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Challenges & Converging Technologies in Logistics & Transport

RICHA TYAGI
Telematics Wire

The distance from digital to physical is shrinking day by day. The world is getting more connected. The world is virtually moving towards becoming a global village in most of the facets of human needs and transactions. Due to exponential developments in travel and communication, sharing of scientific and technological developments has revolutionized not only how we live and interact but has conjoined the world economies. Sharing of surplus goods, services and resources from one

habitat to another in a state or in a nation and lastly but not the least among the world nations is the core of this global village, thanks to continuously developing means of transportation and travel.

The canvas of movement of goods and people is dotted with the number of mobility options. The prominent ones being shipping, railways, aeroplanes, and now drones, air taxis are slowly joining the fray. But, goods transportation and passenger mobility by road is still the most utilized option in world economy and same

goes for India too.

According to Mordor Intelligence report, Transportation Industry in India - Analysis of Growth, Trends and Forecast (2020 - 2025), transportation industry contributed roughly 6.3% of GDP and is majorly dominated by road sector. Whereas in many developed economies, transportation accounts for between 6% and 12% of the GDP. In addition, logistics costs can range between 6% and 25% of GDP. The government has recognized the seriousness of the development of this



segment for the economic health of the nation and has allowed 100% FDI in roads and highways sector to boost connectivity across the country.

Where does the problem lie?

There are several challenges in India's logistics sector that are contributing in high logistics cost such as no uniformity in state policies, slow pace of digital adoption, poor transport infrastructure, under-developed road network and many more. Different components of logistics sector such as production, warehousing, transportation, wholesale, and retailing are affected by these and various other problems.

High logistics cost in India in comparison to other countries is an area of concern as it creates challenges for the manufacturing growth and comprehensive development of the country. According to a report by Arthur D Little and the Confederation of India Industry (CII), India's Logistics and supply chain costs currently amount to a staggering US\$400 billion, up to 14% of the GDP, China's 9% and the US and Europe on

average at 8%. If we compare it to the global average of 8%, India's logistic cost has raised a competitiveness gap of approximately US\$ 180 billion.

With the increasing number of vehicles on the road, the management of transport and fleets becomes a critical component in the gamut of supply chain. The future of transportation and logistics lies in technology and digital innovations. Traditional ways of managing operations and flow of required information are becoming obsolete, inefficient and costly. That's where telematics based software solutions come in.

Twin Software solutions

The two most important software being utilized in logistics and transport segment are fleet management (FMS) and transport management software (TMS). The difference between a TMS and an FMS is that TMS solves planning, execution and post-processing (mostly day-to-day ops processes), while FMS focuses solely on fleet telematics and providing visibility on the movement of vehicles.

In the transportation and logistics industry, FMS and TMS are prominent for their contribution in managing the operations in an efficient, transparent and online sharing of information with all stakeholders. Both these software are having most of the common features, but their focuses are different and they are not mutually exclusive, but are used in combination by large fleets' operations. However, for logistics companies FMS is more suitable while in case of organizations

having transport focus TMS is more in use.

Fleet Management

The world is marching into the era of connectivity with instantaneous online sharing of information, adopting more effective methods of driver-vehicle communications and vehicle-to-infrastructure connectivity. To manage all the problems occurred in managing fleets we have come a long way from the time when fleet management solutions were only a means for tracking vehicles. More and more comprehensive software solutions are

FMS Solutions providers in India (Table 1)

SI No	Company	Solution	Head Office
1	Arya Omnitalk	Fleet Vigil	Pune
2	Autoplant	En Route	Maharashtra
3	BlackBuck	Blackbuck - Trucker	Bengaluru
4	Bosch India	iTraMS	Bengaluru
5	CarlQ (Varroc)	CarlQ Platform	Maharashtra
6	Intellicar (TVS)	TRACK	Bengaluru
7	SmartDrive (Omnitracs)	Omnitracs One	Hyderabad
8	iTriangle	aQuiLa Track	Bengaluru
9	Traxoid Automations	Traxroot- Fleet	Bengaluru
10	Jungleworks	Tookan	Haryana
11	MAK Tree solutions Pvt. Ltd	MAKTree	Bengaluru
12	Kale Logistics Solutions Pvt. Ltd	HELIOS	Delhi
13	Here Technologies	HERE Last Mile	Bangalore
14	LOZICS	LOZICS	Mumbai
15	Scania	Scania Fleet	Karnataka
16	Roundtrip	EasyRoutes	Tamil Nadu
17	SparkMinda	TrackITplus	Pune
18	Uffizio	Trakzee	Gujarat
19	Odoos	Odoos Fleet	Gujarat

reaching the market with newer and better features in line with the rising expectations of stake holders in logistics. Some of the important Indian and global companies in fleet management are shown in Table 1 & Table 2.

Converging Technologies in Fleet management

Telematics touches almost every area of fleet management and, therefore, brings a whole addition of use cases to fleet managers. Let's see how this combination of telecommunications and informatics is pushing the envelope for effective fleet management. **Pre historic track and tell telematics devices have long evolved in smart devices** playing ubiquitous role in monitoring a vehicle using GNSS, dashboard cams, sensors, and various other tools and technologies. It is used to record and map the vehicle's location, its route, speed, and ensure the safety of the drivers and passengers through various numerous sensors. It combines telecommunication, vehicle technologies, for instance, road

safety, computer science, and electrical engineering to give a connected driving experience.

Real-time updates: With the help of telematics, keeping real-time updates become very easy. With smartly managed fleets, the managers are a lot more flexible in their day to day operations and the business could get more profitable. They can monitor the current status of the vehicles and update the customers with accurate timelines for the delivery of products. Immediate monitoring invites better response to external factors such as inclement weather conditions, temporary disruptions and modified orders.

Safer fleets: Fleet vehicles are equipped with a number of sensors to ensure that drivers on the road follow safe practices. Access to tons of data has been provided regarding driver behavior and vehicle condition. FMS can warn drivers about aggressive activities they may be doing, a vehicle they may collide with while parking, punctured tires, equipment failure, and more

Reduced fuel costs: A NACFE (North American Council for Freight Efficiency) report states that fuel accounts for 22% of the total fleet management cost. And with fuel prices rising, the share is expected to only get bigger. FMS provides detailed reports on fuel consumption and idling of vehicles. With proper evaluation, some instances of unnecessary fuel consumption can be quickly identified and eliminated. Another way that FMS reduces fuel costs is by ensuring optimum vehicle performance.

Predictive maintenance: Vehicles are the most valuable assets. Conventional methods of estimating vehicle maintenance rely either on the number of miles the vehicle has seen or on hours/days of use are already being replaced by the analytical data provided by OBD port in the vehicles. With FMS, vehicle can even signals when vehicle is likely to face some breakdown or actually need maintenance. This helps improve both the life and performance of these carriers. Additionally, predictive maintenance reduces the avoidable cost of breakdown and untimely maintenance.

FMS Solutions providers (International Companies Table 2)

SI No	Company	Solution	Head Office
1	Mireo	MireoFleet	Balkans
2	Fleetio	Fleetio	UK
3	Geotab	MyGeotab	Canada
4	Track Your Truck	NetTrack	Lynchburg, US
5	Onfleet	Onfleet	USA
6	Avrios International	Avrios	Germany
7	GPS Trackit	GPS Trackit	USA
8	Heavy Vehicle Inspection & Maintenance	Heavy Vehicle Inspection Maintenance Fuel HVI APP	USA
9	Verizon Connect	Verizon Connect	USA
10	GPS Insight	GPS Insight	USA
11	Teletrac Navman	TN360	Australia
12	Abivin	Abivin vRoute	Singapore
13	Route4Me	Route4Me	USA
14	Whip Around	Whip Around	USA
15	Quickbase	Quickbase	USA
16	Samsara	Samsara	USA
17	Navotar	Navotar	USA
18	Gurtam	Fleetrun	Lithuania (EU)
19	PeopleNet Communications	PeopleNet Fleet Manager	USA

It adds to user confidence in the vehicle reliability.

Cheaper insurance: This has a tremendous potential when it comes to fleet management benefits. Auto insurers now offer the option of usage-based insurance (UBI), which relies on information obtained from telematics black boxes. Reliable-driving behavior builds confidence among insurers that they are less likely to encounter a situation that demands compensation on their behalf. UBI programs have recently become quite popular in many countries and fleet owners there from various businesses are cutting costs with cheap auto insurance – sometimes even as cheap as 40% with Optimum Driving Score. In India too experiment in UBI are being attempted but as yet it is far from securing a worthwhile place in insurance space alongside traditional insurance models.

Internet of Vehicles (IoV). When it comes to fleet management system, Internet of Things (IoT) morphing itself into IoV. Notepads have been replaced by tablets and handheld devices. The maintenance staff can now quickly scan

any part of the vehicle and easily update the Central Hub's diagnostic report in a matter of seconds. With faster ground operations, fleet manager can easily dispatch vehicles and meet growing demands without losing the edge on the quality side of things. Though IoV has a potential of changing the future of fleet management, yet a lot of developments in policies, business practices will have to evolve before IoV becomes a commercial reality

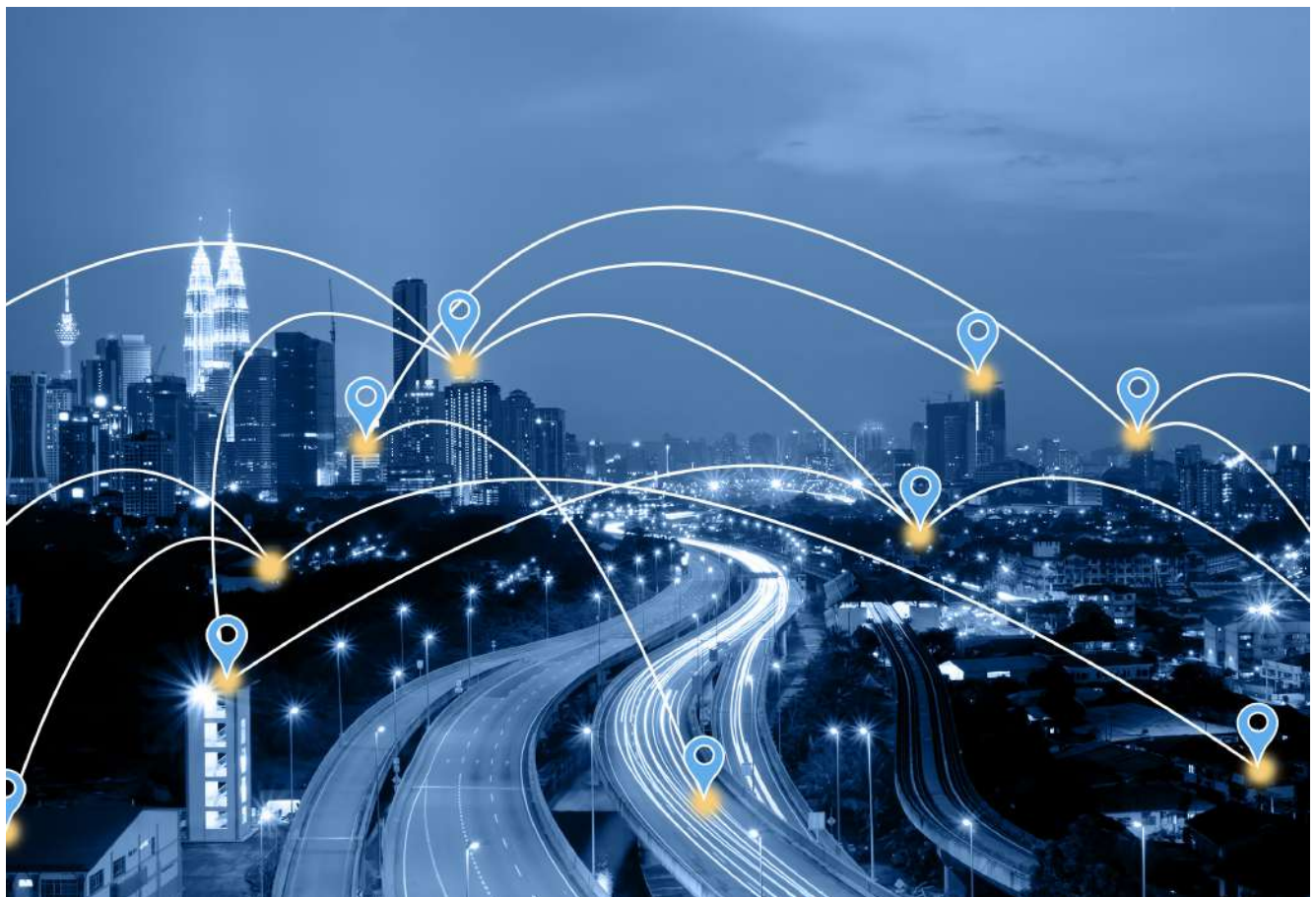
Connected mobility. is yet another invaluable addition to the fleet management. It has brought greater safety and efficiency to the transport models. We are moving to a future where vehicles can communicate with each other to avoid collision, with traffic lights for continuous movement or the infrastructure that communicates with trucks helps them find safe parking spaces.

Big Data and its Impact- Courtesy AI & ML: Fleet management operation consists of multiple data points, and how that data makes the process more efficient. A modern connected vehicle can generate huge amount of data per day of operations could be as high as more than a terabyte in an hour. Yet collecting large amounts of

data would be pointless without a powerful way to process it - enter big data! Inspired by Artificial Intelligence and Machine Learning, Big Data aces it with advanced solutions for fleet management.

Augmented Operations with Augmented Reality: Augmented Reality (AR) is still in its nascent stage. But it's expected to be more relevant in the future of fleet management. From loading the vehicle to driving it safely on the road, AR finds application virtually in almost every aspect of fleet management. AR is a step further with wearable technology. Imagine maintenance workers wearing smart glasses, which let them know just by looking at a selected part of the vehicle. This makes routine inspections easy, reliable. In warehousing operations too observers can easily know the location of each item in the cargo hold, and where to go inside the truck for easy unloading.

Blockchain brings Transparency and Accountability : Blockchain is a method of record keeping where irrevocable records of transactions are available to all participants – making it virtually impossible to alter or fudge the records.



Even though blockchain faces some challenges such as standardization in record-keeping methods and acceptance of the technology from various industries, most experts agree that it will play a key role in fleet-management solutions. Blockchain is useful to create transparent, automated payment systems. This makes the transaction part easy for the business well as other parties such as vendors, suppliers, owners and fleet managers. This can be done by creating smart contracts that automatically initiate transactions upon completion of the delivery. Blockchain also removes unnecessary middlemen and third parties from the equation, adding to the overall efficiency of the process.

