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16

Multilayered Platform for Health Risk Reduction and Safety on Public Transport: A Case Study from Italy

Narciso Gaspardo

ATAP (Local Transportation Authority operating in the Italian Province and City of Pordenone)



20

Tampering versus non-tampering - how telemetry devices can solve for more efficient fleet management

Poorvak Kapoor

Euler Motors

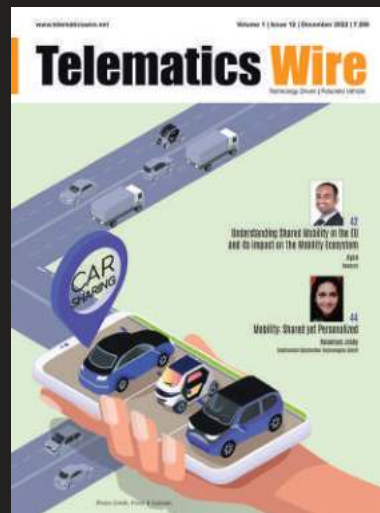


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CONTENTS

Volume 2 | Issue 03 | March 2023

News



- 04 Geotab G09 device to enable OTA in Cummins ECU
- 05 Researchers propose a fourth light on traffic signal for autonomous vehicles
- 06 FLO Ultra a new DC fast charger
- 07 Nissan Motor to use Trimble RTX for its ADAS
- 08 LG Innotek develops wireless battery management system



- 09 Zoox robotaxi to operate on public road in California
- 10 ECARX and SiEngine to collaborate with FAW on digital cockpit platform
- 12 Indie to acquire video processors for automotive cameras, GEO Semiconductor
- 13 Targa Telematics connects BMW and MINI to its data stream
- 14 In Conversation
Sagar Apte, Varroc Connect
- 16 Multilayered Platform for Health Risk Reduction and Safety on Public Transport: A Case Study from Italy
Narciso Gaspardo, ATAP (Local Transportation Authority operating in the Italian Province and City of Pordenone)



- 20 Tampering versus non-tampering - how telemetry devices can solve for more efficient fleet management
Poorvak Kapoor, Euler Motors
- 28 Road to Sustainable Mobility in India with Green Hydrogen
Chirag Moro, Ducker Management Consulting Pvt Ltd

- 32 Business-agnostic maps: Connecting the dots to unlock business value
Abhijit Sengupta, HERE Technologies
- 34 Artificial Intelligence & Machine Learning Applications for 5G and Beyond
Dr. Arunkumar M. Sampath, Tata Consultancy Services
- 39 Metaverse – Advent in the Automotive world!

Mohan Bachhav, Shashidhar Korikar Vittal & Sankalp Sinha, IBM Consulting India



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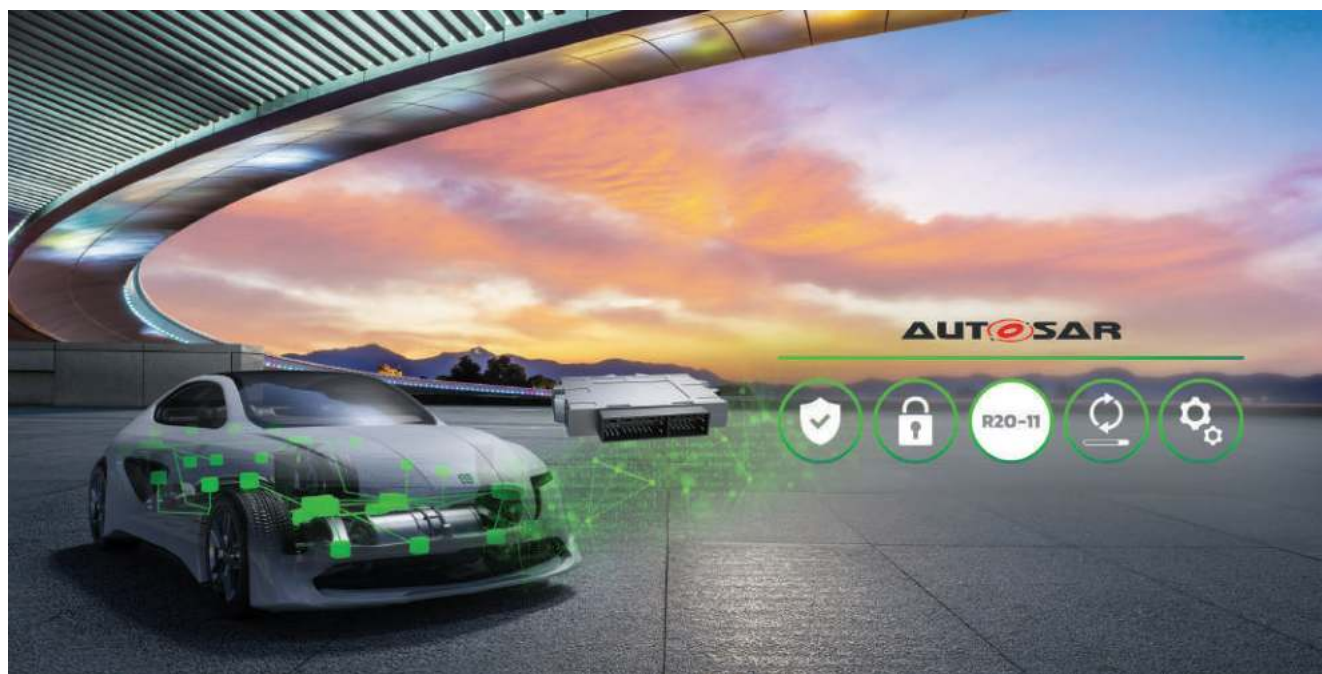
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New update for EB tresos 9 for ECU development now available

Elektrobit announced the new update of EB tresos 9. The update fully supports AUTOSAR R20-11 and integrates the onboard intrusion-detection capabilities in Argus CAN IDPS, developed by Argus Cyber Security.

EB tresos 9 specifically streamlines the development of software features that comply with the latest standards for security and safety including ISO/SAE 21434 for cybersecurity risk management and SAE J1979-2 for on-board emissions diagnostics, which will be mandatory for vehicles in the US as of 2027. It monitors traffic, detects threats and anomalies, and offers prevention mechanisms for common attack methods such as denial of service and brute force. EB tresos 9 also fulfills the firmware-over-the-air requirements defined by AUTOSAR for updating ECUs during normal vehicle operation.

Industry experts expect the share of production vehicles incorporating ECUs based on AUTOSAR basic software to reach 80% by 2027. EB tresos 9 will allow OEMs and Tier 1s standardizing on AUTOSAR to reduce development costs and overall development time.

EB tresos 9 is a significant part of Elektrobit's overall software and engineering services offerings, which uniquely provide a one-stop-shop for carmakers seeking to build their own automotive OS – the harmonized software platforms that will control all systems in next-generation vehicles. Elektrobit has been developing automotive basic software for over 30 years, resulting in the industry's most mature and reliable software line.

Elektrobit intends to make continued updates to the EB tresos line as further updates are made to the AUTOSAR standard. In addition, EB tresos 9 roadmap includes measures for higher degree of automation for reducing costs and enhancing development efficiencies of teams, and a new, state-of-the-art graphical user interface to make it easier and more intuitive to use.

Geotab G09 device to enable OTA in Cummins ECU

Geotab Inc. (Geotab) announced that its G09 device will enable Over-the-Air (OTA) connectivity for Cummins Engine Control Units (ECUs).

OTA software updates will be sent directly to Cummins ECUs through Geotab's G09 device, providing multiple benefits for fleet customers and OEMs:

- **Optimal Engine Efficiency and Performance:** OTA software updates provide access to the latest Cummins software allowing customers to ensure their vehicle's ECU is running at peak performance.
- **Less downtime waiting for updates:** Connected Software Updates can update engine software in less than five minutes. OTA software updates eliminate the need to perform calibration updates at service locations allowing users to update software when and where it is most convenient.
- **Safe and Secure:** OTA engine software updates utilize a two-step approval process ensuring safe and secure installation.



Researchers propose a fourth light on traffic signal for autonomous vehicles

At a traffic light, red means stop and green means go. But transportation engineers at North Carolina State University are now proposing a “white light,” which would enable autonomous vehicles to help control traffic flow – and let human drivers know what’s going on. In computational simulations, the new approach significantly improves travel time through intersections and reduces fuel consumption.

“This concept we’re proposing for traffic intersections, which we call a ‘white phase,’ taps into the computing power of autonomous vehicles (AVs) themselves,” says Ali Hajbabaie, corresponding author of the paper and an associate professor of civil, construction and environmental engineering at NC State. “The white phase concept also incorporates a new traffic signal, so that human drivers know what they are supposed to do. Red lights will still mean stop. Green lights will still mean go. And white lights will tell human drivers to simply follow the car in front of them.”

The white phase concept rests on the fact that it is possible for AVs to communicate wirelessly with both each other and the computer controlling the traffic signal. When enough AVs are approaching the intersection, this would activate the white light. The white light is a signal that AVs are coordinating their movement to facilitate traffic through the intersection more efficiently. Any non-automated vehicles – those being driven by a person – would simply be required to follow the vehicle in front of them: if the car in front of them stops, they stop; if the car in front of them goes through the intersection, they go through the intersection.

When too many vehicles approaching the intersection are being controlled by drivers, rather than AVs, the traffic light would revert to the conventional green-yellow-red signal pattern.

“Granting some of the traffic flow control to the AVs is a relatively new idea, called the mobile control paradigm,” Hajbabaie says. “It can be used to coordinate traffic in any scenario involving AVs. But we think it is important to incorporate the white light concept at intersections because it tells human drivers what’s going on, so that they know what they are supposed to do as they approach the intersection.

“And, just to be clear, the color of the ‘white light’ doesn’t matter. What’s important is that there be a signal that is clearly identifiable by drivers.”

The researchers first introduced a “white phase” traffic intersection concept in 2020. However, that initial concept relied on a centralized computing approach, with the computer controlling the traffic light being responsible for receiving input from all approaching AVs, making the necessary calculations, and then telling the AVs how they should proceed through the intersection.

“We’ve improved on that concept, and this paper outlines a white phase concept that relies on distributed computing – effectively using the computing resources of all the AVs to dictate traffic flow,” Hajbabaie says. “This is both more efficient, and less likely to fall prey to communication failures. For example, if there’s an interruption or time lag in communication with the traffic light, the distributed computing approach would still be able to handle traffic flow smoothly.”

To test the performance of the distributed computing white phase concept, the researchers made use of microscopic traffic simulators. These simulators are complex computational models designed to replicate real-world traffic, down to the behavior of individual vehicles. Using these simulators, the researchers were able to compare traffic behavior at intersections with and without the white phase, as well as how the number of AVs involved influences that behavior.

“The simulations tell us several things,” Hajbabaie says. “First, AVs improve traffic flow, regardless of the presence of the white phase. Second, if there are AVs present, the white phase further improves traffic flow. This also reduces fuel consumption, because there is less stop-and-go traffic. Third, the higher the percentage of traffic at a white phase intersection that is made up of AVs, the faster the traffic moves through the intersection and the better the fuel consumption numbers.”

When only 10-30% of the traffic at a white phase intersection was made up of AVs, the simulations found there were relatively small improvements in traffic flow. But as the percentage of AVs at white phase intersections increased, so did the benefits.

“That said, even if only 10% of the vehicles at a white phase intersection are autonomous, you still see fewer delays,” Hajbabaie says. “For example, when 10% of vehicles are autonomous, you see delays reduced by 3%. When 30% of vehicles are autonomous, delays are reduced by 10.7%.”

The researchers acknowledge that AVs are not ready to adopt the new distributed computing approach tomorrow, nor are governments going to install brand new traffic lights at every intersection in the immediate future.

“However, there are various elements of the white phase concept that could be adopted with only minor modifications to both intersections and existing AVs,” Hajbabaie says. “We also think there are opportunities to test drive this approach at specific locations.

“For example, ports see high volumes of commercial vehicle traffic, for which traffic flow is particularly important. Commercial vehicles seem to have higher rates of autonomous vehicle adoption, so there could be an opportunity to implement a pilot project in that setting that could benefit port traffic and commercial transportation.”

The paper, “White Phase Intersection Control Through Distributed Coordination: A Mobile Controller Paradigm in a Mixed Traffic Stream,” is published in IEEE Transactions on Intelligent Transportation Systems. First author of the paper is Ramin Niroumand, a Ph.D. student at NC State. The paper is co-authored by Leila Hajibabai, an assistant professor in NC State’s Edward P. Fitts Department of Industrial and Systems Engineering.

FLO Ultra a new DC fast charger

FLO, a North American electric vehicle (EV) charging network operator and a smart charging solutions provider, introduced FLO Ultra, an ultra-fast charger engineered to maximize energy delivery with future-proof performance and smart design that enables the ultimate EV charging experience.

“EV demand and sales are topping all industry expectations and are now forecasted to exceed more than 45% of U.S. light duty vehicle sales by 2030,” said Nathan Yang, FLO Chief Product Officer. “As new EV drivers hit the road, they will be looking for fast charging that is safe, accessible, convenient, intuitive and reliable. This is why we designed FLO Ultra – to provide the ultimate EV charging experience.”

Rapid EV charging in a smart, flexible package

With a simple but revolutionary design, the FLO Ultra charger features two high-powered charging ports in one rugged aluminum enclosure. It will charge most EVs to 80% in 15 minutes with up to 320 kW* available using dynamic power sharing and up to 500 kW* with multiple electric vehicle charging stations connected together.

These level 3 EV chargers can be configured in a variety of ways, allowing for flexible parking options for drivers and easier installation for site hosts.

“FLO Ultra’s flexible and modular design accommodates charging on one or on both sides and parallel or pull-in parking for charging,” said Yang.



EV charging infrastructure designed to meet all drivers’ needs

The FLO Ultra charging station was designed for driver convenience and is brilliantly simple to use for EV drivers looking to charge and return to the road.

“Before FLO Ultra, fast chargers were often viewed as intimidating and imposing,” said Yang. “We want all drivers to feel comfortable, safe and secure when charging and FLO Ultra’s design reflects this. This is a charger for all drivers.”

With its sleek construction, the FLO Ultra charger has a low-horizontal profile while its highly visible illuminated canopies make it easy to locate. State-of-charge indicators quickly let drivers know if the DC fast charging station is available for immediate use.

The new charger also features a patent-pending, motorized cable management system. This system keeps cables off the ground while the extended reach allows for charging regardless of vehicle port placement. Most importantly, the motorized system makes the cables feel lighter and easier to maneuver, reducing strain on users.

Additionally, the FLO Ultra charging station is equipped with an independent color touchscreen display for each charging port and supports flexible and secure payment options for quick and easy transactions.

Rugged durability, modular construction for industry-leading uptime

Like all of FLO’s charging products, the FLO Ultra charger is built to last. The enclosure is made of durable, recyclable aluminum designed to withstand extreme weather conditions. The EV fast charger is easily serviceable with large front and back doors and modular components for quick replacement. Finally, FLO Ultra is connected to the FLO network, which enable remote monitoring to assure swift diagnostic and proactive action to avoid potential issues.

All these features contribute to industry-leading uptime. Uptime measures the availability of EV charging stations to users and is the percentage of time that a charging station is operational. FLO has raised the bar with its optional FLO Performance Warranty, which guarantees a minimum of 98% uptime for all covered FLO chargers.

Built to last in North America

FLO Ultra chargers will be available starting in 2024 and will meet the National Electric Vehicle Infrastructure Program’s (NEVI) minimum standards, including Buy America requirements. NEVI will provide \$5 billion in formula funding to states to build out charging infrastructure along highway corridors – filling gaps in rural, disadvantaged, and hard-to-reach locations while instilling public confidence in electric car charging stations.



Nissan Motor to use Trimble RTX for its ADAS

Trimble announced that Nissan Motor Co. Ltd. will use Trimble RTX® technology in its driver assistance system. Trimble RTX which provides high-accuracy positioning, will enable hands-off and guided freeway driving capabilities of Nissan Ariya ProPILOT Assist 2.0 driver assistance system.

While positioning with standard Global Navigation Satellite System (GNSS) signals may drift up to 10 meters (25 feet), Trimble RTX provides higher accuracy and enables consistent lane determination for driving applications. This makes Trimble RTX a key component for many of the

latest driver assistance systems like the ProPILOT Assist 2.0. Increasingly being used on freeways, lane-level accuracy via advanced driver assistance systems (ADAS), where the driver is still the ultimate decision maker, is a key enabler in the journey to fully autonomous solutions.

The ProPILOT Assist 2.0 system enables hands-off driving while cruising in a single lane. When the vehicle approaches a road divide, or when passing a slower vehicle is possible, the system judges the appropriate timing of branching off or passing based on information from the navigation system and 360-degree sensing. Intuitive audio and visual guidance is given to the driver, who is then prompted to put both hands on the steering wheel and confirm the operations.

Trimble's positioning solution, underpinned by its integrity monitoring capabilities, enables consistent lane-level positioning in complex, real-world driving environments. As with any current steering system, the driver must remain alert and attentive at all times.

The Trimble RTX network is supported by a globally redundant and resilient infrastructure—backed by a team of ISO 20000 certified network engineers and IT specialists, monitoring operations around the clock to ensure optimal signal performance and reliability for drivers who will depend on it. Trimble's RTX positioning technology can provide decimeter-level accuracy in seconds, making it an ideal solution for autonomy applications, including automotive driving, when accuracy, speed of convergence and accessibility to a single global network matter.

Hyundai launches Bluelink+ with new IONIQ 6

Hyundai has launched its Bluelink+ connected car service program. It will be offered first in the new Hyundai IONIQ 6 and carried on to other future models later on.

Bluelink+ is launching with the new 2023 IONIQ 6 and on all future Bluelink-equipped Hyundai models starting with the 2024 model line-up. By standardizing access to top safety, maintenance, and remote technology features, Hyundai is offering a complimentary connectivity program for all new owners. All services included in the previous Bluelink Connected Care, Remote and Guidance subscription packages are now offered complimentary on a non-trial basis for new buyers with Bluelink+ (4G LTE network and technology dependent).

Hyundai is providing all these features to new car purchasers with no "trial period" or recurring subscription fees. Bluelink+ is a complimentary connected car program. With this program Hyundai is providing its customers more than \$350 in estimated annual savings.

"Bluelink+ is part of our commitment to being a technology leader," said Manish Mehrotra, vice president, digital business planning and connected operations, Hyundai Motor North America. "Other automakers follow a traditional subscription model and have monthly fees for most of these safety and convenience features. Hyundai is once again leading the industry by standardizing technologies that enhance the customer experience."

