to produce the battery modules to power them, pending final government approvals. The JV battery plant will be located in Ohio's Fayette County, about 40 miles southwest of Columbus.

The announcement, held 45 years to the day after Honda announced its first production facility in Ohio — October 11, 1977 — will transform Honda's Marysville Auto Plant (MAP), East Liberty Auto Plant (ELP) and Anna Engine Plant (AEP) for the electrified future, including the creation of over 300 new jobs. Honda plans to begin production and sales of Honda EVs in North America in 2026, based on its new Honda e:Architecture. The $700 million re-tooling will enable AEP associates to produce the battery case, to be combined with the battery modules from the JV plant on a sub-assembly line at MAP, with the complete battery unit then installed in EVs built by associates at both MAP and ELP.

These Honda facilities, along with the new EV battery plant, will serve as a new EV hub in Ohio, and play a key role in developing the company's knowledge and expertise in EV production that will be shared across Honda's North American auto production network in the coming years. Honda's EV hub will leverage the company's longstanding production, product development, and purchasing operations located in Central Ohio.

As part of its goal to achieve carbon neutrality for all products and corporate activities by 2050, Honda announced a vision to make battery-electric and fuel cell electric vehicles represent 100% of its vehicle sales by 2040 in North America.

Honda produced and sold a record of more than 100,000 electrified vehicles in the U.S. last year, including the Accord Hybrid, CR-V Hybrid and Insight hybrid sedan. Honda's new investment in its Ohio plants will support production of electric vehicles and EV components.

New EV Battery Production Joint Venture

Honda will obtain the battery modules from a new joint venture (JV) between Honda and LGES, subject to customary closing conditions, including regulatory approvals. That JV production facility represents a commitment to invest $3.5 billion in Fayette County, Ohio, and will employ 2,200 associates, who will produce pouch-type batteries to be provided to Honda plants for EV production.

Pending regulatory approvals, the joint venture between Honda and LGES will be established in 2022, with the overall investment projected to reach $4.4 billion. The two companies plan to begin construction in Fayette County in early 2023, in order to complete the new production facility by the end of 2024. This will enable the start of mass production of battery modules using advanced pouch-type, Li-ion cells by the end of 2025, with an annual production capacity of approximately 40GWh.

Honda Manufacturing in North America

Honda has produced automobiles in North America for 40 years, beginning in November 1982 at the Marysville Auto Plant. Honda began manufacturing operations in North America in 1979 with motorcycle production in Marysville, Ohio.

Over the past four decades, Honda has steadily grown local production capabilities and now employs more than 30,000 associates at 18 plants with the annual capacity to produce 1.86 million automobiles, nearly 4 million engines, 500,000 power equipment products and 300,000 powersports products, as well as the HondaJet advanced light jet and GE Honda HF120 turbofan engines. In 2021, more than 95% of all U.S.-sold Honda and Acura automobiles were made in North America.

Cumulatively, Honda has invested nearly $24.6 billion in its North American manufacturing capabilities, including more than $3.6 billion over the past five years alone. The company works with nearly 800 original equipment suppliers in North America with cumulative parts purchases of more than $535 billion.

Cubtek Inc. is using R&S ZVA40 network analyzer and R&S ZVA-Z90 millimeterwave converter. **Source:** Rohde & Schwarz

Rohde & Schwarz empowers launch of 4D imaging radar platform by Cubtek in partnership with NXP

Cubte Inc. is using network analyzers from Rohde & Schwarz in the development of 4D imaging radar for RF measurement of the E-band. Rohde & Schwarz oscilloscopes and their independently developed, application-specific integrated circuits (ASIC) provide the measurement tools for automotive radar research and development.

Future self-driving vehicles will face complex road scenarios and 4D imaging radar sensor modules in the 77 GHz band will be indispensable. Compared with LiDAR, 4D imaging radar is less susceptible to inclement weather conditions and is more in line with safety requirements for self-driving vehicles.

4D imaging radar covers distance, speed, horizontal angle and vertical angle. Most current conventional radar systems either lack vertical angle detection or have very limited sensor capabilities for vertical angles. Relative to conventional systems, 4D imaging radar has achieved a breakthrough in horizontal and vertical angular resolution, with angular resolution of nearly 1 degree and 0.1 degree of angular accuracy.

4D imaging radar has far more antenna channels than conventional systems, which significantly enhances performance. Conventional radar systems usually have a 3-transmitter/4-receiver antenna architecture but 4D imaging radars can have a transceiver volume that is several times greater. As 4D imaging radar systems require more 77GHz millimeterwave antennas and transceiver chip integrations, their millimeterwave antenna, IC adapter design, and millimeterwave test validation will play an extremely critical role.

77GHz automotive millimeterwave radar manufacturer Cubtek Inc. partnered with NXP Semiconductors to launch a 4D imaging radar platform at the CES last January. The NXP imaging radar chipset solution uses the flagship S32R45 radar MPU and the second-generation high-performance RFCMOS radar transceiver TEF82XX for 12 transmitting and 16 receiving 77GHz antenna channels that can be expanded to 192 virtual antenna arrays using MIMO technology. 4D imaging radar performance is improved by optimizing the high-resolution algorithms with angular resolution of less than 1 degree.

When developing the 4D imaging radar, Cubtek chose the R&S ZVA40 network analyzer and the R&S ZVA-Z90 millimeterwave converter from Rohde & Schwarz to make RF measurements of the E-band. The instruments provide both high performance and highly accurate measurement results in sensitive, high frequency environments.

Rohde & Schwarz digital oscilloscopes include the portable R&S RTH series, the mid-range R&S MXO4 and the high-end R&S RTO6 or R&S RTP series. The latter can analyze the demodulation bandwidth of FMCW signals. The company developed the ASIC itself for low noise and high performance, creating the best measurement tool for automotive radar research and development.

aiMotive and Parkopedia partnership provides automakers with cost-effective and scalable automated parking solutions

aiMotive and Parkopedia announced a partnership to offer automakers scalable, autonomous parking solutions which minimise everyday parking hassles for drivers, without relying on the presence of additional infrastructure within parking facilities.

The cost-effective and scalable parking navigation solution is able to provide navigational support for drivers within both indoor and outdoor parking facilities by utilising aiMotive's perception technology, combined with localisation information provided by Parkopedia's Indoor Mapping service – a cost-effective, scalable indoor mapping solution for automakers looking to future-proof their navigation and deliver the driver convenience services expected today.

Within Indoor parking facilities, such as underground and multistories, the line of sight to satellites is blocked which prevents access to GPS. An alternative form of localisation is therefore required to maintain the navigation services which drivers have become accustomed to on the road, as well as enabling Mobility as a Service (MaaS) and convenience services of the future.

The partnership will see drivers provided with indoor turn-by-turn directions to accurately selected parking locations, such as to a pre-booked parking space or to electric vehicle (EV) charging points, or the closest available parking space to desired destinations or exit points, minimising overall journey time and maximising range – saving time and preventing frustration for drivers, while also enabling 'find my car' convenience and safety services.

The partnership will also enable autonomous parking services within any parking facility, without the need for prior training or testing, or the addition of any additional hardware at the location. The Type 1 Automated Valet Parking (AVP) function for automated vehicles is also based solely on in-vehicle intelligence and integrated features that are already present in the vehicle. Once activated at a designated drop-off point, the vehicle is able to navigate parking structures to park itself, and, when summoned by the vehicle owner, will return to a predefined pick-up point.

AVP is SAE Level 4 automation product made publicly available to drivers, due to the lower cost of implementation and lower risk profile of low-speed driving in a constrained environment, however, it requires consistent and reliable global localisation and navigation within the entire area of operation. Parkopedia is able to provide the localisation required by using advanced robotics techniques combined with data from sensors present on most connected vehicles and landmarks that are already present in all car parks.

aiMotive's full-stack automated driving software, 'aiDrive' offers a state-of-the-art highway assist solution with L2+ and L3 features. Moreover, the stack's unique Automated Valet Parking concept offers features from dropping off the driver, searching for and manoeuvring into a parking space and even returning to the driver when summoned. This system relies on in-vehicle intelligence instead of infrastructure investment, enabling quick scaling in target markets.

To date, Parkopedia has completed multiple 'proof of concept' use cases for Indoor Maps with global automakers and has generated comprehensive coverage of major parking facilities on a global scale. The partnership will provide automakers with the opportunity to distinguish themselves with highly valued convenience and comfort features that are simple to implement and require no infrastructural change or specialist hardware to deliver indoor navigation or as part of full AVP delivery.

Cyberattacks increase in auto dealerships as hackers take advantage of gaps in protection

Cybercriminals are getting craftier as auto retailers continue to fall victim to well-disguised attacks. According to the second annual dealership cybersecurity study by CDK Global Inc., an automotive retail software provider, 15% of dealers have experienced a cybersecurity incident in the past year. Of those impacted, 85% of the occurrences were due to sophisticated phishing attempts concealed as legitimate emails that resulted in data breaches, IT-related business interruptions and loss of revenue. The consistent cyberthreats have auto retailers concerned about securing their networks as they prepare for the upcoming Federal Trade Commission (FTC) Safeguards Rule implementation on Dec. 9.

"Consumers are continuously shifting to a more mobile environment, requiring automotive dealerships to streamline their sales and service online. Unfortunately, it can lead to creating gaps in IT networks for securing data," said Joe Bell, vice president and general manager of IT Solutions Product & Technology, CDK Global. "Updating a dealership's IT infrastructure, establishing an incident readiness plan and identifying qualified individuals to oversee the requirements are important steps for auto retailers in meeting the upcoming FTC compliance deadline."

The amended FTC Safeguards Rule outlines compliance measures that includes securing customer data and implementing a comprehensive information security program. Having a solid cybersecurity plan in place is key for dealers to meet the Safeguards Rule, yet the study found that only 37% of auto retailers are confident in the current protection, resulting in a 21% decrease in preparedness compared to CDK Global's 2021 study. With the Rule compliance deadline fast approaching, dealerships are getting serious about their cybersecurity measures.

The CDK Global State of Cybersecurity in the Dealership report found nearly 60% of dealers plan to prioritize upgraded investments in IT infrastructure, including:

- Anti-virus and malware protection increased by 31% compared to 2021, followed by establishing secure networks with consistent updates and patching.
- Dealers plan to update cybersecurity measures to combat top cyber threats, such as email phishing, ransomware, lack of employee awareness, theft of business data, PC virus or malware, and stolen or weak passwords.
- Additional action plans include securing endpoint devices, investing in cybersecurity insurance and continued staff training.

Dealerships are preparing for the influx of possible attacks to their infrastructure, including hiring cybersecurity experts both in-house and externally and educating staff on detecting potential cyber threats.

"With the recent surge of ransomware attacks around the world and the advancement of security protocols we have made, cybersecurity remains a huge priority," said Preston Petersen, general manager and partner at Team Automotive Group in Baton Rouge, Louisiana. "The risk to businesses and our industry is at an all-time high, and we take that risk very seriously."

Ensuring that dealers will be FTC compliant by Dec. 9 remains uncertain, as many auto retailers are finding the Safeguards Rule to be difficult to understand or complete. CDK's State of Cybersecurity report found that only 35% of dealers fully comprehend the new ruling and less than half are well-prepared. While 71% were familiar with protection mandates including multi-factor authentication, data encryption, and data and systems inventory, several requirements remain cloudy, including compliance on mitigation, threat detection and response.

"Partnering with a managed service provider can assist dealerships in eliminating the guesswork for FTC compliance, ensuring a safer, more secure and up-to-date IT infrastructure," said Bell.

Andrew McClure, director of IT Operations of The Patrick Dealer Group locations in Illinois, echoed Bell's recommendation on dealer cybersecurity safeguarding. "Engage with a chief information security officer who aligns with (analytic models) FAIR/NIST/CISA standards, research best practices and follow directions on structuring a layered cybersecurity program for your business," McClure suggested. "Cybersecurity investments will pay dividends in threat/risk reductions."

Airbiquity brings over-the-air connectivity to two-wheeler market

Airbiquity® has launched OTAmatic® mLink, a solution for two-wheeler original equipment manufacturers (OEMs) that eliminates the need for embedded telematics control units (TCUs) to deliver vehicle-to-cloud connectivity for over-the-air (OTA) software updates.

OTAmatic enables the secure delivery and installation of OTA software updates for vehicle maintenance, feature upgrades, and consumer personalization. OTAmatic mLink enables safe and secure delivery, installation, and management of OTA software updates to motorcycles, scooters, and other two-wheeler vehicles using consumer smartphones. OTAmatic mLink also reduces OTA related hardware requirements for embedded TCUs and other devices when used in a hybrid "brought-in built-in" system architecture.

OTAmatic mLink provides numerous benefits for two-wheeler OEMs including:

- Reduces cost related to OTA connectivity, processing, and management
- Lowers or eliminates data transmission costs associated with downloading software packages and uploading usage, performance, and diagnostic data
- Enables consumer notifications via smartphone for consent and update progress

Stellantis opens software and technology center in Bengaluru

Stellantis inaugurated a new software center in Bengaluru, Karnataka, India. The new center will focus on the development of software and technological innovations. The new site is the Company's second global innovation center in the country.

The facility, spread across 50,000 square feet, will serve as the primary development center for STLA SmartCockpit – one of the three technology platforms that are key to the Company's digital transformation strategy due to arrive in 2024 and deployed across the four STLA vehicle platforms. In addition, the Bengaluru center will play a crucial role in the development of AI and ADAS technologies for STLA AutoDrive. Additionally, the Base Software Development team in Bengaluru will support Base software platforms made with the Classic and Adaptive Autosar frameworks.

The new center was launched by Yves Bonnefont, Chief Software Officer at Stellantis, together with the Stellantis India top management team. The Bengaluru office will house state-of-the-art labs, including a next-generation acoustic lab, which is tasked with the development of specific audio signatures as well as premium audio experiences for Stellantis vehicle owners worldwide. The establishment of the new digital hub as a key contributor of change for a sustainable tomorrow is a robust demonstration of Stellantis' unabated dedication to facilitating the global mobility sector's digital transformation.

The new innovation and development center in Bengaluru will help nurture Indian expertise in the software and technology sector and give opportunity to wield such proficiency in global markets. The company is also collaborating with Indian universities to explore the development of industry-specific curricula and support ongoing expansion.

Hyundai Mobis and Luxoft jointly develop next-generation IVI platform for future mobility

Hyundai Mobis, the automotive supplier, and Luxoft, a software engineering firm, announced that they are collaborating for next-generation IVI platform for future mobility.

Hyundai Mobis' system integration expertise and Luxoft's SW competitiveness are expected to provide more compelling solutions in the global automotive market.

Both companies are working on the Infotainment Cockpit Controller MIS (MOBIS Infotainment System), the most advanced system that can integrate up to six displays including Digital Cluster, AR Head-up Display, Passenger Display, Center Stack Display, and two Rear Seat Entertainment. It also provides personalized services such as multiple VPA (Virtual Personal Assistants). This product has adapted Qualcomm's latest GEN4 AP based on Android 12 to provide users with a more seamless and richer infotainment environment.

Yulu Bikes invests in real-time customer support with Freshworks software

Freshworks Inc., a software company empowering the people who power businesses, announced that Yulu Bikes, Micro Mobility Vehicles service in India uses Freshworks' Freshdesk™ and Freshchat™ to unify and automate customer support across multiple digital channels including mobile apps and AI-powered chatbots.

India is an evolving market for electric mobility and Yulu enables first and last-mile connectivity that is seamless, shared, and sustainable. In the last 5 years, Yulu expanded its business in the space of shared mobility by introducing battery swap stations, resulting in an increase in the volume of incoming customer queries. Yulu hosts India's one of the largest battery-as-a-service networks with 3 million battery swaps to date.

Yulu Bikes sought a user-friendly experience native to its mobile app and available through the user's channel of choice. This left Yulu's support team navigating through fragmented customer conversations across multiple channels. With Freshworks, all conversations are in one place and the company can track its team performance using custom analytics for metrics.

Chat serves as a top area of focus for the customer-facing team at Yulu. Most customers want to quickly interact with the company when facing an issue on the road and do not want to wait around. Freshchat's bots capabilities significantly reduced 30% of the incoming chat volumes by providing real-time resolution. With intelligent automation, Yulu is able to automate repetitive tasks and allow its agents to focus on issues that require human intervention.

Veoneer partners with Arbe to develop high-performance automotive radars

Tier 1 automotive technology supplier Veoneer has partnered with 4D imaging radar solutions company Arbe Robotics to co-develop radars for automotive-grade safety and advanced driver assistance system (ADAS) capabilities.

Veoneer said it intends to develop, market, and integrate two surround 4D imaging radars that build on Arbe's designs: a long-range, high resolution, 360° sensing solution with 48×48 radio frequency [RF] channels, and one with 24×12 RF channels.

The 4D ultra high-resolution imaging radar will be able to operate in difficult weather and lighting conditions, and is capable of distinguishing true threats to driver safety from false alarms. The company said its sensor will be "modular in design, reliable and affordable," providing system redundancy and "data diversity" needed for both safety and autonomous operation.

Traditional radars have been capable of identifying distance, direction, and relative velocity of an object. 4D imaging radar is high-resolution, long-range sensor technology that can do all of that, as well as identify the height of an object. It's considered a key component in the development of ADAS for some Level 2 and 3 driver assistance functions.

"Veoneer's patented waveguide technology will enhance Arbe's performance metrics further by improving antenna efficiency and reducing performance variability in the manufacturing process," the company said.

Van Dan Elzen, EVP Radar Product Area at Veoneer said the 4D radars are intended to work together with other devices, such as cameras and lidar sensors.

"Autonomous functionality will take multiple, orthogonal sensing modalities to be safe in a large variety of driving circumstances," he told. "They have strengths and weaknesses, and having orthogonal sensing modalities allows greater ability to fail operational."

Arbe was chosen as a partner because of its 2K high resolution surround radar that is "able to enhance the perception system and sensor fusion. Veoneer is a hardware supplier and system integrator headquartered in Sweden. The company offers a variety of products, including radars, lidars, thermal night vision cameras, vision systems, and ADAS software.

Wejo unveils integration of live, real-time connected vehicle data with prototype of autonomous vehicle

Wejo Group Limited, a provider in Smart Mobility for Good™ and cloud and software analytics for connected, electric and autonomous vehicle (AV) data, unveiled DLIVEREE, an AV prototype that is being used to develop and demonstrate Wejo's Autonomous Vehicle Operating System (AV-OS), software that will use live, real-time connected vehicle data to support development, testing, and operation of AVs for the future. The AV prototype allows Wejo to build, test, and demonstrate Wejo's live API data powering AV development projects, including freight, delivery, and robotaxi or ride-hailing vehicle use cases. The initial prototype was showcased for the first time during Wejo's "Data in the Desert" on-track driving experience event.

DLIVEREE represents the next stage of evolution for AV-OS that will demonstrate how AV developers will be able to utilize connected car data that integrates real-time parameters, including the number of cars on the road, construction barriers, pedestrians crossing the street, cyclists, slippery roads, or other dangerous weather and road conditions. The prototype will also support the standardization of a common connected vehicle language for AVs to communicate real-time road settings, vehicle status and inform digital twin testing.

"To be clear, Wejo is not entering the race to develop autonomous vehicles but we are propelling AV adoption forward, and the prototype we are developing will demonstrate how Wejo's AV-OS can empower AV developers by rapidly accelerating innovation to realize the full potential of AVs," said Richard Barlow, Founder and CEO of Wejo. "We want to help reduce the 1.3 million deaths that happen each year on the road and the additional 8 million due to emissions. Instead of learning from historical data, our edge-based processing of live API data will provide intelligence on long-range conditions across traffic and roadways and democratizes access to live, real-time connected vehicle data, resulting in safe and efficient AV development – and truly autonomous AVs. We are ultimately supporting the creation of the most experienced driver on the road."