Ecosystem in India

There are various factors that also need to be addressed for matching world standard in our logistics and transport system.

Low education levels and Lack of Training: Fleet driving is not an easy task. The driver is on the steering for extended periods of time ensuring safe driving standards with the precious cargo behind him. In India, the truck drivers are generally not adequately educated and trained. The survey done by Save Life Foundation in 2020 found that

based on educational qualification, overall 37.1% of truck drivers were educated up to primary level (until Class 5th), 44% were educated up to high school level (until Class 10th) while 8.8% were illiterate. Trained drivers take a comprehensive view of what is happening on the road, thus improving the overall safety and efficiency of the operation.

Lack of standards: Indian trucking industry is suffering due to its unorganized nature. Every state has its own different policies. The working conditions for the truck drivers are not satisfactory due to lack of proper standards and regulations. There is no formal association to protect the interests of drivers and this has led to a decline in the number of new players entering the field.

Fragmented Market : As per NITI Aayog report, 2021, around 75 percent of the market is run by small owner-operators who own up to five trucks. Only 10 percent of the market is run by big fleet operators who own more than 20 trucks. Small players are unable to optimize driving patterns and have less ability to invest in larger trucks, digital tools and software, and the expertise required to operate them. This market structure creates an impediment in shift to

FMS by these players.

Autonomous Vehicles fleet a paradigm shift

Would a discussion in fleet management be complete without bringing up autonomous vehicles? Obviously not!

Autonomous vehicles are now getting attention in the entire transportation industry, whether it is a taxi booking service or paratransit dispatch system. The benefits of an autonomous vehicle are obvious, especially for commercial fleets. Autonomous vehicles will change fleet management, they don't need long breaks, are safer on the road, and help cut down costs. Fleets of self-driving vehicles are the next big thing in the future of fleet management.

Conclusion

FMS is an effective innovation for the trucking industry, which is bringing transparency and improves the efficiency of operations for operators, but at present in Indian logistics and transport ecosystem, FMS has a long way to go. In order to make better ecosystem in India, the government needs to take initiatives to improve poor road infrastructure, digital connectivity and develop training centers for training of drivers.

Government Initiatives

Uttar Pradesh government and some other states have already granted industry status to warehousing and logistics sector in the state in line with inclusion of logistics and infrastructure as subhead in the category of logistics and transport industry by Government of India. The need for integrated Logistics sector development has been felt for quite some time in view of the fact that the logistics cost in India is very high compared to developed countries. Indian government is trying to fix the problem of managing cost in the logistics sector by creating a competitive awareness amongst states to sensitize the governing mechanism towards the logistics cost. According to the 3rd edition of Logistics Ease Across Different States (LEADS), 2021, Gujarat was adjudged as the Best Performing State in the Logistics Performance Index, while Haryana and Punjab stood at the second and third, respectively.

The central govt also launched the 'PM Gati Shakti Master Plan', an INR 100 lakh-crore project for building 'holistic infrastructure' in India. The idea behind the scheme is that the government is aiming to create a digital platform promising the "integrated planning and coordinated execution" by sixteen ministries. It will bring many government departments like railways, roads and highways under one umbrella. In this era of geo-satellite imagery, Big Data, land and logistics plans would be realized in an efficient manner on the ground.

Amongst many other initiatives for Improving state of road infrastructure in the country undertaken by MoRTH, the program to convert some state roads in NHs merits a mention here. According to MoRTH this conversion includes state roads running through length / breadth of the country, connecting adjacent countries, National Capitals with State Capitals / mutually the State Capitals, major ports, non-major ports, large industrial centers or tourist centers, roads meeting very important strategic requirement in hilly and isolated area, arterial roads which enable sizeable reduction in travel distance and achieve substantial economic growth thereby, roads which help opening up large tracts of backward area and hilly regions, achieving a National Highways grid of 100 km, etc. This is bound to improve transportation scenario within the country.

On the other hand, Indian government is also taking interest in the safety of passengers in public and commercial transportation. AIS-140 is a major regulation that mandates all commercial vehicles to be equipped with GPS-tracking devices that enable continuous tracking and tracing. As per the law, each truck should have an active GPS device, thus enabling basic telematics services of tracking, tracing and navigation along with SOS functionalities.

THE PATH TO NEXT GENERATION PLATFORM FOR IOT-POWERED INSURANCE

DOMENICO MANGIACAPRA, Henshin Group

TOMASO MANSUTTI, Wefox

Disruption and innovation in the insurance world

Two current trends are significantly reshaping the global insurance industry: IoT technologies and Sharing Economy.

Internet of Things (IoT) is profoundly transforming the insurance sector because, for the first time, all actors in the ecosystem – customers, insurers, and the various stakeholders in other industries – can be directly connected. Products, tools, services, people, and organizations are now fully capable of connecting and communicating with each other through smart sensor networks.

A remarkable example is customer relationships today. Connecting with customers has never been so easy. Contact

used to typically occur at point-of-sale, claims and renewal periods. Now, with the use of wearable devices, home automation and telematics, insurers can connect with customers on an ongoing basis and providing valuable feedback – and pricing – based on activity levels.

If this growth trend continues at the current rate, as estimated in the recent report published by Transforma Insight (2020), global IoT market is expected to grow to 24.1 billion devices in 2030, generating \$1.5 trillion annual revenue, a compound annual growth rate (CAGR) of 11%. This means that IoT connectivity will become pervasive, as sensors will be embedded in the largest number of vehicles, buildings, appliances, and wearable devices

that a typical household uses.

Considering predictions of analysts and industry experts, it is reasonable to assume that by 2025 each of us will have at least fifteen connected IoT devices, leading to an exponential increase in data. Given these estimates, it is not hard to understand how the impact of IoT technologies will be greater on the insurance industry – compared to other industries – which has always been data-centric and data-driven. Insurance companies around the world have long relied on historical data from policy administration solutions, claims management applications and billing systems to make informed decisions about risks, customers and more. What has changed recently is the availability of huge

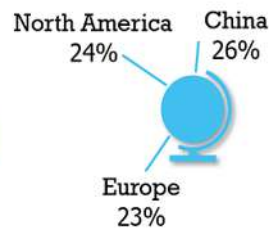
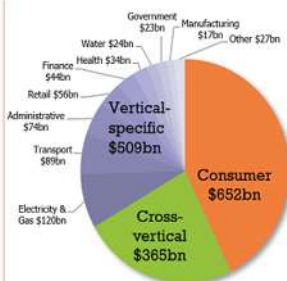
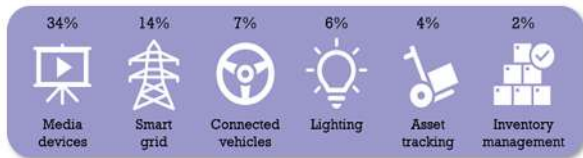
INTERNET OF THINGS MARKET SCENARIOS 2019-2030

24.1 billion

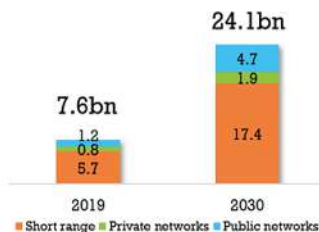
IoT connected devices in 2030 (7.6bn 2019)

\$1.5 trillion

IoT revenue in 2030 (\$465bn 2019)



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Source: [Transforma Insights](https://www.transformainsights.com/) (2020)

volumes of new data captured by sensors and other sources; this entirely new event is overwhelming the insurance business model upside down. The new industry leaders will be those who can process this explosion of data in a timely manner to make the right business decisions.

The dizzying and unstoppable rise of IoT applications, along with big data trends, are therefore paving the way for additional revenue streams, niches of products, innovated distribution options and new service opportunities primarily in the insurance world and in a variety of areas: Connected Car primarily, then Smart Manufacturing, Smart City, Smart Home, Connected Health, and Connected Public Administration.

A second significant trend that is a source of disruptive innovation in the insurance industry is the **Sharing Economy**. The Sharing Economy, also known as collaborative economy, is an economic model centered on the practice of exchanging and sharing goods, knowledge and/or services that in recent years has completely redesigned social and consumption coordinates. The goal is to achieve economic, environmental, and social improvement. In fact, the sharing of goods and services allows not only to minimize the waste of resources and its environmental impact, but also to obtain a significant economic return. Moreover, the Sharing Economy makes it possible to achieve greater individual and collective wellbeing.

Entire productive sectors – from rental, to mobility, to real estate, to entertainment – have been involved in the transition towards the **new paradigm of Insurance-as-a-service**.

For some time now, insurance companies have been responding to this shift from product to service and from ownership to access. These are called upon to rethink all the steps of the value-chain, proving flexibility, adaptability, and speed. Thus, the entire sector seems to be converging on the following new assumptions: insurance products should all be focused on people's needs, they should be smart, activated instantly, relieved of a lot of bureaucracy and with an increasingly short-term perspective.

In light of the above trends, it is clear that the **insurance industry is on the edge of a radical change**. However, with

a few exceptions, the entire sector is still at an experimental level of implementing the potential enclosed in IoT technologies. That's because it's not just about introducing new technologies, but about the ability to manage complexity, having platforms that can integrate huge amount of data from IoT devices quickly and, above all, flexibly. In addition, the insurance world is a particularly complex industry with a more abstract customer experience, where – unlike the retail sector, for example – a push strategy still prevails over a pull strategy, i.e., products are still more brought to customers instead of being requested.

From Connected Car to Connected Insurance

Within the insurance sector, the motor insurance segment is certainly worthy of special emphasis as mobility is a source of a more sustainable economic, social, and environmental development.

The motor insurance industry has unquestionably been one of the sectors most affected by the effects of the *Fourth Industrial Revolution* which can be summed up by the blurring of the line between the digital and the physical world and realizing a shift from traditional networking to more digital interactions through mobile communication, social media, and online events.

The Covid-19 pandemic has merely accelerated processes that were already in place. One of these processes is precisely the digital transformation of entire economic sectors including finance, retail and logistics, marketing, and advertising, and automotive.

A careful reading of the statistics confirms this development trend.

In 2013, McKinsey¹ estimated that the number of networked cars would rise by 30% a year. Two years later, Gartner² predicted that there would be 250 million connected vehicles on the roads by 2020.

According to what emerges in the recent report published by Technavio 2021, it is reasonable to assume that connected vehicles will be the precursor to the large-scale proliferation of telematics insurance.

As the data clearly show, the Automotive Connected Car Platform market is projected to grow by USD 4.92 billion, registering a CAGR of almost 13% during 2021-2025.

Connected cars generate an impressive

amount of data and have tracking capabilities that can help insurers develop accurate pricing strategies based on consumers' driving behaviour. The data collected by connected cars can also support insurers in streamlining the claims process and provide cost savings.

Many insurance companies, in fact, still have a lot of manual workflows. For instance, accident claims are typically reported to the insurance company by phone and require the submission of attached documentation. Long reporting times, incorrect or missing data, and imprecise descriptions result in avoidable additional workload for the customer and the claims handler during claims processing. This example is one of several scenarios where **telematics** data offers great value.

Telematics products create value both for customers – who can benefit from lower premiums and value-added services – and for insurers, as they gain benefits on their income statements.

Initially, about fifteen years ago, **usage-based insurance (UBI) policies** were mostly based on mileage and speed. Now, recent advancements in technology have increased the effectiveness, accuracy, and cost of using telematics, allowing insurers to capture data not only on how many miles people drive, but also on driving behaviours (i.e., data on speed, acceleration, hard braking, hard cornering, time of day, and phone use while driving). Thus, the outcome of this technological progress has been the growth of several variants of UBI model, which include Pay-As-You-Drive (PAYD), Pay-How-You-Drive (PHYD), Pay-As-You-Go, and Distance-Based Insurance that have helped improve the traditional actuarial models.

Current Telematics-based Insurance Challenges

Connectivity is turning the car into a smart device with the potential to become a crucial element in enabling and contributing to the spread of the Internet of Things (IoT).

Native connected vehicles can contribute to unlock the enormous business potential of the IoT industry, to unleash the value of vehicle data and, hence, to generate new revenue streams throughout a vehicle's life cycle. The path to data monetization, however, is proving to be quite challenging.

In this regard, it is interesting to note that McKinsey³ (2021) has recently lowered the expected value of car data monetization by 2030 compared to what they predicted in their 2016 report. This is because the “uptake of car-data monetization has been slower than anticipated, making it impossible to reach the upper range cited in our original forecast”. According to McKinsey multiple factors account for this slowdown:

- Lack of immediate availability of particularly advanced skills among players along the value chain, especially OEMs.
- Slow development of new and more capable IT architectures.
- Slow pace on the part of various stakeholders in forming the ecosystems needed for data monetization.
- The negative effects that the Covid-19 pandemic has had on the mobility industry overall.

Today, most manufactured on-road vehicles are not natively connected. As a result, although in the short term all vehicles that will be globally manufactured will be natively connected, almost all telematics-

based insurance programs are meanwhile required to face three major challenges:

Firstly, insurance companies rely on hardware and software devices (after-market OBD-II dongles, “black-boxes,” or mobile apps that are added or retrofitted to vehicles) to collect and analyse driving data. Such reliance requires significant investments to achieve long-term value and limits the power of insurers, as they depend on an external device to capture vehicle data.

Secondly, insurance providers need deep and domain-specific knowledge to standardize and unify datasets from various sources (hardware and software devices) according to different communication protocols, such as vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), vehicle-to-pedestrian (V2P) and, finally, vehicle-to-everything (V2X).

Thirdly, the insurance industry on a global scale – and, before this sector, the OEMs – are called upon to tackle the extremely delicate issue of data processing, mainly data security and privacy responsibility arising from laws and strict regulations (both nationally

and internationally) regarding methods of collecting, storing, and sharing data to derive useful insights while achieving data trustfulness and ensuring data fairness and transparency.

The technological progress in enabling connected cars is impressive. Dashboard navigation, infotainment systems and Bluetooth-enabled displays are just a glimpse of what’s coming in the not-so-far-off future.

As can be seen from the issues outlined above, however, the biggest challenge for the connected car to reach its full potential will therefore be the ability to collect a massive amount of raw data from vehicles and the surrounding environment, and sort it to build offerings tailored to the customer.