Bluelink+ Features

All Bluelink+ services are offered complimentary with the purchase of a new Hyundai vehicle, the first year of ownership for certified pre-owned, and the first three months for used car owners. Key safety and maintenance features, previously included in the Connected Care Package, are now part of Bluelink+ Basic, which will be available for subsequent owners to connect with no associated fees. That means essential key safety and maintenance features, such as, Auto Collision Assistance, SOS Assistance, Remote Diagnostics, Maintenance Reminders, and over-the-air ECU Updates, are available with no trial period, and for the life of the supporting technology and 4G LTE network.





LG Innatek develops wireless battery management system

LG Innatek has developed a Wireless Battery Management System (Wireless BMS) that improves battery performance. The wireless BMS that LG Innatek has developed is embedded with a Radio Frequency (RF) communication module that combines essential components for wireless communication, such as a RF communication chip and antenna, into one unit. The advantage of a wireless BMS is that reduces the weight of vehicles mounted with a BMS.

Once the cables connected to the BMS are removed, the vehicle weight is reduced by 66~198lb. Removing the dozens of cables and connectors required for a BMS reduces both the weight and volume of a battery pack.

This secures additional space of 10~15% for a battery pack, enabling increasing the capacity of a battery, and hence, the range of an EV. It has been confirmed that a wireless BMS increases the mileage of an electric vehicle by up to 12 miles. The additional space for a battery pack also improves the flexibility of battery design.

In addition, the possibility of a cable or connector failure due to vehicle vibration is completely removed. Furthermore, battery pack assembly previously done manually due to the complexity of cable connections can now be automated using a robot, achieving cost reduction.

LG Innatek had already developed an 800V wired BMS in 2020. Since the charging duration decreases as the voltage increases, domestic and overseas automobile makers tend to adopt 800V as their voltage system for electric vehicles.

To send and receive data for an electric vehicle battery wirelessly, a wireless BMS must be equipped with dozens of components such as an RF circuit, RF communication chip and antenna.

In the case of previously released wireless BMS, these components were attached one by one to a PCB. Because of this, the BMS production process required a lot of time and there was too much development burden in expanding the product lineup, LG Innatek said.

LG Innatek instead first applied to its wireless item an RF communication module that it had developed using its high-precision, high-density, multi-layer board technology. The RF communication module is composed of a four-layer board and dozens of wireless communication components that were densely integrated into this board. This structure helped the company to develop a wireless BMS on which the battery pack could be mounted much more easily.

The RF communication module mounted on the company's wireless BMS is designed to be compatible with all types of communication chips. This compatibility enables applying the company's Wireless BMS easily to all electric vehicles produced by its clients.

Google updates Maps app for EVs with new features

Google has added new functions to its Google Maps app in electric vehicle. Through these new features, Google is aiming to address typical EV user needs – such as finding the right charging station, and planning trips where charging may be necessary along the way.

In enhancing the first step of the charging experience, Maps will automatically recommend the best charging stop on any route that will require the EV to recharge. This estimation is based on a number of dynamic factors along the user's chosen route – including the current traffic situation ahead of them, the charge level of their EV when planning the route, and their EV's expected energy consumption. In determining the optimal charging stop that will also achieve the shortest route time, Google includes the expected driving and charging time, while accounting for the charging speeds available at the station. If the user wishes to change the station chosen by the app, they can quickly do so through the app's UI.

A new filter will allow users to more easily find charging stations that offer fast, ultra-fast, and rapid charging. More specifically, the new filter will help users locate chargers that offer a maximum charging capacity between 150 kW and 350 kW DC. Google estimates that, when using these chargers, their enhanced capacity will provide enough power for the user to visit, recharge, and resume their journey in less than 40 minutes.

Supporting both of these new functions is a refined search results menu. For the EV version, the app's search results have been updated to account for the availability of charging stations at nearby locations. When the user searches for a destination, the app will now show a new icon indicating whether or not that destination (or those nearby it) has EV chargers on the premises. In outlining the convenience this update adds to the user experience, Google used the example of planning a route to a nearby supermarket – where the user can more easily select a store that will allow them to charge their vehicle.

Google confirmed that these features will roll out gradually over the next few months for EVs offering Google built-in. Today, EVs from Polestar, Volvo, Renault – and select vehicles from GM's brand portfolio – already offer the built-in Maps app. Honda and Ford are likewise planning to equip their future EVs with the native navigation application.



Zoox robotaxi to operate on public roads in California



Zoox announced that it has completed a key milestone: deploying the purpose-built robotaxi on open public roads with passengers. On February 11, 2023, Zoox conducted the first run of its employee shuttle service in Foster City, California, without traditional driving controls carried passengers on open public roads.

Zoox completed rigorous testing on private roads and received approval from the California Department of Motor Vehicles (DMV) to operate its robotaxi on the state's public roads. To date, Zoox is the only purpose-built robotaxi permitted on California public roads that is self-certified to the Federal Motor Vehicle Safety Standards (FMVSS). Zoox's ground-up design, which does not include traditional driving controls such as a steering wheel or pedals, incorporated FMVSS performance requirements directly into its vehicle and added more than 100 safety innovations not available in today's passenger cars.

"Becoming the first company to operate a purpose-built robotaxi with passengers on open public roads in California is a significant milestone in not only Zoox's journey, but for the autonomous vehicle industry at large," said Aicha Evans, Chief Executive Officer at Zoox. "With the announcement of the maiden run of our autonomous employee shuttle, we are adding to the progress this industry has seen over the last year and bringing Zoox one step closer to a commercialized purpose-built robotaxi service for the general public."

Following the completion of its historic first run, Zoox will deploy its employee shuttle service in its headquarters of Foster City, California. The employee shuttle service will be offered exclusively to all Zoox full-time employees. The robotaxi is capable of transporting up to four people at a time on a public route between Zoox's two main office buildings, traveling up to 35 mph, and handling left-hand and right-hand turns, bi-directional turns, traffic lights, cyclists, pedestrians, vehicles, and other road agents on this route.

In compliance with the California DMV permit, Zoox will first provide its service to its employees. As the company continues to advance its progress and secure additional government clearances, it will expand its service to the general public.

Polestar and Luminar expand partnership to multiple vehicles

Polestar and Luminar announced plans to deepen their partnership by expanding the integration of Luminar's technology on the Polestar 5 – the electric 4-door GT expected to launch in 2024 based on the Polestar Precept concept car. This expanded partnership provides a foundation to further collaborate on lidar integration and design on Polestar's future vehicles.

Both the Polestar 3 and Polestar 5 will seamlessly integrate Luminar's long-range Iris lidar and software into the roofline.

Coinciding with the announcement, sales of Polestar 3 with lidar have been brought forward so that customers in initial markets can now place orders for Polestar 3 with lidar, with deliveries expected in 2024.



ECARX and SiEngine to collaborate with FAW on digital cockpit platform

ECARX, and SiEngine, an automotive semiconductor company and investee of ECARX, have established a collaboration with FAW, to work on the development of high-performance digital cockpits based on the SE1000 System-on-the-Chip (SoC) from SiEngine. The new digital cockpit is planned for mass production by the end of 2023 and will roll out to empower FAW vehicles.

Based on ECARX's high-performance digital cockpit computing platform, code named E04, which is embedded with the SE1000 7nm SoC from SiEngine, FAW and ECARX will collaborate to develop the next digital cockpit intended for use in future FAW models. Planned for mass production by the end of 2023, the platform is the first to combine ECARX's self-developed hardware computing module, global vehicle operating system, and software stack, with the SiEngine high-performance automotive-grade digital cockpit SE1000 SoC. It also supports Android Automotive and GAS-based Google services and experiences from its eco-system for the global market, collectively empowering automakers to deliver a market-leading smart cockpit solution.

The SE1000 SoC utilizes a 7nm AI processor combined with 8.8 billion transistors specifically designed for use in digital cockpits to meet the high performance, high reliability, and high security needs of automotive-grade hardware.

SE1000 adopts the industry-leading multi-core heterogeneous architecture design and high-performance computing cluster, with 8-core CPU, 14-core GPU, and independent NPU with 8 TOPS AI computing power, which can support the development of intelligent driving functions, providing a high computing power foundation for the digital cockpit computing platform. At the same time, its powerful audio and video processing capabilities can support up to seven high-definition screen outputs and 12 video signal inputs, and it is the first in the industry to be equipped with dual HiFi 5 DSP processors. SE1000 also has built-in independent function safety islands and information safety islands. Different processor clusters independently serve different functional domains and integrate system safety functions of ASIL-B level, greatly improving the real-time, safety and data privacy of the system.

The ECARX high-performance digital cockpit computing platform demonstrates ECARX's extensive technical know-how and integrated customer-service approach, combined with its mass production experience developed from the 3.7 million cars already on the road with ECARX technology onboard. By leveraging the synergy between ECARX's self-developed in-vehicle operating system and full-stack safety solution, the platform can give full play to the superior computing power of the SE1000 SoC. The platform is also the first in the digital cockpit field to adopt LPDDR5 high-speed memory modules, significantly increasing processing speed to bring excellent performance experience.

The collaboration between ECARX, FAW, and SiEngine is another important strategic milestone after ECARX listed on the Nasdaq on 21 December 2022. The platform marks the next step in ECARX's mission to deliver a world-class vertically integrated full-stack computing system designed to reshape the future of smart mobility. Combined with the SE1000 SoC, the computing platform will provide consumers with a safer and more personalized intelligent travel experience. It is expected that two FAW Hongqi models equipped with the digital cockpit computing platform will be mass produced by the second half of 2023.



Elektrobit provides software architecture for Sony Honda Mobility's AFEELA

Elektrobit has announced its role as a software and services provider for the Sony Honda Mobility (SHM)- AFEELA. The prototype, was unveiled at CES 2023. Partnership for software architecture between Elektrobit and SHM began in 2019. AFEELA brand vehicles are slated to enter commercial production in 2025.

Elektrobit developed the software architecture for the AFEELA prototype. It also developed the cockpit system including software for the Qualcomm high-performance computing (HPC) processors and the software stack up to the UX design powering all cockpit displays. In addition, Elektrobit provided integration services for the cockpit system encompassing all software and hardware components and applications from Sony and its partners.

The AFEELA represents a paradigm shift in how vehicles are designed, with software playing an increasingly important role, both for core vehicle operation and as a way for carmakers to innovate. Software takes center stage in the AFEELA prototype cockpit, allowing Sony to integrate its latest audio and camera sensor technologies as well as array of gaming, movie and music content. SHM also announced a partnership with Epic Games, opening up an array of experiential possibilities which can be brought to life within the cockpit system.

Gotion and InoBat to jointly develop giga factory for EV batteries

Battery manufacturers InoBat and Gotion High-Tech have agreed on a battery production cooperation. The two companies signed an MoU to examine the construction of a joint battery factory. This factory would have an annual production capacity of 40 GWh for battery cells and packs for use in electric vehicles. The partners would preferably build the battery factory in Central or Eastern Europe. Technical cooperation for LFP and NMC batteries is also under consideration.

Gotion and InoBat will look at ways to work together on several key common topics of interest, such as:

- co-development of a JV gigafactory with cell and pack production capacity of 40 GWh to support EV applications, with the CEE region being one of the regions under consideration
- technical cooperation based on both sides' respective advantages of LFP and NMC batteries
- co-develop the potential for ESS battery production at existing InoBat premises in Slovakia allowing fast access to the European market
- technology and commercial partnership in facility operations
- investigation of recycling concepts for production scrap and end of life batteries

Through the cooperation following the MoU, InoBat benefit from Gotion's expertise in electric storage solutions whilst Gotion will benefit from InoBat's existing manufacturing sites and expansive market connections in Europe to facilitate Gotion's internationalization. By working together in mutually beneficial areas, both companies aim to devise new and exciting technologies to accelerate the global charge towards a green energy future.

Otonomo to merge back into Urgently

Otonomo Technologies Ltd. and Urgently, Inc., a provider of digital roadside and mobility assistance technology and services, announced that they have entered into a definitive agreement to merge in an all-stock transaction. As a result of the transaction, Urgently expects that its shares of common stock will be listed under the ticker symbol "ULY".

Upon closing of the transaction, which has been approved by each company's board of directors, holders of Otonomo's ordinary shares will receive common stock of Urgently. Otonomo's shareholders and other equityholders will own, in the aggregate, approximately 33% of the combined company on a fully diluted basis, subject to the determination of the final exchange ratio pursuant to the terms set forth in the definitive agreement. The transaction is expected to close in the third quarter of 2023, subject to the approval of Otonomo's shareholders and the satisfaction of other customary closing conditions.

Merger Highlights:

- Urgently and Otonomo equityholders will own approximately 67% and 33%, respectively, of the combined company on a fully diluted basis, subject to the determination of the final exchange ratio pursuant to the terms set forth in the definitive agreement.
- Combines differentiated and synergistic technology portfolios encompassing advanced data processing and analytics, connected insurance, mobility assistance network management and service delivery
- Creates meaningful cross-selling revenue opportunities and cost savings
- Transaction expected to close in the third quarter of 2023
- Urgently's 2022 revenue estimated at more than \$185 million¹; a 25% increase over Urgently's 2021 revenue
- Urgently maintained an annual CSAT score of 4.5 or greater from 2020 through 2022
- Post-closing, Otonomo will be a wholly owned subsidiary of Urgently
- Urgently investors include BMW i Ventures, Porsche Ventures, Jaguar Land Rover's InMotion Ventures, American Tire Distributors, Iron Gate Capital and Emerald Technology Ventures.

Indie to acquire video processors for automotive cameras, GEO Semiconductor



Indie Semiconductor, announced that it has entered into a definitive agreement to purchase GEO Semiconductor, Inc. Acquisition of GEO, a private fabless semiconductor supplier, adds immediate scale to indie's Image Processing program and enables true sensor fusion of Radar, LiDAR, Ultrasonic and Computer Vision solutions in advanced driver-assistance systems (ADAS) applications. The transaction is expected to close in the first quarter of 2023, subject to customary closing conditions.

GEO's camera-based sensing and viewing capabilities are shipping today to some of the world's largest automotive OEMs including Honda, Hyundai, Kia, Nissan and Toyota. With design wins across more than 20 Tier 1s and 400 car models, GEO has programs with every major image sensor supplier in the world and is engaged in multiple EV and autonomous vehicle programs.

GEO's products comprise three generations of application specific camera video processors, including those focused on viewing, where video is projected on a display and viewed by the driver, and sensing, where video is processed using advanced computer vision and machine learning algorithms to assist the driver. The unique ability to support both of these key categories will allow indie to deliver solutions in applications ranging from simple backup cameras to full Autonomous Driving platforms.

Subject to the terms and conditions of the definitive agreement, indie will pay \$180 million in the aggregate to GEO equity and debt holders at closing, comprised of \$90 million in cash plus approximately 12 million indie Class A common shares, based on a 20-day VWAP. In addition, if certain performance targets are exceeded over an 18-month post-closing period, there is an opportunity for such holders to earn up to \$90 million more in equity, collared between \$8.50 and \$11.50 per INDI Class A common share. The transaction has been approved by the boards of directors of both indie and GEO. indie expects the acquisition to be accretive to 2023 non-GAAP earnings per share.

The securities to be issued in connection with the transaction have not been registered under the Securities Act of 1933 and may not be resold absent registration under or exemption from such Act. This press release shall not constitute an offer to sell or the solicitation of an offer to buy any securities.

NavInfo to supply BMW with navigation maps for China

NavInfo will be supplying high-definition maps and location-based services to BMW. The size of the deal will depend on the number of BMW vehicles in China which will be using NavInfo maps for navigation.

The agreement will increase NavInfo's market share and improve its profitability and other operational results, according to the company.

Founded in 2002, NavInfo was the first firm in China to receive a navigation electronic map license and has focused on developing its high-precision mapping business since 2015.

Ottometric gets \$4.9M seed funding for automated validation of ADAS

Ottometric, a startup in the validation of Advanced Driver Assistance Systems (ADAS), has secured a total of \$4.9 million in its seed funding round. The round was led by Rally Ventures, with participation from leading mobility funds including Goodyear Ventures, Proeza Ventures, Automotive Ventures, Trucks VC, Reinforced Ventures and Investor Collaborative.

Ottometric was founded in 2019 by a team of automotive industry veterans from companies like General Motors, Autoliv, NVIDIA, and Optimus Ride who have been instrumental in the evolution of ADAS over the past decade, and have a deep understanding of the artificial intelligence (AI) training and validation processes. Their unique expertise in automotive electronics, AI, computer vision, and big data analytics has enabled the company to develop a breakthrough cloud software platform that automates and streamlines the ADAS development and validation process. Ottometric's initial customers are market leaders in the ADAS industry and include two of the top ten largest Tier-1 automotive suppliers in the world.

Automotive OEMs and their suppliers spend \$ billions every year developing and testing ADAS systems to meet government regulations and improve driver safety and confidence. The development and validation process creates petabytes of data from a myriad of sensors that must be analyzed and validated before the start of vehicle production. Ottometric helps these companies save \$ millions in development and validation costs while significantly reducing time to market versus traditional, painstaking manual annotation and review. Using the Ottometric platform customers can more easily find and fix bugs in ADAS software, enabling shorter development cycles, significant reduction in overall ADAS program costs, and improved system reliability. OEMs and their suppliers can now accelerate the deployment of next-generation ADAS systems to enhance their competitive advantage as well as demonstrate compliance with current and future government regulations.

Targa Telematics connects BMW and MINI to its data stream

Targa Telematics, an Italian company that provides advanced telematics solutions and services for the management of vehicles, fleets, and mobility; has signed an agreement with BMW and Mini for using their vehicle data to provide meaningful insights.

Targa Telematics will capture data from BMW and MINI vehicles and analyse it on its platform. Using this data Targa will provide telematics solutions. The objective of Targa Telematics is to be able to provide fleet managers and drivers with more and more digital services, simplifying the provisioning process in vehicles.



Synop to access MyGeotab for EV charging and energy management for North American fleets

Geotab Inc. and Synop, announced a partnership that will give fleet operators in North America access to integrated EV charging and energy management within Geotab's software platform, MyGeotab.

Synop, the electric vehicle operations platform that maximizes fleet uptime and optimizes energy usage, will be using the Geotab's data insights to allow customers manage their EV assets in real-time on a single, unified platform.

With no additional hardware or installation required, fleet operators can easily identify current charge levels; anticipate when vehicles are expected to be fully charged; gauge necessary energy needed for upcoming trips; evaluate expenses associated with fueling up, and gain insights into the energy efficiency of each vehicle, all within their existing telematics platform.