With access to trillions of data points from more than 85 billion journeys and approximately 19 million vehicles that represent activities on 95% of roads in America, AV developers, DOTs, and fleet operators will be able to better understand current vehicles' status and dynamics. This will include intended movements of vehicles (e.g., forthcoming lane change and exiting the highway) to make calculated instant decisions to maintain road safety alongside automated and non-automated vehicles on the road.

The DLIVEREE AV will showcase:

- Enabling vehicle-to-vehicle communication (e.g., emergency stopping due to a hidden vehicle)
- Use of cloud-based road intelligence (Real-Time Traffic Intelligence) to anticipate the road ahead (e.g., traffic build-up further ahead)
- Capture of Light Detection and Ranging (LiDAR) and camera data for simulation, modeling and visualization
- Intelligent internal and external displays based on Wejo intelligence and vehicle dynamics

Autoliv and Geely to develop advanced safety technology for future vehicles

Autoliv China, a subsidiary of Autoliv, Inc., and Geely Auto Group, a global automobile manufacturer, have entered into a strategic cooperation agreement to develop advanced safety technology for future vehicles. The collaboration includes a system approach to automotive safety and will cover 16 technologies. The objective is to develop products that will meet the future demand for safer vehicles and to save more lives.

"The new cooperation between Autoliv and Geely shows our common intention to speed up the process of going to market with new safety technology that will save more lives. Geely is a strong player in a very dynamic and transformative industry, and I am pleased that we have established this cooperation in China. Our shared commitment to sustainability underpins and supports our collaboration", said Sng Yih, President, Autoliv China.

"This strategic collaboration marks another milestone for Geely and Autoliv and gives us the opportunity to create cars with a new level of safety technology. Through our close cooperation, both Geely and Autoliv can increase our respective innovation capacity and technical competitiveness in the automotive market," said Guowang Kang, Vice President, Geely Auto.

Autoliv and Geely first began working together in 2002 which has since generated numerous advanced technologies, including a pre-pretensioner seatbelt and a steering wheel with hands off detection technology. The new collaboration is non-exclusive.

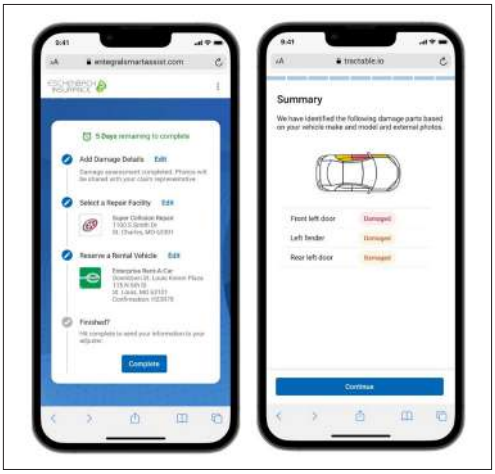
Entegral launches Smart Assist™, vehicle claims assistance product

Entegral has announced the launch of Smart Assist, a vehicle claim assistance product designed for use with mobile devices, in North America. This new SaaS (software as a service) offering puts more control directly into the customer's hands after a collision and, in the process, helps to digitize and automate the claims journey from first notice of loss.

Entegral is an integrated and open platform that facilitates communication and collaboration among tens of thousands of collision repair shops, insurance providers, vehicle manufacturers and other industry professionals around the world. Designed to provide value to industry partners, Enterprise Holdings launched Entegral in 2019 to help simplify the post-accident process, reduce claims cycle times and enhance the overall customer experience.

The latest offering from Entegral, Smart Assist is a self-service application that provides control and transparency to the vehicle owner from first notice of loss through the completion of the claim. Starting with a text message from their insurer, vehicle owners are invited to participate in their own claim journey intuitively and interactively.

"Managing the full lifecycle of an auto claim is complex for everyone involved – not to mention incredibly stressful for the vehicle owner. By connecting people, systems and data on an open platform, Entegral is simplifying and harmonizing the automotive claims experience for industry partners and vehicle owners alike," said Joe Rector, vice president of Entegral. "The launch of Smart Assist illustrates how we're continuing to invest in advanced solutions to improve claims processing. By removing inefficiencies from the process, we enable partnerships to come to life and expedite the accident recovery timeline."



Through AI damage analysis, Smart Assist is streamlining the selection and assignment of the vehicle repair and replacement rental.

With AI damage analysis provided through a new partnership with Tractable®, Smart Assist streamlines the selection and assignment of both the vehicle repair and replacement rental, as well as improves the customer and employee experiences in the claims process.

"We are honored to partner with Entegral to provide our AI technology for this exciting new offering," said Alex Dalyac, co-founder and CEO of Tractable. "Computer vision is accelerating accident recovery; the technology is here, it's on the ground and it's making a difference."

Tractable represents the first of many partnerships intended to expand functionality for solutions under the Smart Assist product. Entegral has a strong global customer base of more than 70 insurance providers, car manufacturers and collision network sponsors in the United States, Canada, United Kingdom, Ireland and Puerto Rico, including most of the top 25 insurance companies.

NTT Com and DENSO to collaborate to provide Security Operation Center for Vehicles

NTT Communications Corporation, the ICT solutions and international communications business within the NTT group, and DENSO CORPORATION, the manufacturer of mobility components offering advanced mobility technologies, systems and products, announced that it will collaboratively develop the Security Operation Center for Vehicles (VSOC) to respond to the threat of increasingly sophisticated cyber-attacks against vehicles.

This collaboration combines the strengths of NTT Com and DENSO to establish and develop the technologies that comprise the VSOC (vehicle SOC) service and its operation systems. NTT Com provides its technological capabilities related to managed IT security, including networking, cloud computing, and ICT SOC, while DENSO leverages its unique technologies related to information security, communications, and data analysis, which it has cultivated in the areas of in-vehicle systems, vehicle cybersecurity, and connected car development. The two companies, both of which have extensive expertise in the IT and mobility fields, will work together to provide robust VSOC services that can accurately respond to evolving vehicle-related cyber-attacks.

The collaboration aims to provide key services that enable prompt incident response at car manufacturers and mobility providers. Services to be provided include:

- Vehicle monitoring and cyber-attack detection by automating the acquisition of log output from communications, connected servers, and security devices installed within vehicles
- Detection of cyber-attack trends along with the details of actual attacks against vehicles on an individual or fleet-wide basis
- Analysis of cyber-attacks and threats by expert security analysts, reporting of results and forensic information that facilitates recovery and response efforts, and real-time visualization and alerting for customers through a client portal site
- Reliable and highly-available vehicle security monitoring on a global scale, built atop of NTT Com's proven infrastructure and operational experience
- Through this collaboration, the two companies aim to provide VSOC services and accelerate their development to contribute to the realization of a safe and secure mobility society.

Pradeo acquires Yagaan and strengthens its cybersecurity services unification strategy

Pradeo, global provider of mobile fleet and application security enters into exclusive negotiations for the acquisition of Yagaan, an application security software company based in France. Thus, the the company is strengthening its path towards unifying cybersecurity services by providing comprehensive expertise and solutions in the fast-growing mobile security market.

Pradeo's objective is to become the sole contact for CISOs, application developers, auditors, device manufacturers and other cybersecurity stakeholders for all issues related to the protection of mobile applications and associated web services, as well as smartphones and tablets.

The acquisition of Yagaan, whose team has conceived and developed code mining, a disruptive technology for auditing applications' source code, Pradeo is expanding its market share and consolidating its global development. Created in 2017, Yagaan has 10 employees who will join the Pradeo team to bring its staff count to 60. Yagaan teams will remain based in France.

Next-generation BMW voice assistant to be based on Amazon Alexa technology

BMW announced that it will launch its first vehicle with Amazon Alexa-based new-generation voice assistant within two years. The new BMW voice assistant will work in cooperation with Alexa and allow customers to check the weather report, manage their smart home remotely and control music while keeping their eyes on road. Additionally, both BMW voice assistant and Alexa can be used separately or together.

The BMW voice assistant was first introduced in 2018 and according to the German carmaker has become an "increasingly important part of BMW iDrive".

Amazon senior vice-president of devices and services Dave Limp added that "this cooperation with BMW is a great example of what Alexa Custom Assistant was designed for — to make it faster and easier for companies to develop custom intelligent assistants for virtually any device, without the cost and complexity of building from the ground up."

The BMW Group and Amazon share the strong commitment to maintaining customers' trust and protecting their privacy, including giving them control over their data.

Toyota to produce electric car powered by BYD batteries in China

Toyota Motor Corp announced the launch of a small electric sedan, which will be powered by BYD Co batteries and will be produced and sold in China.

The Japanese automaker said the car would be called the Toyota bZ3. It did not say when the vehicle will be available in showrooms. It is the second model in the new Beyond Zero (bZ) series of battery electric vehicles (BEVs) from Toyota, which has been criticized by activists and green investors for not embracing BEVs quickly enough. The bZ3 was developed jointly by Toyota and BYD.

Renault Trucks now assembles and distributes e-cargo bikes with Kleuster

Renault Trucks, part of the Volvo Group, has joined forces with Kleuster, a Lyon-based electric cargo bike manufacturer, to accelerate the production and distribution of the Freegônes e-cargo bikes. These cargo bikes will be assembled at Renault Trucks' Vénissieux industrial site and distributed through the manufacturer's European network. Through this partnership, Renault Trucks is adding last-mile delivery solutions to its electric vehicle range.

By joining forces with Kleuster, Renault Trucks is sharing its expertise, industrial infrastructure, and large-scale production capacity. Freegônes' assembly and logistics have moved to a 2,100 m2 building in Renault Trucks' long-standing Vénissieux site, which also boosts the regional economy.

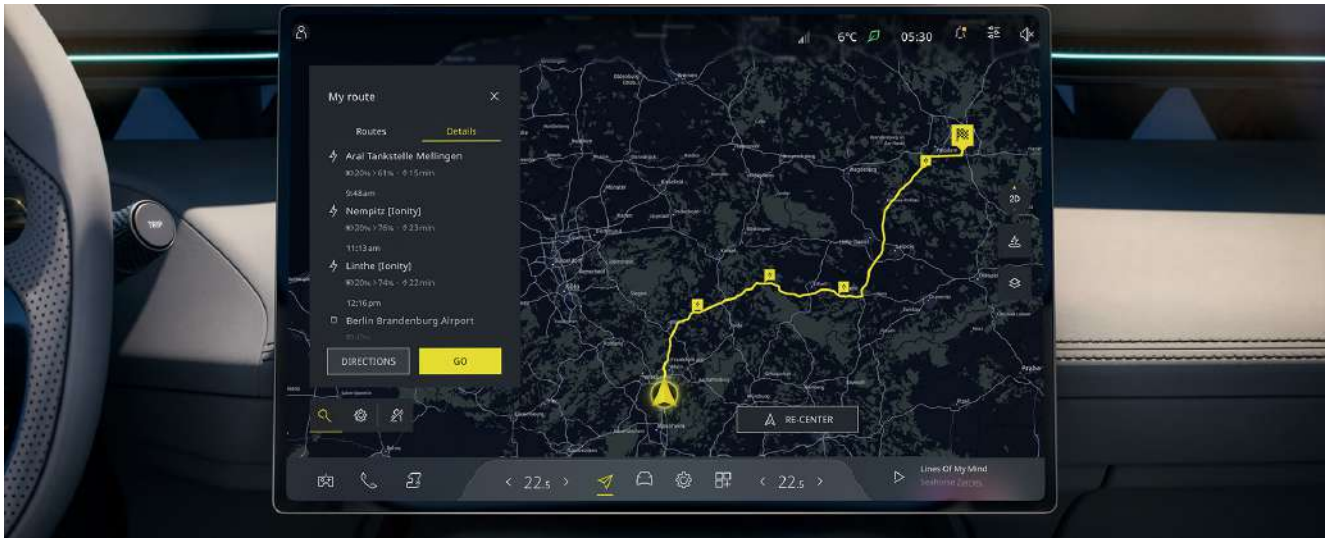
By integrating Kleuster products as a complement to its range of electric vehicles, Renault Trucks is providing professionals with an effective and innovative solution for last mile delivery. Renault Trucks is now the only European manufacturer with such a wide range of electric vehicles, varying between 650 kg and 44 t GVWR.

Prominent Energy Solutions Company launches electric and hybrid vehicle pilot program

Voltyx and its family of operating companies is currently in the process of launching their pilot program for electric and hybrid vehicles. This pilot program will focus on right-sizing the sales and non-field technician fleet to reduce the organization's overall carbon footprint.

As of now, Voltyx is slated to replace 4% of their overall fleet with EV and hybrid Fords by the end of 2023. A major step towards lower emissions exuded by their entire workforce. While a 4% replacement is on the docket for 2023, the company's plans for moving towards EV and Hybrid vehicles does not stop there as the long-term goal is to replace the sales and leadership fleets as well.

In addition to this pilot program, Voltyx currently has charging stations located at two St. Louis, MO area offices with plans to install more by the end of 2023. These additional charging stations will be added to support the new EV and Hybrid vehicles which will be allocated throughout the continental United States.



HERE powers Lotus ELETRE's digital cockpit with EV navigation and range assistant

HERE Technologies has been chosen by Lotus and ECARX to deliver integrated navigation services to the recently launched Lotus ELETRE, the automaker's pure electric hyper-SUV.

HERE Navigation is a software-as-a-service, cloud-native navigation solution for connected vehicles. With HERE Navigation, the Lotus ELETRE's navigation experience can be updated over-the-air, ensuring that drivers have access to the very latest version. Additionally, Lotus and ECARX are using the HERE Software Development Kit (SDK) to integrate HERE Navigation into the Lotus Hyper OS mobile application for drivers to have an end-to-end navigation experience, inside and outside the vehicle.

HERE Navigation runs on the ECARX digital cockpit head unit that has been developed specifically for the new Lotus ELETRE model. The digital cockpit runs on dual system-on-a-chip that increases processing speeds to support multiple simultaneous applications.

MiX Telematics introduces new KPI management SaaS module

MiX Telematics, a SaaS provider of connected fleet management solutions, launched a new, integrated KPI management module for subscribers to its premium fleet solution.

Built as an extension of MiX's embedded dashboards and self-service analytics capabilities, this functionality is fully customizable by customers – allowing them to visually track their performance on specific issues impacting their fleet's risk, safety, efficiency and sustainability.

The software empowers users to set and then monitor their organization's progress against critical business objectives on a weekly, monthly, quarterly and/or annual basis. It leverages MiX's highly configurable and flexible data engine to systematically draw conclusions without user intervention. Dashboard visualizations instantly reveal problem areas that may require faster action or intervention.

Geotab and Phillips Connect address transportation sector challenges through asset tracker

Geotab and Phillips Connect announced that StealthNet™ and SolarNet™ asset tracking and management solutions are available through the Geotab Marketplace. Phillips Connect solutions are fully integrated with the MyGeotab platform, providing users with faster access to analytics that help increase operational efficiency and lower operating costs.

StealthNet™ and SolarNet™ are IP67 rated, making them ideal solutions for capturing actionable data from trailers, chassis, containers, equipment, and light-duty vehicles that operate in harsh conditions. They are also easy to install, require almost no ongoing maintenance and are expandable to interface with other sensors through hard-wire and Bluetooth connectivity.

The integrated solution provides users with the ability to track assets diligently to manage theft or loss, automate yard checks, and help identify maintenance issues before costly repairs are needed.

Key benefits of the integrated solution include:

- Allows for total awareness of trailer health with deep data insights and analysis in real time
- Enables comprehensive monitoring of chassis sensors to receive status updates and notifications to help identify issues before they arise
- Helps users monitor location and status of containers and cargo with real-time alerts
- Provides visibility into location and status of small vehicles and heavy equipment with high-performance tracking

Velodyne Lidar signs multi-year agreement with Yamaha Motor

Velodyne Lidar, Inc. announced a multi-year agreement to provide its lidar sensors to Yamaha Motor for eve autonomy, a joint venture between Yamaha Motor and Tier IV, Inc. eve autonomy's autonomous goods transport service eve auto provides logistical support for factories to improve efficiency and safety.

Yamaha Motor is using Velodyne's Puck lidar sensors to provide localization and navigation capabilities for their eve auto all-in-one automated conveyance service. Velodyne's lidar sensors enable small electric vehicles to navigate factory facilities autonomously.

eve auto is a full-service solution that provides customers with a quick set up that does not require any construction. Built for both indoor and outdoor applications that allows customers to transport goods autonomously, eve auto has a towing capacity of 1500 kg and can navigate slopes up to 7 degrees and gaps up to 3 cm. eve auto's autonomous capabilities are enabled by Velodyne's lidar technology and can be connected with existing infrastructures and external systems through web API.

Motional and Uber announce multimarket commercial agreement for autonomous ride-hail and delivery services

Motional and Uber Technologies Inc announced a commercial agreement to offer fully driverless rides using Motional's new all-electric IONIQ 5-based robotaxis.

The 10-year, multimarket agreement creates the opportunity for effective scaling and broad adoption of AVs by pairing Motional's advanced driverless technology with Uber's network of millions of customers. The companies will strategically deploy the service in cities across the U.S., with the first trips expected to start later this year. Motional and Uber have a shared vision for AVs to offer an affordable, convenient, and safe transportation option for everyday travel.

As part of the commercial partnership, Uber will share targeted insights to efficiently allocate and position Motional's vehicles. AVs present a unique opportunity to leverage those insights to optimize operations, including reducing vehicle downtime and unnecessary miles traveled, which enables the companies to maximize time spent in revenue-generating service. Smarter operation also translates into a better experience for Uber customers, ultimately leading to reduced wait times and lower fares.

HEADLINES

- JERA and Toyota deploy large capacity Sweep Energy Storage System with second-life batteries
- Elektrobit partners with Canonical to pave the way to a new era of software-defined vehicles
- VIA Motors partners with AUSEV to accelerate the electrification of Australia's commercial electric vehicle market
- Nauto announces collaboration with BrightDrop to bring safety technology
- Drive System Design and Alvier Mechatronics establish joint operating agreement to provide sustainable electrified propulsion solutions
- ZF and NIO sign strategic cooperation agreement
- Kodiak Robotics and IKEA announce cooperation for autonomous freight delivery in the U.S.
- SaverOne signs MOU with truck manufacturer Iveco
- Hertz partners with Palantir to drive operational excellence and enhance customer experience
- Volkswagen Group and Xanadu establish quantum simulation program for battery materials
- Baraja and Veoneer enter advanced LiDAR development agreement
- Hero MotoCorp partners with Terrafirma Motors Corporation to debut in Philippines
- ACC & ProLogium partner up to accelerate the development of solid-state EV battery
- Zvision partners with NVIDIA to accelerate the industrialization of solid-state LiDAR AI technology
- Qualcomm and Vodafone partnering to develop and test next-generation 5G Open RAN infrastructure
- RL Automotive partners with European Space Agency to improve the accuracy of big data
- AWS and the BMW Group collaborate to deliver BMW's new cloud-based vehicle data platform
- Siemens and Volta Trucks partner to accelerate commercial fleet electrification
- NTT DATA and DENSO start to build an ecosystem for EV batteries
- Volkswagen to invest in a joint venture between CARIAD and Horizon Robotics
- Mercedes-Benz and Microsoft collaborate to boost efficiency, resilience and sustainability in car production
- SunPower and General Motors to power homes of the future with electric vehicles
- Seeing Machines enters into collaboration with Magna
- Ansys simulation helps accelerate next-gen wireless communication for Murata Manufacturing

THE EV CHARGING ECOSYSTEM PAVES THE WAY FOR A NEW TECHNOLOGY PARADIGM

DOMENICO MANGIACAPRA, Henshin Group
ROBERTO BALZERANI, Sopra Steria

Mobility is the Hub of IoT in the Smart City

Nowadays, around 55% of the world's population is estimated to be living in an urban area or city, a proportion that is expected to rise to 80% by 2050 (WEF, 2022). More than two-thirds of global population, nearly 7 billion people, will live scattered over a small portion of the planet as cities only cover 2% of the world's land but consume over 78% of the world's energy and account for more than 70% of global CO2 emissions. In this global scenario, cities are turning into the hubs of the services-based world economy and movement of people and goods becomes a key factor to increase of social cohesion, economic and environmental development. Mobility affects people's wellbeing and societal progress as it provides access to education, jobs, healthcare, and trade.