The availability of vast amounts of data will increase people’s risk awareness and move the industry from paying for a claim to preventing a claim from happening in the first place. Just think, for example, of driving safety, protecting vehicles from natural events through connections with weather forecasts, and natively connecting with in-car systems for a native and flexible insurance offering, etc., these are only a few

CONNECTED CAR MARKET SCENARIOS


Global Automotive Connected Car Platform Market Geographical Segmentation


CAGR during 2021-2025



 Market will accelerate at a CAGR of almost 13%

 42% growth will originate from APAC region

 14.37% YOY growth expected in 2021

 One of the key drivers for this market will be **increased focus of OEMs on the development of autonomous and connected vehicles**

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Source: [Technavio \(2021\)](#)

immediate applications of the potential and benefits in terms of improving the Customer Experience and elaborating new strategies ever more oriented towards Customer Centricity. These strategies include innovation in anti-fraud, innovation in proposition through month-to-month car insurance (giving the customer the freedom to choose the insurance service without ties), innovation in monetization of the use of the insurance service, innovation in process automation, innovation in sales efficiency, innovation in management, innovation in prevention.

Building the Foundation of the Next-Generation Insurance Platform with Edge Cloud Architecture

Given the increasing pace of technology advancements described above, next-generation insurance solutions will not need any installation of hardware and software devices will have to provide for the integration of AI technologies.

More importantly, next-generation platform for IoT-powered insurance shall overcome the cloud model and adopt an **edge cloud architecture** to gain real-time insights across a massively distributed set of devices, with huge volumes of data in a cost-effective manner.

Decentralizing the processing power at the edge (clients/devices) of networks emerges as a necessary step to better handle the huge amount of data in real time coming from vehicles and roadside units and derive from this useful information for developing ad hoc solutions for different use cases.

More specifically, moving processing and intelligence away from the cloud and closer to IoT devices can lead to substantial benefits in the way data can be used, and change the way business is done.

Immediate implementations of what is known in the literature as **edge computing revolution** are self-driving connected vehicles (AD) and Advanced Driver Assistance Systems (ADAS). These technological advances are driving the creation of an entirely new ecosystem of stakeholders – including vehicles, roadway infrastructure, network infrastructure, and the Cloud – that is built on specific requirements for Cloud and network architecture to ensure significant workloads are handled and real-time service

requirements are met.

The advantages of the **new distributed computing paradigm** are mainly two: higher speed and decreased need for a fast network connection. The second benefit



Next-generation platform for IoT-powered insurance shall overcome the cloud model and adopt an edge cloud architecture to gain real-time insights across a massively distributed set of devices, with huge volumes of data in a cost-effective manner

is certainly the most interesting and disruptive because the edge devices, rather than conveying data to the Cloud, can make decisions offline. The implications of this are particularly relevant, for example, in all cases where vehicles travel in areas with poor or unreliable connectivity: while traditional cloud systems would be doomed to fail in such circumstances, the new Edge AI systems can work smoothly.

As a result of the above points, the customer experience would be dramatically improved as well as driver and passenger trust would be noticeably enhanced.

From the scenario outlined in this article it emerges that **the great challenge facing the insurance industry in the short to medium term is to connect insurance companies, intermediaries – such as financial institutions, consumers, and experts – on a shared digital platform.** All players in the emerging ecosystem will be able to manage insurance and financial products and services intelligently and efficiently, literally at the tap of an app.

Markets worldwide require a highly disruptive insurance platform where it will be possible to access insurance contracts at any time and from anywhere, apply for and sign new contracts or terminate old ones with a single click and, finally, where personalized digital advisors will be able to send notifications to customers about the best savings opportunities in a neutral, simple, and fast way. □

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Connected Mobility Continues its Steady Growth in India; Telecom Sector Supports

SOURMEN MANDAL

Counterpoint Technology Market Research

Over the past couple of years, the rapidly developing telecom sector has helped the global automotive industry gain necessary thrust in product development, features and in changing the overall in-vehicle environment. Connectivity features have not only made the drive pleasurable but also made the car more safe and secure.

Moreover, with the transition towards 5G, the future of autonomous driving seems brighter than ever. India's automotive market is lagging in the race to implement upgraded features and services when compared to

other automotive markets such as China, US, Japan and Europe. However, auto OEMs are offering more latest features such as embedded connectivity, advanced driver-assistance systems (ADAS), shared mobility and various subscription-based services leveraging the growing 4G footprint and laying the foundation for broader adoption of advanced ADAS features when 5G rolls out.

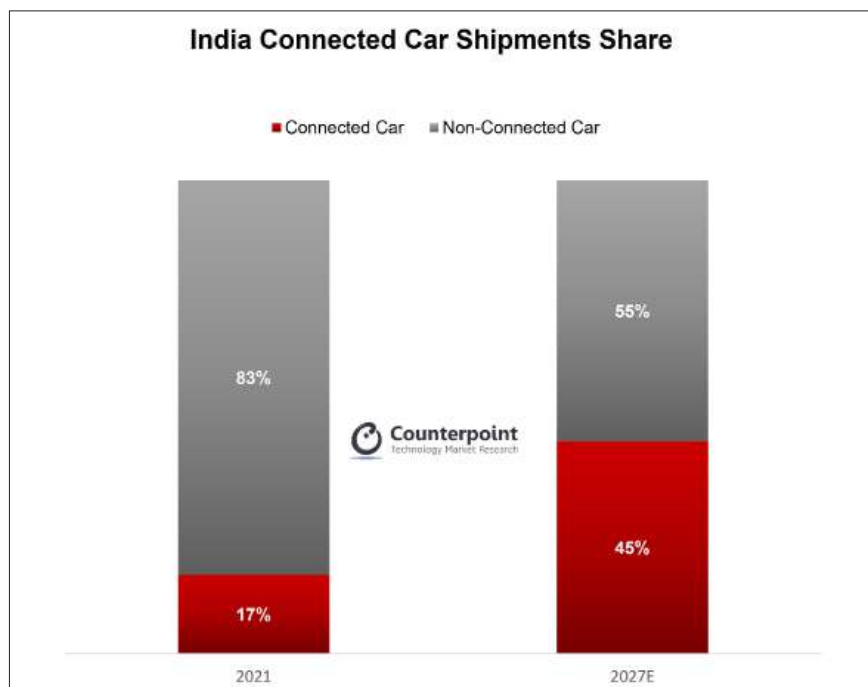
Connectivity trends: 45% of cars will be connected by 2027

India saw its first connected car with

embedded telematics with the launch of the MG Hector in 2019. The car was capable of standalone internet connectivity, which helped the company provide more than 50 connected features as part of the package. Soon, Hyundai and Kia followed with their embedded connectivity car models Venue and Seltos respectively. The rising demand for safety and entertainment features is forcing OEMs to bring such cars. Moreover, Maruti Suzuki, which holds the lion's share of India's passenger vehicle market, has been providing embedded connectivity services as an add-on feature as the Indian market is very price sensitive. Connected car penetration in India reached 17% in 2021 and we expect it to reach 45% by 2027.

Intersecting with the growing adoption of electrification and connectivity, the global automotive industry is transitioning towards autonomous mobility. However, autonomous mobility is still in a nascent phase in India. MG Motor is one of the few brands in India to introduce some autonomous features at Level 1 (L1) autonomy, such as in the MG Gloster. Some other models such as MG's Astor and Mahindra's XUV 700 are offering advanced autonomy features at Level 2 (L2). These OEMs have kickstarted the connectivity and autonomous revolution in India, pushing incumbents to go back to the drawing board.

Telecom operators are also trying to gain from this momentum and



Source: Counterpoint Global Connected Car Tracker, Q3 2021

Connectivity Platforms of Major Car Models

Auto OEMs	Major Models	Connectivity Platform
MARUTI SUZUKI	Baleno, Ignis, Ciaz, S-Cross, XL6	Suzuki Connect
MG	Hector, Astor, Gloster, ZS EV	iSMART
HONDA	City	Honda Connect
HYUNDAI	Creta, Kona, Alcazar, Venue	Bluelink
Mahindra	Xuv500, Xuv300, Xuv700	BlueSense
KIA	Seltos, Sonet, Carnival, Carens	Uvo Connect
TATA MOTORS	Nexon, Nexon EV, Harrier, Altroz	iRA (Intelligent Real-Time Assist)
TOYOTA	Innova Crysta, Fortuner, Urban Cruiser, Glanza	Toyota Connect

Note: Luxury brands generally support connectivity features.

Source: Counterpoint India Automotive Electronics Market, Q4 2021

partnering with OEMs directly. Airtel and MG Motor have joined forces to develop connectivity solutions for the MG Hector. Vi, which has teamed up with Hyundai and Kia, was the first to introduce eSIM in cars with Hyundai's Venue model. Recently, Reliance Jio entered a partnership with MG Motor for futuristic connected car solutions. Jio also offers an eSIM for the MG Astor. Again, we can expect strong competition between top telecom operators to catalyze the connected car revolution with partners such as Qualcomm, Rolling Wireless, LG, Continental and Denso. This should drive the overall connected car adoption to 45% of the total cars sold in the next five years.

IVI trends: 2 in 3 top-selling car variants have touchscreen infotainment display

In the present times, new technologies in the automotive market are offered using a price skimming strategy. New features are first introduced in high-end cars, and once the price comes down, the features become available in mid-end and low-end cars. The Indian automobile market has been a growing market for In-

Vehicle Infotainment (IVI). According to Counterpoint's latest research, 66% of the top-selling car variants offer touchscreen display for infotainment while more than 80% offer digital cluster.

In India, for many years, cars only supported basic audio systems like one-din and two-din, but the scenario has changed now. Features like navigation, human-machine interface, advanced music system and internet connectivity have changed the way consumers perceive innovative features related to in-car infotainment.

IVI was mostly available in the premium trims a few years ago. But as the technology scaled and solutions got cheaper, IVI entered low- to mid-end cars such as Maruti's Baleno, Tata's Tiago and Hyundai's Grand i10 NIOS.

Most of the IVI solutions are passive and do not have dedicated internet connectivity. The infotainment source is still mirroring phones or tethering the internet from the phones.

Many international players like Bosch, Harman, Continental, Valeo and Visteon have partnered with Indian auto OEMs and invested heavily in the development of IVI for Indian cars. Features like reliable voice recognition system and personalization of in-car environment are

driving growth in this segment. Moreover, the development of steering-based controls, voice recognition technology and better map services with voice assistance have reduced the driver's distraction a lot.

The display used in the IVI system has also improved a lot in recent times. The present OLED display with touch-sensors is a massive upgrade from the early TFT display with buttons. Even the size of the IVI display has improved. Almost every car in India costing above Rs 10 Lakh is equipped with a 7" or bigger display. In coming times, we will also see the penetration of Flex-OLED, which will make it possible to integrate HUD with IVI. Apart from hardware development, the IVI software has also improved a lot. Earlier, the IVI system used to only support Android Auto, Amazon Alexa and Apple Carplay, which could only mirror the tethered smartphone screen on the IVI display. But now the auto OEMs have their proprietary connectivity platform embedded in the IVI system that supports a wide range of features like geo-fencing, location updates, weather updates, voice command systems, entertainment services like music on the go, and many other services apart from the basic Android Auto, Amazon Alexa and Apple Carplay.

Major Players Across Different Layers of a Modern Digital Cockpit System

Base Operating Systems	Application Frameworks	Connectivity Standards	Infotainment Platform Developer
			

List not exhaustive

Source: Counterpoint Smart Automotive Services 2022

With the development and promotion of IVI in cars, many foreign companies are partnering with auto OEMs to provide tailored services. A few months ago, HERE, a leader in location services, partnered with SAIC to provide such services for MG cars in India. The development of the IVI system is not only about providing new technologies and upgraded features inside cars but also about creating an ecosystem that will lead the way towards a digital cockpit system.

Era of digital cockpit not too far

With the rapid development of the IVI system, coupled with increased penetration of embedded connectivity, the era of the digital cockpit is not too far. A modern-day digital cockpit is equipped with a lot of human-machine interfaces (HMIs) like best-in-class infotainment (IVI), an all-digital instrument cluster, a heads-up display (HUD) and rear-seat entertainment (RSE), with embedded connectivity being the main element working behind the curtain. A lot of research and development is being done

globally on the digital cockpit and making it more affordable.

Although this ultra-modern feature is not common even in the matured auto markets like Europe, China and the US, still global carmakers are vying to design next-generation digital cockpits with a wide range of advanced features. The development of safety features like ADAS is redefining the cockpit design and system.

Needless to say, we will not see modern digital cockpits inside cars in the mid-price and economy segments soon. But there are a few luxury brands like BMW and Audi which are offering digital cockpit features as part of an add-on service in some of their models for the Indian market. Apart from the premium and luxury segments, we might see digital cockpit systems in cars in the high-price segment, like the MG Gloster, Toyota Fortuner and Tata Harrier, but the real challenge is in making the system affordable for mid-sized and small cars. The rapid commercialization of the technology associated with smart devices and price reduction of LCD and OLED displays will facilitate a quicker implementation of digital cockpits in cars



Connected car penetration in India is expected to reach 45% by 2027 from 17% in 2021

in the high- and premium-price segments.

India is lagging behind in the adoption of such technologies, but we are making steady progress with government help. Over the last decade, the ease of doing business in India has improved greatly. As a result, many foreign automotive companies are setting up bases in India. Chinese OEMs like SAIC and BYD are already operating in India while companies like Tesla are keen to enter the country's automotive segment and redefine technology space in this sector. Ford, which had left the Indian market, now wants to re-enter with its EVs. Many Indian start-ups are also playing a role in boosting the automotive sector by developing and introducing new technologies. Moreover, with the increase in the adoption of EVs, the penetration of advanced automotive technologies will see steady growth. Therefore, we can say that the future of the automotive sector in India, especially in terms of adoption of technologies, is quite bright. □



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Usage Based Insurance - Leveraging interoperability in the era of Connected Vehicles

ANIKET AGGARWAL
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In 1913, Sir Henry Ford revolutionized the auto industry and the world when he invented the assembly line. The automotive industry exploded, and more Americans started owning and driving cars. Restaurants added drive-through lanes so people could buy food and eat in their cars. There were problems with this new model; long wait times sitting in the car did not make for great experience and trained short order cooks were high in demand so the wages rose and so did the cost of food. Borrowing from Henry Ford, the McDonald brothers created an assembly line in the kitchen which increased efficiency and reduced the cost.

After perfecting the operating model, McDonald's was struggling to expand. The royalty fees for franchises left very little cash to fuel the expansion. Harry Sonneborn, who later went onto become President and Chief Executive, McDonalds, asked a pertinent question 'What business are we in?' and realised that they were not in the food business but the real estate business. This pivoted the company into a new model. McDonald's would buy the land that franchises were to run their outlet on at long-term fixed interest rates and lease it to the franchise owner at a markup. They would earn royalty fees from franchisees and collect rent,

as well as keep adding real estate assets to its portfolio. Borrowing from Harry Sonneborn, automakers need to ask themselves, 'What business are we in?'. Most likely, the answer would be 'Software Business'.