Customers with further needs, such as vehicle-to-grid (V2G) support and energy time of use rates, will also have access to these controls within the integration.



SAGAR APTE
CEO
VARROC CONNECT

Can you mention in brief about Varroc Connect?

The world is experiencing interesting times with connected devices redefining how human beings interact with the ecosystem.

Varroc Connect is striving to help OEMs bring managed connectivity to their vehicles. This would mean a lot of solutions and advanced Products working together to bring a cohesive experience. These could be categorized into the following three broad buckets:

Convenience – Features such as remote lock/unlock, remote lights on/off, and remote starting the car and operating the AC

Vehicle health check – View car health dashboard and alerts about critical car parameters, including battery-related alerts

Safety and security – FOTA and COTA allow OEMs to remotely manage and update software in the vehicles. SOS SMS to an emergency contact in case of an accident and remote immobilization when the car is stolen are other critical use cases that will help promote safe driving.

How do you think the regulatory approval for telematics-based insurance will be beneficial for vehicle owners?

- IRDAI has permitted general insurance companies to introduce tech-enabled concepts, such as Pay as You Drive and floater policies for vehicles belonging to the same individual owner for two-wheelers and private cars, among others
- Now, as a step towards facilitating technology-enabled covers, IRDAI has permitted general insurance companies to introduce tech-enabled concepts for own damage (OD) cover in motor insurance policies

Telematics-based insurance and its adaptability in the Indian market

Sagar Apte, CEO, Varroc Connect shared his views with Telematics Wire on regulatory approval for telematics-based insurance and its adaptability in the Indian market.

- Many do not drive as frequently as before but still have to pay the same established annual premium based on the model of their vehicle
- Every individual has different driving and vehicle usage patterns, and with the new add-ons permit, own damage policy coverage can now be tailored based on a customer's driving behaviour patterns, general upkeep, mileage, and vehicle usage patterns to offer the best features they need
- The premium will be determined as per an individual's tailored coverage
- Therefore, opting for the Pay as You Drive or Pay How You Drive add-on in addition to the traditional policy will benefit those customers who have low vehicle usage, take care of their vehicles, follow traffic rules, and maintain good driving behaviour
- Customers will not have to pay standard premium going forward
- Telematics used at Varroc Connect has a robust API to integrate into the existing insurance platforms, which will help with efficient data exchange benefitting both insurance companies and consumers
- Alerts for rash car driving feature embedded in the application will further help the customers

Do you see a reduction in insurance premiums resulting in big volumes for insurance companies?

Safe drivers should definitely benefit from this. We have seen in other countries the larger adoption due to the flexibility and transparency that telematics brings to motor insurance.

What could be the biggest challenge for the insurance companies and regulatory agency in implementing this?

A new Product have to be calibrated for the final end users. Customers will definitely see benefits and working towards assuring them of the value in this program is going to be the key requirement. Insurance companies will have to work to educate the buyers of these products and that I think is going to be the key focus in the next few years.

Would you like to share your views about data security?

Data security is critical and India is working towards implementing

laws that will make these more stringent. Good companies will always welcome these changes. We at Varroc Connect have taken a special interest in developing Products that will protect the data rights of the users.

Where do you see the automotive insurance sector in the coming years with technologies like automotive telematics, ADAS, and autonomous vehicle bringing some disruption?

The market for connected cars is predicted to soar to over \$215 billion by 2027

- Connected cars are potentially safer for road users, and less harmful to the environment
- They open up new revenue streams for the car industry with features such as remote diagnostics, predictive maintenance and online service scheduling
- They also present the car industry with an opportunity to innovate and create stronger relationships with its customers than ever before

Improved Safety: The introduction of 'vehicle-to-everything' communications enables a more direct flow of information between vehicles, pedestrians and road infrastructure. This means that drivers will be alerted to nearby hazards, such as broken-down vehicles, reducing the chance of accidents. It has the potential to improve road safety around the world significantly.

Consumer Experience: Driver demand for connectivity is increasing as people become more familiar with the benefits of staying connected. According to McKinsey, 40% of consumers would change car brands to gain more connectivity within their vehicles

Environmental Benefits: As well as improving road safety, many of the key features of 5G-enabled vehicle-to-everything technology could also help to manage traffic congestion in major cities. Vehicle-to-infrastructure communication enables direct communication channels between a vehicle and nearby road infrastructure without need to connect through a central mobile network

Alternative revenue streams for automakers: 5G also presents a huge revenue opportunity for automakers that goes beyond just the point of sale. It will allow manufacturers to create lasting connections with customers by offering additional features such as remote diagnostics, predictive maintenance and online service scheduling – all of which would not be possible without integrated connectivity.

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MULTILAYERED PLATFORM FOR HEALTH RISK REDUCTION AND SAFETY ON PUBLIC TRANSPORT

A CASE STUDY FROM ITALY

 **NARCISO GASPARD**

ATAP (Local Transportation Authority operating in the Italian Province and City of Pordenone)

Public Transport, a driver of change in the ecological transition of the urban ecosystem

Urbanization is one of the most relevant megatrends of our time (UN, 2022). The exponential growth of urban population will have profound and disruptive implications on a global scale in terms of environmental, economic, political, and social changes.

While today an estimated 56% of the world's population lives in cities, it may perhaps come as a surprise that this percentage is higher in Europe. In fact, it is

estimated that 75% of EU citizens currently live in cities.

Among the most demanding challenges arising from urbanization – air quality, energy efficiency, housing, safety, and security – urban mobility has a key role. In this global scenario, the movement of people and goods is assumed to become an essential factor in increasing economic competitiveness, supporting sustainable development, promoting social cohesion and progress, and improving the quality of life of people.

At the same time, urban mobility is becoming a major source of greenhouse gas emissions globally and, consequently, a crucial factor in meeting the 1.5-degree challenge.

With reference to the main urban transportation problems (congestion, road safety, affordability of public transit, environmental sustainability, and poor infrastructures for active mobility like pedestrian or bike lanes), an almost unanimous answer is shared and on-demand mobility solutions. However, in the absence of coordinated urban transportation solutions between private initiatives and municipalities, a situation has arisen in which many cities are now overwhelmed with competing offerings as multiple players compete for market share. Although this has led to greater availability of shared transportation options for citizens, this freedom of initiative has not led to more efficient transportation systems but has – often – contributed to further intensification of urban mobility. The lack of a holistic approach may be considered one

of the main reasons why the entry of new mobility models into cities has increased the complexity but not the overall performance of current urban transportation.

According to our view, the technological paradigm of integration turns out to be equally crucial in business and governance as well. Problems arising from urban mobility can be addressed and solved through intelligent and integrated solutions.

Reducing car use and increasing environmentally friendly alternative transportation, such as public and active transportation, are effective approaches to mitigate the harmful environmental impacts caused by extensive vehicle use. In addition to decreasing air pollution, the promotion of public transport – increasingly electric or fueled by renewable resources – and alternative transportation modes can also bring about a series of other major benefits, such as reducing road congestion and thus road safety, increasing community mobility and commuter productivity, providing an equitable transportation system, and improving community health and the neighborhood economy.

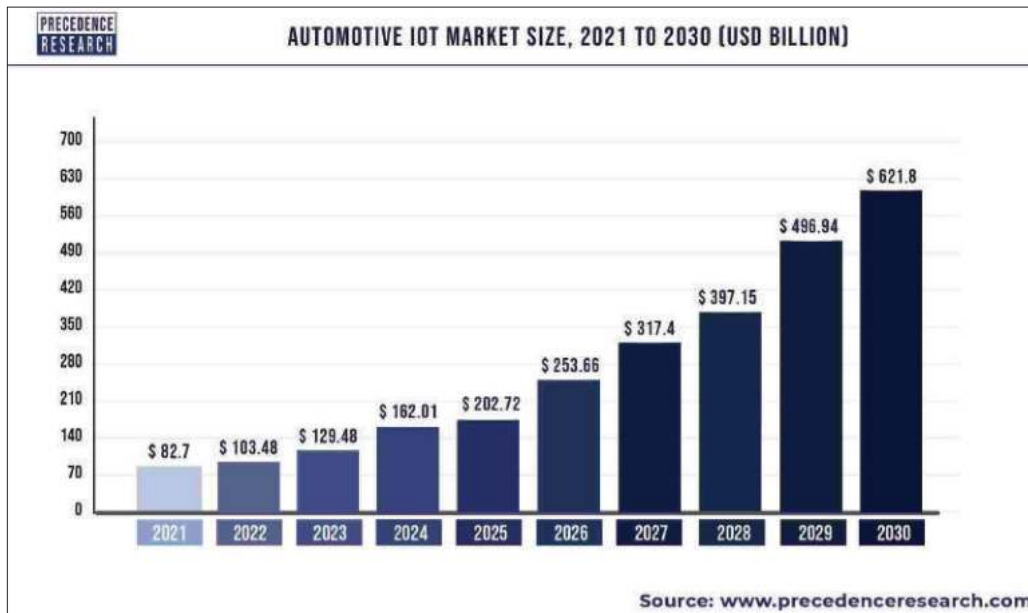
Public transportation is therefore a structural driver of change to accelerate the ecological transition of the city ecosystem set by the European Green Deal and globally.

The synergy of Vehicle Telematics and IoT Technologies in Public Transport

Whereas IoT (Internet of Things)-enabled telematics was once a niche area, today the



Creating a public transportation safety management model requires a composable architectural pattern that can reflect the integration of information technology and digital tools into transportation processes and, consequently, process the endless amount of data from the IoT realm



article aims to illustrate the case of an Italian best practice.

Traditionally, ensuring the physical safety of public transportation passengers and personnel as well as the security of vehicles has always been a priority for operators and authorities in this industry. The issue of public transport safety, however, goes far beyond the internal ability of transport authority to safely perform its functions. In fact, it concerns the ability to provide reliable protection of passengers and personnel from

use of in-vehicle communication systems is gradually gathering wide and profitable applications. Recent studies state that in the forecast period 2022-2030, the size of the global automotive IoT market will be expected to increase at a compound annual growth rate (CAGR) of 25.13%.

The main reasons underlying this rapid market expansion are the ever-increasing demand for better safety features in vehicles, the sales of connected vehicles, and the growing enactment of supportive government measures and regulations. In this regard, just think of the introduction of the pan-European in-vehicle emergency call service (better known as ECall) made mandatory for all new vehicles, cars, and light commercial vehicles as of March 31, 2018.

In addition to initial benefits for early adopters of telematics, such as vehicle tracking, speed, travel distance/time, idling time, hard braking and driving, fuel consumption, vehicle breakdowns, seat belt usage, battery voltage and other engine data, IoT technology enables the integration of a wide range of data from extensive networks of sensors in and outside the vehicle. Automotive IoT application enables not only remote access to the vehicle, as well as offering real-time information on traffic status, parking availability, presence of alternative routes, inclement weather conditions, and updates on locations with less traffic and congestion, etc.

Professional transportation companies

must face a series of challenges daily, ranging from increasing passenger numbers to improving service quality, reducing operational and vehicle costs to managing unexpected events such as precisely was the health crisis caused by Covid-19 pandemic.

The massive deployment of IoT technology thus takes public transportation sector to the next level. The benefits that such technology brings are manifold both in terms of greater personalization of travel experience for people who rely on public transportation to get around, and in terms of an advanced fleet management system for the operators themselves such as, for example, improved predictive maintenance, better routing and vehicle tracking, increased fuel efficiency, improved driver performance. McKinsey Center for Future Mobility (2018) estimated that once telematics adoption reaches 80%, the benefits of the combination of telematics and IoT devices will be found at a systemic level in the Smart City environment, just think of connected payment services that facilitate pedestrians to pay for public transportation and back-end monitoring that allows more buses or trains to be put into service in real time or based on predictive intelligence before a spike in demand.

Pordenone: a pioneering paradigm of a medium-sized city

Building on the above considerations, this

external influences. In this sense, the Covid-19 pandemic emphasized this need even more, introducing huge challenges to public transport industry overall. Such unprecedented global emergency therefore highlighted the need to accelerate the development of a smart, sustainable, and user-centered transportation ecosystem.

In times of pandemic, worldwide regulatory protocols for public transportation all converged on one essential point: ensuring a “safe capacity” of maximum passenger load to guarantee social distance and prevent the spread of coronavirus, thus providing the highest level of protection for passengers and staff, especially during peak hours (mainly related to school hours).

Movement authorities and transit operators around the world had to act quickly to find quick and efficient solutions to provide safe mobility services in a global situation that was very fluid and dynamic at the time.

Italy was the first European country to be affected by the COVID-19 pandemic and therefore the first to have to respond to an unprecedented challenge.

ATAP – Local Transportation Authority operating in the Italian Province and City of Pordenone in the northeast of the country with a fleet of 171 vehicles – decided to address the challenges posed by the pandemic as an opportunity to rethink the organization of its services and respond by adopting new technological solutions

capable of ensuring the health safety of passengers.

Digital technologies proved to be a crucial tool for safely managing public transportation considering the critical issues of the moment.

The first project implemented is called *Salisco*. This is the name of the multilayered platform for dynamic travel management – powered by MOVENS technology developed by Henshin Group – capable of ensuring compliance with the safety measures prescribed to cope with the health emergency. The IoT platform was designed to ensure safe and on-time trips by monitoring the changing travelers' load restrictions, controlling the flow, and staggering ridership. Thanks to MOVENS technology, ATAP was able to significantly improve the levels of safety and wellbeing of citizens by:

- real-time monitoring of passenger flow to avoid overcrowding peak times
- calculating the number of extra means of transport to be added in specific time slots and specific routes especially during peak hours

The integration of MOVENS technology with ATAP's fleet management module has also made it possible to optimize trip planning and remote management of each type of vehicle uploaded to the platform.

Travelers can rely on a smart app to check schedules, routes, and to know occupancy on local public service buses and coaches. The app – developed by the software company Molo17 – provides advance knowledge of the flow of people on the vehicles, making the contribution of each traveling citizen essential to reach solutions quickly, empowering their behavior, while fully respecting users.

Analysis of the immense amount of data also proves to be extremely relevant to the development of driver personal safety training courses based on precise indicators. In fact, ATAP maintains that improved corporate fleet management requires constantly updated training of its staff aimed at decreasing road accidents and driving stress, reducing fuel consumption and CO₂ emissions. The fruitful collaboration with the Italian company DRIVEVOLVE Srl goes in this direction.

The topicality of the Covid problem calls for reflection on what has been done in the past and what is being done to prevent the spread of pathogens, especially in indoor environments.

The monitoring of airborne agents and pollutants in the air inside public transportation, also known as indoor air, which are potentially harmful to health, is a necessary activity that public and private

entities are required to respond to increase the level of safety of people on board and improve travel comfort.

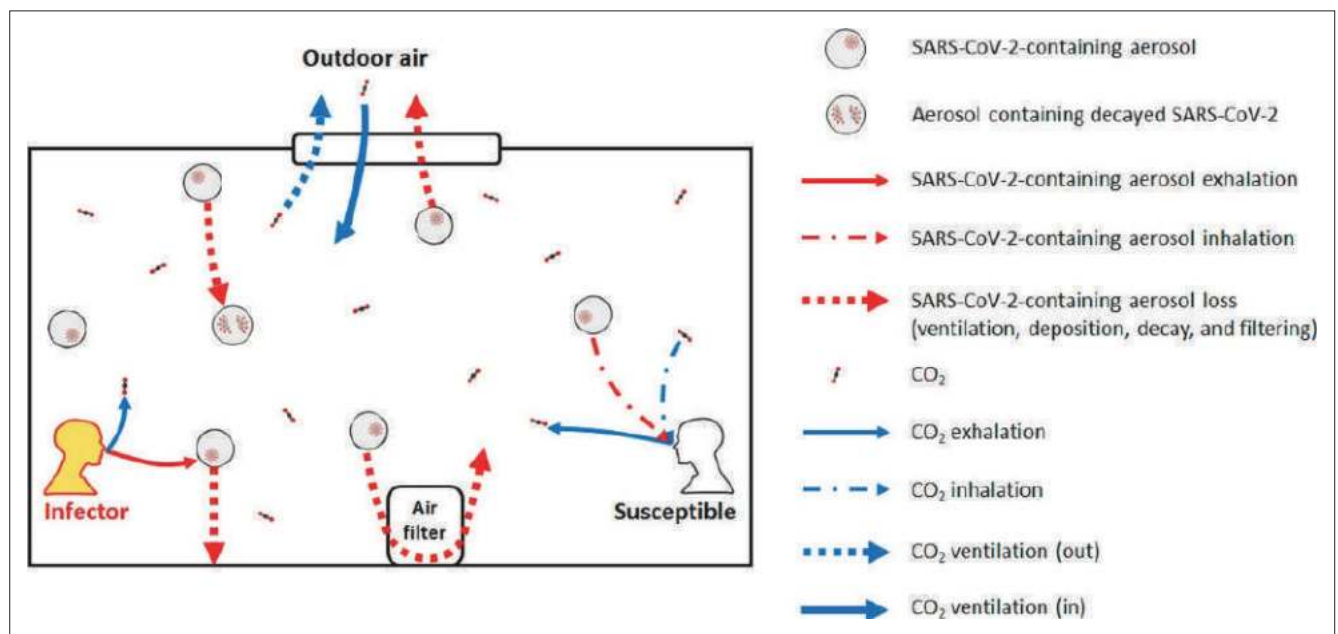
A recent study conducted by the Cooperative Institute for Research in Environmental Sciences (CIRES, 2021) and the University of Colorado Boulder has shown a correlation between high CO₂ levels and increased risk of virus transmission, specifically Covid-19.

A high CO₂ concentration is therefore a warning sign of poor indoor air quality because it indicates a low air exchange rate (TRA or TRAh Air Exchange per Hour). Consequently, in such a scenario, CO₂ can serve as a “proxy” for the number of viruses in the air. Monitoring carbon dioxide levels within an environment is therefore a useful, inexpensive, and easy way to determine the risk of people contracting Covid-19.

Sensor data can then be used to assess indoor air quality; in addition, the multi-channel alert and notification system included in the platform enables timely deployment of actions to reduce Covid-19 risk transmission.

Considering this research and the need to ensure maximum of public transportation, ATAP launched another project related to the adoption of an on-board air quality monitoring system.