However, today's mobility systems are unable to meet future demands without leading to increasing congestion and pollution. Indeed, urban mobility is currently responsible for 40% of all CO2 emissions from road transport and up to 70% of other pollutants from transportation. Mobility sector is a major source of greenhouse gas emissions globally and, consequently, is a crucial factor for winning the 1.5-degree challenge. To address the worrying effects from these projections, several specific measures are already being taken on a global scale, such as optimizing public transportation and accelerating automated, connected, electrified, and shared mobility (ACES). Smart urban mobility is increasingly relying on today's data generation and sharing technologies, which are needed to support decision-making for greater interaction between the public and private transportation sectors.

From a technology perspective, a global trend is clearly underway, namely, the progressive integration of all services into technology platforms. This implies that all user-centered services are managed by technology platforms to be delivered seamlessly.

In the Smart City digital ecosystem, among the wide variety of software platforms, mobility is the most intense and complex technology.

Mobility platform provides the foundational technology layer for integrating all user-centered services.

The Role of EV Charging Infrastructure in Making a Smarter City

Electrification of transportation and mobility results to be one of the key enablers for boosting transition to greater sustainability and innovation. Electric vehicles (EVs) help a city become smarter in terms of eco-friendly transportation system, pollution reduction, and accelerating the integration of renewable energy sources. The growing spread of EVs introduces new opportunities and threats to existing energy system. EVs do not create a power-demand crisis, but they can reasonably contribute to hourly peak demand and then, reshape the electricity load curve. This entails that – if the EV charging is not managed smartly but in an uncontrolled and simultaneous way – the current energy system is unable to support the expectable additional burden caused by the hourly peak demand in congested zones. On contrary, if charging is performed in smart way, the impact of a rising EV market could be not only neutral but also profitable to the energy system overall. In a more comprehensive perspective, an EV is not only a useful means of transportation to accelerate the decarbonization process, but also a "mobile energy storage". Considering that the EVs spend an average of 95% of their time idle in parking lots, it makes sense to leverage that inactivity to turn these vehicles in "battery banks of the future" and thus help stabilize electrical grids powered by intermittent renewable energy sources (IRENA, 2019).

In this framework, the timing of recharge clearly emerges as a critical issue. Innovation based on cloud-based solutions is the response to this challenge. Smart charging technology allows charging speed to be changed depending on requirements of customers and power grid system. This digital infrastructure enables communication among the EVs, the charge point operator's cloud-based charging management platform, and the power grid system so that the energy consumption can be modulated and adjusted based on current energy demand. In this way, owners of EVs can connect their means to the power grid during expensive off-peak hours, without the vehicle consuming power until the economic off-peak hours. Smart charging promotes increasing penetration of EVs without affecting the existing grid infrastructure while maximizing the integration and the use of renewable energy sources.

Implementation of smart charging systems starts from basic models – which encourage consumers to defer charging from peak to off-peak periods – to more advanced models that provide energy balancing and ancillary services in near-

Source: MarketsandMarkets (2022), Electric Vehicle Charging Station Market

real time.

Additional flexibility to the power grid can be achieved through Vehicle-To-Grid Technology, where the EV battery can not only draw power from the grid (V1G) but also inject electricity back into the grid (V2G). As a result, EVs can serve as energy storage facilities – by providing the needed flexibility to the smart grid operator – and as a distributed energy source – by providing energy back to the grid.

EV fleets can therefore generate large electricity storage capacity. If most vehicles sold as of 2040 were electric, more than 1 billion EVs could be on the road by 2050 (compared to about 6 million today), exceeding the capacity of stationary batteries. These projections indicate that about 14 tera-watthours (TWh) of EV batteries could be available in 2050 to provide grid services, compared with only 9 TWh for stationary batteries (IRENA, 2019).

In addition to these benefits, implementation of Vehicle-to-Grid (V2G) service opens up the opportunity to develop new business models based on the concept of energy-as-a-service:

- powering household loads (Vehicle-to-Home – V2H) to supply loads in case of failures or to optimize the cost of the bill by playing on different energy prices in charge and discharge cycles carried out at different times
- integrating EVs with buildings (Vehicle-To-Building – V2B) and Energy Communities (ECs) to optimize the use of locally available generation resources by maximizing self-consumed energy (i.e., energy that is locally produced and locally consumed/stored in batteries)
- using EVs (only those with large capacity) to provide ancillary services to the grid (black start, voltage control, frequency control, reserve) and/or provide power to microgrids in island operation.

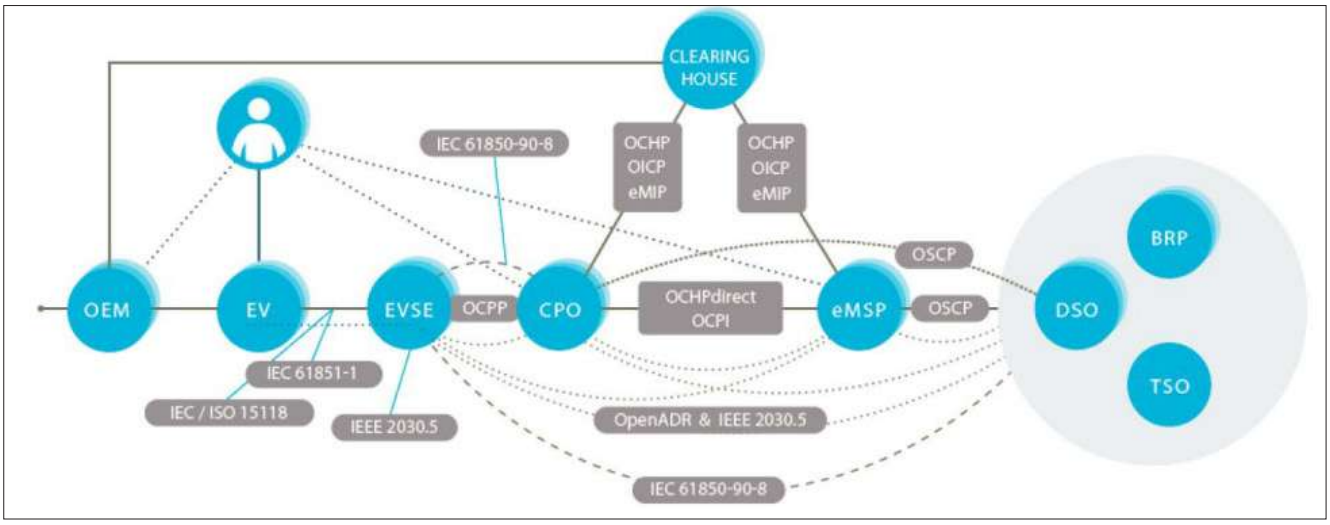
Digitalization of electric grid into smart grid fosters the integration of value-added services targeting prosumers and other stakeholders involved in the energy market. Thus, the use of EVs not only challenges the sustainability of smart grid, but also promotes and encourages its upgrading, acting as a driver of economic development.

Flexibility in the electricity system emerges as the glue that connects a renewable energy system with the growing shares of renewable energy to increasingly electrified end-use sectors. Power system flexibility – coupled with the adoption of smart technologies (V1G, V2G and V2H/V2B/V2X) and the introduction of new regulations, business models, and operating practices – allows for reliable and cost-effective electricity supply.

An overview of EV charging infrastructure market clearly shows how the global scenario is fast growing, highly segmented and therefore particularly complex. The global EV charging station market is expected to grow from 2,354 thousand units in 2022 to 14,623 thousand units by 2027, a CAGR of 44.1% (MarketsandMarkets, 2022). In addition to the technological innovations mentioned above, the main growth factors are four: the increasing adoption of EVs, the urgency of reducing carbon dioxide emissions, the government initiatives and tax incentives to encourage faster deployment of EV charging infrastructure, and, finally, also the reduction in the price of electric cars.

High complexity of this ever-evolving market lies in the degree of segmentation that is structured at the level of charging mode (plug-in charging and wireless charging systems, also known as static and dynamic inductive charging systems), charging type (Level 1-120V, Level 2-240V and Level 3- DC rapid/fast/Superchargers), different types of users (residential and commercial), and, finally, according to geographical region (North America, Europe, Asia-Pacific and LAMEA-Latin America, Middle East and Africa).

A closer analysis of this data clearly highlights the main factor hampering the growth of this market: the lack of



Source: Reprinted from ElaadNL (2016), Protocols and market roles in the charging network

standardization of current EV charging infrastructure.

Only a few years ago, customers' main concerns had about purchasing EVs were about price and driving range. Today, number one concern is another: ensuring accessibility to adequate charging infrastructure network. From the EV driver's viewpoint, in terms of user experience, this means always having the certainty of being able to recharge when and where needed, with a minimum of hassle or unexpected problems. The lack of common standardization is found mainly in three aspects: the differences between EVs and charging connectors, the communication protocols between the car and the charger, and finally the issue of security and transparency of charging payment.

The Challenges of EV Charging Ecosystem

EV charging ecosystem includes a variety of businesses and service providers, but not the power suppliers to grid. They are five components of that ecosystem: OEMs, EVs, electric vehicle supply equipment (EVSE), charge point operator (CPO) and finally E-Mobility service provider (EMSP). To ensure a smooth and efficient transition to a sustainable mobility, interoperability needs to become a widespread and standardized best practice. Thus, EVs, charging facilities and additional services need to be compatible with each other for the purpose of promoting broad adoption of electric cars and thus help overcome various regulatory, commercial, or political barriers.

The figure above illustrates the myriad of communication protocols and technology standardization among stakeholders taking on different market roles in the charging network. EV charging infrastructure must be therefore resilient and operate according to shared standards to support exponential market growth and a wide range of evolving use cases.

Interoperability emerges as a critical issue both from the EV driver and various stakeholders point of views.

For an EV driver, the possibility to recharge anywhere (EV Roaming), anytime with a single card or other method of identification, regardless of the brand or type of the charging station operator and service provider is clearly a priority.

Thus, electric vehicle supply equipment needs to be able to upscale their networks while expanding their offerings and delivering a seamless charging experience for drivers. Developing a back-end system that can increase charger availability by analyzing and fixing problems remotely is therefore required. Different charging locations clearly have their specific requirements. EVSPs can then support different types of locations and business models through a flexible back-end system that also supports open standards for grid connectivity to and within the network, and APIs for legacy applications.

Flexible billing options are also not exempt from critical issues. In case a user has chosen a contract-based solution by signing a contract with charging point operators or e-mobility service providers (CPOs or EMSPs), the first step of a recharge process in a charging infrastructure is the user identification/authorization phase, which is not uniform and still open, due to different technological solutions chosen by different CPOs/EMSPs. CPO systems, thus, need to work in synergy with EMSPs as well as the other ecosystem stakeholders.

In this regard, among new technologies, Distributed ledger technology (DLT), such as blockchain, acting as fundamental data layer on which information, values and electrons are exchanged, has the potential to play a crucial role in transforming the entire energy sector, starting with the facilitation of identification and authentication procedures that underlie applications that perform optimization and coordination of energy production and distribution processes (IRENA, 2019).

It follows that one of the major challenges facing the electric vehicle charging industry today is heterogeneity and, thus, scalability.

EV charging ecosystem challenges thus call Energy Management Technology into question.

Towards a New Technological Paradigm: The Digital Integration Hub

The high level of complexity only mentioned in the previous section emphasizes how the implementation of a new IT architecture

underpins EV charging infrastructure.

In this global charging ecosystem scenario, integration emerges as a new paradigm not only in technology, but also in business and governance.

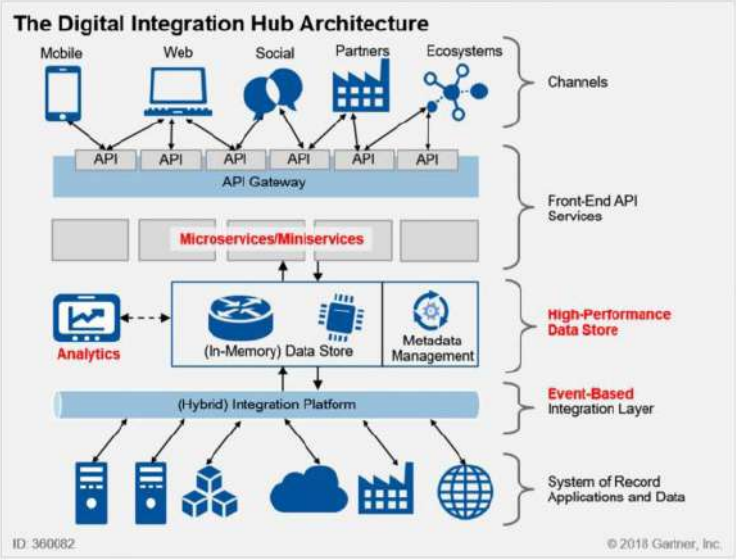
Developing a smart charging infrastructure depends primarily on several organizational and technological assumptions:

- the need for data to know in detail the available resources (location data of the EV connected to charging column, available energy in the battery, SOH, zonal energy price, etc.)
- the integration of EV with ECs' energy management systems, which requires interoperability and convergence of standards (SAE vs. IEEE)
- the evolution of regulation
- the availability of reliable price signals

The proliferation of front-end applications and to the exposure of third-party services offered via APIs is now an acknowledged fact.

These new channels on the one hand produce an increase in business opportunities, but on the other hand expose IT platforms to a large volume of calls to be processed.

As emerges in a well-known 2018 study by Gartner, the Digital Integration Hub (DIH) can be an architectural response to this current issue. The DIH is an advanced application architecture that aggregates multiple back-end systems, which manages data by creating a single scalable, high-performance data store. This high-performance data store is synchronized with application data sources through integration patterns that combine event, request, and batch logics. The focus of this architectural paradigm is on improving Customer Experience.



Source: The architectural pattern proposed by Gartner (2018)

The Architectural Model

The main features of the Model are as follows:

- A robust set of standard API to access in a "standard" way heterogeneous data sources. In addition, "hooks" should be provided to collect data directly from the event/message bus (Kafka)
- A micro/mini services architecture for a better and easier horizontal scalability and implementation of new features (managed by Kubernetes)
- A centralized console to manage the CI/CD pipelines to standardize deployment
- A centralized console to manage the "control" of the solution: events monitoring, log collection and correlation, metrics collection
- Dedicated database to optimize storage and speed: noSQL, timeseries

> The Digital Integration Hub architectural pattern can ensure easy, fast, and highly scalable access to applications and data from so-called Systems of Record, i.e., enterprise legacy systems, all using structured APIs on different levels.

The purpose of a DIH is to boost the implementation of a high throughput, low latency API layer by realizing a decoupling between data from legacy systems and data processing services from APIs, by enabling to:

- prevent overloading of legacy systems due to computational load required by APIs
- simplify the application integrations required by the implementation of API services
- create new and advanced digital experiences for users through front-end systems through an orchestrated ecosystem of microservices

This architectural model envisions the adoption of several open-source products and projects, such as Kubernetes, Apache Kafka, MongoDB, ELK, Prometheus, GitLab, and Nexus to prevent technological lock-in. ❑

AUTHORS

DOMENICO MANGIACAPRA
CEO
Henshin Group
He has been working around new technology mobility platforms for many years, holding several executive positions in various IT companies. Currently, he is CEO of Henshin Group, a tech company focused on developing IoT infrastructure designed to be an open-source platform ecosystem for mobility and energy.

ROBERTO BALZERANI
Innovation Director
Sopra Steria
He has been working in the energy industry for many years. He currently holds the position of Innovation Director at Sopra Steria Italy where he is working on the development of digitalisation technologies that are enabling the energy transition. Sopra Steria is a European Tech leader recognised for its consulting, digital services and software development, helps its clients drive their digital transformation to obtain tangible and sustainable benefits.

THE IMPACT OF AUTONOMOUS TRUCKS ON INDIA'S LOGISTICS SECTOR

ABHIJIT SENGUPTA
HERE Technologies

As the fifth largest economy in the world, India has been investing in logistics infrastructure in the country. Most recently, the government launched the National Logistics Policy[1] that stresses the need to adopt technology to strengthen the logistic sector such as streamlining processes for seamless coordination, to reduce overall logistics cost, and to provide an uptick in employment opportunities within the industry.

So far, India has seen an improvement in road networks and rail connectivity, more ports, inland container depots and warehousing services. This enhanced infrastructure throughout the country is enabling businesses to operate more efficiently and is taking India closer towards becoming a global manufacturing hub.

Automation is key is to enhancing logistics efficiencies – from processing freight operations, tracking, and documentation. The use of autonomous vehicles (AVs) is an example that enhances safety and efficiency of logistics companies.

How self-driving trucks will benefit India

According to a study[2], the global autonomous truck market size is projected to reach USD 2,013.34 million from 2019 to 2027, at a compound annual growth rate (CAGR) of 12.6%. In India, there are already a handful of start-ups working to make self-driving trucks a reality, indicating the level of market confidence in AVs.

India has also revealed plans to build 26 green expressways in the next three years so that travel times between cities can be reduced. While a more connected road network will bring cities and communities closer together, this presents a great opportunity to spur the trials of autonomous trucks in India, which

will benefit supply chains and alleviate congestion in international shipping ports.

Moreover, India is facing a shortage of 2.2 million truck drivers[3] – a strong business incentive to move to self-driving trucks that can operate 24/7 with no need for rest stops. Since drivers account for about 40% of the cost of the freight move, the savings are significant.

Prioritising safety first with location intelligence

India has one of the highest number of casualties in road accidents globally. In 2020, the country reported over 116,000 road accidents on national highways – including expressways, causing close to 48,000 deaths[5]. To that point, the Ministry of Road Transport and Highways of India has said that they will tap on artificial intelligence and advanced traffic management systems to improve the safety of road users and the surveillance network for security purposes[4].

Highly automated driving requires the vehicle to be able to sense, plan and act, all without human intervention. That requires various technologies working together to ensure a safe and smooth ride. This is where routing and navigation tools for trucks play a critical role. For instance, there are some roads where trucks are not allowed to park or turn into. If there is a diversion, smaller vehicles can take side roads to continue their journey, but some of these might not be suitable for trucks or permissible for automated vehicles.

For any level of autonomous driving, precise map data is necessary. Dynamic content, which includes traffic and weather data along with information about connectivity on the route, can be added to build an accurate and up-to-date picture of what is happening on the roads. It includes the operational design domain, which is information about where AVs are allowed to drive, along with certain road conditions and selected streets.

Location technology further supports highly automated driving at the simulation stage. Even before the vehicle sets its wheels on the road, it would already have "driven" millions of kilometres in simulation – thanks to map content and traffic data that simulate real-world scenarios. Such simulation runs are essential to teach

automated pilots to drive safely in all circumstances before the vehicle hits actual roads. This helps to instil confidence that autonomous trucks can also provide a safe driving experience in the domains they're designed for.