In 2021, there were 139.6 million connected cars in the US which is set to grow to 166.5 million by 2025. It is estimated that 7 out of 10 drivers would be driving a connected car sending petabytes for data to the automakers every day. The products and services based on vehicle data will generate between USD 25 – 30 billion by 2025 for US automakers and grow 5X by 2030. This line of business will run at significantly

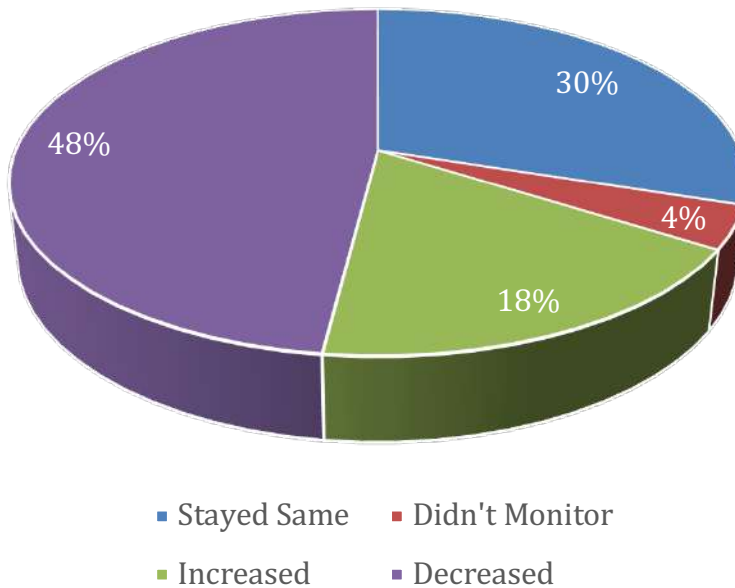
US Connected Car Drivers and Penetration, 2021-2025

	2021	2022	2023	2024	2025
Connected car drivers (millions)	139.6	146.9	154.0	160.6	166.5
—% change	5.6%	5.2%	4.8%	4.3%	3.7%
—% of internet users	55.4%	57.6%	59.7%	61.5%	63.0%
—% of licensed drivers	60.3%	63.0%	65.6%	68.0%	70.1%
—% of smartphone users	59.6%	61.7%	63.8%	65.5%	66.8%
—% of population	50.3%	52.5%	54.6%	56.5%	58.2%

Note: ages 14+; licensed drivers who drive a connected car and have accessed its internet enabled features at least once in the past year.

Source: Insider Intelligence, Aug 2021

Change in Insurance Premium



higher margins and contribute a majority share in the overall profits. The probability of succeeding at pivoting automotive business from vehicle manufacturing to software hinges on automaker's ability to:

- Rapidly identify opportunities, build prototypes, launch, and iterate
- Choose the right monetisation models – usage based, revenue sharing, timely subscription
- Develop new business models built on technological innovation and partnerships

In this paper, we examine usage-based motor insurance its terms of its current market status. Further, we analyse the various business and monetisation models and, make recommendation on expansion of usage – based insurance supported by a strong ecosystem.

Usage Based Insurance

Motor insurance underwriting model has been based on broad demographic characteristics like a driver's age, gender, residence, education level, or credit score. This meant that one's insurance cost would be dictated by the driving behaviour of the people with whom they share broad demographic attributes but little else. Instead, usage-based insurance uses telematics data such as speed, acceleration,

hard braking, phone used while driving, time of the day and miles driven to build individualistic driving profile and adjusts the insurance premium based on that.

There have been proof of concept, minimum viable products, and limited product launches for usage-based insurance (UBI). In 2022, TransUnion Insurance and Trends Report conducted noted that 49% of the drivers who were offered UBI options opted into it, buying the promise of lowering car insurance rates.

Nearly half of the ones who opted in, got a discount on their insurance premium owing to their good driving behaviour. The results proved effective in convincing drivers that good driving behaviour can translate into lower cost of vehicle ownership.

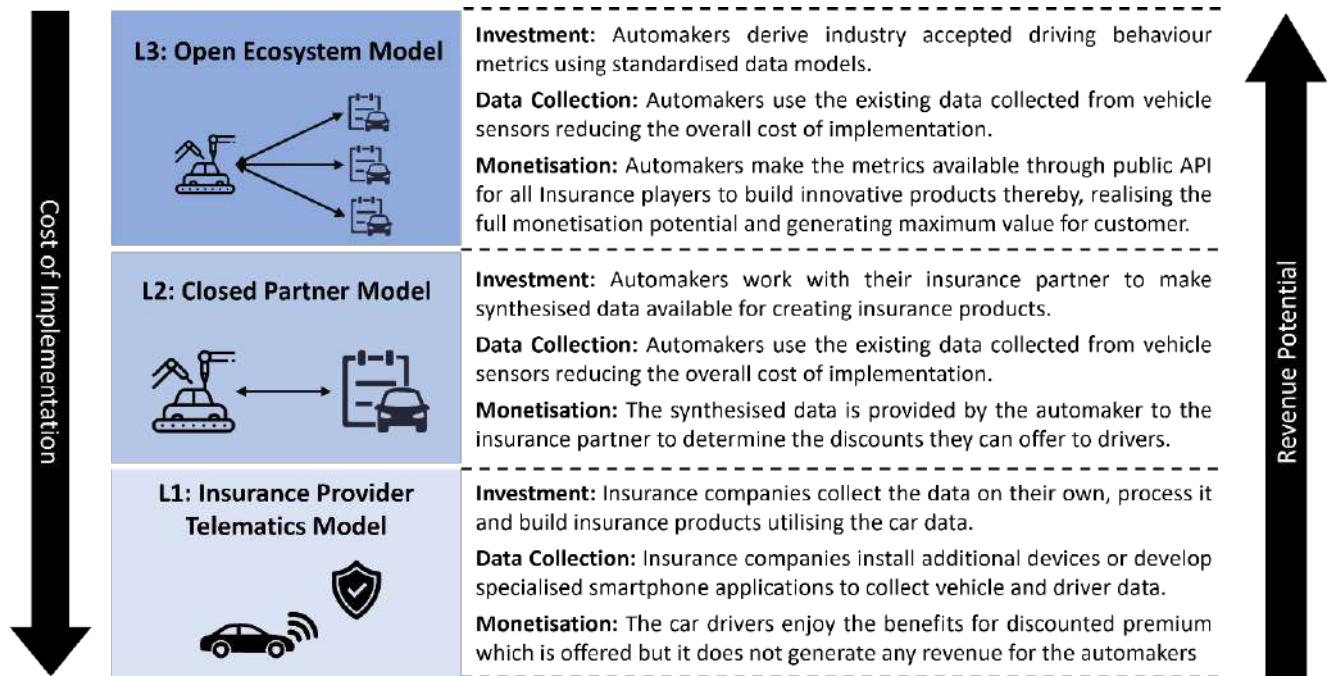
The report highlighted that most drivers who opted in the program were satisfied with their choice, according to their survey. Nearly two-thirds (64%) were "very satisfied" or "extremely satisfied." About a quarter (26%) of respondents said they were "neutral" about their experience.

Vehicle manufacturers and insurers alike consider UBI to be ripe for mass adoption. Automotive industry needs to solve for an **agile business model** and a **right monetisation model**, to make UBI synonymous with motor insurance and realise its full monetisation potential.

Building the API Economy

Insurance Provider Telematics Model is the first and the most prominent model in the US market. It is characterised by insurance providers collecting vehicle and driver data on their own. Travelers IntelliDrive is one example of this model. IntelliDrive mobile application makes use of the driver's phone's GPS and timestamp data to compute acceleration, speed, distance driven, phone use and night-time driving. This information is plugged into actuarial models to determine the premium discounts that Travelers can offer to its motor insurance customers. Nationwide Insurance SmartRide is a variation of this model in which they implant a telematics device in the vehicle's On-Board Diagnostics Port (OBD-II) to collect vehicle data. The cost of procuring telematics devices, installing them and / or building specialised applications and setting up the data infrastructure slows down the speed of adoption and lowers the margins on the offering. Nonetheless, the popularity of the offering has compelled every major insurance provider to have a Usage-Based Insurance product available for its customers.

The automakers recognised the opportunity to enhance the customer experience and expand the scope for usage-based insurance by tying up with insurance providers. This led to the genesis of the **closed – partner model**. In this model, the driver authorises the car manufacturer to share the vehicle and driver data which is collected through multiple sensors in a connected vehicle with the insurance provider who in turn provides usage-based insurance premium discounts to the driver. It should be noted here that the insurance provider is responsible for selling usage-based insurance through the existing channels (agent, bancassurance, online, etc.). For example, State Farm which was using mobile application for its Drive Safe and Save Program, has recently built a partnership with Ford to improve its offering. Connected Car customers with eligible connected Ford and Lincoln Vehicles can straight away opt into the State Farm UBI program. This is a win – win situation for State Farm and Ford Motor Company. State Farm would be able to get more accurate data to base its discount computations at a fraction of the cost. Ford customers would get additional value from owning a Ford Connected Vehicle. In the future, data sharing partnership can be



expanded to assess incidents and damages which opens the possibility for end-to-end digitised claims verification and settlement.

However, **the closed partner model** solves the problem of adoption but only for a fraction of people.

Imagine you are enticed to opt in for usage-based insurance, but your automaker has not tied with your existing motor insurance vendor. It leaves you with two options:

- Go through hassles associated with L1 Model with your existing insurance provider (assuming they have such offering) or,
- Switch the insurance provider who has tied with your carmaker but lose the renewal benefits

Secondly, it is difficult to achieve scale in this model as the auto manufacturer IT teams need to work together to define the specifications and tailor the data connectors (Data APIs / Data Pipelines) for each insurance partner.

Path to Monetisation

In simple terms, Insurance companies' earnings are the sum of the premiums less the claims. Aggressive strategy of making riskier bets can get greater-than-expected-claims which will compromise the earnings. On the other hand, conservative strategy of keeping premiums high will result in loss of market share to competition, ultimately lowering the earnings.

In the case of motor insurance, Insurance

companies using the driving behaviour and vehicle health data can predict the probability and value of the claims more accurately. They can fine tune the premium pricing and transfer the benefits of lower premium (if any) to the policy buyer. All insurance companies will have to adopt usage-based insurance to protect their market share.

In the closed partner model, automakers monetise the vehicle and driving data by either charging a percentage of the premium on the policies sold or as a variable cost for data being provided as service to the insurance company. Apart from the adoption and scalability issues discussed above, this model fails to maximise the monetisation potential.

Open Ecosystem Model: API Monetisation

The open ecosystem model is characterised by automakers making processed data available to the authorised insurance companies through public APIs. The underlying data schema and specifications should be standardized and published so that any insurance company can consume the data and build neo-insurance products to better serve the end consumer i.e., vehicle owners.

Case Study – AccuWeather Self Service Developer Portal

AccuWeather, recently launched a self-service

developer portal that operates as an online store for their API packages and as a hub for their external developer community. The inventory of monetized AccuWeather APIs spans a spectrum designed to fit different developer needs. For example, one paid option offers continuous updates in near-real time, while another free option offers more periodic updates for developers who want to keep traffic demands or costs low. Within 10 months of launch, the portal had attracted more than 24,000 developers, issued 11,000 API keys, and generated hundreds of paid package purchases. AccuWeather recognized the unique value of their data—and of easy access to it—and was able to directly monetize its APIs. At the same time, they were able to derive indirect value through a growing developer ecosystem around their services—leading to exposure in new markets as developers use their APIs in new ways.

The volume of API calls increases with the increases in number of customers who have opted in. The 'per-call' pricing serves as a proxy for revenue sharing. The volume of the API calls is also directly correlated to the granularity of data and thereby, the accuracy of the underwriting process. Thus, the rates increase as more is data consumed to perfect the premium calculation and improve the earnings. Differential pricing across volume-based tiers attracts more Insurance companies to conduct proof of concept and trials at lower costs.

Automakers can adopt a tiered payment model based on the nature of the data being used and the number of API calls. We have created some tiers for illustrative purposes

Tier	Data		API Calls Per Day		
			Less than 500k	500k – 1mn	1mn – 10mn
Basic	Mileage: Current odometer reading, average daily miles, city mileage, highway mileage		\$0.001 per call	\$0.002 per call	\$0.006 per call
	Maintenance: Car service history, time to next service and list of dates vehicle has been recalled for servicing.				
	Performance: Acceleration, top speed, engine brake horsepower				
Advanced	Basic +	Driving: Braking frequency, application of emergency brakes, state of ignition, route maps for journeys made, idle time, pleasure drive distance, use of horn, acceleration history, deceleration rates, lane departure warning, seatbelt on – off history	\$0.003 per call	\$0.006 per call	\$0.012 per call
		Fault Detection: Tires / treads condition, air pressure in tires, condition of brake pads and brake discs, engine warning, clutch wear			
Premium	Advanced +	Damage: Known vehicle damage, list of damaged parts, cost of damaged parts and dashcam video recording	\$0.005 per call	\$0.007 per call	\$0.014 per call
		Cabin Use: Number of occupied seats and seats occupied by child seat			

We recommend bundling the APIs based on the nature of the data. The rationale is two-fold. Firstly, the difference between the basic and advanced set of APIs is linked with accuracy of the underwriting process itself. Deeper understanding of the driving behaviour and condition of the vehicle improves the statistical models used for predicting claims risk. Secondly, the premium set of APIs allows insurance companies to verify, assess and approve the claims reducing or eliminating the manual steps involved in the claim approval today. This will provide Insurers a competitive edge in the market and automakers would have their share as enablers of the innovation.

Case Study – General Motor’s OnStar Insurance Services

General Motor’s OnStar, debuted in 1996, as a built-in GPS tracker and emergency communication system. The early start made General Motors (GM) one of the data collection leaders. The company has logged more than 121,000 TB of data usage across the Buick, Cadillac, Chevrolet, and GMC brands since the launch of 4G LTE in 2014.

For the motorists, who choose OnStar Insurance, GM can utilise the massive amounts of posteriori data on driving

behaviour and vehicle mechanics to go a step further than offering discounts. They can provide it for actuarial pricing of premium as part of the underwriting process.