The IoT multilayered platform –



Source: Environ. Sci. Technol. Lett. 2021, 8, 5, 392-397

Figure 1. Schematic illustrating the exhalation, inhalation, and other loss processes of SARS-CoV-2-containing aerosols and the exhalation, inhalation, and other sources and sinks of CO₂ in an indoor environment.

powered by MOVENS technology – collects measurements of several physical-environmental parameters such as the concentration level of CO₂, fine particulate matter (PM₁₀, PM_{2.5}), VOCs (so-called volatile organic components such as, for example, ammonia and formaldehyde), nitrogen dioxide, ozone, carbon monoxide, outdoor and indoor temperature, relative air humidity. The cloud platform also detects other parameters such as atmospheric pressure, environmental brightness and UV index, acoustic noise level and vibration (through a triaxial accelerometer with a range of up to 16g and dynamics of 800Hz). The latter parameter is particularly interesting because it allows real-time detection of any potholes or irregularities in the road surface and thus contribute to road safety.

ATAP recently added another IoT module, self-powered with internal battery and mini-photovoltaic panel, based on a photocatalytic disinfection system by means of transparent micro-perforated films to be applied on the vehicle's interior windows.

Due to a photocatalytic additive, the removable film effectively reduces in a short period of time – through a physical process of photocatalytic oxidation (activated by any light source, solar or artificial of any kind) – up to 95% of microorganisms such as bacteria and fungi, transforming harmful organic substances into harmless inorganic molecules (H₂O and CO₂) for the organism. The effectiveness of such a device, WiGlass – produced by the Italian company WiWell Srl. – against Coronavirus has been confirmed by accredited laboratories and bodies that have carried out tests in accordance with UNI EN 13697: 2015 and Reed-Muench method.

Once the IoT module is installed, the platform – always powered by MOVENS technology – facilitates a reduction in sanitation expense costs as it operates on three levels:

- Verifies the effectiveness of the sanitization action by real-time monitoring of operational parameters/values against reference ones defined by laboratory tests
- Measures the residual presence of pollutant particles removed from the film
- Measures physical-environmental parameters that express the degree of indoor air quality

Conclusion

The path to innovation toward Smart Transportation begins with finding business partners.

In the perspective of sustainable development, ATAP is pleased to have strengthened ties with its territory, having identified valuable local partners, mentioned above, for the purpose of systemic enhancement of available resources and the configuration of an exemplary condition that can serve as a model for other Smart City initiatives.

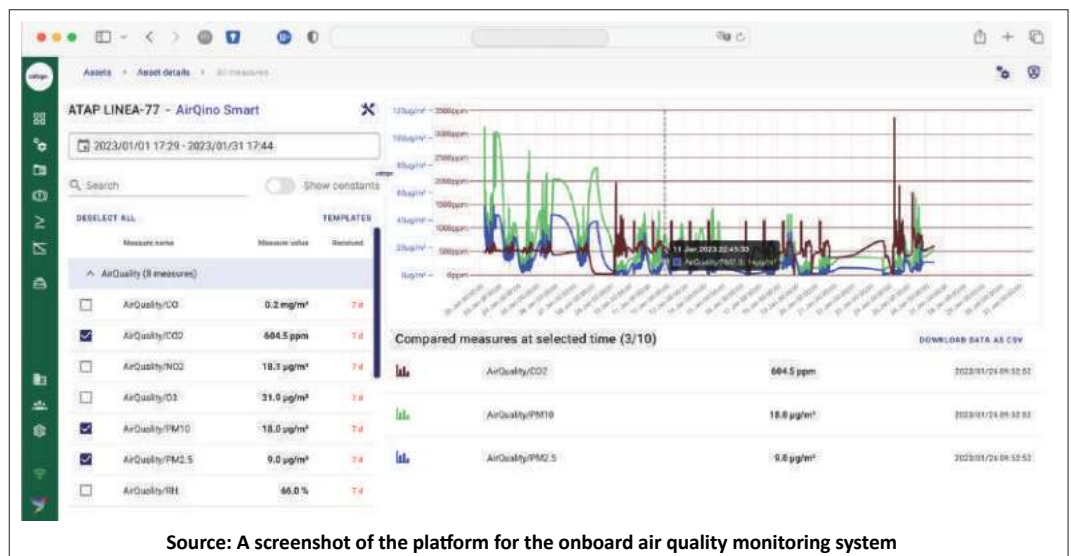
Creating a public transportation safety management model requires a composable

architectural pattern that can reflect the integration of information technology and digital tools into transportation processes and, consequently, process the endless amount of data from the IoT realm.

ATAP decided to adopt MOVENS multilayered platform primarily for two reasons related to its standardized microservice architecture:

- To facilitate rapid integration of additional services with no impact to business continuity
- To enable correlation of different assets from multiple Smart City domains and provide standardized data formats that ATAP can integrate with artificial intelligence-based solutions, simplifying complex workflows and greatly increasing fleet productivity.

Another key aspect for ATAP is the fact that MOVENS platform is evolving according to global standards set by the MOBI (Mobility Open Blockchain Initiative), thus ensuring maximum compliance with the EU's General Data Protection Regulation (GDPR) and future regulations coming into force. □



Source: A screenshot of the platform for the onboard air quality monitoring system

AUTHOR

NARCISO GASPARDO

President

ATAP (Local Transportation Authority operating in the Italian Province and City of Pordenone)

Narciso Gasparido has extensive experience in the world of finance, having held various positions in Mediocredito, in the Friulian Dolomites Park, in Information Technology for the local government system (Insiel), until taking on the role of General Manager of the financial bank Mediocredito for several years. Currently, he is President of Local Public Transport of the Friuli Venezia Giulia region and ATAP (Local Transportation Authority operating in the Italian Province and City of Pordenone).



TAMPERING VERSUS NON-TAMPERING - HOW TELEMATICS DEVICES CAN SOLVE FOR MORE EFFICIENT FLEET MANAGEMENT

▲ POORVAK KAPOOR
Euler Motors

Telematics is becoming an important aspect of the EV industry as a standard norm/default setting, especially for the commercial segment. Undoubtedly, the software is critical in driving vehicle economics and optimizing fleet operations. Commercial EVs are already taking

advantage of this technology, and deploying it for battery and vehicle efficiency.

However, markets like India are one of the trickiest for telematics to function, given the varied and abrupt road and driver patterns, lack of clearly marked lane systems, and erratic traffic situations amongst others. These scenarios, often inconsistent and

unpredictable, make the job of a telematics device that leads the telematics function complex.

One of these challenges is to assess and deploy when the vehicle or telematics device tampering occurs. Tampering refers to any interference with the vehicle that can be associated with vehicle or cargo theft, which



endangers vehicle safety. A telemetry device is a tracker that can help in this regard, and help relay information back to the cloud if this happens.

However, given the road and traffic scenarios in India many a time this telemetry device itself gets disrupted just during normal vehicle operations, say driving through a highly rough road or when encountering severe collision. This attached device upon impact, often reports this as a criminal or fraudulent activity, just because it has been configured to do so. While this is a clear case of non-tampering, it may cause an unnecessary vehicle to shut down, and lock the vehicle, adding to the complexity of the tech implementation.

Often in many scenarios, automated sensors provide data, which generalizes the cases and raises an alarm for device or vehicle tampering. While this may be the case in some, there are times when the telemetry device is often disconnected due to collision detections, reckless driving, driving via uneven terrains, over speeding. These may not warrant preventive actions such as triggering alarms or shutting the vehicle. In some cases, the presence of primary and secondary tracking devices can help monitor events to maximize output, whereas the second can act as a backup as the former goes offline.

These data inaccuracies can be solved by multiple-level checks/ input through the telemetry device

Inside a commercial EV, a telemetry device is installed at a secure place where its task is to capture all the vehicle data, relay it to a cloud, and then to the vehicle operator/ fleet manager for remote fleet tracking. The device is also a single point of failure, the absence of which one cannot determine the whereabouts of the vehicle or truck during road operations. The device also requires exposure to an open sky, to connect to the cloud, which implies it has to be placed on the vehicle, and not inside it. Given its location, often a metallic enclosure is used like a seal to protect the device from outside wear and tear.

In case of road fluctuation (which may not necessarily be tampering), a shutdown may occur, as a preventive measure. To

avoid this issue, a multiple-level check via the telemetry device can help assess the scenario or prevent disruption of unnecessary operations on the road.

- The first input is to check for the voltage supply to the telemetry device. Often, a disrupted / or disconnected wire harness can cut the voltage supply to the device, which may occur during on-road operations.
- Further, the external signal works as a heartbeat to this alert system and acts as an indicator of a healthy and live connection.
- If these points go offline, an additional IMU sensor is knowing navigation and activity recognition patterns. The IMU sensor is meant for elevation and data for the inference pipeline which helps correlate decisions of tampering at the local ECU (Electronic Control Unit).

Accuracy of data to make the right decision

While remote fleet monitoring and control is an excellent tool to drive higher profits and efficiencies in commercial EVs, the Indian market needs intelligent tracking solutions connected to monitor very nuanced driver and on-road dynamics and anomalies. A device unplugging is seldom a black-and-white scenario, and companies need to deploy the right technology to address the gray that stands in between.

The issue with telematics devices today - they are not able to differentiate between tampering of devices vs non-tampering of device situations in EVs - leading to inefficiency due to unnecessary vehicle shutdown start with

- They are not able to differentiate between tampering of device and non-tampering of device situation in EVs - leading to inefficiency due to unnecessary vehicle shutdown



While remote fleet monitoring and control is an excellent tool to drive higher profits and efficiencies in commercial EVs, the Indian market needs intelligent tracking solutions connected to monitor very nuanced driver and on-road dynamics and anomalies

- What do we mean by situations where tampering happens - examples
- What do we mean by situations where tampering does not happen - examples
- How do we solve for this

Messages to drive

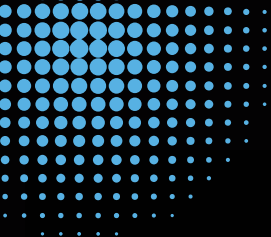
- India presents very complex challenges for telematics to function given the highly unpredictable traffic and driver scenarios
- Tampering versus non-tampering scenarios - one of the biggest problems for CV OEMS to solve (where often tampering isn't the issue, but it is the telemetry device getting unplugged due to rough driving or terrain)
- This creates data inaccuracies and leads to unnecessary vehicle shut down - which can be solved by multiple level checks/ input through the telemetry device. □

AUTHOR

POORVAK KAPOOR
AVP, Vehicle Intelligence
Euler Motors

Poorvak's responsibilities include defining requirements and designing cloud infrastructure for connected vehicles- over-the-air updates (OTA), remote commands, remote telemetry, and IoT. He is part of the engineering leadership team at the company. He comes armed with an overall experience of around a decade across diverse organizations like Cube26 Frankly.me. Poorvak has completed his graduation from the IMS Engineering College, Ghaziabad where he studied computer science.





13

14

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ABOUT US



Illustrious and exploratory journey for new frontiers in road mobility by Telematics Wire dates back to 2011. Recognising the potential of emerging technologies in mobility space, GPS industry handbook and 'Vehicle Tracking and Navigation' conference & exhibition were then pioneer media initiatives taken by Telematics Wire in building up a connected ecosystem within the automotive industry.

Foreseeing emergence of connected vehicle technology in the horizon of Indian automotive industry, 2015 saw the landmark shift in the form of a focussed conference and exhibition 'Connected Vehicle 2015'. Rest is history. Connected Vehicle (CV) concept soon got aligned to connected and autonomous vehicle with consistent and continuous development of the annual forum of Telematics Wire with yearly International Conferences and Exhibitions.

As a top automotive technology media brand in India, Telematics Wire's aim is to create a highly engaging, knowledge-sharing and interactive business networking platform for all the industry stakeholders, thought leaders, decision makers and professionals, like you. Through our industry leading events, we have been providing a one-stop convening space for local as well as global industry players working in the area of connected, autonomous, smart, shared & electric mobility. Our events have developed over the past 11 years alongside the automobile industry, embracing new technology, promoting future innovation and fostering disruption. The industry participation and wider array of converging technologies, products and solutions one came across in our past events has spurred Telematics Wire in going for the next big frontier. We are now all set to take a giant leap with a vision to offer a massive opportunity for the entire CASE mobility ecosystem to showcase their products, technologies, concepts and trends transforming the automotive world while exchanging knowledge with industry experts and engaging in high-level deliberations.

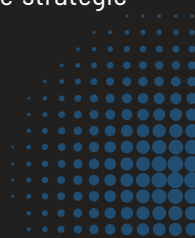
With the above view, Telematics Wire is now launching Connected, Autonomous & Electric Vehicle Expo 2023 (CAEV EXPO 2023) at a scale to bring together automotive manufacturers and their ecosystem of partners who are continually inventing new business models as India is emerging as a global automobile manufacturing hub with the introduction of advanced features such as ADAS, connected car tech, digital instrument cluster, mobile app-based controls, etc.

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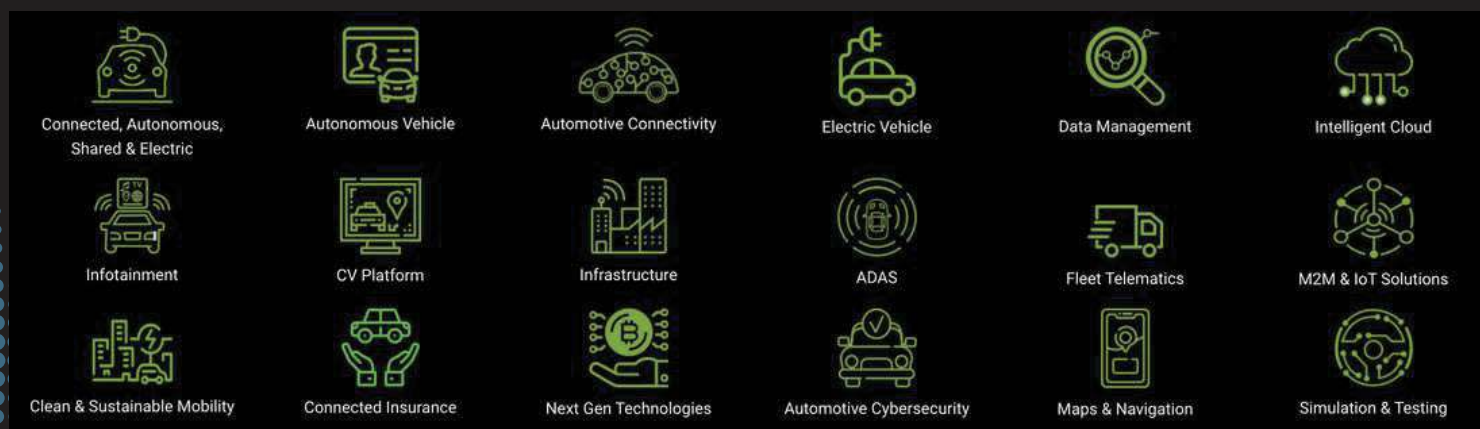
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ROAD TO SUSTAINABLE MOBILITY IN INDIA WITH GREEN HYDROGEN

CHIRAG MORO

Ducker Management Consulting Pvt Ltd

Globally, we are seeing an increasing interest in fuel cell electric vehicles (FCEV) in the passenger car segment as well as in the heavy-duty commercial vehicle segment. While there are no fuel cell vehicles on sale in India, there is an increasing interest in these vehicles and in the usage of green hydrogen.

Introduction

Hydrogen fuel cell vehicles use electric motors to run the vehicle just like a battery electric vehicle. However, unlike a battery electric vehicle, fuel cell electric vehicles generate the electricity onboard the vehicle using a fuel cell, where hydrogen from the fuel tank combines with oxygen from air to generate electricity.

One of the key reasons why fuel cell vehicles are gaining popularity is due to the fact that drivers can just fill up the fuel tank with hydrogen just like a petrol-powered vehicle. With fuel cell vehicles,

there are no long waiting times to charge batteries that owners of battery electric vehicles face. However, the generation of hydrogen is a complicated process making it expensive. Due to the gas-flammability of hydrogen and its ease of dispersion, storage and transportation of hydrogen is also challenging.

The supply chain involved in delivering clean hydrogen fuel cell vehicles includes several players in renewable energy generation, electrolyser manufacturing, hydrogen generation, fuel cell manufacturing, and OEMs.

The Indian Government wants the Country to be a Green Hydrogen Leader

Based on the source and process, hydrogen is classified into different colours. Black or brown hydrogen is produced by coal or lignite gasification, while grey hydrogen is produced by steam methane reformation (SMR). Blue hydrogen is produced by

natural gas or coal gasification along with carbon capture storage. Green hydrogen is generated by the electrolysis of water using electricity from a renewable energy source like solar or wind. The electric current is used to split the water molecules into hydrogen and oxygen.

India is beginning to invest heavily into green hydrogen. The current hydrogen production stands at 6.7 million tons per year, which is used by the fertilizer industry and refineries. Presently, the country does not import or export hydrogen. The Energy and Resources Institute (TERI) estimates that the demand in India could reach 23 million tons per year by 2050. The Indian government plans to increase green hydrogen production to become self-reliant in energy production before 2050 to reduce crude oil imports and the dependence on other countries. The government has announced an investment of around Rs. 19,800 crores (USD 2.43 billion) to set up green hydrogen production capacity of 5 million tons per year by 2030. The investment also includes increasing the renewable energy capacity by 125 GW. The current installed capacity is around 160 GW. Around Rs. 1,500 crores (USD 183.74 million) is being set aside for pilot projects and Rs. 400 crores (USD 49 million) for R&D. With this investment, the Indian government aims to decarbonize industrial, mobility, and energy sectors and export green hydrogen and its derivatives.