Autonomous trucks require unique skillsets

With employment opportunities and upskilling being a priority of the National Logistics Policy, autonomous trucks can open new job opportunities within the logistics sector. When handling an autonomous truck, the skills required will shift from a driver to an engineer operator.

For instance, programming skills are vital for someone to have a full understanding of how the whole AV system works. Robotics and electrical engineering skills needed for working with both hardware and software, electrical systems, and communications systems are equally important as well.

With cost savings brought about by AVs, companies can even invest in job trainings for their existing driver pool to help staff the new, higher-skilled technical roles.

Navigating the global supply chain crisis with autonomous trucks

The pandemic hasn't just disrupted supply chains, it has exposed some long-term weaknesses.

However, India's mobility ecosystem and logistics sector show big promise thanks to commitment by the government, and the constant innovation by companies.

The adoption of AVs could be seen as part of an evolution for the country to keep up with the latest tech trends and make transportation and roads safe for all. Not only do AVs bring about economic and operational benefits, they also have the potential to create new opportunities and improve the competitiveness of India's logistics sector. In the long term, AVs can help alleviate supply chain backlogs, fast-track the industry on the road to recovery, and improve overall road safety in India.❑

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AUTHOR

ABHIJIT SENGUPTA
Senior Director and Head of Business for Southeast Asia and India
HERE Technologies

Abhijit Sengupta is Senior Director and Head of Business, Southeast Asia & India at HERE Technologies. He was most recently appointed as as Co-Chair of the Smart Mobility Committee at the European Chamber of Commerce (Singapore) and is an existing member of the Logistics Council at the Internet and Mobile Association of India.

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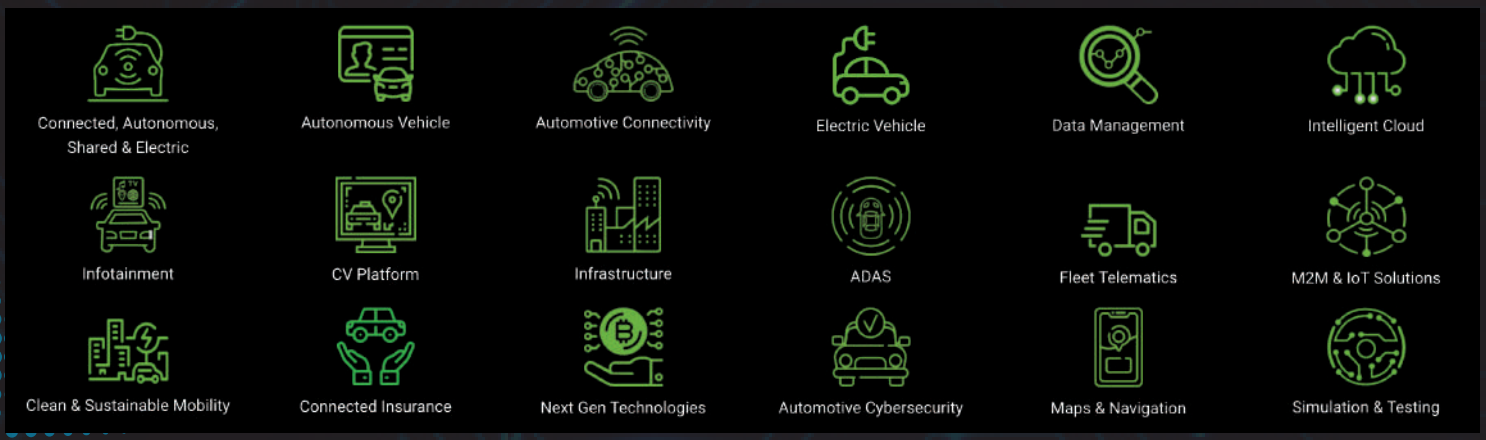

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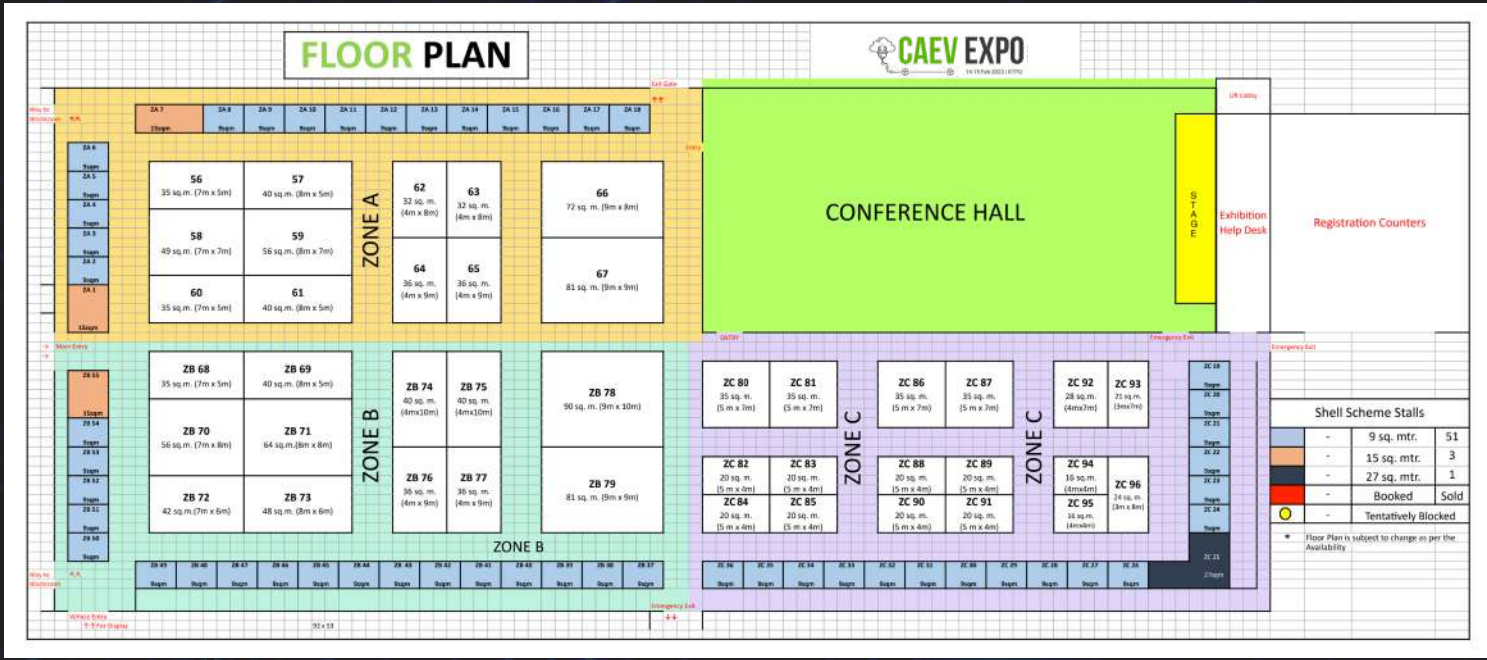

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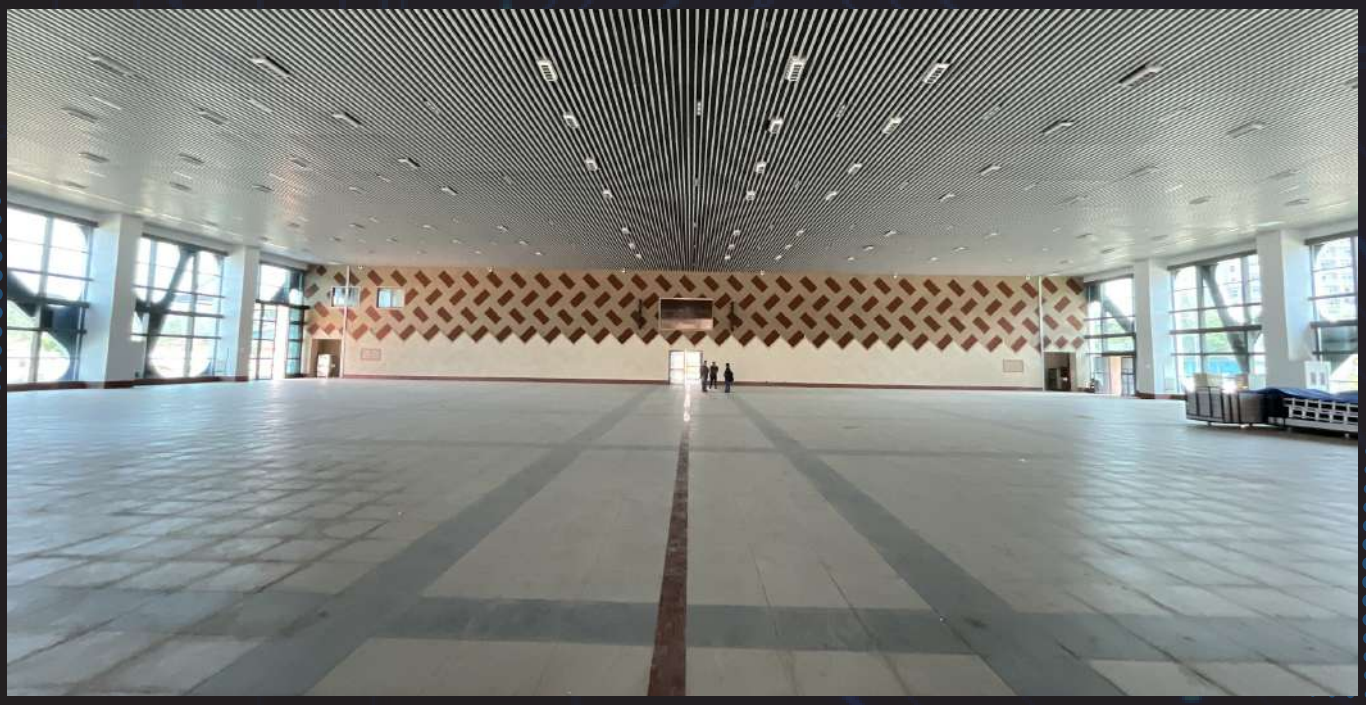


Contact Us

For Delegate Registration
Poonam Mahajan
Telematics Wire
M: +91 9810341272
mgr_corpsales@telematicswire.net

For Speaking/Panel Slot
Yashi Mittal
Telematics Wire
M: +91 9810340678
mgr_corpcomm@telematicswire.net

For Sponsorship/Exhibition
Anuj Sinha
Telematics Wire
M: +91 8744088838
anuj.sinha@telematicswire.net

ROAD SAFETY 2.0 ON INDIA'S PRIORITY LIST OF SURFACE TRANSPORT MODERNIZATION

ABHIJEET SINHA
Ease of Doing Business

Road traffic injuries (RTIs) are the leading cause of death globally for all ages and the first cause in the 5–29 years age group. Close to 1·5 lakh people die each year, and up to 4.5 are injured by RTIs. More than 60% of these deaths are attributable to vulnerable road users (i.e., pedestrians, cyclists, and motorcyclists).

Road traffic collisions reduce countries' annual GDP by a range of 1–3%. India fares worst with the highest number of global road fatalities. With just only 1% of the world's vehicles, India accounts for 11% of crash-related deaths, denting the Indian economy by nearly US$ 38.9 billion equivalent to 1.85% of GDP.

The traditional approach to road safety is not yielding the desired results, which is evident from the fact that despite some exciting & promising efforts like developing Zero fatality corridors, identifying & fixing blackspots, installing cameras for enforcement etc., the highest number of road fatalities took place in 2021.

Recently another valuable Indian life was lost on the road because safety was ignored. The death of Cyrus Mistry in a road accident is very unfortunate. But this isn't the first time we have witnessed such a tragedy. A Maharashtra MLA recently died in a road accident. Cabinet Minister Gopinath Munde died in one such accident in 2014. Famous comedian Jaspal Bhatti met a similar fate in 2012. The unfortunate fatal road accident of Cyrus Mistry suddenly brought the media's limelight on road safety. But the fact is that one life is lost on Indian roads every 4 minutes! Nearly 1.3 million people died on Indian roads in the past decade.

Where are we going wrong?

"Nothing works except in context, and finding out what works where and under what circumstances is a real scientific endeavour." – **Prof Angus Deaton**

Mere copying western road safety solutions will not work on Indian roads where the problem is multi-layered. The traffic is not homogeneous like in western counties, In India over 60% of traffic constitutes two-wheelers. Unlike in western countries, the heterogeneous traffic on Indian roads constitutes pedestrians, cyclists, motorcycles, cars, buses, commercial vehicles, trucks, tractors and at times animals also. Similarly, in High-Income western countries maximum accidents revolve around cars but in India, two-wheelers and pedestrians are the most vulnerable road users with 60% of fatalities & injuries. The road safety measures of the western countries are more focused on safety measures within cars like seatbelts, airbags etc, whereas we need more focus on safety measures out of cars without compromising the inside safety measures. Therefore adopting western road safety parameters will not provide a human-centric solution in the Indian context. An Indian solution is needed, which fits in our context of geo-socio-political scenarios and economic realities, where technology compensates for human limitations and encourages good drivers by creating a human-centric ecosystem.

We need to address the engineering & road design problems based on our traffic composition, there should be separate & enough lanes, foot over bridges, and flyovers for the two-wheelers & pedestrians as far as possible. Vehicle safety features should comprise both within the vehicle and out of the vehicle depending on the vulnerable road users.

Similarly, we need to improvise the enforcement system with our innovative solutions considering the complexity of enforcement in India due to the dense population, shortage of traffic police manpower, the huge cost of automated enforcement system and the challenging financial positions of most of the municipalities. We need a carrot & stick approach to enforcement using low-cost technologies within our means such as we can change driving behaviour by incentivizing good drivers rather than wasting time, energy & money on identifying & punishing bad drivers.

Identifying Road Safety & Risk Issues

Road safety has always been a complex and multifaceted issue. Despite many factors leading to fatal and non-fatal road injuries, the evidence identifies that four main risk factors consistently increase the risk for road injuries and deaths and are hence acknowledged by the WHO as major risk factors.

- speeding,

- drunk driving,
- helmet use, and
- use of seatbelt or child restraint

According to a study published in The Lancet journal, at least 30,000 lives in India could have been saved just by the implementation of simple road safety measures to prevent the above four main risk factors.

World Economic Forum-led Road Safety 2.0 pilots also reveal that majority of accidents are due to human errors and can be prevented with the use of technology to compensate for human limitations.

Besides human errors, the deficits in road engineering that create accident-prone spots and the sudden appearance of potholes and poor safety measures in the vehicles also contribute to the accidents. But the major reason remains the driving behaviour.

How to Improve

Having identified the major risk factors of road accidents, the next question comes how to improve the driver's behaviour to ensure adherence to traffic rules.

The study reveals that the behaviour can be changed either by the fear of penalty through strict enforcement or by self-motivation through incentives. For a densely populated country like India, encouraging & self-motivating drivers for better driving through incentives & rewards can be a better option.

Reward Good Drivers

Road Safety 2.0 concept of tracking driver's behaviour through IoT and converting it into easily understandable scores called **Safe Driving Scores**, which can be popularized Like CIBIL Scores by linking various road & vehicle-related incentives/ financial benefits with it. Mandating Safe Driving Score for every DL holder can be a real game changer for road safety in India.

The success of World Economic Forum (WEF) led Road Safety 2.0 pilots, demonstrated that this theory is more effective with a drastic reduction in accidents.

Safe Driving Scores

The driver's behaviour which is a subjective matter can be tracked using IoT and converted into scores on a real-time basis that may be called ***Safe Driving Scores***.

Incentive schemes for encouraging SDS by linking it with all road & vehicle-related transactions such as rebates in Insurance premiums, rebates at vehicle workshops, and wayside amenities drivers like CIBIL score can be a game changer for road safety in India.

Ecosystem to Reward Safe Driving Scores

There is a need to create an ecosystem to reward these scores. For commercial vehicle drivers, this will generate a new revenue source for safe drivers as every transporter will prefer drivers with higher SDS, which will automatically create a ranking system of drivers based on their Safe Driving Scores.

Insurance companies who are the main stakeholders can now come forward due to regulatory modifications by IRDAI. This will reduce the dependency on third-party funding for road safety and will create a self-sustainable ecosystem.

Good Driving Scores mean better drivers, who will get more rebates in insurance premiums. Similarly, a good/ careful driver will lead to lesser accidents and thus a lesser pay-out for insurance companies. Thus drivers will carve for higher Safe Driving Scores to get maximum rebates in the insurance premiums, thus will drive safety resulting in lesser road accidents.

A win-win for everyone.

Tech-Based Automated Enforcement System

However, the self-motivating measures for improving drivers' behaviours alone mayn't be a complete solution for road safety. Strict & transparent enforcement systems of traffic rules are equally essential. Both are complementary to each other.

The enforcement system needs to be automated, comprising speed cameras, incident detection cameras and ANPR systems, IoTs and high-end software for real-time detection of violations and issuance of automated penalty challans with a robust recovery system.

But the problem with an automated system is not the availability of technology but the availability of funds. The equipment and software of automated enforcement systems are firstly expansive and secondly require skilled manpower for flawless operations. Most Indian cities / municipalities don't have enough financial resources. Here we require the PPP model.

How to implement an Automated Enforcement System on PPP Model

World Economic Forum did a pilot for the automated enforcement system on the PPP model and found it quite effective and economically viable.

The technology companies / OEMs are ready to bear the upfront installation cost and 5 to 7 years of operation & management cost through their skilled manpower and to recover their Capex & Opex cost as a fixed annuity or as a part of challans/penalty recovered by the government. This is not only financially viable but will also bring additional revenue to cities/municipalities in addition to improving road safety and providing a lot of job opportunities.

A win-win for everyone as with these measures, we can achieve our target to reduce road deaths by 50% otherwise the same old storey will continue once the social media euphoria is over on deaths in road accidents. ❑

AUTHOR

ABHIJEET SINHA
National Program Director
Ease of Doing Business

Abhijeet Sinha is a Technocrat, currently National Program Director of Ease of Doing Business a leading emerging tech piloting agency. He started his journey from Modi's Citizen from Accountable Governance (CAG) election campaign team in 2014 parliamentary polls, also participated in various Pilots like IMNCI (Asha-Anganwadi), National Population Register (NPR-CAA), UIDAI (Aadhar) and also Project Director of ambitious 5000 km e-highway pilot National Highway for EV (Jaipur – Delhi – Agra) for Govt of India.

Firefighting with AI: How tech can prevent EV battery explosions?

DR. AMIT SHEKHAR
BytEdge

Since the advent of mass-produced plug-in electric vehicles, there have been an increasing number of fire related incidents. High-voltage lithium-ion batteries in EV cars can short circuit, break down, and spontaneously combust. To add fuel to fire, pardon the irony, lithium-ion fires are difficult to control and create hazardous smoke.

Several well-known brands have come under investigation for such incidents.

Because of these incidents , the United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA) launched a new Battery Safety Initiative study into EV car fires in 2021. The goal was to drive the industry toward safer batteries and fewer occurrences involving energy storage devices.

The issue of fire hazards is global and pervasive in all kinds of vehicles and not just passenger cars. Incidents involving Electric scooters have become a significant concern for India's electric vehicle sector. In early 2022, at least four videos of e-scooters on fire went viral, raising major concerns about the safety of green two-wheelers.

Flourishing in Flames

The global EV battery market is expected to increase at a CAGR of 19.0% between 2022 and 2027, from USD 56.4 billion to USD 134.6 billion. Rising demand for electric cars, developments in battery technology, favorable government policies and regulations, and the launch of new plug-in EV models are driving the market for EV batteries.