During the pandemic, when people saw their cars sitting unused for months, many began to wonder why they are paying for the coverage they don’t need. Altered and often reduced driving activity created a receptive market for OnStar’s Usage-Based Insurance (OnStar Insurance), which was in development before the COVID-19 pandemic began.

OnStar Insurance Services, GM’s insurance agency, rolled – out OnStar Insurance in Arizona in November 2020. They are the exclusive agents for OnStar Insurance. The policies sold through them are underwritten and issued by Homesite Insurance Group, an affiliate of American Family Insurance.

Like General Motors, automakers can make use of their captive finance units to co-develop insurance products. Such products should be sold under revenue sharing arrangements where instead of charging for API usage, automakers take a share in the earnings of the product.

Typically, Insurance companies would pay commissions to the channel partners like banks or agents for selling the insurance products. Automakers can leverage their dealership networks to increase their margins.

In conclusion, we propose a hybrid model where automakers make the data available for insurers by creating an open – API ecosystem and co-develop their own UBI offerings which they sell exclusively through their dealer and direct-to-customer channels at high margins. □

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Clean and Sustainable Mobility in India

R V RANJAN

Ranjans Li-on Energy Private Limited

Introduction

Clean Mobility is a global need, particularly for India which is dealing with high pollution level. India has committed to reduce its total projected carbon emission by one billion tonnes by the year 2030. As a measure to achieve this, India is working towards building non-fossil energy capacity of additional 500 gigawatts by the year 2030. The current available energy resources are mostly consumed by the Mobility users, like, vehicles on road, railways and agricultural equipment. This article discusses the present scenario in India and suggests an approach to achieve Clean and Sustainable Mobility.

Clean Energy in Mobility

Vehicles running on Petrol and Diesel are large contributors to pollution and it is important to note that vehicular pollution has high concentration in metros and cities. On the face of it, Electric Vehicles are seen as a solution to reduce this pollution as they by themselves are non-polluting. The focus of Government of India and several State Governments on increasing the use of Electric Vehicles is a step in the right direction. But the moot question is whether Electric Vehicle, in its present form, are a pure clean energy solution in India? The answer is in the negative because of the battery being used and the way they are being charged. Majority of Electric Vehicles in India still use lead acid batteries. Lead is

a carcinogenic and toxic substance and the acid in the battery emits dangerous fumes. It is satisfying to note that Lithium Batteries are now gaining popularity which overcome these shortcomings of lead acid batteries. Here, it is highly important to increase the safety features in Lithium Batteries. However, be it lead acid or lithium battery they are both being charged using electricity supplied by the Grid. The Electricity Grid in India has Thermal Power as its predominant power source. Thermal power plants burn coal in huge quantity and are one of the biggest contributors of pollution. Energy & Mobility Analysts and the EV industry predict an exponential growth in use of EVs in India over the next decade. This will lead to increase in demand for additional energy resource. Unless there is a concentrated strategy to meet this new exponentially increasing demand for electricity from Renewable Energy resources, the net result may be further increase in fossil-based power plants. It is feared that this may result in further increase in pollution. So, at

present E-mobility is not clean and its need of the hour to devise strategy for Clean and Sustainable Mobility.

Present Power Generation Scenario and Strategy for Future

The following table summarizes the present installed capacity of various sources as of 2021-22:

The total renewable energy resource in India is targeted to be 36.5% of the total energy resource by end of 2022. However, wind and solar being the main renewable energy resources the resultant power generation from renewable resources is fluctuating. Solar Power is available during sunlight and wind energy is dependent on wind pattern. Due to this erratic and fluctuating power generation from renewable resources, it is a technical and economic challenge to integrate these in the National grid. This calls for a multi-pronged approach some of which are highlighted here:

Fuel Type	Capacity (MW)	% to total
Hydro	51,301	10.7%
Coal + Lignite	2,17,302	45.3%
Gas	25,735	5.4%
Nuclear	10,080	2.1%
Total Conventional Capacity	3,04,419	63.5%
Total Renewable Capacity	1,75,000	36.5%
Total Capacity by 2021-22	4,79,418	100.0%

Source: Published Report of Central Electricity Authority, Ministry of Power, India – January 2021

- Storage of power generated from Renewable resources using batteries (Energy Storage System ESS).
- Use of Hydropower plants as a balancing generation resource as they can be started and stopped in very less time,
- Use of hydroelectricity for pumped storage i.e., use excess power generated during day time from solar power farms to pump available water to a storage and use this stored water during supply shortfall to produce hydroelectricity.
- Time and tariff-based management of demand.

The strategy at the macro level has to actively promote battery storage of solar and wind power generation with integrated battery storage units. This calls for heavy initial investment but the gains of increasing reach of clean energy outweighs the initial cost. Non-toxic batteries like lithium batteries, sodium batteries and others should be promoted to make energy storage clean. The cost per MW of battery storage would drastically come down as it reaches economies of scale as it happened in the case of Solar PV cells. India has abundant untapped hydro-power which can be harnessed judiciously giving due consideration to any environmental imbalance being created. Hydropower generation is apt for use as a balancing source to take care of fluctuations in renewable power generation. Pumped hydropower generation also achieves this objective. The demand for electricity increases substantially in evening and by encouraging the movement of some of this demand to day time when renewable energy is available would further increase the proportion of clean energy in the energy basket in India. This can be possibly achieved by reducing tariff during day time and increasing tariff during morning and evening. Charging of batteries for Electric vehicles during daytime should be encouraged so that the increased demand on account of EV charging is met by renewable resources at the macro level. This calls for creating

EV charging infrastructure in work places, commercial and industrial establishments. Multi-pronged strategy is needed to achieve the goal of Clean Energy for the country in general and E-Mobility in particular. The following section dwells on Sustainable Mobility in India.

Present Status – Electric Vehicles a drop in Ocean of Mobility

As of year 2019, India had 295.77 million vehicles on road with an average growth rate of 9.4% p.a. In comparison the total Electric Vehicles registered in India in 2020-21 was a mere 1,04,806 vehicles (source: published data available on web). Low speed electric two wheelers and three wheelers (L2 category) do not require registration. Arguably, due to relative low cost of such electric vehicles they would have sold in much higher numbers. To build a case if it is assumed that registered vehicle comprised only 10% of total electric vehicles sold in 2020-21, the total number of electric vehicles sold in 2020-21 can be pegged at 1 million electric vehicles. In the same year 2020-21, 26.27 million vehicles were registered in India, thus EV sales were mere 3.80% of total sales. Again, considering 10% annual growth rate in new vehicles, there would be approximately 525 million vehicles on road in India by the year 2025. Considering that sale of EV is growing exponentially, say at annual growth rate of 100% per annum, there would be approximately 65 million electric vehicles on road by 2025. This implies that even at an optimistic rate of 100% growth every year EV would comprise only 12.38% of total vehicles by 2025. So it can be said that 82% of vehicles on road by the year 2025 would be directly contributing in further increasing pollution. This points to an

alarming situation and it can also be inferred that new Electric Vehicles alone may not be able to achieve the goal of sustainable clean mobility. The following section discusses steps to achieve sustainable clean mobility.

Focus on Hybrid – Convert IC engine Vehicles to Electric Hybrid

The easiest and fastest way to achieve sustainable clean mobility is to promote hybrid vehicles. The 300 million vehicles on road cannot be taken off road suddenly as it would bring an economic catastrophe. Replacing these vehicles by electric vehicles is not feasible rather it is feared that the gap may widen further. The quick and sustainable solution is EV conversion and government needs to prioritize and incentivize this. This would have an immediate effect on reducing oil imports and pollution and increasing clean energy vehicles in the basket. Hybrid EV conversion also effectively addresses the main barrier of “range anxiety” in fast adoption of Electric Vehicles. The user remains worried that he/she may get stranded when the battery gets fully discharged. Wide spread network of charging stations and battery swapping stations can address this range anxiety considerably but a hybrid vehicle addresses this most aptly. The user can have smaller sized battery sufficient enough to take care of his daily routine drive, thereby reducing his/her upfront cost. The user will have existing IC engine option to fall back to, when the battery gets discharged or he/she has to once in a while drive the vehicle unusually more than his/her routine daily ride. EV conversion kits – hybrid or complete electric are today available at less than Fifty Thousand Rupees for two

Vehicle Type	Number of vehicles sold
Passenger Vehicles	3.38 million
Commercial Vehicles	1.01 million
3 wheelers	0.7 million
2 wheelers	21.18 million

Wheeler, Eighty Thousand Rupees for three wheelers and Two Lakh Rupees for four wheelers including a Lithium Battery capable of running for approximately forty kilometres in a single charge. However, Central and State Governments need to urgently frame guidelines to ensure standardization, quality and safety. Government Incentives for EV conversion would lead to fast adoption and help in progressing towards the goal of clean and sustainable mobility.

The above table gives a snapshot of vehicles sold in India in the year 2020-21.

From the above data it is clear that emphasis needs to be built on conversion of two wheelers running on petrol. In addition, conversion of 3 wheelers and small cargo trucks to electric (hybrid or fully electric) brings in lot of economic sense as the decrease in per km cost of running the vehicles often leads to a pay-back period of less than 2 years.

Large Scale production of EV components in India

It is ironical to note that India is far lagging in production of EV components in India. The industry is still largely importing EV components, CKD kits and EV from China. China continues to be the dominant source of lithium cells. Sustainable E Mobility can be achieved only when India is self-reliant on all components of Electric Vehicle. The need of the hour is that governments in India prioritize this and promote setting up for large scale indigenous factories to produce EV components like motor, controller, harness, BMS, GPS and other electronics and also the lithium cells. The assembly of EV and batteries for EV may continue in MSME sector and governments may nurture them by providing funds and tax incentives. Standardization and Quality

are must for sustainable development in this respect.

Battery Swapping and Charging Infrastructure

Two big impediments in the growth of Electric Vehicles sector (converted vehicle or fully electric) are high cost of battery and range anxiety. Battery Swapping addresses both these concerns to a large extent. Battery Swapping introduces battery as a service. The battery swapping model envisages battery swapping operators who own the batteries and swap discharged battery with charged battery on payment of small usage charges. This decouples the battery cost from the vehicle cost and thus makes the vehicle almost 40% cheaper and hence more affordable. With the operator having a network of swap centres in its area of operation and using GPS, Cloud Services and Mobile App the customer is freed from range anxiety as well. Swapping is at a nascent stage in India but is bound to grow exponentially and it needs a start push from Government or Large Corporates. The Swapping Operator can charge the batteries at a dedicated solar or wind energy farm thus making it a completely clean solution. In the same way, solar and wind energy farms can be roped in as EV charging infrastructure. This would help in realizing the goal of clean and sustainable mobility.

Railways and Rural Mobility

Historically, Indian Railways used to run on steam by burning coal and then moved on to diesel locomotives. Now, Indian Railways is electrifying the routes and already consumes more than 20 billion units (kWh) of power every year. Indian Railways has electrified about 35% of its route and with ongoing electrification the electricity requirement of Indian Railways is set to further increase. Most of this electricity again comes from

Thermal Power Plants. Indian Railways having vast track of land under its control must look at installing captive solar farms to partially meet its energy requirements. Solar panels coupled with battery storage can also be installed on passenger / cargo bogeys to take care of lighting needs. This would be a leap forward towards achieving clean and sustainable mobility. Rural Mobility revolves around tractors and trolleys which are also used for farming by attaching farm equipment. These are all predominantly users of diesel. With availability of land not being a constraint in rural India, focus should be on developing stand alone isolated solar farms with battery storage to meet the energy requirements of the locality. Hybrid Tractors (by adding EV option to existing tractors) can also play a significant role in achieving clean and sustainable mobility.

Standardization – Need of the Hour

The IC engine vehicle industry is now more than a century old. There is enough standardization in design and components. The quality standard is generally high. The EV industry in India is in its early stage and is largely dependent on imports. For the EV industry to be sustainable in future, it is important to bring in standardization and quality standards. The existing government policies need an overhaul with focus on quality and safety. Standardization would also help in fast adoption of Battery Swapping and EV conversion. This in turn would lead to Clean and Sustainable Mobility.

Conclusion

At present, mobility be it IC or Electric is not fully clean in India and is not sustainable in future. Immediate steps need to be taken in increasing the share of renewable resources in our energy basket and its fair utilization by adding adequate storage of renewable power produced. Focus should be on converting existing IC vehicles and ideally making them hybrid. Battery Swapping also needs to be institutionalized and promoted to make EVs more affordable and desirable. Captive Solar Farms for Railways and Rural India is the need of the hour. All these measures would enable India in moving towards Clean and Sustainable Mobility. In this way India can also achieve its target of reducing carbon emission and reducing pollution by the year 2030. □



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R V Ranjan is Director & CEO of Ranjans Li-on Energy Private Limited, Pune, India. Team Ranjans provides complete energy solutions with innovative & customized SMART, SAFE & SURE Lithium Batteries for E Mobility and ESS. Mr. Ranjan, Gold Medallist in his Graduation & MBA, MS from Manchester University, has 25+ years of experience in Investment Banking, Project Finance & Top Management Roles.

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Zeliot on a Mission Towards Creating a Better Mobility Ecosystem

ANUP NAIK
Zeliot Connected Services

Founded in 2018, Zeliot is a new age deep tech company that is all set to transform the mobility ecosystem to its better version. And since then, they have set a benchmark in the vehicle telematics industry. Their vision is crystal clear about offering IoT platform-based solutions to enterprises and automotive OEMs.

Today, the telematics market is extremely crowded and choosing the right mobility telematics solution providers becomes a hard nut to crack. They usually get trapped by the bait of cheaper vehicle telematics solutions and compromise on the quality. But being a pinchpenny can actually add on to their future expenses. Here is where they need a reliable solution.