While the government is encouraging investments in the sector, what will really help the sector grow is the need to enforce laws to attract companies to shift to green hydrogen from other sources. These could include concessional land rates to set up renewable energy parks, concession on green electricity, and PLI scheme to

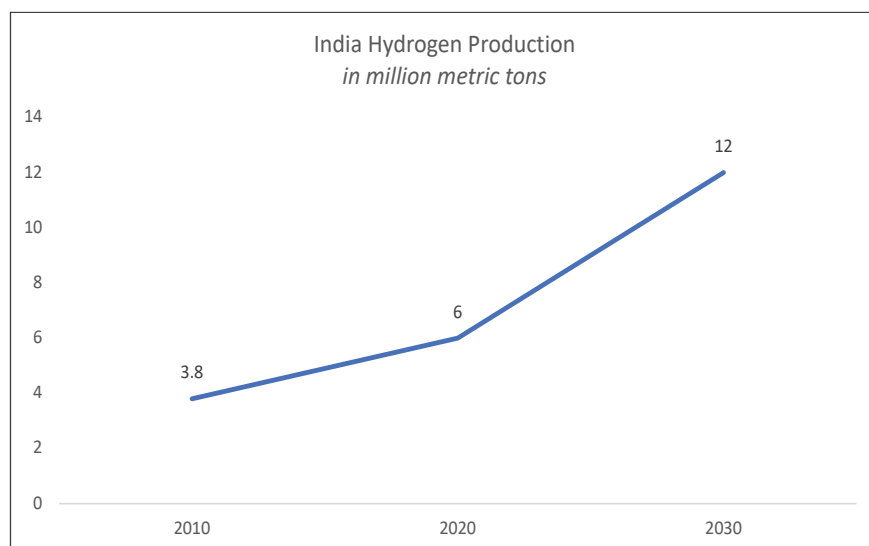


Chart 1: Hydrogen Production in India

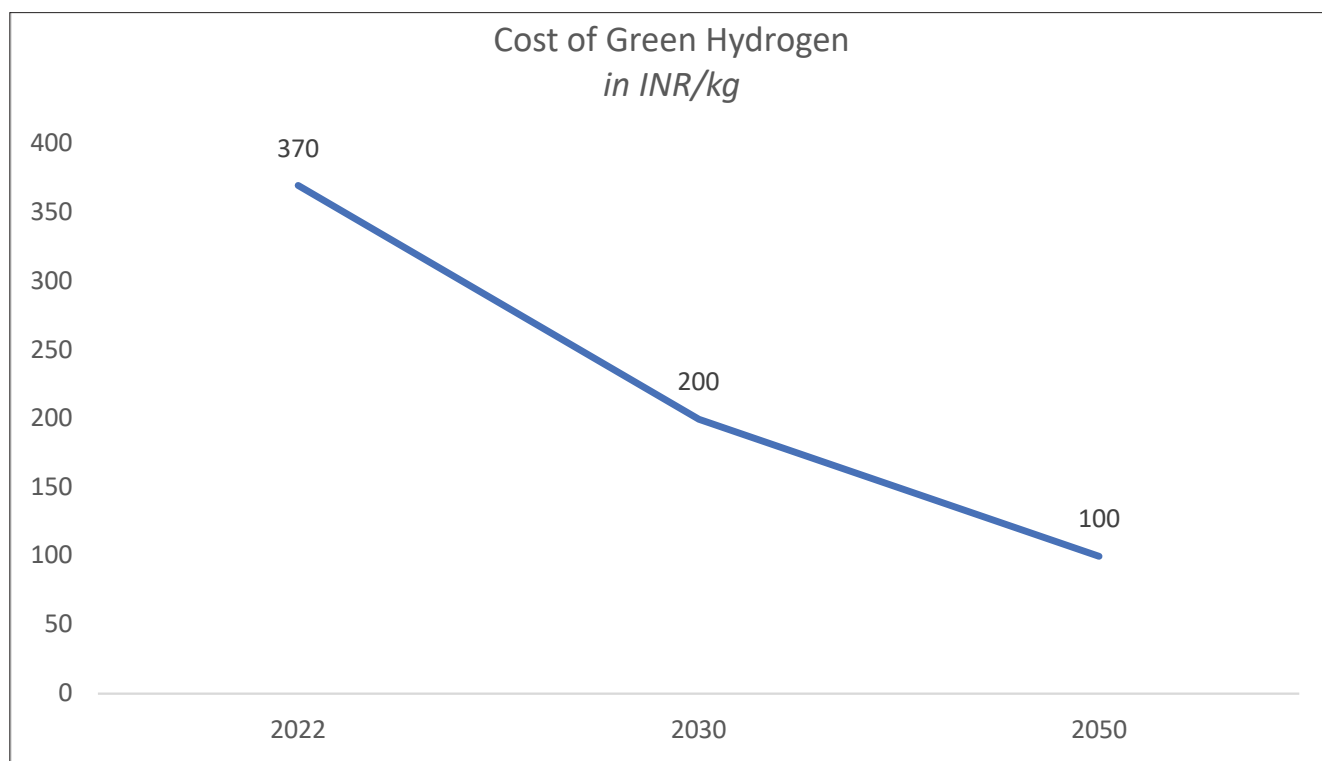


Chart 2: Cost of green hydrogen in India

encourage local electrolyser manufacturing.

Growing Interest from Suppliers

Electrolysis of water can be done by two main types of electrolysis methods – Alkaline Electrolysis and Polymer Electrolyte Membrane (PEM) Electrolysis. In India, there are only a handful of companies manufacturing electrolysers. These include Ohmium and Eastern Electrolyser. Ohmium uses only PEM electrolysers as they claim that these are more resistant to the fluctuations that come from renewable energy sources like solar and wind, making them ideal for the production of green hydrogen, while Eastern Electrolyser manufactures PEM and Alkaline electrolysers. Cummins is also working on the technology and showcased an electrolyser at the Auto Expo 2023. A team of researchers from the Indian Institute of Science (IISC) in Bangalore have developed a new technology to produce green hydrogen from biomass. The process produces 100 grams of hydrogen from 1 kg of biomass.

Today, electrolysis of water is expensive, but investments along with the expected support from the government, the cost of producing green hydrogen is likely to

decrease in the next few years.

To meet India's hydrogen production and export targets, many companies are investing in setting up manufacturing plants. Some of these include:

- Adani New Industries and TotalEnergies will invest Rs. 4 lakh crores (USD 49 billion) in green hydrogen over the next 10 years. The initial phase of investment will include adding 1 million tons of production capacity per year.
- Reliance New Energy Limited is collaborating with Stiesdal to manufacture hydrogen electrolysers. The companies will be investing nearly Rs. 50 lakh crores (USD 612.48 billion) in green energy and other projects in Gujarat over the next 10-15 years. The investment will include a 100 GW renewable energy plant.
- L&T commissioned a green hydrogen plant at its AM Naik Heavy Engineering Complex in Hazira, Gujarat. The plant will produce 45 kg of green hydrogen per day and has a capacity of 800 kW (Alkaline electrolyser – 380 kW and PEM electrolyser - 420 kW).
- Indian Oil is building a green hydrogen plant at Mathura refinery. The company plans to add 25 million tonnes of capacity.

- Indian Oil, L&T and ReNew Power formed a joint venture to produce green hydrogen in India. The joint venture will also focus on the production of electrolysers.

- NTPCL is working on a fuel cell-based micro-grid with hydrogen production at NTPC Simhadri in Andhra Pradesh. The plant would use a 240 kW electrolyser which gets its electricity from a nearby solar project, and would also be equipped with a 50kW fuel cell.

- Indian Oil Corporation has scaled up the production technology developed by the Indian Institute of Science to produce 250 kg of hydrogen per day from biomass for use in fuel cell buses.

Just like electrolysers, there are only a handful of companies in India that produce fuel cells. Fuel cells are used in a vehicle to convert the hydrogen stored in a tank to electricity to power the vehicle.

Prominent companies in this field include Sainergy Fuel Cell India and Adar Poonawala-backed h2e Power. Adani Group has signed a MOU with Ballard Power Systems to evaluate a joint investment to manufacture PEM-based hydrogen fuel cells in India for mobility and industrial applications. SFC Energy has tied up with FC TecNrgy to manufacture fuel cells in India. The joint

venture will open a manufacturing unit, R&D centre, and a repair centre in Gurugram. EH Group, based in Switzerland, established an Innovation Lab at IIT Madras Research Park to develop fuel cell technologies, with a focus on control systems software. Reliance Industries has also been working on fuel cell technology for the last few years, while Cummins showcased a fuel cell for medium and heavy-duty vehicles at the Auto Expo 2023.

A fuel cell stack is one of the most expensive components in the drivetrain. Today, the fuel cell stacks used in FCEVs are imported, and to bring down costs, localization needs to increase. Localization can also happen in batches, bringing costs down gradually.

But, it is not just the fuel cell stack that needs to be localized. There are other power electronic components, compressors, and cooling systems that contribute to the



India is beginning to invest heavily into green hydrogen. While the government is encouraging investments in the sector, what will really help the sector grow is the need to enforce laws to attract companies to shift to green hydrogen from other sources. These could include concessional land rates to set up renewable energy parks, concession on green electricity, and PLI scheme to encourage local electrolyser manufacturing.

overall cost of the drivetrain. The cost of these components need to be reduced.

While more announcements are expected, the government could provide incentives to manufacturers of electrolyzers and fuel cells to increase manufacturing in India.

Hydrogen Fuel Cells in India's Mobility Sector

While there are no commercial examples in India, companies have begun building fuel cell vehicles for testing and development. Some of the notable developments in the country include:

- Council of Scientific and Industrial Research and KPIT (Sentinent Labs) have developed India's first fuel cell bus. The operational cost of the bus is claimed to be less than that of a diesel bus.
- Toyota began a study with MORTH to evaluate the feasibility of fuel cell vehicles in India. Toyota imported a Mirai FCEV to India for the purpose.
- h2e Power is developing India's first hydrogen-powered three-wheeler which will use a low pressure hydrogen storage technology which is said to cost less. The technology was developed by Canadian hydrogen storage company H2M.
- Toyota supplied one hydrogen fuel cell module to Ashok Leyland to build a fuel cell commercial vehicle for a feasibility study. The commercial vehicle manufacturer showcased a fuel cell electric truck at the 2023 Auto Expo with a PEM fuel cell and a hydrogen carrying capacity of 33.6 kg.
- Toyota also showcased the Corolla Cross Hydrogen Concept prototype and the Mirai at the 2023 Auto Expo in Delhi.
- Hyundai conducted a feasibility study using the Nexa FCEV in India. The car was showcased at the 2020 Auto Expo and the 2023 Auto Expo.
- Ashok Leyland is in talks with Reliance Industries to install Reliance's existing fleet of trucks with hydrogen fuel cells.
- At the 2023 Auto Expo, Tata Motors showcased their first FCEV bus, the Starbus FCEV. Their order from Indian Oil will be delivered in FY2023-24. The OEM also showcased the Prima E.55S, a hydrogen FCEV truck concept.

- MG showcased the Euniq 7, a 7-seater FCEV MPV at the Auto Expo 2023.

It's not just the on-road transportation sector that is looking at the usage of hydrogen fuel cells. The Indian Railways is also planning to launch hydrogen trains by the end of 2023. These trains will be used on narrow gauge heritage routes like the Darjeeling Himalayan Railway. The first train is likely to be called Vande Metro and would run on the Kalka-Shimla route. The trains are expected to have a range of 600 km and a maximum speed of 160 km/h. The railways is manufacturing a prototype train at Northern Railway workshop and this train would be test run on the Sonapat-Jind section in Haryana.

In the global passenger car segment, Honda and Toyota were the first companies to enter the field and launched FCEVs in the passenger car market. While Hyundai followed suit to launch their fuel cell vehicle, Toyota, which was pushing fuel cell vehicles, turned its attention to battery electric cars, while still continuing development of hydrogen fuel cell vehicles.

BMW is working on fuel cell technology and showcased the iX5 Hydrogen. The German manufacturer has also worked on a hydrogen-powered internal combustion engine. A V12 engine from a 7 Series was modified to allow combustion of hydrogen.

Some global truck OEMs including Hyundai, Nikola Motors, and Hino Trucks along with Toyota are also developing hydrogen fuel cell trucks for long-distance trucking.

Hydrogen Internal Combustion Engines

It's not just fuel cells that the industry is working on. Internal combustion engines which run on hydrogen are also gaining popularity and could be the stop-gap solution between diesel engines and FCEVs for commercial vehicles, while the cost of FCEVs decrease. At the Auto Expo in 2023, Cummins showcased a hydrogen internal combustion engine meant for medium and heavy-duty trucks and buses. Tata Motors and Ashok Leyland showcased hydrogen internal combustion engine-powered trucks at the Expo.

Hydrogen Refueling Station Infrastructure

As expected, due to the lack of fuel cell vehicles in India, there are no public hydrogen refueling stations. Stations are present in Indian Oil's R&D Centre in Faridabad and in the National Institute of Solar Energy in Gurugram. A refueling station is expected to be commissioned in May 2023 in Leh and could be set up by NTPC and Amara Raja Power Systems.

Hydrogen refueling pump can be added to existing petrol stations. An ARCO gas station in California also has a hydrogen refueling pump. This allows for faster expansion of the refueling network.

Where Does India Stand?

Globally, the demand for green hydrogen is increasing and India is one of the few countries to have announced a production target, although it is lower than the target set by some countries. In comparison, the USA is targeting production of 10 million metric tons of clean hydrogen by 2030, 20 million metric tons by 2040 and 50 million metric tons by 2050. The European Union has a similar target of 10 million metric tons of green hydrogen by 2030, while China's target is 100,000 to 200,000 tons by 2025. The Asian country's green hydrogen production could reach 100 million metric tons by 2060.

Industry experts believe that India can achieve its green hydrogen production target of 5 million metric tons per annum by 2030.

What Does the Future Hold?

It is clear that India's green hydrogen policy will increase the number of investments made into the sector to shift India's energy sources from non-renewable to green

hydrogen, but localization of components and meeting decarbonization targets is a step-by-step process.

Localization is key in ensuring steady progress to bring down costs. With the right support from the government, the number of companies investing in setting up electrolyser and fuel cell manufacturing is expected to increase.

Looking at consumption and the ability to invest in new technology, companies like Reliance Industries and Indian Oil are likely to scale up faster in green hydrogen production. NTPC supplies hydrogen to the National Fertilizer Limited, and together, they are likely to scale up green hydrogen production.

Since cost is a major factor in the powertrain used in a vehicle, two-wheelers, three-wheelers, and four-wheelers are likely to remain or shift to battery-electric power, while commercial vehicles could shift to

hydrogen power.

Fuel cells will see growth in heavy payload, long distance vehicles like buses, trucks and trains. The technology to achieve this is likely to become commercially viable in the next 3-5 years (considering initial cost and operational cost) as localization of components increase. This can be fast-tracked if the government imposes additional tax on vehicles running on fossil fuels. Logistic and e-commerce companies should also take the initiative to test the feasibility of hydrogen fuel cell vehicles in their fleet.

Since fuel cell technology is expensive and is still a couple of years away, it is worth keeping an eye on hydrogen-powered internal combustion engines in heavy-duty commercial vehicles. We could see these vehicles on the road once the country's hydrogen production increases. □

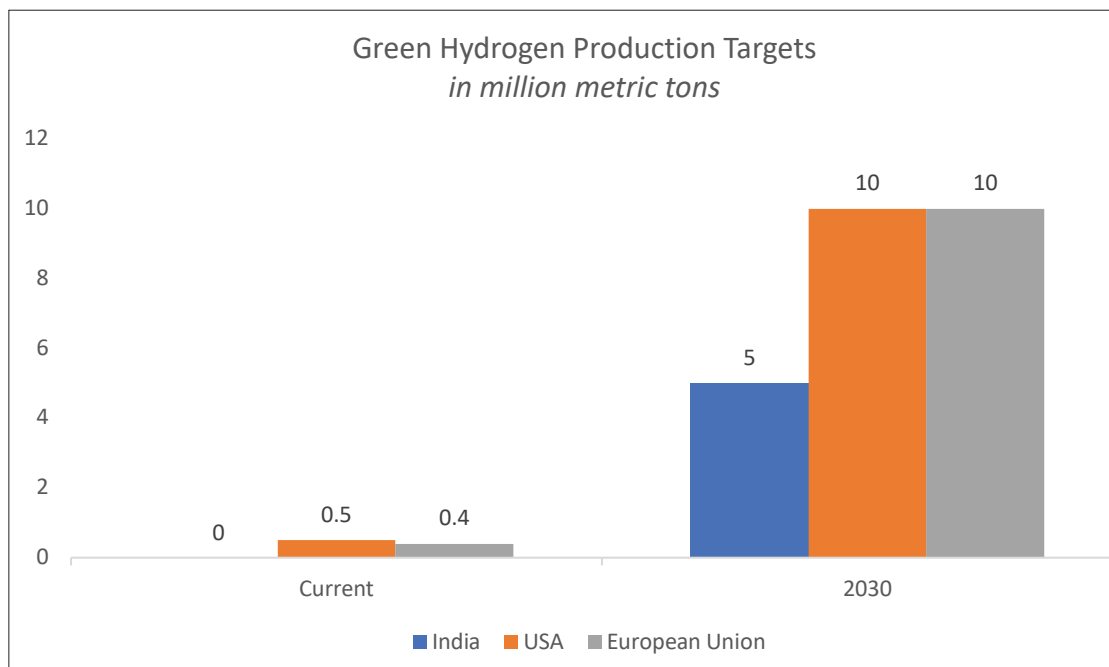


Chart 3: Global Green Hydrogen Production Targets

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BUSINESS-AGNOSTIC MAPS: CONNECTING THE DOTS TO UNLOCK BUSINESS VALUE

 **ABHIJIT SENGUPTA**
HERE Technologies

Digital maps have become an integral part of our everyday lives, where they power our everyday commuting, food delivery and ride hailing services. For businesses today, maps are powerful tools to improve internal operations and customer experiences.

High demand for enterprise-grade map data and location services from both consumers and businesses have led to growing investment in digital mapping services. As a result, the global digital map market is projected to expand at a CAGR of

11.92% during the next five years, reaching USD 38.8 billion by 2027¹. The same applies to Southeast Asia, where increasing adoption of geospatial data information and solution in various business verticals are fuelling the growth for the region's digital map market.

While we know that demand for digital map services have gone up, it's also worth noting that in the last five years, the use cases for digital mapping and geospatial technology have become increasingly complex. Maps now require intelligent

software, automation and quality protocols to capture and update in real-time to changes in the real world.

How are tomorrow's businesses using digital maps?

As businesses accelerate their digital transformation, it's essential for them to access fresh, accurate, and rich map content at a higher frequency. Think about a centimetre high definition, three-dimensional map that acts as a digital canvas overlaying onto our physical reality



– this is going to redefine every business and consumer experience.

Digital maps help visualise data, which is a valuable analytic for businesses as they can leverage insights obtained to improve customer experience, retain loyal customers, and gain new leads. For instance, one of Indonesia's largest digital wallet services DANA is utilising HERE location services to bolster inclusive financial services in the country. With its 'Nearby' feature, DANA users can locate top-up agents near them – especially those in rural areas who are unable to top up their accounts via credit cards online – to top up their DANA account conveniently. This feature enhances customer experience and allows DANA to deliver convenience and more efficient, tailored digital offers to their customers.