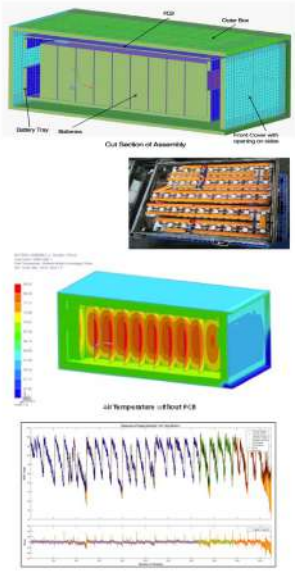
Because of growing worries about the environmental effect of conventional autos, governments worldwide are supporting the use of vehicles that use alternative fuels. EVS are zero-emission vehicles that are becoming increasingly popular for environmentally friendly public transit across the world. To encourage the usage of EVs, numerous national governments offer financial incentives such as tax exemptions, subsidies, free charging, and lower parking/toll charges for EVs.

Leading EV markets including China, the

BYTEDGE

BytEdge – Battery solutions

Problem	Features	Benefits
Cell Selection	Various battery models such as Li-Ion, NiMH, Ni-S	ML base analysis and comparison Thermal behaviour of battery packs
Sizing of Battery Pack	Accurate conversion of battery parameters Pre-defined battery model for performance using parameters	Battery digital twinning with real time and test data
Thermal Management	Thermal performance with CFD and ML modeling	Assess thermal distribution, overheating with prediction and prescription to avoid accidents
Remaining Useful Life and Impact on Performance	Conversion of battery performance with BMS for predicting battery life	Impact of battery degradation on its and vehicle performance



BytEdge Confidential

United States, and Germany are investing extensively in EV charging infrastructure as well as R&D for faster and more effective charging processes. Automakers are expected to invest more in order to fulfill the rising demand for EVs. Companies with considerable R&D spending for EV development include Tesla, Volkswagen, Ford, Nissan, BMW, and General Motors.

OEMs provide a diverse range of electric automobiles, from compact hatchbacks like the Leaf to premium sedans like the Tesla Model 3. The market for electric cars has expanded because of the vast number of consumers enticed by the range of products.

In October 2021, GM announced plans to invest USD 35 billion with the objective of producing and selling more than one million EVs and other technologies by 2025. The firm intends to be all-electric by 2035. In November 2021, Ford announced that it will increase its annual EV production capacity to 600,000 by 2023. It plans to deliver 40% electrified automobiles by 2030. Volkswagen also announced plans to invest USD 86.3 billion in EV development through 2030. Other companies, such as Tesla, Nissan, and BMW, have made significant developments and planning for the projected EV demand over the next 5-10 years.

Sitting on a Bombshell or Matchbox?

Battery explosion or fire does not always require an abnormal energy surge or much time. These unfortunately have been occurring without any warning and it just takes the shortest amount of time to unleash every bit of energy trapped within.

If a Li-ion battery has a storage capacity of 1kWh, it will be self-sufficient for combustion if all of it's energy is released in a couple of seconds. Every battery has an anode, cathode, and separator. The separator divides the other two - anode and cathode while allowing their ions to transfer. If the separator breaks or gets damaged, a short circuit occurs, it can result in a fire or an explosion.

Battery fires and explosions because of separator damage which can happen from electrical instability and external shocks.

Electrical instability occurs when a battery is charged or drained above its rated capacity. There are two ratings for rechargeable batteries: undervoltage and overvoltage. The separator is destroyed if the battery exceeds any of the two ratings while charging.

The anodic and cathodic processes form crystal-like material surrounding the separator during deep discharge. When the battery is allowed to charge to the same capacity it produces, more heat is created inside the battery, causing the separator to be damaged. Internal electrical misbalance occurs when an electric vehicle undergoes deep discharge or overcharging cycles. This causes spontaneous combustion and in some cases an explosion.

External shock occurs when the battery is subjected to external forces, stretches, or buries. External shocks may not instantly trigger possible battery damage, but after a period, it will either explode or cause significant harm. Because the battery separator is very volatile to external shocks, an electric vehicle accident will almost certainly end in an explosion as the material used for the body is often extremely thin and incapable of withstanding major shocks.

Needless to say, continued incidents related to battery fires adversely impact a brand's image but also raise questions about the safety of EVs. The industry needs innovative solutions to attenuate this problem

Solving Tech's Hazards with Tech

Global battery production is expected to exceed 400 GWh by 2022. With the growing demand for batteries, there is a growing need need for improved battery management. A robust battery management system (BMS) is essential for a battery's dependable and efficient operation.

BytEdge proprietary tech works on two fronts to improve both the remaining useful life (RUL) of the battery and prevent explosions. The DesignEdge solution enables rapid prototyping and virtual testing of designs while the BMS system gives insights into the performance and safety of current operating batteries. (different font color & italics)

BMS Solution for RUL Estimation

The commonly available BMS solutions for EVs estimate the remaining useful life (RUL) with an accuracy of around 80% which leaves much room for errors. This comes as a consequence of limited real-time data on driver behavior, road conditions, environmental conditions, etc.

We collected vehicle driving and BMS historical data of over 200 cars for 2 years to build and train an intelligent predictive algorithm. Within testing scenarios, we achieved an accuracy of 84% for RUL which can be pushed to 90% with additional data which shouldn't be a problem for OEMs and automotive manufacturers.

Thermal Management with Simulation

Our key competency is in digital twins. Through our experience across verticals, we could gather enough data and experience to create a simulation engine for batteries including electric motors, vehicle dynamics, air conditioning, and cabin.

Post simulation we use CFD Analysis to predict cell temperature variation in 3D Environment, flow distribution in the pack, and temperature distribution in cells. This helps battery manufacturers, product designers, and quality managers run drive cycles and optimize thermal management strategies with increased accuracy.

Thus, providing early warnings on high temperatures and alerts for possible fire incidences and proactive faulty battery replacement.

Electric vehicles are here to stay despite their current challenges. The fight against climate change is already a war now and global warming can only be controlled and reduced with a change in mindset, a global commitment and clean technology. ❑

AUTHOR

DR. AMIT SHEKHAR
Founder & CEO
BytEdge

BytEdge provides a do-it-yourself ML & AI platform that integrates digital twinning with real time and augmented data-based analytics to optimize product designs and their failure predictions leading to, enhanced safety, a reduced carbon footprint and a significant reduction in design to manufacturing cycle times across automotive and manufacturing industries.

NEED FOR INTELLIGENT BATTERY MANAGEMENT SYSTEMS

ANUSH G NAIR
Tata Elxsi

Battery Management System – It's use, need and benefits

Battery Management System (BMS) is an electronic system that monitors, balances, and protects the battery pack in an electric vehicle. It's a crucial part of any electric vehicle, and without it, your battery pack would be vulnerable to damage that reduces its lifespan. Due to its unstable nature, Lithium-ion cells pose a safety threat to users. The BMS, which manages the functioning of a rechargeable battery (whether a cell or battery pack), thus becomes a crucial factor in ensuring electric vehicle safety. BMS primarily oversees the operation of the traction battery and protects it from overcharging, over-discharging as well as excessive current during charging and discharging. There is a need for thermal management of these battery packs affects safety and useful life of the battery, which is also provided by BMS. It protects both user and battery by ensuring that the cell operates within its safe operating parameters. It also monitors the State of Charge (SoC), State of Health (SOH), and State of Power (SoP) of the battery to ensure it is operated in an effective and safe way. BMS also balances the cells to ensure same voltage is maintained across cells, which maximizes the usable battery capacity. BMS also collects a lot of data from the battery pack, to be used for analytics-based features.

Evolution of BMS Features & Trends

Most fuel gauging circuits employ coulometric counting to determine dynamic capacity, in layman's terms, it keeps a tally of current in and current out. It's an easy principle, but not as easy to execute accurately and consistently. The holy grail is to enable something called life usage forecasting. Much research has been undertaken to achieve increasingly sophisticated forecasting, which is important for large battery installations. Often, BMS integrates the primary protector as well as the fuel gauging features. It has

become a true system application capable of interactive control with the host.

Today, there are four major trends in battery technology.

The sophistication of BMS software: The trend is towards better estimation of battery state and the management of battery life and performance. BMS models have been enhanced via accurate real-world performance data. Multi-physics battery models that self-optimize and AI-enabled models to self-update and parameterize are used for the same.

Higher-voltage vehicle architectures: 400V architectures for energy-dense, cost-effective applications. 800V initial adoption in high-performance sectors. 1200V system for off-highway vehicles. Faster charging with higher currents and a need for BMS to be scalable.

Advancements in battery monitoring: Smart embedded sensing enables monitoring and controls individual cells. It also isolates one cell or draws power from certain cells and helps in self-healing and extending the life of cells.

Cloud-enabled BMS: This is Digital Twin based battery monitoring and state estimation. Over-the-air data transfers help tune BMS based on updated system understanding. Big data analytics helps improve battery life and performance. Detailed battery data helps to improve second-life use and uptake.

Digital Twin (DT) framework for Intelligent BMS & Features

Framework of DT for Intelligent BMS includes an on-board BMS and its off-board counterpart. The on-board system consists of a battery pack, BMS, and associated sensors. The off-board system is a cloud platform where digital twin of the battery, cloud BMS functions, data utilization, and other value-added services are hosted. The on-board system will also have access to big data, including data from other vehicles, map information, weather information, traffic information, and charging infrastructure information. Once deployed the DT will get refined, based on the data from real batteries and accuracy will improve over time. Cloud BMS will use information from both digital twin and physical entity of both battery states. It will control the operation of a physical battery.

Some features of the digital twin framework for intelligent battery management systems are:

Safety

- Battery Anomaly Detection
- Cell Temperature Estimation
- Prognostics & Diagnostics
- Safety & Control

Performance

- Driver Characterization
- SoC and SoP Estimation
- Energy Optimisation
- Advanced Battery Thermal Management

User Experience

- Trip Recommendations
- Smart Range Prediction
- SoH Estimation
- Remaining useful life prediction

Key Challenges Faced

As the number of wires and connectors between cell monitors increases, there are two major challenges. Firstly, the layout changes such as split packs increase wire length, cost, and weight. The second is that there is an increase in failures such as wire breaks and poor connector contact.

The Coulomb counting is the easiest approach to estimate the state of charge (SOC) of a battery, However, the Coulomb counting method suffers from the following sources of errors:

Initial SOC error: It is based on integration current, so any errors in the initial SOC assumption will remain as a bias.

Current measurement error: Current sensors are corrupted by measurement noise, but simple, inexpensive current sensors are likely to be noisier and possibly biased.

Current integration error: The Coulomb counting method employs a simple, rectangular approximation for current integration. Such an approximation results in errors. As the load changes rapidly, the errors increase with the sampling interval.

Uncertainty in the knowledge of battery capacity: The Coulomb counting method assumes perfect knowledge of the battery capacity, which is known to vary with temperature, usage patterns, and age of the battery (Time).

Timing oscillator error. The timing oscillator provides the clock for SOC update, that is, the measure of time comes from the timing oscillator. Any error or drift in the timing oscillator will influence the measured Coulombs.

Another challenge faced is the Real-Time State of Health Estimation. Present BMS technology is inadequate to accurately predict the state of health (SOH) of a battery. There are only a handful of choices. Either to prematurely replace the battery or to wait until an explicit failure event occurs. Both choices have undesirable consequences: premature replacement will result in increased cost to the user and unsustainable and excessive waste to the environment, whereas waiting out will negatively impact the safety and quality of experience to the user.

Solutions in BMS

Open circuit voltage modeling demonstrates how careful modeling and optimization can result in parameters that are applicable to a wide range of temperatures. The need for careful modeling is demonstrated using scaling, a crucial strategy that, when ignored, results in up to 90% higher SOC errors.

Battery Impedance Estimation is another criterion required for effective battery management.

Battery Capacity Estimation is another solution that uses accurate knowledge of battery capacity, which is crucial for all aspects of a battery management system. Adaptive strategies for universal battery management uses newer versions of batteries that come in slightly different chemical compositions.

Lastly, Optimal charging strategies refer to battery chargers that have two competing objectives; one seeks to charge fast and the other attempts to minimize capacity fade and temperature rise due to charging.

Conclusion

Electric Vehicles have become a foundation to the new mobility paradigm world over. Established players and new entrants are investing to bring latest products to the market. India along with developed economies are also at the forefront of this resolution.

The market for Battery Management Systems (BMS) is expected to grow as demand for electric vehicles rises. In the future, electric vehicle batteries will be simplified, making them easier to charge and use. The news of EV's catching fire doesn't go well with a common user who thinks of buying an EV. The relevance of BMS is here which safeguards not only a battery, but the entire vehicle and protects occupants from a thermal fire. It also allows users lot of convenience features backed by cloud to provide real time information about a battery in the best possible manner. This is done while ensuring safety and security which are of the highest priority from a user's perspective. Even though there are still some unresolved challenges in BMS, the advantages that it provides to an EV system and users are far more. BMS is gradually and steadily improving, this will save energy and accelerate performance. ❑

AUTHOR

ANUSH G NAIR
Technology Manager, Electrification Practice
Tata Elxsi

Anush G. Nair has more than 20 years of industrial experience. He holds B.Tech in Electrical Engineering and M.Tech in Computer Science. At present, he is working as a Technology Manager in the Electrification Practice Group at Tata Elxsi. Present areas of interest are Electric Vehicle Architecture, Traction, Energy Storage Systems, and Digital Twin and their applications in Electrification.

EVs TO PUSH TELEMATICS ADOPTION

ABHIK MUKHERJEE
Counterpoint Technology Market Research

Telematics is presently one of the most promising technologies rapidly modernising India's mobility sector. Telematics services are enabling customers to access a variety of features as per their requirements. In particular, commercial vehicle operators are using these services to improve productivity. The basic function of a telematics device is to connect a vehicle to the internet so that a variety of information is shared wirelessly, like the vehicle's location, trips, health and access to SOS services. Before 2021, the penetration of telematics devices was not high in the Indian market despite a few policy initiatives. But now India's automotive sector is steadily moving in this direction. With the rise of electric vehicles (EVs), we expect a further increase in the demand for telematics.

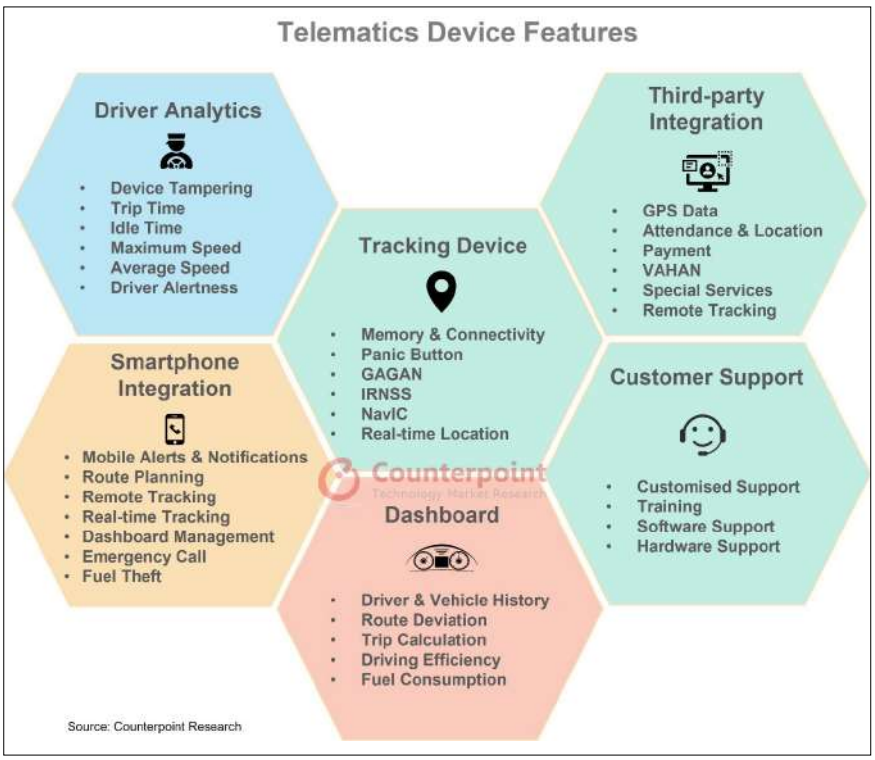
Among the different types of telematics devices, black box and OBD-II are used most commonly. Based on their features and specifications, telematic devices in India can be divided into three categories:

Basic devices: These devices support basic functionalities like real-time vehicle tracking, geo-fencing, and geo-tagging. They can also support either GPRS or LTE and may or may not be equipped with a panic/SOS button.

Compliance devices: Compliance devices are certified by the Automotive Research Association of India (ARAI) or the International Centre for Automotive Technology (ICAT) to ensure compliance with government specifications under the AIS-140 regulation. In addition to the basic features, compliance devices must have an eSIM and a panic/SOS button. Moreover, compliance devices must transmit data to at least two different IP addresses for proper monitoring and real-time vehicle tracking. The device must function through India's GAGAN (GPS Aided GEO Augmented Navigation) satellite-based system. Currently, there are more than 125 approved vendors across the country which provide AIS-140 telematics devices. Commercial vehicles are the major drivers of India's compliance device market.

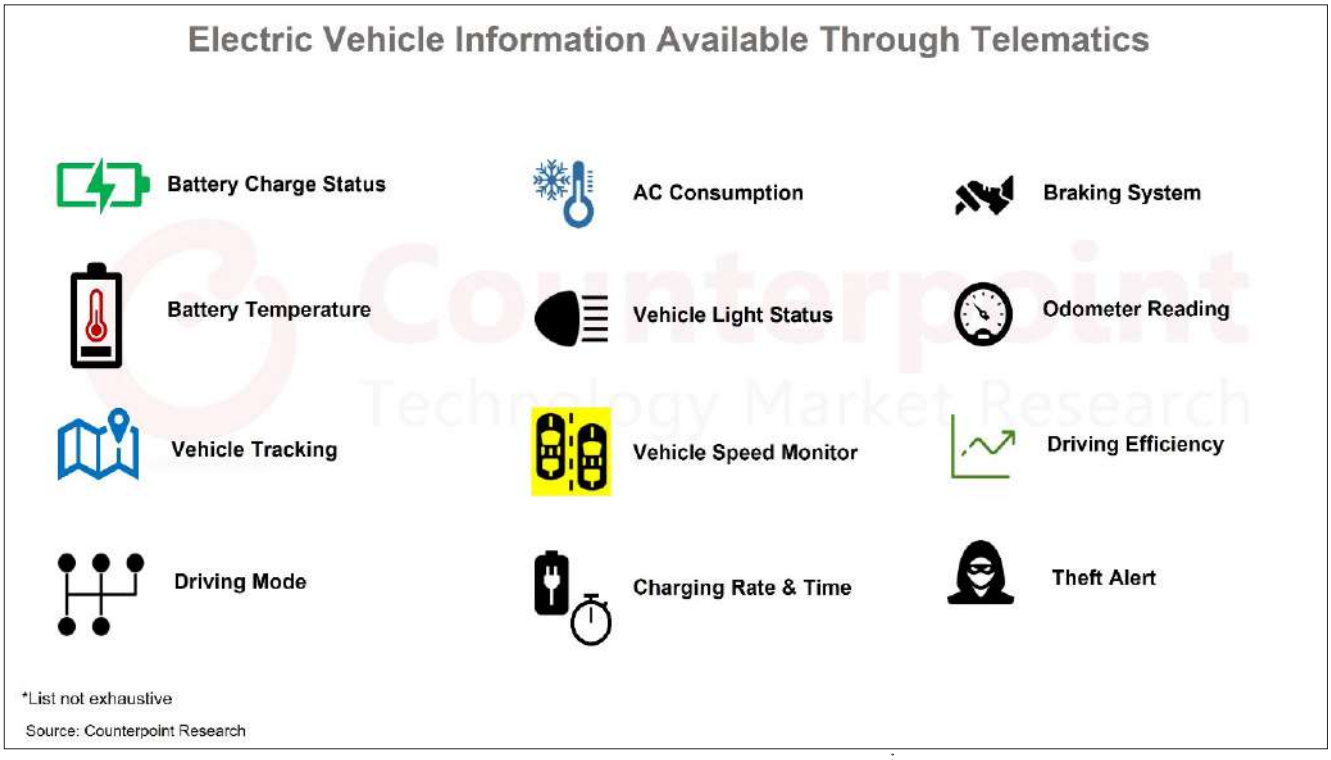
Advanced devices: Advanced telematics devices are generally equipped with a strong 4G connectivity module that can support an advanced driver-assistance system (ADAS) along with Wi-Fi hotspots. Moreover, software integration can access most of the vehicle diagnostic data such as speed alerts, fuel monitoring, route planning, and driver alertness. These devices come with larger in-built storage to store vehicle data when connectivity is not available. Advanced telematics can also provide driving recommendations, driver monitoring systems, dashboard cameras for incident recording and overall vehicle analytics for better vehicle maintenance. However, advanced devices form a very niche base in the Indian market.