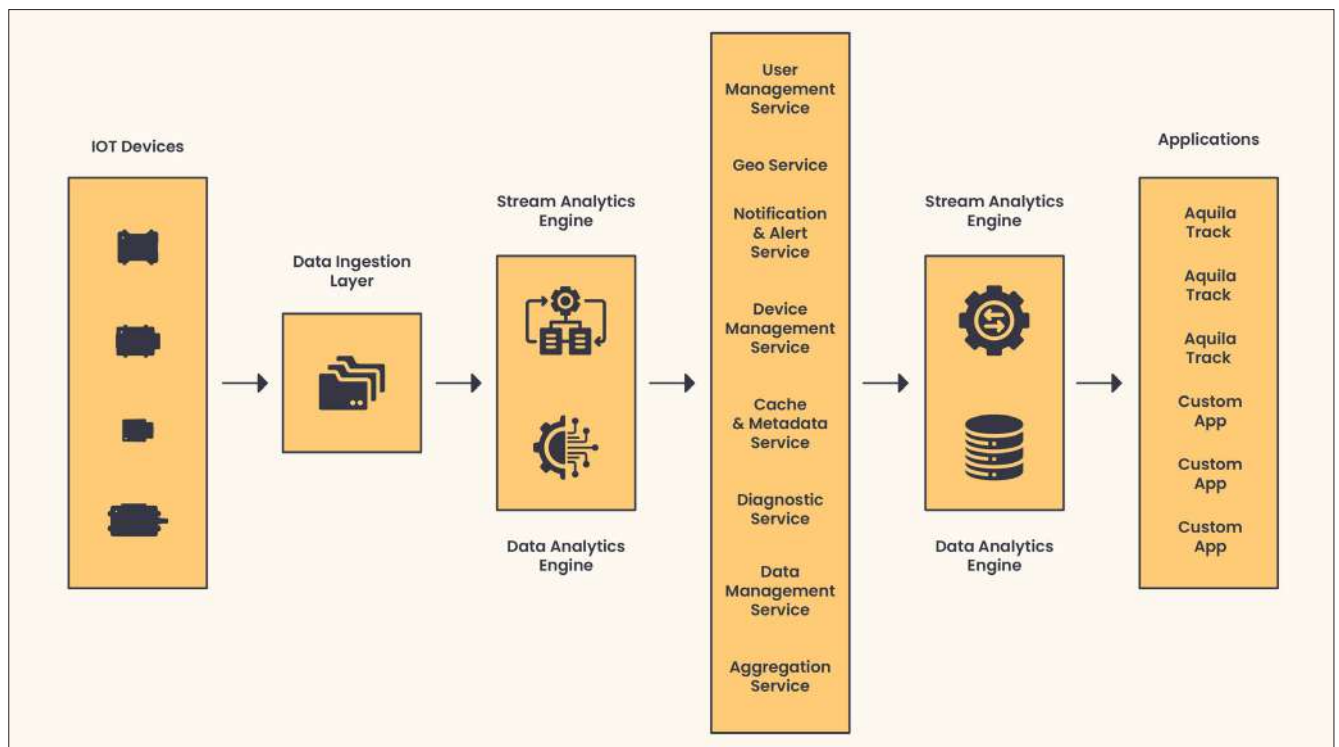
Zeliot is taking up the charge.

Since 2018, Zeliot has successfully developed a platform that has hosted over 1,00,000 devices and they are still counting. Their core belief isn't just offering a fundamental software platform to customers but a transparent mobility ecosystem. Anup, one of the co-founders of Zeliot, gave more clarity to their vision by adding, "We are productizing each component of the software platform, some of the components are Telematics Hub, Data Engineering pipelines and many others, over the course of time. Along with this, we are creating a data computation package for the Telematics device. This package will eventually run on the edge by allowing us to control a lot of data

parameters before sending it to the cloud. The combination of platform products and the edge package will bring in a lot more efficiency in the way IoT data, especially telematics data is handled. This will lead to huge amounts of savings for our partners or customers in terms of cloud expenses." Currently, Zeliot is in the good books of many large enterprises and Automotive manufacturers (OEM). Undeniably, Zeliot has already taken a step forward in upgrading the existing mobility ecosystem to the next level.

An Evolution to The Existing Ecosystem

Data privacy has always been a challenge in the automotive telematics industry.



And that's why telematics hasn't unlocked the doors of the mainstream automobile market yet. For combating this challenge, Zeliot is striving hard to make the automobile OEMs reimagine a world of smart telematics that's more secure and reliable.

They are focusing on creating an ecosystem for the customers by allowing more control over how they would want to adopt the technology. This can be achieved by reimagining how the software platform components can be monetized. Consequently, all this will eventually allow Zeliot's customers to have more control over data as well as solutions.

Clarifying this idea further, Anup added, "We don't want to talk just about solutions. In our domain, the solution is usually specific to the customers. Most of the time, Auto OEMs or even large enterprises can't really make sense of what's readily available. Hence, it's always viable to let the customers make changes manually. This will even allow the customers to build something proprietary on top of the solution that we will deliver. Vehicle Telematics solutions

aren't new to the ecosystem. A lot of brands are available in the market with pre-made solutions. But are these solutions secure? How would you know whether your data is encrypted and doesn't go to the third-party platform? We understand all the issues that people face while processing this data. Thus, we have divided the platform and the solutions. However, we will make sure to deploy the platform on our partner's cloud subscription model where data isn't routed through us. This will further avoid the misuse of data."

The data experts at Zeliot understand the fact that every customer has different use cases for the same platform and solutions. Thus, they give space to customers for picking and choosing suitable solutions and manage services modularly in a cost-effective way. Elaborating this further, team Zeliot requests the customers to deploy the software platform components through cloud marketplaces by ensuring that the data directly hits their own cloud subscription. It's possible with over 450+ APIs on offer and the entire solution framework, including the readily-available frontend web and mobile applications. Additionally, customers can seamlessly

build their custom proprietary logic. These APIs cover a wide range of functionality where the users get access to every parameter, be it simple or complex. Indeed, Zeliot's entire business logic revolves around a microservices architecture where they are going to be strong backend platform players.

As Key Platform Players

The entire framework of Zeliot's Connected Mobility Platform (CMP) focuses on handling a huge amount of telematics data at a high frequency efficiently. Thus, it allows users in the effortless onboarding of new Telematics Hardware that already supports 1000+ tracking devices. Besides that, it gives an option to apply real-time custom rules to the extracted data.

For instance, users can get instant insights into vehicle health, fuel consumption pattern, and much more. Thanks to the highly advanced Data Engineering Pipelines of this CMP! One good thing about this process is the securely-hosted data on the cloud under a customer's subscription model. OEMs and Enterprises can individually develop a plethora of solutions on top of the CMP.

Solutions for OEMs:

- End of Line (EOL) Applications: Users can digitally store and maintain logs from the vehicle before it rolls off the production line by performing a quality check on the vehicles.
- Vehicle Lifecycle Management Applications: This solution will let OEMs remotely service a vehicle, read or clear Diagnostic Trouble Codes (DTCs) by updating the firmware on the ECUs. They can even schedule a campaign for it. Moreover, it will massively reduce the vehicle callback cost and service time for OEMs, ensuring customer delight. Additionally, OEMs, Third-party Road Side Assistance Networks (RSA) or the nearest Emergency Services center will get instant reports via CMP's secure APIs in case of a vehicle breakdown or accident. As a result, it will save their crucial time by automating the Emergency Response System (ERS) dispatch to the customer.
- Mechanic Applications: Through these apps, the mechanics will be able to effectively service the vehicle via smart

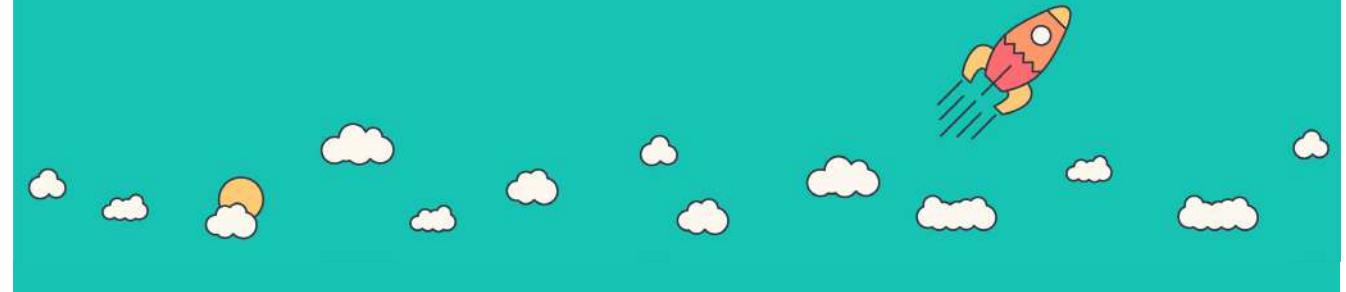
features viz., Vehicle Health Card, Clutching / braking patterns, Vehicle Drive Terrain analysis, DTC history, etc. Indeed, it will provide OEMs with in-depth insights into the state of the vehicle during periodic maintenance and services.

- End Customer Applications: It will allow OEMs to enable smart connectivity features for end customers while improving their engagement and delight. Besides that, OEMs can use these apps to upsell other services to the customer, make exciting announcements, reward customers for safe driving via gamification, and much more. Thus, it will contribute to promoting road safety. In a broader scenario, the benefits of safe driving will offer tangible returns to customers. For example, reduction on insurance premiums, better financing options, better resale value, discounts on vehicle servicing, etc.

Solutions for Enterprises:

- Fleet Management Solutions: Businesses will have access to real-time insights into the fleet's location and performance. For instance, average fleet utilization, fleet downtime, cost of managing the fleet, fleet health card, etc. Fleet management solutions coupled with driver apps will enable more use cases, including, driver job scheduler, driver attendance with access control to the vehicle, driver expense management system for facilitating smooth and transparent transactions to the driver on the job, and much more.
- Smart City Applications: Zeliot's CMP is an ideal platform for unifying all the components of a smart city to develop applications on top of it. These components include GPS and electronic ticketing solutions for intercity and intracity buses, electric or manual last-mile connectivity options, smart traffic signals. Furthermore, users will get benefits of GPS enabled ambulances and other emergency vehicles, smart cameras for detecting traffic law violations, etc. With these integrated components into the CMP, users can efficiently ingest and analyze data to enable Command and Control Centers for various departments of a smart city.

Bosch picks up 14% stake in Zeliot



- People Transport: It will allow a smart and safe commute to the users by solving key problems related to road congestions and traffic wait time. A few of the advantages include Urban mobility solutions, Employee and Student Transport solutions, etc.

Many pioneer brands are partnering with Zeliot on this mission of enhancing the mobility ecosystem. Bosch is one of them.

A Partnership With Bosch

Recently, Bosch picked up 14% of Zeliot's as a big step towards a positive change in the current mobility ecosystem. This investment by Bosch India's mobility team is a significant validation for encouraging Zeliot's vision. Bosch is amongst the pioneer brands in the vehicle ecosystem with over 18 manufacturing sites and 7 development and application centers

operational in India.

Today, almost every vehicle manufacturer uses at least one component with Bosch's labelling while assembling their final product. Smart mobility solutions will be the next mammoth step in the automotive domain. Bosch aims to be the leading driver of these smart mobility solutions, globally.

Over the past decade, Bosch has invested more than INR 8000 crores on various innovative ideas aligned with the "Make In India" scheme. Now, their next target is to build an Atma Nirbhar Bharat by investing over INR 1000 crores for the localization of advanced automotive technologies in the upcoming five years. They will contribute an additional investment of INR 1000 crores for expanding digital platforms, including the mobility marketplace and mobility cloud platform.

Fortunately, Zeliot is also a part of

Bosch's journey towards a better mobility landscape. This investment will enable Zeliot and Bosch to improve customer experiences with connected mobility solutions. There are a few evident synergies between the companies that are undeniably going to elevate Zeliot to the next level, including:

- Integration of microservices for transacting digital assets
- Partnerships in strategic modules on mobility specific SaaS portfolio

All in all, the core aim of this partnership is to create a mobility ecosystem that allows partners more control and solutions.

Summing it up,

Change is always going to remain a constant in the vehicle telematics industry. And visionary automotive brands will appreciate it. Zeliot is already creating a revolution in the mobility ecosystem by bringing this change. Their affordable cloud subscription model that's more secure and reliable is making it possible. With this revolutionary mobility ecosystem, telematics solutions will be a win-win situation for both OEMs and their end customers. Pioneers like Bosch

have joined hands with Zeliot towards a strong mobility platform solution by picking up 14% of their stakes. But it's just a beginning, there are still more milestones to achieve. □



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Anup Naik, aged 30 is a co-founder and director of Zeliot. He comes from a technology background with an experience of 8+ years and has an engineering degree in CSE. He provides the business roadmap and formulates the vision for the company and is instrumental in achieving the roadmap with a team of 45+ members.

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Connected Vehicles: Key to all our Road Transportation Problems!

TUSHAR BHAGAT
 Ufficio India Pvt. Ltd.

Connected Vehicles

Your car not only communicates with you but also with the car in front of you, the traffic sign on the side of the road, and also to those traffic lights you see ahead. The advancements in the field of the automotive industry have led to the development of connected vehicles (CV) and their data platforms. The CV paradigm dictates that all advanced vehicles be equipped with technology that allows them to communicate with nearby vehicles, connected infrastructure, and surroundings.

CVs are architected in a framework that works well for both short-range communication (DSRC) and long-

range communication. This form of communication has an array of applications, as it can support a whole new generation of in-fleet safety features. In fact, vehicle connectivity can assist drivers to prevent 76% of crashes on the road—greatly reducing the cost of accidents and fatalities.

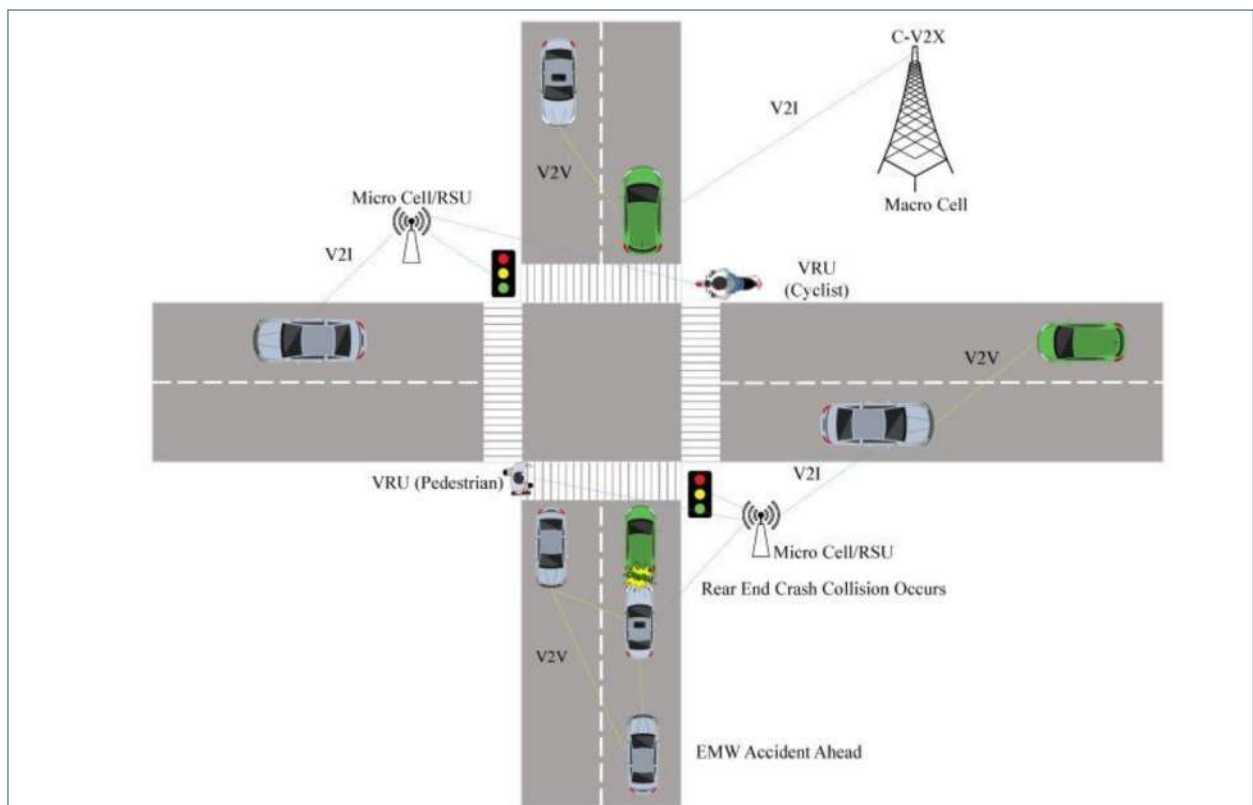
How did they come to be?