Up-to-date and accurate maps further allow businesses and end consumers to plan smarter, more sustainable routes. In automotive, digital maps and location technology are powering connected cars that help drivers avoid obstacles, reduce risks on the road and make the driving experience more enjoyable. From advanced driver-assistance systems (ADAS) to smart navigation, major automotive brands are connecting vehicles and sharing data with other devices inside and outside the car. Such connected vehicles are delivering personalised digital experiences and remote connections that are more than welcome by consumers. Not to mention, this is also paving the way to fully autonomous vehicles in the near future.

VinFast, Vietnam's leading manufacturer of premium automobiles, is an example of an automaker that is integrating location services – HERE ISA (Intelligent Speed Assistance) Map – into its new electric line-up to stay compliant with the European Union's General Safety Regulations on ISA mandate aimed at improving driver safety.

Similarly, for the transport and logistics industry, business-to-business (B2B) relationships have intensified because of the increased market and consumer expectations on last mile delivery. To keep up with that – as well as to ensure supply chains remain resilient to disruption, supply chains are moving to a predictive model where businesses are using real-time estimated times of arrival (ETAs) and visibility tools to automate workflow

management and decision-making.

As a result, digital maps and location technology have become the unifying links that bring disparate datasets – warehouse, fleet, vehicle, vessel, rail, air cargo, shipment and environmental data – together to gain insights that will help businesses save time, money and fuel. With location data, businesses can create accurate multimodal ETAs and replace time-consuming, manual processes, and focus on improving sustainability with more accurate route calculations.

So, what kind of map can help unlock business value?

Location data is the foundation to building a real-time digital representation of the world – one where businesses across verticals can benefit from. To do so, map building can only be done right by map providers who can orchestrate the publishing of the richest, most accurate and freshest map on the market.

However, for businesses to truly reap the benefits of a great map, they need to be able to seamlessly integrate location into their applications and overall business operations. This is where business-agnostic maps become critical. This means that businesses – regardless of the industry and size of the company – do not need to create any map from scratch, and instead could use the same location data to build solutions and integrate with existing applications that address their unique business needs. A business-agnostic map has location as the common denominator to provide companies the freedom to bring their own data, map, and services for location-based enrichment.

Rather than competing with businesses to develop personalised or localised maps, a business-agnostic map serves as an enabler

for businesses to grow and scale. Be it from vehicles, satellite and aerial imagery, government or third-party sources, map providers who place location data at the core of detecting and processing real world changes, will triumph in having a more complete representation of the world

What's the new map industry standard for next-gen business?

We already know that thanks to modern technology such as machine learning and artificial intelligence, digital maps today are smart. They consist of orchestrated layers of data from countless sources to create value for data-driven businesses across many use cases – from automotive, transport & logistics, retail, to financial technology and more.

With the ever-evolving customer demands, next-generation businesses are relying on maps as digital products and services. These include leveraging location data for autonomous transportation, building smart and sustainable cities, and influencing the future of mobility – think ride hailing, food delivery and e-commerce.

As mentioned earlier in the article, the demand for maps and its applications have become increasingly complex. When you imagine where the future of maps is going, software that produces maps with the highest accuracy, coverage, and freshness for businesses of all types and enable businesses to seamlessly integrate them into their operations will be the key to open location for everyone. Ultimately, location data should be available for everyone and thanks to software, map making and maintenance will become a simplified process to support every business operations. □

Ref:

Global Digital Map Market Insight | 2022-2027, Digital Journal, September 2022

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ARTIFICIAL INTELLIGENCE & MACHINE LEARNING APPLICATIONS FOR 5G AND BEYOND

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Introduction

Increased digitalization supported by a well-established wireless communication system plays a critical role in societal growth to offer multiple applications and services including communications, connected vehicles, healthcare, travel & tourism, entertainment, and last-mile connectivity. The fifth generation (5G) of wireless networks is being deployed across different countries, including India. Artificial Intelligence (AI) synergistically enhances 5G networks by delivering new capabilities and offering new business opportunities. The proliferation of 5G-connected sensors, devices, and vehicles in an Internet of Things (IoT) or Internet of Vehicles (IoV) environment, accompanied by AI advancements, can help improve 5G system performance and efficiency, along with distributed

intelligence across the connected entities. AI-enabled 5G, with inherent advantages such as software-defined networks (SDN), network function virtualization (NFV), ultra-low latency, high security, and ultra-high reliability, not only enhances the perception, reasoning, and decision-making ability of the devices but also offers a new paradigm for problem-solving approach. The new business opportunities and use cases force the network operators to increasingly use AI in their networks to deeply and accurately learn the evolving system needs and consumer behaviour.

AI enhances the inherent strength of 5G networks by providing autonomous capabilities which allow the networks to evolve into self-organizing networks (SONs) that perform most functions without human intervention, adapt themselves to changes

in the network conditions, and repair faults when they occur (Ref [1]). The accuracy of AI algorithms and models depends on a large amount of data for training and implementation which is well enabled by the 5G support for massive device connectivity and IoT networks via massive machine-type communications (mMTC). As AI algorithms demand high levels of computational capabilities supported by increased memory and better processors, 5G networks provide a suitable environment through the inclusion of caching and edge computing. With software-defined network (SDN) capabilities along with its associated technologies such as Network function virtualization (NFV), network slicing, etc., 5G networks would also facilitate the use of AI techniques for intelligent and dynamic network management and orchestration.

AI also plays an important and expanding role in the evolution of 5G towards 6G.

Keywords: Artificial Intelligence, Machine Learning, Next Generation Mobile Networks, 5G, 6G, Edge Cloud, Deep Learning, Mobile Computing

AI & ML Applications across different industries

Over the past decade, many industries have benefited from the applications of Artificial Intelligence (AI) and Machine Learning (ML). In recent years, as the COVID-19 pandemic

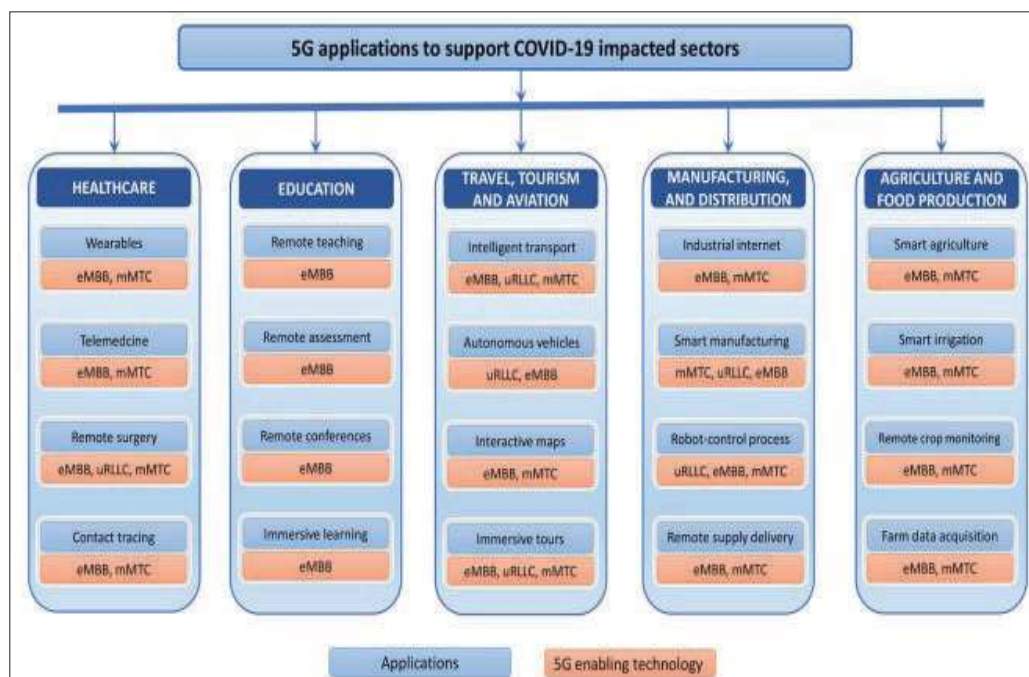


Figure 1. 5G applications to support COVID-19 impacted sectors (Ref [1])

has disrupted usual life and work patterns and caused severe economic losses across different sectors, increased digitalization aided by 5G and AI together contributed to speeding up the evolution of a fully connected and intelligent world. Figure 1 shows the role that 5G technologies play(ed) in various sectors to enable them to handle the challenges caused by COVID-19 pandemic by supporting various operations or technologies in each sector (Ref [1]). As Figure 1 (Ref [1]) indicates, 5G technologies such as enhanced mobile broadband (eMBB), ultra-reliable low latency communications (URLLC), and massive machine-type communications (mMTC) enabled different sectors such as healthcare, education, travel & tourism, manufacturing, and agriculture to recover from the pandemic.

In ref [2], a detailed study is presented on how AI has benefited 13 global industries. The biggest impact of AI across different industries is shown in Figure 2 (Ref [2]) while the biggest revenue gains due to AI implementation are depicted in Figure 3 (Ref [2]). It is evident from figure 2 that the Information technology (IT) function is the most impacted across different industries ranging from banking and financial services to health care and life sciences to travel, transportation, and hospitality sectors. Among manufacturing-oriented industries, AI's impact is most evident in automotive and consumer packaged goods (CPG). In industries with significant customer touch points through sales and service such as CPG, retail, and utilities, the biggest impact of AI is observed.

Figure 3 clearly indicates that Telecommunications, Hi-tech, Retail, Banking & Financial Services, and Energy are the top 5 industries with the biggest revenue gains due to AI implementation (Ref [2]). The numbers from Figure 3 also indicate that AI implementation resulted in an average revenue increase of 17% with an average cost reduction of 12% though the numbers vary across the industries.

Next-Generation Mobile Networks

Next-generation wireless networks are expected to support a multitude of services across a range of heterogeneous devices with different Quality of Service (QoS)

Industry	Most Frequently Mentioned Function of Greatest Impact	2 nd Most Frequently Mentioned Function of Greatest Impact
Automotive	Manufacturing (41%)	Information technology (17%)
Banking and financial services	Information technology (25%)	Finance and accounting (20%)
Consumer packaged goods	Manufacturing, sales and IT (tied at 19% each)	Marketing and R&D (tied at 12% each)
Energy	Finance and accounting (22%)	Information technology (17%)
Healthcare and life sciences	Information technology (29%)	Customer service (14%)
High tech	Information technology (51%)	Customer service (8%)
Industrial manufacturing	Information technology (21%)	Manufacturing (20%)
Insurance	Customer service (28%)	Information technology (20%)
Media, entertainment and information services	Information technology (32%)	Sales (14%)
Retail	Sales (31%)	Information technology (29%)
Telecommunications	Information technology (42%)	Sales (14%)
Travel, transportation and hospitality	Information technology (24%)	Marketing and customer service (tied at 18% each)
Utilities	Sales (19%)	Information technology (19%)

Note: Survey participants were asked to choose the one function of greatest impact by 2020. Percentages are % of all business functions surveyed in each sector.

Figure 2. The biggest impact of AI across different industries (Ref [2])

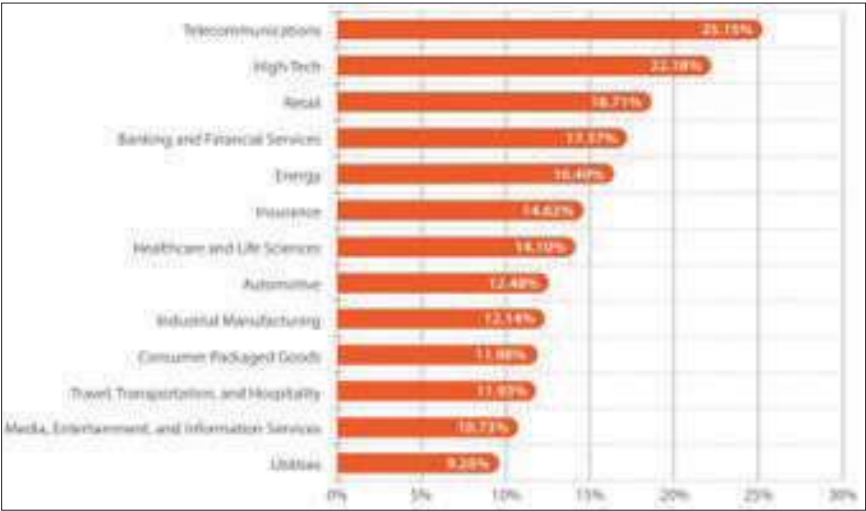


Figure 3. The biggest revenue gains due to AI implementation (Ref [2])

demands and flexible allocation of network resources in response to network dynamics. The use cases for next-generation networks range from rapid transfer of messages among connected & autonomous vehicles (CAVs) with near-zero latency to high-quality Augmented Reality (AR)/Virtual Reality (VR) entertainment applications.

AI-enabled next-generation wireless networks, shown in Figure 4 (Ref [3]), cater to diverse use cases such as dynamic resource allocation for smart city applications, CAVs, deep learning (DL)-based spectrum allocation for cellular networks to handle heterogeneous traffic coming from mobile, vehicular, smart grid and tactile domains, and self-organizing networks (SONs) using ultra-dense mmWave spectrum. To meet the stringent demands for resource efficiency, reliability, and robustness for 5G

and beyond networks, AI/ML techniques are deployed to intelligently manage the networks and the resources (Ref [4]). The diverse use cases for 5G and the associated lessons learned in implementation pave the way for advanced technologies toward 6G network design and standards development.

AI use cases in 5G & beyond

Recent reports and continuing research indicate that 5G networks provide unifying connectivity with virtually everything around us through connections/communications with billions of IoT devices. Artificial Intelligence is a learning platform that can make virtually everything around us intelligent.

Different ML algorithms such as Supervised Learning, Unsupervised

Learning Classes	Learning Models	Applications in 5G
Supervised Learning	ML and statistical logistic regression techniques	Dynamic frequency and bandwidth allocation in self-organized LTE dense small cell deployments
	Support Vector Machines (SVMs)	Path loss prediction model for urban environments
Unsupervised Learning	K-means clustering, Gaussian Mixture Model (GMM), and Expectation Maximization (EM)	Cooperative spectrum sensing and Relay node selection in vehicular networks
	Hierarchical Clustering	Anomaly/Fault/Intrusion detection in mobile wireless networks
Reinforcement Learning	Reinforcement Learning algorithm based on long short-term memory (RL-LSTM) cells	Proactive resource allocation in LTE-U Networks is formulated as a non-cooperative game, which enables SBSs to learn which unlicensed channel, given the long-term WLAN activity in the channels and LTE-U traffic loads
	Reinforcement Learning with Network assisted feedback	Heterogeneous Radio Access Technologies (RATs) selection

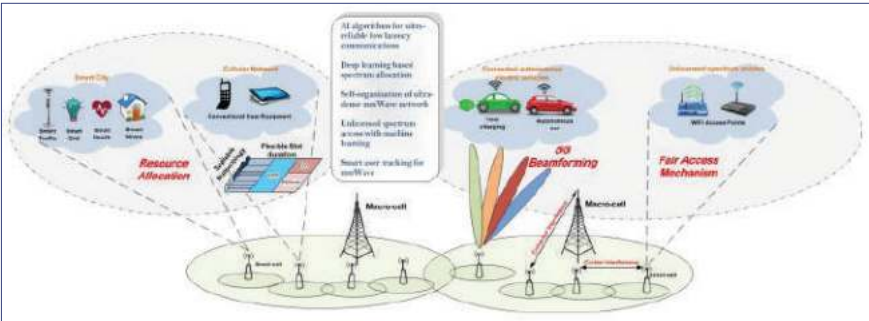


Figure 4. AI-enabled future wireless networks and services [Ref [3]]



Figure 5. Advanced Wireless machine learning use cases from Qualcomm [Ref [6]]

Learning, and Reinforcement Learning apply different models and support specific applications in 5G. Below is an excerpt of different learning classes and corresponding applications in 5G (Ref [5]).

Qualcomm showcases demos on how AI can benefit the performance and efficiency of 5G operating in sub-7 GHz and mmWave across different use cases (Ref [6]). The use cases in 5G and beyond with AI deployment include the following and are shown schematically in Figure 5 (Ref [6]).

- Massive MIMO channel state feedback – provides higher throughput and improves system capacity

- Mobile mmWave beam prediction – helps improve capacity and extend battery life
- Positioning accuracy – improved through a combination of 5G, GNSS, multiple sensors, and varying path-profiles
- Network planning – diverse node types used for the efficient improvement of mmWave coverage
- AI-assisted RF sensing for indoor positioning – currently Wi-Fi is used with future applications planned to use 5G

In Ref [6], it has been well captured on

how AI and 5G are both working together to accelerate innovations. This is shown schematically in Figure 6, wherein

A) Advances in AI result in the betterment of 5G with the following benefits

- An enhanced level of performance
- Highly efficient resource utilization
- Improved battery life through optimal energy consumption
- Data privacy protection and personalized security
- Kaizen (Continuous improvement)

B) Proliferation of 5G makes AI applications better with the below benefits

- Positively responsive user experiences and services
- Continued lifelong learning
- Improved flexibility for distributed functionality across devices
- Cloud-based enhancement of intelligence at the edge devices
- Distributed learning-assisted intelligence scale up
- Large data availability for improved AI models

On-device AI improves the 5G end-to-end system. Figure 7 shows the evolution of 5G, AI, and cloud from cloud-centric AI in the past to partially distributed AI in the current scenario to fully distributed AI in the future. Among different ML algorithms, Federated Learning (FL) is found to bring on-device learning to a new level. The evolution of Connected Intelligent Edge through the mutually beneficial cycle shown in Figure 6 is presented in Figure 7 (Ref [6]). Recent studies confirmed that processing data at the edge devices provide improved key performance indicators (KPIs) such as ultra-low latency, enhanced privacy, and improved cybersecurity. To achieve higher levels of efficiency and scale-up of AI-enabled intelligence, more data processing needs to be taken up at the edge on devices such as smartphones, cars, laptops, and smart wearables (watches, glasses, and biometric sensors). Connected Intelligent Edge brings new and enhanced devices by combining edge cloud AI with on-device AI to provide multiple services such as a) contextual awareness, b) fingerprint-based security, c) voice activation, d) face detection, e) gesture tracking, and f) computational photography, to name a few. These services facilitate multiple intelligent edge opportunities such as a) local network

analytics, b) low latency interactive content, c) industrial automation and control, d) on-demand computing, Augmented Reality/Virtual Reality, etc.