The rise in demand for telematics has brought forward a wide range of applications like fleet management, usage-based insurance, driving recommendations and vehicle-to-grid data transmission.



Uses of telematics in EVs

The steady increase in the share of EVs in total vehicle sales ensures that electric is the future. By the end of 2030, the EV share in global vehicle sales is expected to cross 53%. But with this increase in EV numbers, the demand for their service and maintenance will also increase. Unlike an internal combustion engine (ICE) vehicle,



EVs have fewer moving parts, thus ensuring lower maintenance costs. However, EVs are complex electronic machines, and a lot of systems need to work simultaneously for an EV to function properly. For instance, it is important to ensure the proper flow of electricity to the motors, proper functioning of regenerative braking to store the kinetic energy, proper temperature of the battery, adequate battery charge and proper functioning of the charging port. Besides, in-cabin electronics like lights, infotainment systems, display on driver dashboards, and HVAC systems must be optimized. The usage of telematics in EVs is not limited to real-time tracking, geo-fencing or geo-tagging. It can also provide necessary information on vehicle health along with map rerouting, booking of slots in charging and swapping stations, and remote access to the vehicle, including theft alerts.

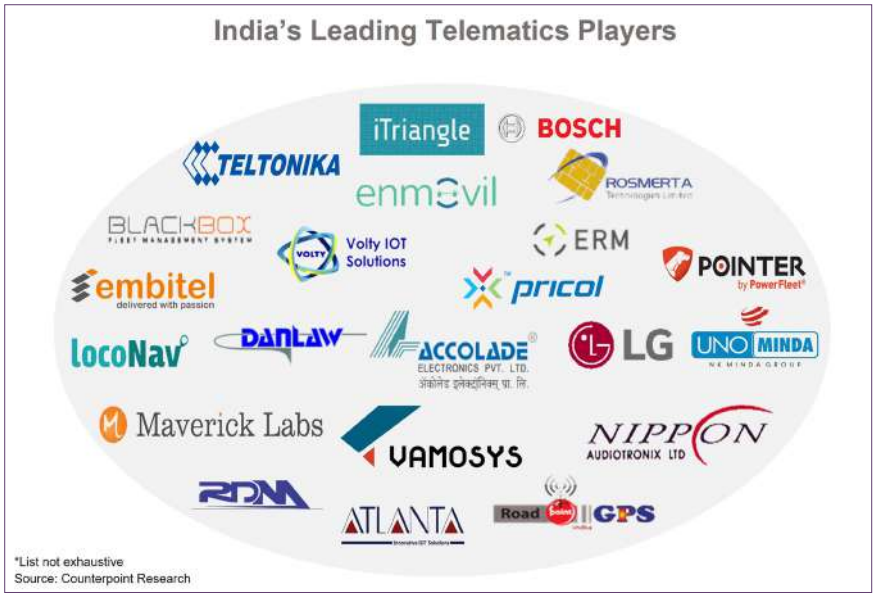
Sometimes electronic systems fail to operate properly, which can be fixed with simple software updates. Telematics also provides firmware and software updates over the air (FOTA/SOTA), through which software bugs can be fixed easily. Also, when connected to the internet, EVs are prone to cyber threats, which can sometimes lead to fatal consequences. To safeguard the passengers, telematics is used to deploy anti-virus systems. The information transmitted by the EVs through telematics gets processed and analyzed in real-time, which can help in refining designs and tailoring them for India's roads and environment.

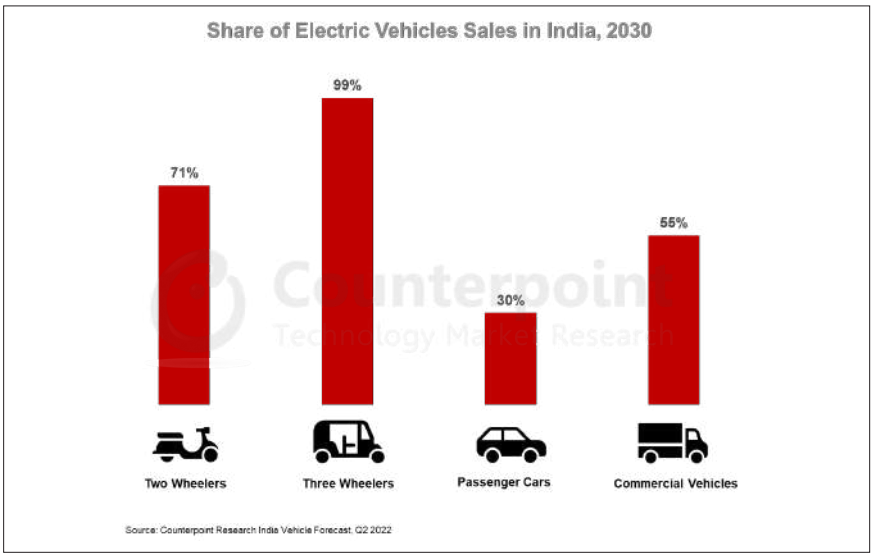
Present Indian scenario

India is at a very nascent stage in both EV and telematics adoption. By the end of 2021, EV penetration was a mere 2% of total vehicle sales and, in turn, telematics devices designed for EVs were lesser. Of the total vehicles sold in 2021, only 5.1% came with embedded telematics and total telematics penetration including aftermarket and retrofit was just little above 2%. So, before we can discuss telematics in EVs, we must find out why the penetration of telematics is so low in India. The following are some of the key reasons:

Less local sourcing: India is strongly lagging in connectivity module and semiconductor production. Most of the important components required for telematics are imported, resulting in high costs.

Lack of vertical integration: Due to





this lack of local sourcing of important components, vertical integration is almost absent. Manufacturers have to rely on different suppliers, which results in the varied cost of components.

Fragmented market: India's telematics market is quite fragmented. Many players have limited capacity and are present only in a few regions. There are a few telematics hotspot markets where the competition is comparatively more than the rest of the country.

Lack of proper government policy and technology implementation: Back in 2017, the government put out a mandate that all commercial vehicles including school buses must be fitted with telematics under the AIS-140 regulation. There are a few strict specifications that are required to be present in an AIS-140-certified device. However, even after almost five years, AIS-140 penetration remains low in the country. This can be attributed to the presence of bureaucratic red tape and favoritism. The failure to set up proper backend servers required under the AIS-140 regulation is another major reason.

Network black spots: Many remote and rural areas in the country are still deprived of proper mobile internet connectivity along with many network black spots. To cater to such scenarios, telematics devices should be equipped with large data storage where the vehicle data can be collected and transmitted later as and when internet service resumes. However, with bigger storage, the device cost also increases.

Technological barriers: The usage of physical SIM cards makes service provider portability difficult. To counter this, companies can provide an eSIM, which also happens to be a mandatory requirement for the AIS-140 certification. As India is at a nascent stage of eSIM adoption, it will be difficult and costly for domestic manufacturers to provide eSIM options across their product portfolios.

Market outlook

It is necessary to take full advantage of EV telematics. As EV sales in India are slowly gaining traction, the demand for telematics will rise significantly in the coming years. Counterpoint Research predicts that almost 71% of two-wheeler sales, nearly 99% of three-wheeler sales, almost 30% of passenger car sales and more than 54% of commercial vehicle sales, including bus sales, will be electric by the end of 2030. Among two-wheelers, most of the high-speed (>25km/hr) vehicles with a fixed battery will come with embedded telematics. Similarly, all electric three-wheelers for cargo and last-mile delivery will have embedded telematics. Telematics for commercial vehicles will specially have a wider application for fleet management and asset tracking.

We might not need to wait till 2030 to witness a boom in India's telematics market. The Ministry of Roadways' decision to remove toll tax plazas to clear roads will likely boost the demand for both embedded and retrofitted telematics devices. According to the ministry, the government will deduct toll taxes directly from vehicle owners' bank accounts based on the vehicle's GPS location. If implemented properly, this decision can give a big boost to telematics sales. Total telematics penetration in India is expected to cross 15% by end of 2030.

Heading toward the future

In the automotive sector, the ultimate aim of developing newer and better technologies is to achieve autonomy. Some nations have approved the deployment of Level 3 (L3+) and higher autonomy. Moreover, self-driving cars are also being used in ride-hailing services in some places. However, India is still a long way from proper in-vehicle connectivity, electrification and autonomy. There is an urgent need for the country to develop indigenous technologies in this field. Most of the leaders in the automotive sector, including in components, are from other countries.

India is currently at a stage where it can rise to become one of the world's most important business hubs. Given the present global geopolitics and the Indian government's urge to make the country self-reliant through policies and schemes like the Performance Linked Incentive (PLI) and Make in India, India is set to become one of the most desired destinations to set up manufacturing plants. With the entrance of foreign technology, the Indian automotive sector is expected to grow in leaps and bounds. ❑

AUTHOR

ABHIK MUKHERJEE
Research Analyst (Automotive Ecosystem and IoT)
Counterpoint Technology Market Research

Abhik is a Research Analyst at Counterpoint Technology Market Research based out of Kolkata. He is Part of Counterpoint's Automotive and IoT team. He is also interested in tracking emerging technologies. His core area of research is Electric vehicles and ecosystems. Before joining Counterpoint, he worked as an Academic Associate and holds an M.Phil. degree in Economics from Visva-Bharati Central University.

Next Generation Connectivity: Road Transportation Set for a Quantum Leap

V RAMANATHAN
ZF Group

Within the next decade, every vehicle on roads in India and across the world that are involved in moving goods or people will be fully connected and will operate in an autonomously organised transportation ecosystem, That's the strategic view of vehicle technology leader ZF, which has long pioneered advanced connectivity and digital innovations at the vanguard of 'Mobilizing Vehicle Intelligence.'

The digital transformation of the commercial vehicle industry is gathering pace with data-driven and software solutions helping achieve ever-higher levels of safety, efficiency and sustainability. Leveraging its pre-eminent position as the world's largest supplier to the commercial vehicle industry, ZF produces holistic systems which enable vehicles to see, think, and act. Helping shape Next Generation Mobility, ZF is helping propel the industry towards an increasingly Automated, Connected and Electrified (ACE) future.

These ACE technologies have the potential to revolutionize mobility, enhancing safety, and operating efficiency while reducing fuel and emissions as well as lowering the Total cost of Ownership (TCO). In line with global trends, India is fast gaining ground in developing smart mobility solutions for commercial vehicles powered by ACE technologies.

Through advanced Fleet Management Solutions and digitalisation, the future of connectivity and mobility automation will undoubtedly see road transportation take a quantum leap over the next decade. India is no exception. The adoption of advanced connectivity solutions is also gaining prominence across India's commercial fleets. Many Indian fleet owner-operators already benefit from the real-time rich vehicle and driver data available through telematics technology.

Greater commercial vehicle industry sustainability continues to be achieved through the ongoing reduction in carbon emissions. India has taken several initiatives in support of this goal, including the increased adoption of electric vehicles. India's government launched the Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme which has boosted the country's adoption of electric vehicles. The Indian electric commercial vehicle market share reached 57% in 2020 and is poised to grow further as a result of the significant economic and environmental benefits they offer to OEM customers and fleets.

These benefits are also fuelling the drive towards ACE technology adoption across India's commercial vehicle industry alongside improved safety, operational efficiency, enhanced driver comfort, lower fuel use and operating costs as well as smart fleet management. Digitalization is also paving the way for new opportunities to further enhance efficiency and shape the future of mobility. This includes:

Advanced Drive Assistance Systems (ADAS)

In India, aapproximately 30%* (according to MoRTH , Govt of India) of road accidents involve commercial vehicles. Addressing this serious issue, the Indian commercial vehicle market is witnessing a paradigmatic shift with fleets increasingly focused on improving vehicle safety. This has led to the increased development and adoption of Advanced Driver Assistance Systems (ADAS) to support drivers and help avoid accidents.

By connecting ADAS with advanced digital solutions, new avenues are being opened to enhance safety and efficiency. Connected vehicles are capable of joining with multiple devices over wireless networks to assist drivers with a wide range of support functions as well as providing driving, vehicle and environment information.

ZF develops highly automated driver assistance systems as well as smart, connected solutions. Digitalization represents a powerful enabler for shaping future mobility in India and world-wide. As a global technology 'one-stop powerhouse', ZF has unparalleled experience in ADAS hardware and software technologies, OEM-specific validation, and being fully compliant with Indian and international regulations. This unrivalled experience and range of competencies, creates an efficient process which is changing the way ADAS systems are brought to market.

ZF's extensive suite of intelligent ADAS solutions include Electronic Stability Control, Lane Keeping Assist, Blind Spot and Forward Collision Warnings, Collision Mitigation systems, Adaptive Cruise Control as well as AEB for vehicles and to help protect pedestrians and cyclists. ADAS also enables higher levels of autonomous driving including platooning, and yard automation to help fleet owners maximize safety, lower their TCO and providing enhanced comfort and support for drivers at all levels of experience.

Vehicle Motion Control

Vehicle Motion Control includes technologies that influence the longitudinal, lateral and vertical dynamics of a vehicle. Mechanical and mechatronic components such as steering, brakes, dampers and electronic control units, are complemented with advance software developed in-house by ZF. This helps achieve optimal driving strategies and seamless interaction of the vehicle's control actuators.

As an essential enabler for automated and autonomous driving, cutting-edge software is embedded within the ECU, advanced sensors, smart control systems and intelligence

actuators as a plug-and-play solution, enabling both longitudinal and lateral vehicle control.

ZF is a global leader in the development of highly complex and proven brake technologies for commercial vehicles. As a systems solutions supplier, ZF has leveraged its braking systems expertise to develop fully integrated solutions. For example, ZF implements automatic emergency braking and avoidance assistance through the interaction of brakes, sensors and electronic control units. These can help avoid or mitigate collisions with other vehicles and pedestrian.

As braking systems are the foundations of vehicle safety, increasingly automated and autonomous vehicle technologies are being integrated with truck braking systems. ZF's comprehensive portfolio of commercial vehicle braking systems, suspension solutions, transmission, steering, axles and drivetrains, combined with its advanced connectivity capabilities offers many advantages for customers. This includes helping maximize fleet safety as well as cost and operational efficiency which represents a strong potential winning edge for commercial vehicles in India.

Autonomous Driving

Autonomous driving is widely viewed as a game-changing innovation for commercial vehicles as it is increasingly becoming for passenger cars. Autonomous driving for commercial vehicles has gained significant traction in recent years, particularly with the significant rise in e-commerce deliveries. Given the enormous potential for automated commercial vehicles, autonomous trucks could even become more commonplace than driverless cars in the years ahead.

The financial benefits of automation, largely derived from enhanced efficiency, driver assistance and productivity, are particularly significant for commercial vehicles. While the path towards full vehicle autonomy is being mapped at a pace never before seen, there are many more miles to go before the final destination is reached. Key truck and trailer functionalities have already been automated prepare the way for further evolution towards fully autonomous commercial vehicles. In controlled environments across the world such as shipping ports, mines and large industrial sites, commercial vehicles such as trucks, tippers or loaders are already greatly benefiting from autonomous technologies and yard automation solutions. Similarly, the advances in ADAS are continuing to help make mobility ever-safer.

The greatest potential for autonomous commercial vehicles is arguably within cities, where immediate action is being demanded to address environmental and sustainability challenges. Nevertheless, increasingly autonomous vehicles operating from controlled sites to the highways with truck platooning technology and highway pilot functions, for example, are also making headway.

ZF has developed highly sophisticated telematics solutions that collect and analyses data to enable better informed fleet management fleets decisions to be made in real time, from routing to refuelling. ZF is providing the foundations for autonomous driving through its comprehensive portfolio of in-house developed sensors, cameras and LiDAR.

Integrated Vehicle Safety

Integrated vehicle safety combines active and passive safety technologies and goes hand-in-hand with the development of increasingly automated and autonomous driving. Advances in safety technology, including increasingly powerful electronic control units, and sensors, form the basis for increasing levels of semi and fully automated driving functions. Integrated safety enhances comfort, convenience and driver support with easy-to-use assistance systems and functions such as vehicle occupant health monitoring. These technologies can help assist in critical driving situations, safeguarding occupants.

As a leading developer and manufacturer of proven active and passive safety technologies, ZF is focused on helping reduce the potential for human error which is the root cause of approximately 90% of road accidents, according to [source]. With the advent of active safety technology like ADAS, drivers are supported in emergency braking or evasive maneuvers to help prevent accidents. ZF also provides collision avoidance systems as well as automatic emergency steering and braking among many other active safety technology solutions.

Passive safety technology also plays a crucial role in mitigating the impact of accidents for vehicle occupants and other road users. ZF's passive safety product portfolio includes a range of innovative technology solutions such as active seatbelts which ensures seatbelts are free of tangles and remain at the correct tension, particularly during emergency maneuvers.

e-Mobility

ZF is also at the vanguard of the commercial vehicle industry's electric transformation to support a more sustainable future. eMobility is gaining significant traction with approximately 24% of demand in global markets expected to be for all-electric commercial vehicles, according to a study by [source]. This demand is expected to grow further to 28% in 2031 and to 53% by 2035.

There is already considerable momentum in the electrification of delivery vehicles, buses and other key urban vehicle segments worldwide. Several leading manufacturers are also working towards introducing battery-electric or fuel-cell/battery models over the next couple of years.

Fully committed to eMobility, ZF's extensive electrified product portfolio addresses the industry's need for clean and efficient technologies. Supporting both conventional fuel and all-electric vehicles, ZF has developed an unrivalled range of electric solutions including drivelines, air management, steering and braking technologies, paving the way towards an increasingly electrified future. Demand to reduce carbon emissions, energy consumption and deliver ever-lighter commercial vehicle components and systems is already helping drive the growing adoption of eMobility solutions.

Through the Paris Climate Agreement, India has committed to reduce carbon emissions by 30 to 35% by 2030, creating

AUTHOR

V RAMANATHAN
Head - OE Business, Commercial Vehicle Solutions Division
ZF Group

a further boost to the adoption of electric vehicles. Similarly, the Government of India's roll-out of its FAME scheme is accelerating the take up of electric vehicles in major cities.

In India, last-mile delivery accounts for about 53% of total delivery costs [source] which makes it the most expensive part of the shipping process. These cost challenges can be significantly addressed by electrification which is a key reason why it is gaining ground in India, with e-commerce businesses firmly focused on electrifying last mile deliveries.