The need to access better information created a demand for smarter infrastructure and technology. Increasing demand for “always connected” has opened up a market for CVs and their data platforms across the world. The wide umbrella of connectivity is allowing fleet managers to share information

seamlessly. CVs really bring the best of both worlds—the collection of sensor data in real-time and its secure transmission. The concept of CVs is appealing because anyone can access the right information at the right time. CVs can ensure smooth integration between your smartphones and your fleets. The minimal power requirements, the affordable cost to consumers, and the easy-to-scale model of connected vehicles are gaining traction among fleet businesses. Therefore, the potential of CV is really promising.

Why do they matter?

V-2-X (Vehicle to everything) connectivity



has always been all about providing users with better data and analytics. Connected vehicles communicate in a framework that allows real-time, short-range, over-the-air data exchange. This manner of communication allows vehicles to detect potential hazards, calculate risks, and issue warnings. With such vehicle connectivity, your fleet will always have 360-degree awareness of their position in relation to the other vehicles. Besides, connectivity improves drivers' judgment and helps them make better on-road decisions.

Connected vehicles create new, data-rich environments and are vital in attaining less congested and more eco-friendly roads. In fact, connected vehicle technology aims to tackle some of the biggest challenges of the transportation industry:

Safety:

According to WHO statistics, every 24 seconds, a fatal, life-threatening accident occurs around the world. Even with the presence of safety features like airbags and antilock brakes, the number of traffic fatalities continues to rise. Road accidents not only hurt lives but also create economic strain. In the United States of America alone, the annual cost of vehicle breakdown amounts to almost 227 billion dollars. The cost of accidents affects businesses in more ways than one, which is why there is a dire need for solutions. Accidents mean repair expenses, driver injuries, lower productivity, and higher insurance premiums. All these combined can really dent your ROIs and affect your business adversely.

To tackle all these issues, CVs will give drivers the tools they need to anticipate collisions and reduce the number of casualties. With safer drivers, we'll have safer roads. Hence, these CVs are equipped with features that help drivers prioritize safety. For instance, with CV platforms, your car (and drivers) can communicate with the car in front of it. If you (or your drivers) are tailgating or driving at such speeds that collision is guaranteed, you will get notified and will be required to slow down. Such a mechanism greatly reduces the risk of rear-ended collisions. Additionally, alerts and warnings for reckless driving, traffic violations, or frequent lane departures can be issued as well. Thus, the CV platform helps drivers execute compliance on the road by

providing tools to enhance holistic safety.

Mobility:

Nobody likes traffic! Owing to rapid urbanization and population boom, today's roads have been more congested than ever. In fact, in a year, the people of Mumbai, India spend 11 days in traffic while commuting. According to the findings of the Central Road Research Institute (CRRI), the fleets of Delhi waste 40,000 liters of fuel per day in traffic.

The effects of such congestion on everyday productivity, fuel consumption, and sustainability are devastating. In this context, vehicle connectivity is seen as a valuable tool, almost a coping mechanism of sorts, to deal with the exponentially rising commute times and carbon emissions. Connected vehicles can keep the traffic moving and here's how:

V-2-X communication will generate an incredible amount of new data about how, when, and where vehicles travel. Such big data, when incorporated with predictive AI technology, can help fleet managers identify the best times to dispatch their vehicles. This wave of data will give birth to multiple transport applications that can help people with their traffic experience.

Environment:

Vehicles consume a lot of energy even before they start running on the road. The manufacturing process itself takes a great toll on the environment. When on the road, these vehicles consume petroleum products like petrol and diesel. Extraction, distillation, and combustion of petrol is an energy-intensive process. The transportation sector alone contributes 27% of the global carbon-dioxide emissions. Such exhaust leaves a devastating carbon footprint and contributes significantly to global warming. Besides that, fuel costs are one of the biggest expenses for a fleet manager. Therefore, monitoring your fuel

consumption and expenses is crucial.

Here, connected vehicle data platforms can be of great help. They will generate data that can help drivers make smarter, greener transportation choices. For example, with access to real-time information about traffic conditions, drivers can choose alternative routes. Data platforms can help fleet managers achieve fuel efficiency through route optimization. Unnecessary stops at intersections, stop signs, and roundabouts can be eliminated through short-range communication. A longer range of communication established via GPS platforms can help fleet managers get insights into fuel and driver costs. They can leverage such data to streamline their fuel/energy use.

Conclusion:

The pace at which technological developments are taking place in the automotive industry has sped up in recent years. Vehicle connectivity is one of those advancements that brings along with it some pragmatic challenges. On the bright side, they have opened up a whole new world of possibilities and applications. From traffic management to in-fleet driver coaching, from keyless fleets to real-time data analytics—anything and everything is possible with CVs. The importance of such technologies can never be undermined. CVs provide a platform to put data to good use and make roads safer, more efficient, and more economical than ever before. □

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Tushar Bhagat is the CEO of Uffizio. He has simmered 15 years worth of informatics knowledge & experience into a one-of-a-kind telematics platform. This fleet management system has been acclaimed and widely used by businesses in over 60 countries. He firmly believes in finding creative solutions to everyday challenges—so businesses can bloom into their full potential.



Kia Carens

Luxury Plus 1.4 Petrol DCT 6 STR

Kia Carens launched in India on February 15. The Carens is available in five trim levels – Premium, Prestige, Prestige Plus, Luxury and Luxury Plus. The price of Carens starts from Rs.12 lakhs to Rs.20 lakh.





SPECIFICATIONS

Safety Features:

- ◆ Overspeed Warning - 1 beep over 80kmph, Continuous beeps over 120kmph
- ◆ 6 Airbags (Driver, Front Passenger, 2 Curtain, Driver Side, Front Passenger Side)
- ◆ Tyre Pressure Monitoring System (TPMS)
- ◆ Child Seat Anchor Points
- ◆ Seat Belt Warning

Engine & Transmission:

- ◆ Engine Type – Smartstream G 1.4T-GDI
- ◆ Fuel Type – Petrol
- ◆ Max Power - 138 bhp @ 6000 rpm
- ◆ Max Torque - 242 Nm @ 1500 rpm
- ◆ Drivetrain – FWD
- ◆ Transmission - Automatic (Dual Clutch) - 7 Gears, Paddle Shift, Sport Mode
- ◆ Emission Standard – BS6
- ◆ Turbocharged

Braking & Traction:

- ◆ Anti-Lock Braking System (ABS)
- ◆ Electronic Brake-force Distribution (EBD)

- ◆ Brake Assist (BA)
- ◆ Electronic Stability Program (ESP)
- ◆ Hill Hold Control
- ◆ Hill Descent Control

Locks & Security Features:

- ◆ Engine immobilizer
- ◆ Central Locking - Keyless
- ◆ Speed Sensing Door Lock
- ◆ Child Safety Lock

Telematics Features:

- ◆ Find My Car
- ◆ Check Vehicle Status Via App
- ◆ Geo-Fence
- ◆ Emergency Call
- ◆ Over The Air (OTA) Updates
- ◆ Remote AC On/Off Via app
- ◆ Remote Car Lock/Unlock Via app
- ◆ Remote Sunroof Open/Close Via app
- ◆ Remote Car Light Flashing & Honking Via app

Entertainment, Information & Communication Features:

- ◆ Wireless Charger
- ◆ Smart Connectivity - Android Auto (Wireless), Apple Car Play (Wireless)

- ◆ Integrated (in-dash) Music System
- ◆ Head Unit Size – 2 Din
- ◆ Touch-screen Display
- ◆ GPS Navigation System
- ◆ 6+ Speakers
- ◆ USB Compatibility
- ◆ Aux Compatibility
- ◆ Bluetooth Compatibility (Phone & Audio Streaming)
- ◆ AM/FM Radio
- ◆ Steering mounted controls
- ◆ Voice Command

Instrumentation:

- ◆ Digital Instrument Cluster
- ◆ Electronic 2 Trips Meter
- ◆ Average Fuel Consumption
- ◆ Average Speed
- ◆ Distance to Empty
- ◆ Digital Clock
- ◆ Low Fuel Level Warning
- ◆ Door Ajar Warning
- ◆ Gear Indicator
- ◆ Shift Indicator
- ◆ Digital – Tachometer
- ◆ Instantaneous Consumption

MARUTI SUZUKI BALENO

Alpha AGS

Maruti Suzuki launched its new generation Baleno on 22nd February. Prices of the Maruti Suzuki Baleno starts from the Rs.6.50 lakh and stay under Rs.10 lakhs for the top variant



SPECIFICATIONS

Safety Features:

- ◆ Overspeed Warning - 1 beep over 80kmph, Continuous beeps over 120kmph
- ◆ 6 Airbags (Driver, Front Passenger, 2 Curtain, Driver Side, Front Passenger Side)
- ◆ Child Seat Anchor Points
- ◆ Seat Belt Warning

Engine & Transmission:

- ◆ Engine Type – 1.2L VVT
- ◆ Fuel Type – Petrol
- ◆ Max Power - 88 bhp @ 6000 rpm
- ◆ Max Torque - 113 Nm @ 4400 rpm
- ◆ Drivetrain – FWD
- ◆ Transmission – AMT - 5 Gears
- ◆ Emission Standard – BS6

Braking & Traction:

- ◆ Anti-Lock Braking System (ABS)
- ◆ Electronic Brake-force Distribution (EBD)
- ◆ Brake Assist (BA)
- ◆ Electronic Stability Program (ESP)
- ◆ Hill Hold Control

Locks & Security Features:

- ◆ Engine immobilizer
- ◆ Central Locking - Keyless
- ◆ Speed Sensing Door Lock
- ◆ Child Safety Lock

Telematics Features:

- ◆ Find My Car
- ◆ Check Vehicle Status Via App
- ◆ Geo-Fence
- ◆ Emergency Call
- ◆ Over The Air (OTA) Updates
- ◆ Remote Car Lock/Unlock Via app
- ◆ Remote Car Light Flashing & Honking Via app
- ◆ Alexa Compatibility

Entertainment, Information & Communication Features:

- ◆ Smart Connectivity - Android Auto, Apple Car Play
- ◆ Integrated (in-dash) Music System
- ◆ Touch-screen Display
- ◆ GPS Navigation System
- ◆ 6 Speakers
- ◆ USB Compatibility

- ◆ Aux Compatibility
- ◆ Bluetooth Compatibility (Phone & Audio Streaming)
- ◆ AM/FM Radio
- ◆ Steering mounted controls
- ◆ Voice Command

Instrumentation:

- ◆ Analogue - Digital Instrument Cluster
- ◆ Electronic 2 Trips Meter
- ◆ Average Fuel Consumption
- ◆ Average Speed
- ◆ Distance to Empty
- ◆ Digital Clock
- ◆ Low Fuel Level Warning
- ◆ Door Ajar Warning
- ◆ Adjustable Cluster Brightness
- ◆ Gear Indicator
- ◆ Heads Up Display (HUD)
- ◆ Analogue – Tachometer
- ◆ Instantaneous Consumption



Role of AI and ML in the Automotive Sector: A Roadmap for 2022

MUDASSIRKHAN PATHAN
Intangles Lab Pvt. Ltd.

With the pandemic leaving a trail of disruption in its wake, the global automotive industry has been quick to adapt and evolve. The most prominent of these transitions is undoubtedly the growing relevance of AI and ML in the automobile sector. With industries around the world pivoting towards digital innovation, the automotive industry is one of the few sectors that is leading this transformation by harnessing these new age tech advancements. Let's see what role AI and ML are slated to play in the automobile industry in 2022:

With Artificial Intelligence and Machine Language taking center stage across numerous arenas in the automobile industry, the most prominent perhaps is the EV sector. In stark contrast to the traditional IC powered engines that are a product of 120 years of research and development, the EV is still at an evolutionary stage and is yet to be fully embraced across mainstream vehicle platforms, especially in a country like India. However, as concerns for planet-friendly and emission free transportation grow deeper, the focus on EVs as the next

automotive frontier is poised to increase.

And at the heart of the EV revolution is the optimization of AI and ML to enhance efficiency and effectiveness where it matters MOST. When it comes to EVs, the most crucial aspect is battery management, hands down. As the single most critical component of electric vehicles, the EV battery is responsible for dictating the overall shelf life of the vehicle. Therefore, EV players are laying deep emphasis on utilizing AI and ML for various battery management metrics like range prediction to gain accurate statistics on effective mileage achievable and health monitoring modules which can gauge the remaining useful life of the battery.

When it comes to EVs, battery management facets cannot be compromised. It is important that EV users gain a clear picture of battery performance beforehand to avoid unnecessary hindrances on account of the battery running out. Here AI and ML assay a huge role in determining the battery performance which depends upon a number of variables such as acceleration patterns, deceleration patterns, transmission utilization trends, and use of headlights and

HVAC. The AI models need to contextually track the various behavioral patterns that take a toll on the battery. This includes being intuitive of subtle trends in operating modes which can affect the current output of the battery, such as the exact time when the lights are switched on. The AI and ML-based predictive system must also include various ambient factors like temperature conditions and humidity levels which can impact the overarching performance of the vehicle.