Towards 6G

Machine Learning (ML) plays an important and expanding role in the evolution of 5G towards 6G. AI-enabled 6G networks will a) provide high throughput, b) support new high-demand applications, and c) improve the usage of radio frequency bands, to name a few. 6G wireless connections for data exchange at the various spectrum of frequencies using different cutting-edge technologies. Researchers have been building upon 5G systems to conceptualize 6G, where new 6G wireless systems will have ML as their main component for the physical layer, transceiver design, network, and application layers (Ref [7]). Multiple studies are being carried out on how ML techniques can be

- beneficial in wireless channel estimation and resource allocation
- used to devise better network-layer protocols for next-generation wireless systems
- embedded in various convention layers of a wireless system

A conceptual representation of an ML-based 6G wireless network is shown in Figure 8 (Ref [7]) which depicts how ML and AI will be embedded in various conventional layers of a wireless system and play a key role in system performance. The conceptual Open Systems Interconnection (OSI) seven-layer model can be categorized into three main categories:

- Physical layer (sensing layer, network layer)
- Middle layer (data link, network, transport, and session layers)
- Application layer

As shown in Figure 8, across different layers and at different network levels, ML algorithms are to be trained with some given data sets for deployment in base stations (BSs), mobile devices, core, and management layers with network assistance. Owing to the need for different sources of data for different network functions in the management domain, a data-driven and ML-native network will be evolved using these new techniques.

Among the ML algorithms, Deep



Figure 6. Mutually beneficial Edge Computing through AI innovations and 5G proliferation (Ref [6])



Figure 7. Evolution towards Connected Intelligent Edge using AI-enabled 5G (Ref [6])

Learning (DL) is found to provide potential solutions to some of the challenges faced in 6G evolution because of its strong applications in learning and building models from real-life situations. Researchers are continuing to explore what additional roles DL can play in wireless networks based on the earlier successful application in the classification problems, quick decision-making on access points to connect to in 6G, optimal resource controller utilization, etc.

A representative evolution of 6G and the critical role of AI/ML techniques in the next-generation wireless networks is shown in Figure 9 (Ref [7]). In this schematic, efforts are made to develop a baseline knowledge of ML techniques that can be applied at the infrastructure level and user/application level for improved wireless

system design such as in channel modelling, channel estimation, and transceiver design. The idea of this concept is to design and build self-organizing networks (SONs) for efficient and effective resource utilization and dynamic scaling as required.

Conclusion

Multiple industries and sectors have been adversely impacted by COVID-19 pandemic. The critical role that 5G technologies play(ed) in various sectors such as healthcare, education, travel & tourism, manufacturing, and agriculture to recover from the pandemic is presented. AI/ML applications across different industries are presented with IT being the most impacted/biggest beneficiary in terms of AI/ML techniques and with Telecommunications, Hi-Tech, and Retails

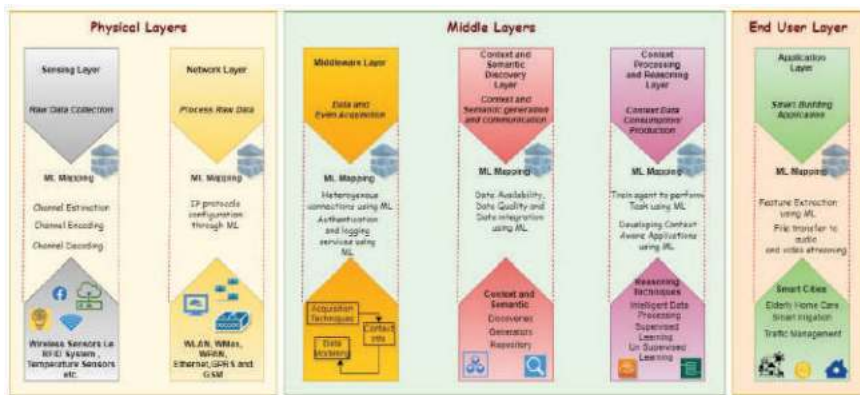


Figure 8. A conceptual representation of ML-based 6G wireless network (Ref [7])

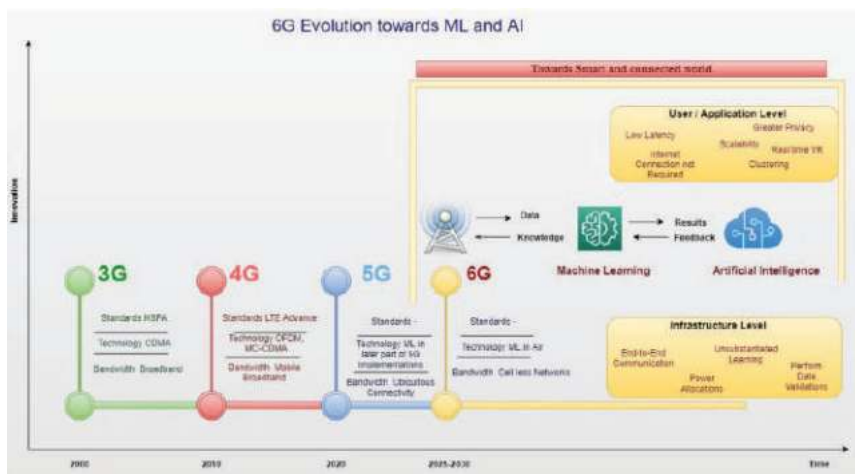


Figure 9. Evolution of 6G and the potential role of ML techniques (Ref [7])

industries being the biggest revenue gainers from AI/ML implementations. Next, AI-enabled next-generation wireless networks were briefly presented followed by specific use cases of AI/ML applications wherein supervised, unsupervised, and reinforcement learning algorithms could be applied. The evolution of cloud computing from cloud-centric AI in the past to the present partially distributed AI to the fully distributed AI in the future was presented next. The mutually synchronous 5G networks and AI/ML techniques with each

benefitting the other were then presented followed by a conceptual representation of an AI-enabled 6G network with specific areas of impact by AI at the infrastructure level and user/application level.

Future Work

Next-generation wireless networks (6G) will increasingly focus on “intelligence” though dealing with a higher level of complexity than all the preceding generations of wireless networks. This will necessitate extensive applications of Deep

Learning-based algorithms and intelligent mechanisms to orchestrate the available resources, services, and users to evolve into self-organizing networks (SONs). Thus, future networks are expected to employ ML algorithms to learn from their environment, adapt to the changes in an automated fashion, and achieve optimal performance.□

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METaverse - ADVENT IN THE AUTOMOTIVE WORLD!

🏢 MOHAN BACHHAV, SHASHIDHAR KORIKAR VITTAL & SANKALP SINHA

IBM Consulting India

Decoding / Understanding Metaverse

In simple terms, a Metaverse is a shared online space, a virtual world backed by technologies letting one meet and interact with other likeminded evangelists and things online.

Metaverse provides its users a shared 3D space which is a customizable digital overlay of the real world and can be immersive and intuitive. This virtual space can either duplicate an actual location, all aspects of real world or be a complete fantasy location.

What technologies constitute Metaverse?

- * Non-Fungible Token (NFT)
- * Augmented Reality (AR)
- * Virtual Reality (VR)
- * Blockchain
- * Mixed Reality (MR)
- * Extended Reality (ER), etc.

Key Attributes of Metaverse

- * Persistence/Synchrony
- * Fully functioning economy

- * Unlimited concurrent users
- * Interoperability of digital assets, information, etc.
- * User-generated content
- * Spanning private/public networks, open/closed platforms, etc.

Metaverse in Automotive space

In the Automotive space, Metaverse can plan a significant role in bringing out concept products quickly and intuitively without adopting multiple Engineering or Mathematical model changes. For example, in

- * Design
- * Online Vehicle Purchase
- * Advertising
- * In-car entertainment
- * Virtual Drive Experience
- * Smart Manufacturing
- * Smart & Secure Supply Chain, etc.

Market Potential

The global Metaverse in Automotive Market was valued at USD 5.3 Billion in 2021 and it is estimated to be valued over

USD 116.5 Billion by 2030, at a CAGR of over 41.46% for the period from 2022 to 2030. North America was valued USD 1.67 Billion in 2021. Amongst geographies, North America would lead the innovations in Metaverse, followed by Europe and China. Fast growing markets like India is fast catching up raising opportunities for technology conglomeration.

Which Automotive companies are moving ahead?

- * AUDI is backing up a startup - Holoride, which has begun selling virtual rides
- * NISSAN is using Invisible-to-Visible (I2V) technology
- * HYUNDAI Motors has also stepped into this space with the online entertainment platform Roblox
- * BMW, Ferrari, VW, Porsche, Tesla, etc. are fast venturing into this space

How Metaverse touches across Automotive Value Chain

Product & Services

- * Virtual rides. Like we travel in the real world, go on trips, drive to the office, off road trips, and across different country landscape and geographies. This is all being implemented in the virtual world i.e., the Metaverse, as well. Virtual reality creates a 360-degree view of the places. As you travel in the Metaverse, you will be able to access places using cars or any other medium of travel as one would do in real world, giving you a much better view than a video or photograph would.
- * The driver of the car would be able to see both real-world and virtual worlds and create immense possibilities for better rides. It uses Invisible-to-Visible (I2V) technology that works with the 3D view and augmented reality.

Dealership

- * Metaverse is going to make the car



purchase a lot easier and bring in innovation at every stage. One will be able to check the cars after putting on the glass and have complete view of the car as one would see in real world

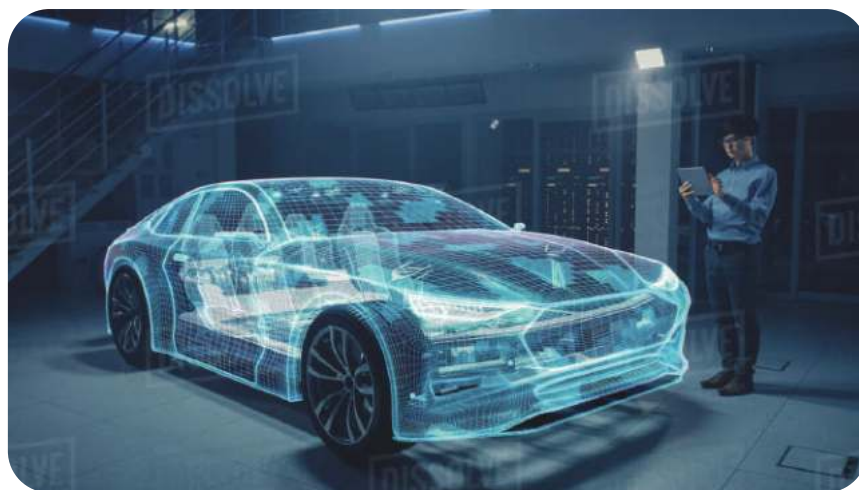
- * Users of Metaverse can virtually visit the car showroom. They can sit inside the car's virtual model. They can even take the car for a spin. All the functionalities of the car can be replicated in the Metaverse. It's just like having a digital twin of the real-world car model
- * If one likes the car, commercials can be closed by making the payment in the form of Cryptocurrency and the car so chosen can be delivered to them in the real world.
- * Tech Mahindra announced their version of Metaverse. They have named it TechMVerse where they specifically mentioned providing car dealership solutions in the Metaverse which they have named DealerVerse

Manufacturing & Supply Chain

- * A Metaverse-driven approach to manufacturing is akin to companies like Shopify democratizing e-commerce and facilitating relationships between business owners and suppliers.
- * Rapid production process design, increase in number of product designs, more collaborative product development, reduced risk to quality control are some of the benefits of Metaverse
- * Increased transparency for customers — customers in the Metaverse will have improved visibility into the supply chain process with 3D representations for how products are built, distributed, and sold. Increased transparency means that customers will be able to know what exact lead times are for the cars or its accessories, and spares and any expected delays in shipping, as well as more visibility into real-time shipping costs from different distributors.

Customer Experience

- * Hyundai Motors has also stepped into the Metaverse with the online entertainment platform Roblox. They have bought Hyundai Mobility Adventure where the users of Metaverse can communicate and interact. They can play games, have fun and a lot more.
- * British supercar maker McLaren



Automotive has selected Infinite World, a leading Metaverse infrastructure platform that enables brands to create, monetize and drive consumer engagement with digital content.

Sample Use Cases

Use Case 1: Metaverse & Auto Commerce

How will it work?

Users of Metaverse can virtually visit the car showroom. They can sit inside the car's virtual model. They can even take the car for a spin. All the functionalities of the car can be replicated in the Metaverse. It's just like having a digital twin of the real-world car model.

If they like the car, they can even make the payment in the form of Cryptocurrency. And the car can be delivered to them in the real world.

Who are pioneering it?

Recently, Tech Mahindra announced their version of Metaverse. They have named it TechMVerse where they specifically mentioned providing car dealership solutions in the Metaverse which they named DealerVerse.

Use Case 2: Metaverse for Manufacturing

How will it work?

A Metaverse-driven approach to manufacturing is akin to companies like

Shopify democratizing e-commerce and facilitating relationships between business owners and suppliers. All three key stakeholders in the manufacturing process are benefitted from it, i.e., Design Companies/ Owners, 3rd Party Manufacturers and Logistics Providers, and Customers.

- * Rapid production process design — in a Metaverse framework, you could easily drag-and-drop your assets in a physics-based simulation and can easily identify how to be more efficient or safe in manufacturing without needing to perform significant physical testing.
- * Increase in number of product designs — as with any new technology where there is ease-of-access for user-generated content, there is an expectation to see more content provided within specific genres and business segments (like how content is handled by YouTube). In the case of manufacturing, the barrier to entry for designing low-cost, easy-to-build products is significantly lower with more specific measurements and advanced CAD-like software.
- * More collaborative product development — the Metaverse is a communal space for sharing ideas. As such, it is incredibly easy for different stakeholders within a business to design a product, share it with manufacturers within the same environment, and iterate based on feedback, which will shorten the product life cycle for projects.
- * Reduced risk to quality control — With



more detailed, physics-based designs, the margin of error for production is much smaller. In terms of impact to businesses, they will see lower churn rates for customers as well as lower return rates for defective products.

- * Increased transparency for customers — customers in the Metaverse will have improved visibility into the supply chain process with 3D representations for how products are built, distributed, and sold. Increased transparency means that customers will be able to know what exact lead times are for goods and any expected delays in shipping, as well as more visibility into real-time shipping costs for different distributors for both freight and last-mile delivery.

Who are Pioneering Metaverse in the Automotive World?

Audi

Audi is backing up a startup, Holoride, which has begun selling virtual rides. Nils Wollny, the CEO of Holoride aspires to take the company to be known as a transportation company for the Metaverse.

Hyundai

Hyundai Motors has also stepped into the Metaverse with the online entertainment platform Roblox. They have bought Hyundai

Mobility Adventure where the users of Metaverse can communicate and interact.

Nissan

Nissan is on the verge of making the rides

more exciting. They are working on ideas for both virtual reality and augmented reality. They are using Invisible-to-Visible (I2V) technology that works with the 3D view and augmented reality.

BMW

BMW iX1 Metaverse provides an opportunity to discover the world of dreams as their theme says, Sheer Driving Pleasure. One can enter their virtual world and digitally self-explore the new iX1 inside three surreal dreams; move around, discover wonders, and create fantastic memories. BMW has adopted Omniverse to maintain an exact simulation of its plant in Regensburg.

Volkswagen

Volkswagen launched an integrated Metaverse campaign to promote the safety and intelligence features of its latest Polo model, the IQ.DRIVE. Fusing the world of online gaming with reality, 'Game On' brings interactive storytelling to life via a treasure hunt for hidden NFTs waiting to be discovered by fans on social media. □

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Autonomous vehicle ECU market – Market dynamics

Leading drivers – The rising number of accidents due to human errors is driving the global autonomous vehicle ECU market growth. Driver error is the main cause of accidents. These accidents can be prevented by encouraging drivers to take precautions and incorporating numerous technologies in vehicles, such as active safety systems. Hence, the automotive ecosystem will gradually shift to autonomous vehicles that are free from human errors. These factors will fuel the market growth during the forecast period.

Major challenges – The high cost associated with semi-autonomous and autonomous technologies is challenging the global autonomous vehicle ECU market growth. The use of ADAS technologies and systems, including radars, cameras, sensors, and delicate and sophisticated image analysis algorithms, is limited to luxury automobiles due to their high costs and maintenance. For instance, ACC is rarely offered in low-cost vehicles, as it costs more than USD 1,500. Similarly, night vision cameras comprise various sensors, such as uncooled microbolometer sensors, which are highly expensive. Such factors will challenge the growth of the market during the forecast period.



Gartner's Top Automotive Trends 2023

Gartner has recently published its 2023 automotive trends. These show the course that the automotive sector will take this year and how can companies best prepare to deal with the events that will take place in the coming twelve months:

- Supply chain shortages are here to stay for a big part of 2023
- 2023 is the moment of truth for BEVs
- Tech complexity and high costs swing the autonomy pendulum from L4 back to ADAS
- Legacy makers push for OTA sales but fail to convince customers
- Online retail transformation slows down
- Investment in cybersecurity climbs but mostly due to compliance
- Focus on sustainability grows due to regulation and financial pressure
- Automotive connectivity points multiply

Fleet Management Trends, Growth, Size, Analysis, Professional Survey & Forecast 2023-2030

According to MRFR analysis, the global Fleet Management market is expected to register a CAGR of ~11% from 2022 to 2030 and hold a value of over USD 37 billion by 2030.

Fleet management is the coordination and management of a company's vehicle fleet, which typically includes cars, trucks, and other vehicles. Fleet management involves tasks such as vehicle maintenance, fuel management, vehicle tracking, and driver management, among others. The goal of fleet management is to optimize the performance and efficiency of a company's vehicle fleet, reduce costs, and improve safety.

The COVID-19 pandemic has had a significant impact on the fleet management industry. With lockdowns and social distancing measures reducing the number of people on the road, many companies have had to reduce their fleet sizes and make other changes to their fleet management operations. At the same time, the pandemic has led to increased demand for delivery services, as more people shop online and avoid crowded indoor spaces. This has resulted in increased pressure on fleet management companies to manage delivery vehicles efficiently and cost-effectively and to ensure the safety of drivers and customers.