Shaping the Future of Next Generation Mobility

Globally, mobility leaders are increasingly focusing their efforts on developing ACE technology solutions. Regulators are also introducing mandates to ensure the latest technologies meet the highest safety standards. Highly automated Level 4 commercial vehicles could well start to be seen on our roads within the next three years.

In India, the government is bringing out policy-level changes to drive the adoption of ADAS, e-mobility systems and intelligent solutions for commercial vehicles. ACE technologies are gaining ground in India to address the challenges surrounding safety and road traffic accidents. The increased take-up of digital connectivity and fleet management solutions in India will also help take safety and efficiency to the next level.

The mobility landscape in India is currently undergoing a radical shift. Supporting this trend, ZF is providing the capability to shape the future of commercial transportation systems to meet specific Indian market needs in line with leading global standards. The technologies and services for commercial vehicles and fleets across India are increasingly making them more efficient, safe, connected, intelligent and automated.

During this transition period, old and new technologies will continue to coexist with ZF driving the needs of the future of mobility with innovations for both conventional and electric vehicles. This is particularly important for India as its commercial vehicle industry transforms at varying speeds towards an increasingly Autonomous, Connected and Electric (ACE) future. Hand-in-hand with the many benefits these advanced technology domains promise, India is well-positioned to enjoy a quantum leap as its commercial vehicle industry embraces the transformation.❑

THE ROAD TO 5G: THE INEVITABLE GROWTH OF INFRASTRUCTURE COST

RAJESH KAUSHAL
Delta Electronics India

With a gross revenue of ₹1,50,173 crores, India recently witnessed the official launch of 5G services by the Honorable Prime Minister at the India Mobile Congress 2022. The fifth-generation mobile connectivity is designed to deliver higher multi-Gbps peak data speeds, ultra-low latency, enhanced reliability, massive data capacity, vast network bandwidth, higher performance, and a more uniform user experience across the country.

5G is a unified interface that utilises advanced technologies like IoT, M2M, AI, Edge Computing, Robotics, etc., to support all spectrum types (licensed, unlicensed, shared), bands (low, mid, high), deployment models (macro-cells, hotspots), and multi-device connectivity. The 100x amplification of network efficiency and traffic capacity is expected to generate a cumulative economic impact of $ 1 trillion by 2035.

5G will be a transformational force for Indian society. It will facilitate innovations and development across various sectors. For instance, the concept of an "online university' will leverage the high-speed 5G network to bring education to millions of disconnected learners, particularly in rural areas. The technology will boost the automobile industry with improved vehicle-to-everything (V2X) communication, real-time information on traffic and congestion, and enhanced visibility to avoid safety incidents.

According to a Hans India report, 5G will revolutionise India's agriculture sector with precision farming, optimum cost realizations, utilisation of crop and livestock resources, intelligent management, and an affordable price for the end users. However, the meaningful rollout of 5G services in the country will require at least Rs. 1.5–2.5 lakh crores of Capex in the next two to three years.

Types of Investments in India's 5G spectrum

India's 5G services hold promising

investment opportunities to reach an estimated market size of INR 19,053.19 billion by 2025. Based on an EY survey report, more than 70% of Indian enterprises are expected to make the highest investment in 5G compared to other emerging technologies in the next three years. By 2025, the Indian telecom giants will invest around $19.5 billion in developing the country's advanced infrastructure, while the government will ensure last-mile accessibility to 4G and 5G connectivity in remote villages with a $30 billion expenditure.

5G investment in the country can broadly be classified into active and passive components. The active component comprises the Original Equipment Manufacturers (OEMs) and application developers who aim to invest in upgrading the current networks at the brownfield sites and establishing new infrastructure at the greenfield sites to deliver robust connectivity.

Conversely, passive investments involve expenses on conversion equipment, energy management solutions, energy backup systems, remote monitoring solutions, renewable resource utilisation, and smart cooling technologies. Leading power and energy management companies are providing advanced electronic components, telecom power solutions, industrial automation, and high ratting UPS and data center infrastructure to support the booming 5G framework of the country.

Passive components primarily aim to fund the 5G infrastructure either organically or through indirect investments. In the auction for rolling out the 5G ecosystem, the government fetched the highest-ever amount of Rs. 1.5 trillion from operators. Now, operators will further rely on telecom tower companies, and system integrators (SIs) for putting up 5G infrastructure. As a result, several layers of the industry will witness potential expansion with organic investments in infrastructure, FTTH, and inorganic investments through corporate initiatives.

Organic Investments

At IMC 2022, the Department of Telecommunications (DoT) urged early-stage startups and local stakeholders to invest in India's 5G technology stack. Accordingly, companies will invest in the organic growth of infrastructure and network proliferation to roll out the ecosystem.

Investments in Data Centre Infrastructure

Based on an ICRA report, the Indian data centre market is expected to witness a five-fold growth with an investment of Rs. 1.05-1.20 lakh crores in the next five years. Especially, Edge Data Centres are experiencing a boom in tier-2 and tier-3 towns to provide a better user experience and help adopt digital services. As the name suggests, edge data centres are responsible for the real-time processing of end-user data at the edge of the network and delivering cloud computing resources and cached content.

The expansion of data centres demands an adequate supply of power solutions and backup systems. Most data centres obtain their power supply from municipal electric grids. They then convert the power from AC to DC through transformers and distribute it to multiple endpoints such as Uninterrupted Power Supply (UPS) systems. The data centre industry consumes overall electricity of over 90 billion kilowatt-hours annually to keep the IT infrastructure rolling. Such a massive power supply requires alternative energy sources like solar photovoltaic panels and efficient backup systems to combat outages.

Leading power solution providers cater power infrastructure to data centres and colo companies with integrated energy-saving power components like UPS and distribution units. Their robust power devices, racks and accessories, precision cooling technologies, and environmental management systems offer a modular design, scalable architecture, and optimum space utilisation. Moreover, some power solution providers support green data centres and save more than 25% of energy at reduced operating costs.

According to an Arizton report, the Indian data centre market is projected to reach $10.09 billion by 2027, growing at a CAGR of 15.07%. The 5G ecosystem requires a critical network infrastructure for ultra-scalability and a low-cost, high-quality Internet that deploys IoT devices to gather real-time insights. Such configuration attracts investments from hyper-scalers like Amazon, Google, and Microsoft to draw on their processing power and deliver state-of-the-art customer services.

A hyper-scale data centre typically exceeds 5,000 servers and 10,000 square feet, delivering 40 GigaBytes per second or faster network connections. It offers a perfect power usage efficiency (PUE) of 1.1 from a performance point of view. This way, hyper-scale data centres emphasise stripped-down hardware, maximum disaggregation of components, modularity, automation, and other scalable principles.

Investments in Network Densification

5G involves more phases and varied capabilities than any preceding wide-area wireless technologies. This necessitates a balanced brand-new standalone network core and a non-standalone (NSA) network overlay on an existing 4G LTE network. The interoperability of both networks will be critical for the next four years to provide excellent service and a positive user experience.

The existing 4G LTE network core facilitates the quick rollout of NSA 5G to offer increased network speed. It supports enhanced Mobile Broadband (eMBB) solutions and allows the deployment of pilot projects to initiate innovative use cases. However, standalone 5G networks deliver massive machine-to-machine communication, real-time device-to-device networking solutions, ultra-reliable services, and low-latency functionality for autonomous devices and next-gen IoT.

Thus, telecom providers will eventually move to standalone 5G to include complementary components like edge infrastructure, dynamic spectrum sharing, and network slicing functionality. They will add more cell sites in greenfield regions and hybridise the existing brownfield sites to increase the available capacity.

Network densification will increase traffic per square meter and reduce base-station-to-terminal distances, corresponding to an improvement in achievable data rates. Small cell deployment will follow a simplified Right of Way (RoW) application procedure. The

government will permit service providers to use street infrastructure to deploy the network at a nominal cost of INR 150 per year in rural areas and INR 300 in urban areas.

Installation of telecom infrastructure, including towers, poles, and optical fibers, will be accelerated. A GlobalData report highlights that the Indian government projects to install optical fibre connectivity across 6,00,000 villages under its "Digital India Mission' program by 2023. This will facilitate the growth of the total fibre optic access lines to 10.19 million, covering more than 5 million kilometres by 2025.

Investments in Fibre to the Home (FTTH)

Telcos are estimated to spend around $1.5-2.5 billion on optical fibre cables (OFCs) in the next three to four years to power 5G services and meet the demand for fibre-to-the-home (FTTH) fixed broadband.

With increased data consumption for video viewing on YouTube and OTT platforms, online shopping, and remote working, residential FTTH fixed broadband connections have grown to 57.3% as of 2021. It is estimated that approximately 10M FTTH distribution fibres are required to provide high bandwidth infrastructure across metro cities, enterprises, hospitals, transportation, and educational institutions, taking into account 27 crore households and 8 million MSMEs. Thus, corporate Internet service providers like Bharti Airtel, TataSky, Reliance Jio, and government telecom organisations like BSNL are committed to boosting the Indian fibre broadband sector to 80 million by the end of 2030.

Government Initiatives

Under the National Optical Fibre Network (NOFN), Bharat Broadband Network Limited has expanded OFC connectivity in all state capitals, districts, HQs, and block levels. Moreover, the organisation plans to connect 2,50,000 Gram Panchayats by utilising existing fibres from BSNL, Railtel, and Power Grid and adding fibres wherever necessary. The project estimates a cost of about Rs. 20,000 crores to provide non-discriminatory access to telecom service providers (TSPs), ISPs, and content providers across rural areas.

Furthermore, the government is funding projects of BSNL and ITI to develop indigenous technology for the 4G, 5G, and E-band spectrum. Accordingly, BSNL will deploy a 4G network with a Rs. 1,64,000 crore investment across 100,000 sites. After the completion of the project, the existing core networks will be upgraded to offer 5G services through non-standalone gateways.

Meanwhile, the 'Atmanirbhar Bharat' mission invested around Rs. 2426.39 crores to enable better Internet and data services in the left-wing extremism (LWE) areas. BSNL has been chosen to operate the prestigious project and deploy 4G equipment for the rural population and security personnel. Aligning with the country's defence telecom infrastructure, the Indian Army is looking to set up a 5G network along the borders to improve mission-critical communications and achieve a high-speed data network for operational requirements.

Inorganic Investments

5G spectrum auctions in India allocated 51,236 MHz to four major telecom tycoons. With an Rs. 88,078 crore bid, Reliance Jio won more than half of the airwaves, followed by Bharti Airtel (Rs. 43,084 crores), Vodafone Idea Ltd. (Rs. 18,799 crores), and Adani Group (Rs. 212 crores). However, mid-or low-band spectrum coverage of 5G networks pan-India requires about Rs. 1.3-2.3 lakh crores of Capex on the key components.

Over the next four years, Reliance Industries Ltd. (RIL) will invest Rs. 75,000 crores in setting up four New Energy Giga Factories across 5,000 acres. These units will comprise an integrated solar photovoltaic modular factory, an energy storage battery factory, an electrolyser factory for producing green hydrogen, and a fuel cell factory for converting hydrogen into motive power.

Supporting the 'Make in India' initiative, the telecom giant announced the development of an indigenous 5G technology to connect telecom, e-commerce, retail, and enterprise solutions in India and abroad. The company has collaborated with Google and raised $4.5 billion in investment to deploy affordable 4G and 5G smartphones in the country.

Furthermore, Vodafone Idea Ltd. is expected to overcome its financial pressure and begin its 5G rollout journey soon. On the other hand, Adani Enterprises acquired 400MHz of the spectrum to integrate its digital infrastructure portfolio, including data centres, terrestrial fibre and submarine cables, industrial cloud, AI Innovation Labs, cybersecurity, and SuperApps.

Final Thoughts

India's 5G ecosystem is projected to account for 40% of mobile subscriptions by 2027 and generate incremental revenue of US$17 billion from enterprises by 2030. It will facilitate the launch of new services like home broadband (5G FWA), enhanced video, multiplayer mobile gaming, and AR/VR services. Greenfield networking will allow industry participants to invest in new technology stacks such as passive optical networks, fibre optic switching, and 5G Radio (5G NR) technology. Existing and new greenfield sites will undergo hybridisation to provide stability and cut costs. In a nutshell, the life-changing 5G technology will potentially attract massive investments from telco giants to support innovations and enhance business efficiency.❑

AUTHOR

RAJESH KAUSHAL
LOB Head - India & SAARC Communication & Information Solutions Business Unit | ICTBG
Delta Electronics India

He is responsible for leading the profitable growth of the Communication & Information Solutions (CIS) Business Unit for Delta Electronics India that consists of Telecom Power Solutions, UPS & Data Center Solutions, Networking Systems and Power Quality Solutions. He is a Solution Sales Strategist, with over 26 years of work experience. He is self-motivated professional with proven managerial experience and an outstanding track record in driving business expansion.

Charging stations for electric vehicles

TELEMATICS IN EV FLEETS: A NEW FRONTIER IN AUTOTECH

SIDDHARTHA BAL
iMerit

Touted for their easy availability, petrol and diesel became viable options to refuel vehicles over the past couple of decades. However, with the realization of the extent of damage to the environment by emissions, it seems that the end of the era for petrol/diesel engines has arrived. What has emerged, as a sustainable option today, is electric vehicles (EVs) which further promote the green revolution by minimizing carbon emissions.

As organizations and society at large are emphasizing on zero carbon emissions and taking efforts towards it, we are also seeing increased efforts by the Government of India. With an aim to make India an electric vehicle nation and to further position the country as a leader in the EV industry globally, the Indian government recently launched a number of initiatives like - FAME- I & II (Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles), PLI SCHEME, and Battery Swapping Policy, Special Electric Mobility Zone, Tax Reduction on EVs. All such initiatives have helped the EV's in gaining prominence.

It is apparent that EVs come with a bunch of benefits. The use of electricity makes these vehicles a cheaper option as compared to vehicles that run on fossil fuels. EVs significantly lower the overall emission of harmful gasses, which reduces the risk of environmental damage and risk to public health. Since combustion engines run on fossil fuels they incur more cost of maintenance, unlike EVs. Factors like these will support phenomenal growth for the automotive industry in the coming years.

A survey by MarketsandMarkets claimed that the electric vehicle market is projected to grow at a CAGR of 21.7 percent by the end of this decade. Over time, in order to spur green revolution as

part of their corporate social responsibility and to further save costs incurred on fuel as well as wear and tear of combustion engines, businesses are increasingly promoting and implementing the use of EVs in commercial deliveries.

How greener pastures turn into a rocky road without Telematics

Although the charm of EVs is taking the commercial fleet sector by storm, there are some considerable challenges that might impact the journey of these vehicles. Some of the major challenges include temperature issues, range anxiety, load management on vehicles, and improper road infrastructure.

Using telematics in EV fleets can be key here for managers to address such challenges efficiently. Telematics in application combines GPS and data generated by On-Board Diagnostics to form meaningful information that can be used by fleet managers to track vehicles; predict aspects like fuel, speed, idling, tire and vehicle condition, battery consumption, route status and identify nearby charging stations. Fleet managers access the data generated through telematics through IoT and Clouds.

Telematics has become essential for better deployment of EV Fleets. The global fleet telematics market accounted for USD 7.45 billion in the year 2020 and is estimated to be USD 44.68 billion at a CAGR of 19.8 percent by the end of the year 2030. Although sometimes the price factor may be a deterrent for organizations to incorporate telematics, there might be repercussions. Here is how avoiding the use of telematics might wreck your EVs:

Temperature Issues: Temperature plays a formidable role in the output of electric vehicles. While driving in cold weather, the performance of EV fleets might deteriorate as a result of slow chemical reactions taking place within the batteries. This results in increased energy consumption from batteries in order to reach the location on time. On the contrary, extremely hot weather conditions can result in batteries catching fire. In such cases, it becomes difficult for fleet managers to assess the ideal temperature for the efficient performance of the EV fleets.

Telematics can improve the battery life of electric vehicles

Range Anxiety: Range anxiety refers to the fear of battery drainage and lack of charging infrastructure while the driver is completing deliveries. Adoption and awareness of EVs are still in the infant stage in India. Unlike petrol/diesel vehicles, there are not many refueling stations for EVs. Additionally, it becomes difficult for both fleet managers and drivers to locate charging stations and calculate whether the fleet will be able to reach the charging station before the battery runs out.

Load Management: It is true that EVs have higher mobility that can exceptionally increase the productivity of your business compared to vehicles that run on fossil fuels. However, the mobility of EVs greatly depends on the load. Many times, fleet managers fail to analyze the ideal load capacity of the fleets which severely impacts the battery life of EV fleets.

Improper Road Infrastructure: Improper road infrastructure can severely impact the condition of EVs. While planning routes for delivery, fleet managers do not have access to the current status of roads, which increases the rate of wear and tear of the vehicle. This further increases the risk to the driver's life, which every organization would want to avoid

It might seem easier to resolve and overcome each of these challenges in an individual capacity, however, these challenges are interconnected to each other. And Telematics has the power to deploy capabilities that can not only resolve these problems but also empower EVs for a better tomorrow.

Telematics: A guard rail for EV Fleets

Shifting from a petrol/diesel model to an electric model in fleet management is itself a progressive start to support the net zero emissions initiative. Here is how the incorporation of telematics further unlocks a variety of benefits for your organization:

Transparent Tracking: Telematics gives operators the advantage of tracking electric vehicles through GPS. The tracking is done via protocols like Wi-Fi, LTE, CDMA and 5G which can be viewed on digital maps. Telematics can help in the real-time tracking of vehicles without relying on drivers for updates. This ensures transparency and enables fleet managers to focus on other critical areas to fulfill the delivery on time.

Lowers Maintenance Costs: With telematics, fleet managers get access to all necessary information about the health of vehicles such as pressure on tires, battery life, engine conditions, braking, and acceleration system. With access to this information, actions can be taken in time which increases the life of assets and helps in avoiding unnecessary maintenance costs.

Better Navigation: Telematics can considerably improve the estimated time of arrival by planning the safest and shortest route. Since route planning is done in real-

AI-powered telematics to improve passenger experience

time by assessing aspects like road and traffic conditions, there is a lesser chance of disruptions while completing deliveries. Telematics can further save time by giving alerts on traffic conditions so that drivers can plan an alternate route to deliver on due time.

Charging Methods: Batteries in EVs are at a higher risk of damage, especially due to improper charging. Telematics can increase the battery life by giving regular instructions on how battery conditions can be improved. These applications go the extra mile to timely inform fleet managers about EV vehicle service.

Driving Behavior: By analyzing data gathered through On-Board Diagnostic systems, fleet managers can immediately anticipate improper driving. This reduces the risk of accidents and damage to goods being carried and helps in taking necessary actions against negligent drivers on time.

With this, it is evident why telematics has grown in importance for EV Fleets. Telematics play a key role at every level of the delivery cycle by analyzing the real-time data of electric vehicles as well as data gathered from past deliveries.

AI as a savior in telematics

According to a report by Statista, telematics generates an average of 25 gigabytes of data per hour which is equivalent to nearly 30 hours of HD playback video. With piles of data being generated through telematics, it becomes difficult for IT teams to analyze it and convert it into meaningful information. Additionally, many companies plan to use telematics applications but due to the unavailability of estimated manpower and skills, they often underutilize the data. This is where artificial intelligence (AI) can help. By training AI models to examine data, managers can automate data analytics in fleet management.

Over the last couple of years, the role of artificial intelligence has increased. Today, companies across sectors are implementing artificial intelligence models to ease operations. These models can significantly help in reducing costs and risk of negligence and improve return on investment. With AI-powered telematics applications, companies can access the right data at the right time. AI models further help companies in translating unstructured and unorganized data into actionable insights. This gives them the ability to not only spot irregularities in the mechanics of electric vehicles, but also allow them to operate at maximum potential.

eBikeGo, an electric mobility company, recently announced the launch of its telematics system, 'EBG-matics.' The system uses AI/ML models to analyze the behavior of drivers and vehicles to increase vehicle efficiency. The company uses data generated from telematics in providing better loans and insurance on vehicles according to their condition. The company further informed that it will soon use EBG-matics as a standard on all of its vehicles to predict the health of vehicles.

After examining the potential of the electric mobility ecosystem, the central government announced subsidies for the manufacturing of EV engines, which will only increase the momentum of EV vehicles in India. Although telematics in EV fleets is still in its nascent stage in the Indian economy, we will soon witness industry-altering technological innovations that will lead to the emergence of India as a global leader in the autotech industry . ❑

AUTHOR

SIDDHARTHA BAL
Director of Autonomous Mobility
iMerit

Siddhartha Bal is the Director of Autonomous Mobility at iMerit. His team has annotated over 100 million images for computer vision projects and is considered expert in developing unique solutions for solving some of the most complex use cases in the industry. He works with clients to create an end-to-end solution, ensuring projects run with operational efficiency and produce the high-quality data required.

COP 27 - MUST FOCUS ON IMPLEMENTABLE CLIMATE ACTION

CHRISTIE FERNANDEZ
Climate action entrepreneur, focused on clean transportation & energy.

COP27 marks the 30th anniversary of the adoption of the United Nations Framework Convention on Climate Change.

From COP26 to COP27, we have witnessed the catastrophic impact of climate change almost everywhere in our habitat - Planet Earth.

According to 'Yale Climate Connections', "At least 29 billion-dollar weather disasters have rocked the planet so far in 2022, said insurance broker Aon in its quarterly disaster report issued October 18. Heat waves in Europe killed more than 16,000 people and nearly 1,700 died as a result of flooding in Pakistan.

The disasters included 14 severe weather events (damages done by thunderstorms, hail, and/or tornadoes), six floods, five droughts, three tropical cyclones, and one European windstorm. Comparing the total damages so far in 2022 to past years is difficult, the broker cautioned, because the

Billion-Dollar Weather Disasters, Jan.-Sep. 2022

Rank	Disaster	Location	Dates	Damage	Deaths
1	Hurricane Ian	U.S. (FL, SC, NC), Cuba	Sep. 27-Oct. 1	>$20 billion	137
2	Drought	Europe (W, S, Central)	Yearlong	$20 billion	N/A
3	Flooding	China	Jun. 1-Sep. 30	$12 billion	239
4	Drought	China	Yearlong	$8.4 billion	N/A
5	Flooding	Eastern Australia	Feb. 23- Mar. 31	$7.5 billion	22
6	Flooding	Pakistan	Monsoon season	$5.6 billion	1693
7	Windstorm Eunice	Europe, Western & Central	Feb. 18-19	$4.3 billion	17
8	Drought	U.S.	Yearlong	$4.0 billion	N/A
8	Drought	Brazil	Yearlong	$4.0 billion	N/A
10	Hurricane Fiona	Caribbean, Canada	Sep. 18-25	$3.1 billion	31
11	Flooding	South Africa	Apr. 8-15	$3.0 billion	455
12	Severe Weather	U.S. Plains, Midwest	May 11-12	$2.6 billion	5
13	Severe Weather	Europe, Western & Central	Jun. 19-24	$2.3 billion	3
14	Severe Weather	U.S. Plains, Midwest	Apr. 10-14	$2.2 billion	1
15	Severe Weather	U.S. South, Midwest, NE	Jun. 11-17	$2.0 billion	3
15	Drought	Somalia, Ethiopia, Kenya	Yearlong	$2.0 billion	N/A
17	Flooding	India	Monsoon season	$1.8 billion	1883
17	Severe Weather	U.S. Plains, South, Midwest	May 19-22	$1.8 billion	2
17	Severe Weather	U.S. Plains, Midwest	May 9-10	$1.8 billion	0
20	Severe Weather	Europe, Western & Central	Jun. 2-6	$1.6 billion	0
21	Severe Weather	Canada	May 21	$1.4 billion	12
21	Severe Weather	U.S. Midwest, Mid-Atlantic	Jun. 4-8	$1.4 billion	0
23	Severe Weather	U.S. Plains, South	Mar. 29-Apr. 1	$1.2 billion	2
23	Severe Weather	U.S. Plains, South	Apr. 4-7	$1.2 billion	3
23	Severe Weather	Europe, Western & Central	Jun. 26-29	$1.2 billion	2
23	Typhoon Nanmadol	Japan	Sep. 18-21	$1.2 billion	4
23	Severe Weather	U.S. Mid-Atlantic, Midwest	Jul. 21-25	$1.2 billion	0
23	Flooding	U.S. (MO, KY)	Jul. 25-28	$1.2 billion	28
29	Severe Weather	U.S. Plains, Midwest	May 1-3	$1.1 billion	0

Background image: Flooding in New South Wales, Australia, February 2022. Image credit: NSW Police Force

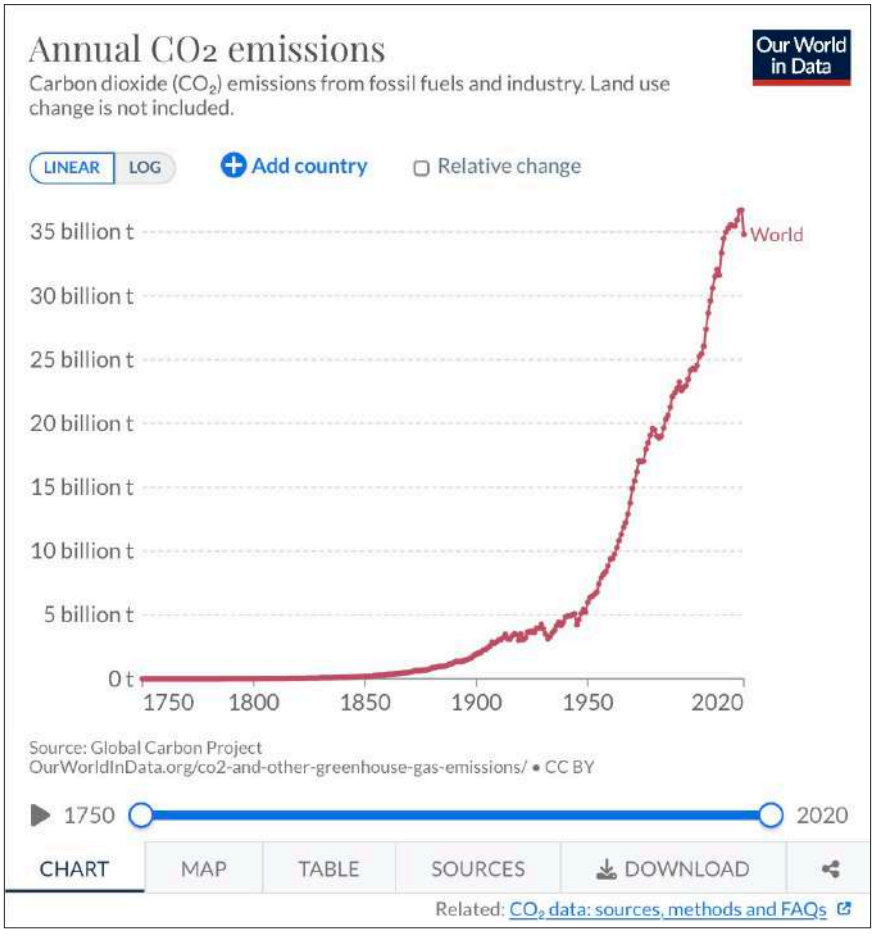
Figure 1. The 29 global weather-related disasters of January – September 2022, according to insurance broker Aon.
Source: https://yaleclimateconnections.org/2022/10/world-rocked-by-29-billion-dollar-weather-disasters-in-2022/

2022 losses are expected to be dominated by Hurricane Ian, and it will some months before those can be tallied."

Wildfires have wreaked havoc too in many countries, destroying homes, large tracks of forests & wildlife.

Over the years, we have been constantly warned about fossil fuel consumption & it's resultant CO2 emissions. However, we expanded our usage of fossil fuels from Coal, to Oil & Gas, and increased consumption year on year, ignoring all the warnings caused by fossil fuels to our environment, and even to our health.

Global CO2 emissions have been increasing rapidly, ever since the Industrial Revolution. From 22 billion tonnes of CO2 emissions in 1990, we now emit over 34 billion tonnes each year.



Source: https://ourworldindata.org/co2-emissions

COP 27 must have a well defined 2-pronged strategy to reduce CO2

Focus must be on quickly adopting 'today's viable technology', such as Renewable Energy (RE) + (EV) Electric Vehicles, instead of depending on 'future viable technologies' such as Hydrogen, synthetic fuels, carbon capture & storage etc.

COP27 CO2 Strategy 1: Reducing fossil fuel consumption & it's resultant CO2 emissions everyday.

COP27 CO2 Strategy 2: Reducing existing CO2 in the atmosphere.

COP27 CO2 Strategy 1: Reducing fossil fuel consumption & it's resultant CO2 emissions everyday using today's viable technologies.

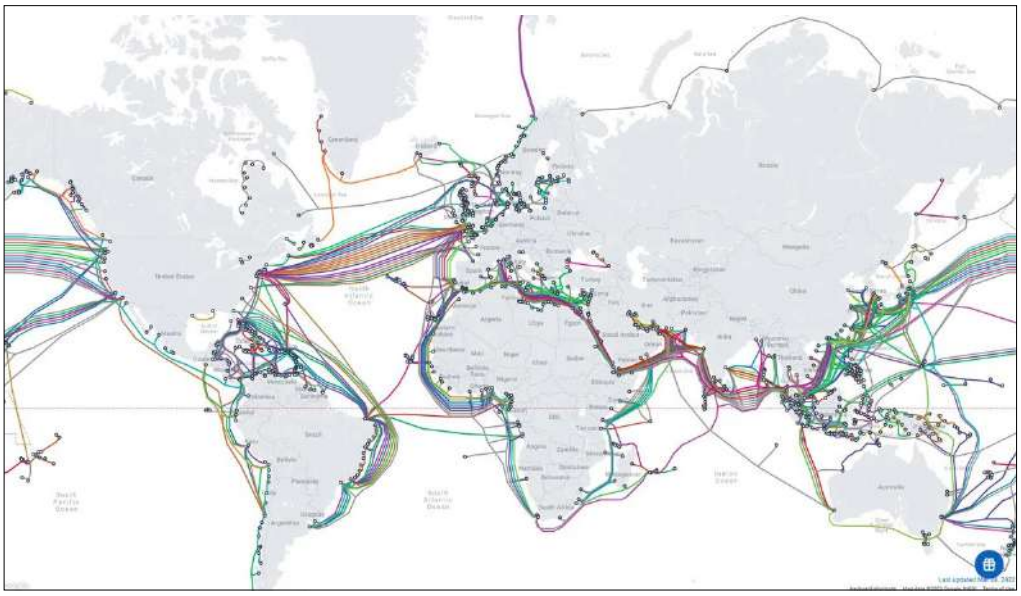
'Renewable Energy (RE) + (EV) Electric Vehicles ' will help to drastically reduce fossil fuel consumption, and it's resultant carbon emissions.

BNEF estimates EV's to displace 17.6 billion barrels of oil per day by 2040, resulting in CO2 emissions reducing by 2.57Gt a year from road transport.

Renewable Energy can also power rail transport, homes, businesses & industries, leading to more reductions in carbon emissions.

#cop27 #climateaction #renewableenergy #GREG

The sun never sets, solar is the cheapest energy to produce, and we have a lot of wastelands to setup solar plants. Other renewable energy sources such as wind & hydro can be connected to the GREG, including clean energy from existing nuclear



Build a 'Global Renewable Energy Grid (GREG)' on the lines of 'World Wide Web (www)'.

Source: https://gcaptain.com/subsea-solar-power-sun-cable-singapore/

energy plants. However, we must refrain from building new nuclear plants, because nuclear waste needs to be managed over 300 years, a liability for future generations.

With a 'GREG', Renewable Energy can continuously flow (bidirectional) from daytime zones to night-time zones. National grids and regional grids can be connected to the 'GREG'.

Plans are already on for undersea cables to transmit renewable energy from Africa to Europe, and from Australia to Singapore.

The 'Global Renewable Energy Grid (GRID)', needs to get connected around the world : Australia - India - Arabia - Africa - America - Australia & from Africa to Europe etc. so as to be able to provide renewable energy to all countries globally to meet their decarbonisation commitments. GREG needs to be institutionalised, with proper funding, so as to promote and oversee the development of national / regional / global grids to transmit renewable energy 24/7/365 with public/private partnerships.

#cop27 #climateaction #electricvehicles

Electric vehicles (EV's) are cheaper to run and more eco-friendly than polluting fossil fuel powered vehicles emitting CO2. According to the International Energy Agency (IEA) we need about 2 billion EV's to be on the road by 2050 for the world to hit net zero. Government's must quicken the pace of adoption of EV's with more favourable policies, incentives and infrastructure. Switching all public transport fleets to electric vehicles, powered by renewable energy must become a priority. This can drastically reduce on a daily basis, fossil fuel consumption & it's resultant CO2 emissions.

Strategy 1B.

#cop27 #climateaction #greenhydrogen

'Green Hydrogen' isn't going to be commercially competitive in the near future as a fuel for road transport vehicles, because of high costs of storage, transport & distribution.

However, Hydrogen is essential as a component or catalyst to manufacture Ammonia, Steel, Glass, Electronics, Medical & Food processing etc., perhaps, the first step is to quickly replace all fossil fuel based hydrogen (black / brown / grey) used in manufacturing plants, with 'Green Hydrogen' produced from renewable energy.

Not sure whether hydrogen will ever become essential or commercially viable as a fuel in road transport (except for captive usage), however, it may become commercially viable (over time) as a fuel for air or sea transport. Fortunately, rail transport switched to electricity from coal & diesel, without too many issues.

'Green Hydrogen' to store renewable energy, instead of using batteries, may become a necessity or commercially viable in certain circumstances.

Strategy 1C.

#cop27 #climateaction #biodiversity

Focus must also be on rejuvenating the soil, in planting more trees and in reforestation, so as to adopt nature based solutions to absorb excess CO2 in the atmosphere, and enhance food production.

COP27 CO2 Strategy 2: Reducing existing CO2 in the atmosphere.

Climate tech is slowly becoming a favourite of investors, focused on 'future viable technologies' such as 'Carbon Capture, Usage & Storage (CCUS)'. All these new technologies will take considerable time to mature & become viable, but our habitat 'Planet Earth', will require all our efforts now to keep it habitable for us and our future generations.

COP27 must allocate budgets on top-priority for reducing fossil fuel consumption & it's resultant CO2 emissions everyday, by investing in building a Global Renewable Energy Grid (GREG). This will enable all countries globally to switch to clean energy 24/7/365, which can drastically reduce consumption of polluting fossil fuels & it's resultant CO2 emissions. Wishing COP27 all success… ❑

AUTHOR

CHRISTIE FERNANDEZ
Climate action entrepreneur, focused on clean transportation & energy.

Odisha transport authority signs MoU with BSNL on vehicle tracking app

The State Transport Authority (STA) in Odisha signed an MoU with Bharat Sanchar Nigam Limited (BSNL) for the development, management and operation of vehicle location tracking (VLT) application.

Under the Nirbhaya scheme for women's safety, the Central government has made vehicle location tracking system mandatory for public transport vehicles and goods vehicles to enhance the security of women and children while travelling in public transport.

Accordingly, the Odisha government has made installation of VLT devices with panic buttons mandatory for all new commercial vehicles to be registered on or after January 1, 2023 and the vehicles registered on or before December 31, 2022 will have to comply by March 31, 2023.

For this purpose, the BSNL, under its 'Vahan Suraksha' model, will develop, deploy, integrate and commission a vehicle location tracking software for tracking and monitoring of vehicles covered under the project. The organisation will also develop mobile applications for various stakeholders and users and commission Geographic Information System (GIS) map for vehicle location tracking systems.

State transport commissioner Arun Bothra said the objective of the project is to introduce a tracking system as required for the implementation of central notifications for continuous monitoring of public transport vehicles for the safety of passengers, better road safety and better support for enforcement services.

A command control centre is being set up in Bhubaneswar to track the vehicles plying across the state. The 24×7 integrated command centre will use both Global Positioning System (GPS)-based vehicle tracking and the GSM/GPRS channel for triggering emergency alerts.

The common emergency toll lines, motor vehicles wing, the police control room and related enforcement units will be looped into a real-time data sharing network with the command centre functioning as an interface for stakeholder agencies, said Dhananjaya Senapati, additional commissioner transport (technical).

He said the government of India has approved vendors to fit VLT devices and panic buttons. The state will publish the standard operating procedure (SOP) for empanelment of these vendors within a few days.

Except auto rickshaws and e-rickshaws, all passenger transport vehicles, including both government and private buses, school and college buses and cabs/taxis will be equipped with VLT panic buttons for the safety of women and children. All goods vehicles operating under the strength of national permit and all goods vehicles transporting explosive and hazardous materials will also have to install the VLT devices.

Mahindra partners with Charge+Zone to set up EV charging infrastructure

Mahindra & Mahindra has partnered with EV charging infrastructure company Charge+Zone to set up a network of charging stations for its electric SUVs. The Mahindra EV users will have access to Charge+Zone's network of over 2500 charging points across 25 cities and 10,000km of highways by the end of FY23.

Under the partnership, the two companies will explore the installation, commissioning, and maintenance of fast DC chargers at various locations, including owned and rented sites, offices or any other areas nominated by Mahindra, its affiliates and group companies. In addition to this, the partnership will also entail rolling out e-mobility solutions spanning discovery, availability, navigation and transactions, with the aim of empowering all EV users to seamlessly access the charging network.

Designed to charge e-4ws, the charging stations will be open to the public as well as to the users and partners of Mahindra. Charge+Zone's charging stations are rapid DC charging points with CCS2 charging protocol, providing 80-100% charge in 20-30 minutes and a full charge in an hour depending on the EV's battery size.

Toyota launches flex-fuel strong hybrid electric vehicles in India

Toyota has launched a pilot project flex fuel-strong hybrid electric vehicle (FFV-SHEV) in India. The new vehicle can run on 100 percent ethanol. An FFV-SHEV possesses a flex-fuel engine and an electric powertrain. This setup extends the dual advantages of higher ethanol use and greater fuel efficiency, as it can run in its EV mode for a good amount of time, while the engine stands shut off.

India's minister Nitin Gadkari launched Toyota's first-of-its-kind pilot project on a flex fuel-strong hybrid electric vehicle (FFV-SHEV). Ethanol – perhaps the most ubiquitous of the alternative biofuels, a locally produced substance, has made its way into people's gas tanks. It is environmentally friendly that aligns with stricter emission norms.

These are seen as alternative fuels which are a combination of regular gasoline and methanol/ethanol. Unlike CNG fuel systems which store petrol and CNG in separate tanks and are used separately by the engine, the flex-fuel combination is stored in the same tank of fuel and is used by the engine as a blended fuel.

Flex fuel engines are already popular in Brazil, the United States, European Union and China among many others. India is the fifth largest manufacturer of ethanol following the US, Brazil, the European Union and China.

In flex fuels, the ratio of ethanol to petrol can be adjusted but the most commonly used flex-fuel use 85 percent ethanol and 15 percent petrol. Unlike petrol, ethanol is not a byproduct of crude oil. Instead, it is a complex derivative of biomass left by agricultural feedstocks such as corn, sugarcane, hemp (bhang), potato, and rice among many other things.

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