Regional Analysis

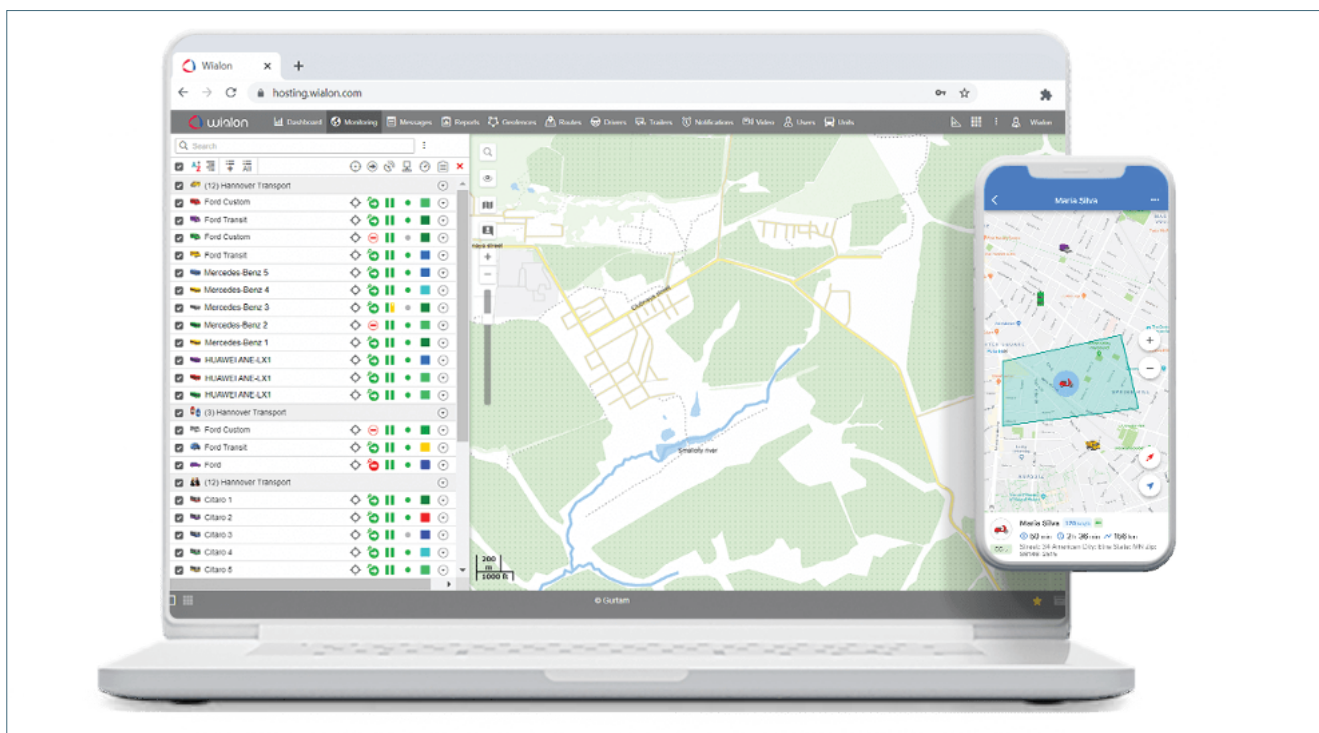
North America is one of the largest markets for fleet management and has a significant market share globally. The region has a well-developed transportation infrastructure and a large number of businesses that rely on vehicle fleets, both of which have driven demand for fleet management services. Additionally, the region's strong economy and supportive regulatory environment have made it a favorable market for fleet management companies, further boosting demand for these services.

Fleet Management Market Technological Advancement

The fleet management market has been undergoing significant technological advancements in recent years, driven by the increasing demand for efficient and cost-effective fleet operations, as well as advancements in technology such as the Internet of Things (IoT), artificial intelligence (AI), and cloud computing. Some of the major technological advancements in the fleet management market include: GPS Tracking: GPS tracking devices are being widely used in fleet management to track the real-time location and movement of vehicles. This helps fleet managers to optimize routes, reduce fuel consumption, and improve the overall efficiency of their fleet operations.

Key Players

Some of the key market players are TomTom N.V. U.S., Fleetmatics Group PLC, General Services Administration, Freeway Fleet Systems, IBM Corporation, Telogis, AT&T Inc., Grupo Autofin de Monterrey, and Navico I.D. The system, MiTAC International Corporation, Trimble Transportation & Logistics, Didi Chuxing, Grab, Cisco Systems.



3 key fleet management trends for 2023 by Wialon

Telematics technology is ubiquitous in the fleet and transport sector, as businesses endeavour to optimise safety, efficiency and performance. As we traverse a tougher economic climate, businesses must be increasingly sophisticated in using the right technology to improve efficiencies. “The race for increased business efficiency is gaining momentum. Using telematics technologies fleet owners will continue to shift their focus from mere tracking to insights-driven intelligence. Based on our partners’ experience and market observation there are several key focuses that we see worldwide in the sector”, says Sergei Kostenko, Head of Product at Wialon, global telematics platform, which provides fleet management services to 3,5 million vehicles in over 150 countries.

Automation will turbo-boost efficiency

Fleet management systems have become critical for fleet companies as they seek to digitise and optimise their processes. The solution providers will increasingly invest in technologies that identify fleet operators’ daily workflow patterns, automate routines, predict and recommend next actions – from smart devices connection to intelligent geofencing, automated route planning & vehicle dispatching, alerts auto processing.

We are seeing a shift from just “paperless” to “clickless” interfaces, where users don’t need to spend 90% of their time on manual data inputs & checks, but rather focus on making the right decisions. For fleet operators and dispatchers this means the ability to turbo-boost productivity: from tracking 10-15 vehicles per operator on average, to effectively managing up to 50-100.

The use of telematics in insurance will gradually become the industry standard

Telematics systems gather hundreds of sensor inputs and analyse vast amounts of data to identify patterns that indicate poor or dangerous driving. Collected telemetry can be combined with additional data such as weather and service history, to deepen understanding and insights about drivers and vehicles.

For insurers, this can significantly improve the precision of risk assessments, and provide fleets with personalised insurance plans, taking into account hundreds of parameters in real time. Direct access to historical sensor data and videos empowers insurers to make more qualified decisions on claims. The use of telematics for insurance will gradually become the industry standard.

AI-driven fleet optimisation

Advancements in AI have unlocked the potential for broad adoption in fleet management. Vast amounts of digitised and structured telematics data create a fertile ground for AI to identify bottlenecks and suggest insights to improve the fleet business metrics. It will drastically improve asset utilisation, driving safety, fuel consumption efficiency and the inventory optimization. AI will act as a business enabler and will provide the fleet managers with transparent insights on how current activities impact the financial results.

“All these technologies are ready for wider adoption in the sector. In 2023 we will see more and more fleets leveraging AI to drive down Total Cost of Ownership and improve their assets efficiency. In fact, proper use of AI will become a great competitive advantage, so we recommend fleet owners stay open to integrating such technologies”, says Sergei Kostenko.

Consumers will prefer hybrid EVs in the future

Zebra Technologies Corporation released the findings of its Automotive Ecosystem Vision Study, which confirmed automotive manufacturers are under pressure to accommodate growing consumers' preference for electric vehicles (EVs) in the near future. Automotive manufacturers must plan for a smooth transition to EVs, which have very different requirements from raw materials to final assembly. Technology-led priorities will therefore be focused on increasing automation, building in-house technologies, and expanding visibility across their respective production and supply chains.

Despite a fluctuating economy, autoPHEV/motive manufacturers are ready to invest in technology innovation as seven-in-10 (74% globally, 69% in APAC) expect to increase their tech spend and six-in-10 (67% globally, 63% APAC) plan to increase their manufacturing infrastructure spend in 2023.

The survey was conducted from August to September 2022, with participation from 1,336 respondents globally, including industry decision-makers, fleet managers and consumers. In APAC, the 350 respondents were surveyed across India, Greater China, Japan, and South Korea.

APAC consumers including India respondents will prefer purchasing EVs in the future

The survey reflects that in the near future there will be a shift in preference, with more than half of consumers (53% globally, 60% in APAC including India) indicating going for a hybrid electric vehicle (HEV). However, navigating this increasing demand for EVs comes with challenges as 68% of global automotive industry decision-makers (60% in APAC including India) say they are under high pressure to produce next generation (i.e., electric) vehicles, while 75% of them (71% in APAC including India) are under high pressure to deliver products that are more eco-friendly, sustainable, and safer for the environment.

The study also highlights consumers across generations pushing automotive manufacturers' acceleration to technology innovation as eight-in-10 say sustainability and eco-friendliness are key priorities in their vehicle purchase and lease decisions. Eighty-seven percent (87%) of Millennials prioritize sustainability in their vehicles followed closely by 78% of Gen Xers and 76% of Baby Boomers. Within APAC, 85% of consumers were aligned with these key priorities, consisting of 92% of millennials, 83% of Gen Xers and 72% of Baby Boomers prioritize sustainability the highest.

Consumers are driving the growing emphasis on personalization – the ability to customize a vehicle to their liking. Nearly four-in-five consumers say personalization options factor into their decision to purchase a vehicle, and eight-in-10 fleet managers share these same requirements for sustainability and personalization. APAC consumers resonate with this most strongly when compared with their global counterparts, with 86% prioritizing personalization options in their purchasing decisions, and 92% of fleet managers sharing the same requirements.

While nearly 80% of automotive industry decision-makers globally (77% in APAC including India) recognize consumers expect more sustainable and personalized vehicle options today, around seven-in-10 concede it's difficult to keep up with increasing customization demands. As a result, three in four automotive manufacturers globally say a top priority is to build strategic partnerships with tech companies for their next generation of production. This number is lower across APAC, at 72% and 64% respectively.

"While it's heartening that consumers are leaning towards a greener automotive future with greater preference towards electric vehicles, this is a signal to automotive decision-makers to actively invest more in safer technologies and robust infrastructure, to better serve their customers," said Tan Aik Jin, Vertical Solutions Marketing Lead APAC, Zebra Technologies.

Trust and Transparency in Automotive Manufacturing

Data and information transparency is highly important to consumers and fleet managers alike, and they are seeking more visibility into the automotive ecosystem. When considering a vehicle for purchase or lease, 81% of consumers globally (85% in APAC including India) and 86% of fleet managers (92% in APAC including India) indicate they want to understand the origin of materials and parts on their vehicle. Millennials lead the way in demanding more transparency in automotive manufacturing, as more than eight-in-10 (both globally and in APAC including India) say it is important to have access to manufacturer information along with knowing if source materials and parts are sustainable and understanding how the vehicle is manufactured from end-to-end.

Beyond gaining greater visibility into the automotive manufacturing process, once they have their vehicles, 88% of consumers (82% in APAC including India) and 86% of fleet managers (88% in APAC including India) want to understand how the data from their vehicles will be used by the automotive ecosystem.

After a vehicle purchase, 83% of consumers and 84% of fleet managers expect ownership and control of the data their vehicle generates. This sentiment is similarly shared within APAC, by 86% of consumers and 88% of fleet managers.

Automotive Supply Chain Visibility

A majority of consumers (79% globally, 83% in APAC including India) and fleet managers (81% globally, 84% in APAC including India) want end-to-end visibility during the manufacturing process. However, only around three-in-10 automotive industry decision-makers say they will prioritize connecting real-time data systems (30% in APAC including India) to enable a holistic view of operations and increase visibility across production and throughout the supply chain over the next five years (32% in APAC including India).

Slightly more than one-third of original equipment manufacturers (OEMs) globally and in APAC said autonomous mobile robots (AMRs), RFID, rugged handheld mobile computers and scanners as well as industrial machine vision will improve supply chain management. Similarly, for suppliers, one-third of those surveyed cite mobile barcode label/thermal printers, wearable computers and location technology as the technologies to do so.

Overall, around seven-in-10 automotive industry decision-makers (76% globally, 67% in APAC including India) agree digital transformation is a strategic priority for their organization. In the next five years, they anticipate expanding their use of technology, with 47% (both globally and in APAC including India) focused on additive manufacturing/3D printing and 45% globally (46% in APAC including India) on supply chain planning solutions.

Mahindra to manufacture 2W & 3W EVs from its Telangana plant

Mahindra & Mahindra (M&M), will be investing INR 1,000 crore for expanding into electric vehicle (EV) manufacturing at its plant in Zaheerabad, Telangana. The investment will spread over eight years. This Zaheerabad plant in Medak district, will manufacture electric three and four-wheelers. At present Zaheerabad plant manufactures tractors.

A memorandum of understanding (MoU) between M&M and the Telangana government was signed recently for this. The manufacturing facility which is in the Telangana Mobility Valley (TMV), a new initiative aimed at boosting sustainable mobility in India. Zaheerabad is one of Telangana's four mega EV manufacturing clusters.

Tamil Nadu releases new e-vehicles policy

The Tamil Nadu Electric Vehicles Policy 2023, released by Chief Minister MK Stalin on 14th Feb'2023, will provide capital subsidy for charging stations and battery swapping stations. It also mentions incentives for retrofitting and re-manufacture of EVs.

According to the policy, the TN government shall develop a road map to have TVs in public and institutional fleets operating in the State in phases. "The State shall endeavour to increase the share of electric buses to 30% of the fleet [operated by State Transport Undertakings] by 2030."

The Government of Tamil Nadu has a vision of attracting Rs. 50,000 crore worth of investments in EV manufacturing, creation of 150,000 new jobs during the Policy period, and development of a robust EV ecosystem in the State.

The policy objectives are as follows:

- a) Transform Tamil Nadu into the preferred destination for EV manufacturing in South-East Asia
 - i) Develop robust infrastructure & industrial ecosystem to attract manufacturing units.
 - ii) Create indigenous EV manufacturing value chains by attracting EV OEM & Component manufacturers to establish units in the State.
- b) Accelerate adoption of EVs in Tamil Nadu
 - i) Provide initial impetus for early adopters of Electric Vehicles through special demand incentives.
 - ii) Develop charging infrastructure with favourable power tariffs through public/ private measures.
- c) Enhance the development of the EV ecosystem in Tamil Nadu
 - i) Develop industry-academia linkages to create a skilled workforce pool for EVs.
 - ii) Promote R&D and innovations in automotive and shared mobility.
 - iii) Promote the recycling industry to develop a circular economy in the State.
- d) Develop EV Cities in Tamil Nadu
 - i) Promote Chennai, Coimbatore, Tiruchirappalli, Madurai, Salem, and Tirunelveli as pilot cities for implementing e-mobility solutions.
 - ii) Promote electrification of commercial and public transport fleets.

FADA challenges Chandigarh Administration EV Policy 2022 in High Court

The Chandigarh Administration's EV Policy has come under judicial scanner with the filing of a petition before the Punjab and Haryana High Court by the Federation of Automobile Dealers Association of India.

Among other things, the federation is challenging the Electric Vehicle Policy, 2022, for "setting mandatory limits and capping the sale and registration of the non-electric vehicles in the city".

Lithium reserves found in Jammu and Kashmir

Lithium reserves have been found for the first time in the country in Jammu and Kashmir. Lithium is a non-ferrous metal and is one of the key components in EV batteries.

"For the first time, lithium reserves have been discovered and that too in Jammu and Kashmir," Mines Secretary Vivek Bharadwaj said. Upon exploration by the Geological Survey of India (GSI), lithium reserves have been found in Reasi district of Jammu and Kashmir.

Earlier, the Mines Ministry had said that to strengthen the critical mineral supply chain for emerging technologies, the government was taking several proactive measures to secure minerals, including lithium, from Australia and Argentina.

According to Pankaj Sharma, Co-Founder and Director of Log9 Materials, "The unavailability of Lithium has been one of the reasons why India has been dependent on other countries for Li-Ion batteries and other EV components. Lithium being one of the core elements of the Li-Ion batteries and taking into consideration the financial impact of sourcing Lithium, the recent discovery of Lithium reserves in J&K will enable India's ambition to become self-sufficient in its energy storage needs. At a time when the government has been catalysing initiatives toward EV battery manufacturing and green mobility to reach its ambitious net-zero goal by 2070, the report from the Geological Survey of India about the discovery brings hope for localized production of Li-ion cells and batteries, which will also go a long way in reducing our trade deficits with the neighbouring country."

Magenta, an EV charging and mobility solution raises \$40 million

Indian homegrown electric vehicle charging and mobility solutions company Magenta has raised a total of \$40 million in Series B funding through a combination of equity and debt.

It has closed \$20 million in equity funding led by two global marquee investors, co-founder Maxson Lewis told DealStreetAsia in an interview.

The company also raised \$20 million in debt in the same round, Lewis said, without disclosing the names of the investors. He said the company is expected to make an announcement in a couple of weeks.

Seed-funded by HPCL in 2018 and backed by Microsoft's global startup program, Magenta had raised pre-Series A funding from JAN (JITO Angel Network) and LetsVentures in 2020. This was followed by a \$15 million Series A funding by Indian American billionaire and serial entrepreneur Kiran Patel in May 2021.



Uber pilots India's first bus hailing service in Gurgaon

Uber has partnered with public transport body in Gurugram to power city buses with bus hailing through its Uber app. Commuters can now book and pay for their seats in Gurgaon's public transport buses using the Uber app. This pilot will start with Gurugaman CNG AC buses on the top two routes during peak commute hours. Commuters will be able to pre-book seats, follow the live location and route of the bus, and know its expected time of arrival (ETA), just like they can do with an Uber cab.

The two routes where this pilot will operate include Badshahpur bus stand to DLF Cyber Park (Shankar Chowk) via Huda City Centre metro station, and BPTP Astaire Garden (Sector 70) to DLF Cyber Park (Shankar Chowk) via Golf Course Road. Buses will run on each route from 7 am till noon, and from 3 pm to 8 pm daily. Pricing for the tickets begins at INR 7 per kilometer.

The partnership will reimagine bus travel by bringing a convenient commute experience with pre-booked seats in public transport buses, and fewer stops which means a faster commute, and a safer ride as there will be no standing passengers in moving buses. Overall, a faster and more pleasant travel experience on the buses. The commuters only need to show digital code confirmation on their Uber app to the driver as they board the bus. They will also benefit from round-the-clock safety support from Uber including having access to a 24X7 Safety Line.

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13 14

April 2023
KTPO, Bengaluru,
India



5000+
DELEGATES & VISITORS

200+
EXHIBITION BOOTHS

60+
SPEAKERS

10+
SESSIONS

Who Should Attend?

- | | | |
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| <ul style="list-style-type: none">■ Automakers■ Automotive OEMs■ Mobility Service Providers■ Tier 1, Tier 2 & Tier 3 Suppliers■ IT Companies■ TSPs■ Chip Manufacturers■ Semiconductors■ System Integrators■ Software/Hardware Providers | <ul style="list-style-type: none">■ Insurance Companies■ Lighting Companies■ Map Providers■ Content Providers■ App Developers■ Big Data Analytics■ Telecom / Wireless carriers■ Cloud Service Providers■ Component Manufacturers■ EV Manufacturers | <ul style="list-style-type: none">■ Government Bodies■ Policy Makers■ Academia / Institutions■ Car Sharing Companies■ Taxi Aggregators■ PSUs / STCs■ Financial Services■ Associations■ Consultants■ Investors■ Logistics & Transport |
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