In case of impending battery heating or leakage issues, these next-gen systems can profile factors which lead to chemical discharges and alterations prior to such events. Therefore Machine Learning systems must predict a plethora of both intrinsic and extrinsic factors to precisely estimate battery longevity. A number of deep tech firms are innovating various cutting-edge algorithms to assert accurate range-prediction for heavy duty vehicles. AI and ML based systems are also being utilized for quantifying performance metrics of emergent EV classes such as fully-electric trucks which are still at an extremely nascent stage.

AI and ML are also crucial for making smart recommendations regarding the charging infrastructure for EVs. These intelligent systems can take into account the preset destination and combine that with the nearest charging destination with respect to the runtime battery needs of the vehicle. AI and ML based models can expertly gauge the chemical health of the battery and make appropriate recommendations regarding slow and fast charging.

The commonly-held perception is that EVs are less prone to failure than ICE vehicles due to a limited number of moving components. However, a closer look reveals that though the number of moving



parts has come down, the susceptibility to breakdowns resulting from failure of minutest parts is much higher. This predicament can prove to be a major hurdle on the road to EV adoption. Therefore, leading OEMs are investing heavily on designing machine learning systems which can make accurate predictions regarding the health of EV drivetrain components by simulating environmental conditions to avert any critical damage like battery heating and motor-lubrication failure. By accurately gauging any looming wear and tear or damage in internal parts, these hyper-intuitive predictive platforms can alert both the owner of the vehicle as well as the OEM to circumvent breakdowns.

With AI and ML moving from the Cloud and onto mainstream applications, it can be safely asserted that these new-age tech paradigms are on the edge. With computational ability advancing exponentially, present-day vehicles come decked with advanced processors that can seamlessly execute sophisticated AI and ML programs using on-premise, edge computation. Today, AI and ML can monitor even the minutest details regarding driver behavior such as drooping eyelids and level of alertness, safeguarding against fatal accidents. These next-gen microprocessors which are embedded deep in the vehicle also enable adaptive cruise control and autonomous driving ability that can significantly decrease driver exhaustion.

Currently, scientists are also dabbling with low-fidelity microcontrollers for running TinyML. These AI and ML microcontrollers can greatly optimise the cost of enabling AI for applications such as collision warning, lane departure alerts and reading traffic signs. At the center of this revolutionary automotive trend, is the MCUNetV2, a first of its kind deep learning framework which consists of Convolutional Neural Networks, computed in a patch-wise manner. This latest technology has the potential to redefine the face of the automotive industry.

Safety continues to be the ultimate focus for OEMs, worldwide. Implementing AI and ML can also help in assessing a wide pool of erroneous driving habits which can increase the risk of accidents and reduce energy efficiency, while making recommendations to avert the same. With the rise of ADAS or advanced driver assistance systems, most



vehicles today come with active cruise control abilities which use both camera and radar technology to identify vehicles up ahead and isolate any surrounding obstacles by automatically slowing down the vehicle. The emergence of autonomous parking enables drivers to park vehicles seamlessly in tight spots by simply putting the vehicle parallel to the empty slot while the AI takes care of the rest.

AI enabled cameras focus directly onto the face and determine whether the driver is intoxicated by employing various metrics such as breathing patterns and blink rate which changes drastically whenever the driver is drunk or lethargic. ML based instrumentation can also detect the level of alcohol related vapor in the driver cabin. Come 2022, these AI based sensors will also be able to distinguish whether the ethanol inside the car is sourced from liquor or everyday items like room freshener and sanitisers.

Both AI and ML also assert an enormous role in high octane motorsports like Formula One and Formula E for commencing various designing and racing decisions. It is common knowledge that all major formula one outfits like Ferrari

and McLaren leverage AI and ML to train systems for making crucial racing decisions pertaining to cornering settings and design decisions pertaining to the aerodynamic package such as angle of wings, contour of the wings and undercarriage diffusers.

AI and ML models are also increasingly being used to ascertain fuel quality at diverse locations. For instance, the quality of fuel that you would get in a metropolitan will certainly be different from what you will get in a tier-3 town. The AI can evaluate trends pertaining to metrics such as Mean Time Between Failure (MTBF) for failures in the fuel injection system and make recommendations around locations where the quality of fuel may be sub-standard.

The growing pertinence of AI and ML in everyday life is undeniable, as both have the potential to redefine every aspect of it. In the case of the automobile industry, AI and ML are proving invaluable in mitigating a number of challenges, especially with regard to EV adoption and developing planet-friendly automotive systems that not only promise never-before-seen levels of performative efficiency, but also enhance user safety. □

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What if your data could speak?

 **SABYASACHI MISHRA**

Motherson Group

Can you imagine the manifold benefits an organization could achieve if their data could speak? Enterprises would be able to identify patterns and insights, right on time to take informed decision. When data gives immersive experience, it even has the potential to become a new language.

This can help enterprises to derive valuable information that would allow them to make better and more informed decisions; provided businesses learn the data language.

Various research reports have highlighted the importance of data and its exponential growth. Global data generation and replication will expand at a compound annual growth rate (CAGR) of 23 percent throughout the projection period, reaching 181 zettabytes in 2025, according to IDC's new Global DataSphere Forecast, 2021-2025. By 2025, more than 25% of data created in the global datasphere will be real-time, with IoT real-time data accounting for more than 95% of that.

"How can you make your data speak?" is the question. To answer this, we must first comprehend the nature of data as a resource and the potential influence it can have.

Data is not just the new oil; it is actually the new soil

The expression "data is the new oil" is a metaphor that became popular in last decade. But as the role of data has evolved, it's about time we think in broader perspective. When we look at data from the perspective of soil, data becomes the DNA and the key resource that helps you leverage insights for achieving your key business goals.

Research shows that in the next ten years, the number of embedded devices, such as those found in smart buildings, manufacturing floors, and self-driving cars, will increase from less than one per person

to more than four, an average person will interact with a connected device nearly 4,800 times each day in just 8 years. 75% of the population will be linked by 2025, creating and interacting with data.

With advances in predictive analytics and artificial intelligence, data is poised to deliver high value actionable insights. It helps in unlocking the full value of data and gain insights in real time.

We may reasonably assume that data is nearly endless as the number of internet users continues to grow exponentially. We will never run out of data. We shall, in fact, continue to create indefinitely. When data is utilized as soil, it does not get deleted once it has been analysed.

Data is non-rivalrous, non-depleting, renewable, and nearly limitless. There are numerous ways for data to be duplicated or mislabelled when merging multiple data sources. Data cleansing helps in saving time, increasing efficiency, and increasing productivity.

Why data needs to be looked at as the new soil

For enterprises in 21st century, it becomes essential to look at data with a new lens. It's the fertile medium that can be enhanced and reused over time with data visualisation being the flowers that blossom from it.

When you look at soil on surface, it's just a crust of mud. To see the various material composed you must take a closer, detailed look. Similarly, looking at data in isolation results in a collection of disjointed facts and a large number of numbers. Only when you begin to deal with the data in a specific way, using the tools to nourish, irrigate, clean, and fertilise it, does it become an asset – a fruit-bearing tree.

To produce results, the data soil must be tilled, cultivated, and put to work. To give outcomes, raw data must also be processed, consumed, and cleansed.

For data initiatives to be successful,

businesses must go beyond spreadsheets and data points on a chart to obtain a thorough knowledge of how this data is supposed to drive business. Data is a rich medium, like soil, that can be irrigated with networks, connectivity, and a comprehensive tool ecosystem.

Business intelligence, data analytics, and data science are all technologies that help you understand and improve the quality of your data, as well as make it operate in the most efficient way possible to give actionable business insights.

When it comes to seedlings and plants, the condition of the soil is critical. But can you just wish for this to happen by looking at the soil? For the plant to take root and flourish, you must dig, plant, till, water, fertilise, and maintain it. The situation is identical when it comes to data. You must come up with fresh ways to make the data useful. To uncover new patterns and associations that matter, you must use new tools, stretch your imagination, and sift through reams of data.

You must irrigate the channels in order to make data more intelligent by employing intelligent algorithms that help in data interpretation.

And, like the flowers blooming in the soil, you get visualisations and insights by dealing with this data. That's when, with the help of data visualisation, your data begins to speak, enabling real time effective decisions.

"Organizations should seek for goal driven actionable insights when considering the evolved role of data as the soil."

While many organizations have defined their data strategy, some organizations are on their journey to look at data like a living organism.

Just like any living organism, data too has its natural evolution cycle and when utilized in the right manner and the right process is followed it gives out the desired output.

Right data visualization cannot be

achieved if the data segmentation is incorrect and even if the data segmentation is correct, but your data analysis is not right, the entire activity goes for a toss. It is important for organization to determine the right data warehouse/lake strategy depending on their business needs and goals and with this it is crucial to have right data ingestion adaptors in place from which the data will be pulled in from varied data sources.

In fact, it won't be an exaggeration to say that in the near future – the entire data journey from ingestion to insights can be automated and operable on a single click.

There are many data analytics platforms that work on the same strategy by focusing on transforming data into meaningful insights to assist businesses in achieving their goals. These platforms offer business-ready digital & analytics capabilities that can help any organisation establish a culture of agility, adaptability, and resilience across the board.

Also, there are platforms, solutions & accelerators that are intended to assist businesses transformation and data management endeavours.

The big data and advanced analytics enable organizations in implementing right digital strategy. It plays a crucial role in transforming each industry, vertical and unit by delivering intelligent insights, personalized experience, streamlining operations and reduced risk. It aids in decision making, improving customer experiences, optimizing products and processes and automation of manual tasks thereby improving productivity and efficiency.

When these techniques are further utilized, they address various industry challenges like slow decision making, delayed alerts and warnings etc. These have been successfully utilized in industries like Manufacturing, BFSI, Transport & logistics, Healthcare, Advertising and Customer services among others. Some of the common use cases utilized include fraud analysis, real time offers, predictive maintenance, demand forecasting, churn analysis, risk management, inventory management, sentiment analysis, people & customer analytics, and many more. All these are strengthened by utilizing Data Science, Artificial Intelligence, Machine/Deep learning and Neural Networks. The



comprehensive data analysis platform entails all of these with a scalable & componentized architecture.

The platforms are structured in a way that on top of the data, there are layers of different tools that are enabled, such as data Lake and data warehouse techniques for capturing the data, Artificial Intelligence, and machine learning algorithms for forming the Lakehouse, as well as data security and other ancillary characteristics. Also, there are features that are built-in, semi-built data models and structures that allow for unified data governance and management.

The data analytics platforms improve responsibility and visibility across all essential operations, while helping a wide range of users, including Operations Head, Product Managers, Business Heads, CXOs, and Innovation Leaders. By digitally engaging all critical functions, it empowers businesses in harnessing the value of data. It helps firms achieve goals such as predictability in business functions, efficient operations, strategic financial

management, faster time to market, and crucial business predictions. Enterprises just need to identify the right data and advanced analytics platform that does it all for them.

So what does It mean for us ?

Data, that can't be untrue, has the potential to solve many business challenges and provide answers to critical problems. The key to effectively utilising data is to devise a plan that identifies the problem or need to be addressed first, and then develop a path for gathering and analysing data that will answer that need. From hindsight to foresight, from reactive to predictive – data maturity and effective utilization can guide organization and deliver better outcomes. When the potential of data like the soil is utilised completely; data speaks and that results in reaping blossoming flowers in the form limitless benefits. Data and advanced analytics are transforming industries and improving business value chain by fostering data driven decision making. □

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5G Convergence - Automotive Industry as the Aggregator!

▲ MOHAN BACHHAV & SANKALP SINHA

IBM

Value Addition of 5G

Today's world is defined by speed and change. The fifth-generation technology standard for broadband cellular networks or '5G' as we call it, represents far greater technological achievement than any previous of its generation jump. The prime reason being bringing the high-speed network and computing to the Edge!

While telecom companies are pioneering the 5G ecosystem, it's true value extraction spans across industries. 5G acts as an enabler for the most part, while the actual disruptions happen in a multitude of other industries.

The 5G technology market is set to reach approx. 800b\$ globally by 2030. The market for connected cars is predicted to soar to over 215b\$ by 2027 with connected services and subscriptions being a recurring revenue pool. It is important to note that much of this growth will not be possible without the convergence of industries, i.e. bringing the competitive advantages of multiple industries together – primarily automotive and telecom, but also technology, media / entertainment, hospitality, banking / payments and the insurance industries. Today's car stands as the hub in the ecosystem.

As self-driving and connected vehicles and services become more common, the focus for automakers is shifting towards issues such as unlocking digital value, data protection / security. Car manufacturers and suppliers have to define digital functionalities and technologies that are necessary in order to implement solutions that are unlike anything that exists today. 5G in its fullest potential would be the instrument towards revolutionary applications.

5G increases the real-time cooperation across the globe. Imagine that technicians with specialized skillsets are able to control and repair your car from anywhere in the world, reducing vehicle downtime and immensely increasing customer satisfaction. Production lines can be almost completely automated and, since everything can talk to everything in real-time, efficiency can surge dramatically. The Internet of Things has barely scratched the surface of its own potential. 5G is poised to facilitate the connection of everything requiring a low latency internet connection, from autonomous vehicles to virtual car manuals to roadside - assist, paving the way for an environment in which every car and its owner is "smart" and connected.

5G is the enabler to success of Industry 4.0 and the Digital Supply Chain, Blockchain deployment at scale, advancements in Augmented and Virtual Reality, Big data and Artificial Intelligence !

You can access your favourite content while driving anytime, anywhere, because 5G is built to minimize delays. It provides a fast, reliable environment for data to travel and reach your devices nearly instantly. 5G enables connecting your car to almost everything be it a smartphone via apps, creating a simple dashboard on the vehicle that controls and connects all the devices in your life and all the services you use, providing 10X better experience in the comfort of your vehicle with faster browsing and seamless downloading and streaming.

Growing 5G Automotive Ecosystem

It is essential to understand the ecosystem resulting out of 5G convergence. It applies across the automotive value chain. For e.g.

Today's connected cars offer multitude of connected services not limited to :

- Autonomous Driving
- Infotainment Services
- Mobility Services
- Vehicle Health
- Driver Safety
- Vehicle Management
- Personalization
- Banking & Payments
- OTA

The ecosystem thus has following stakeholders apart from the OEM if we take connected car as a use case :

- Telecommunication Infrastructure Provider
- Device Partners
- Operating System Platform Provider
- Integrator Partner
- Infotainment Content Provider
- Service Providers
- Banking & Insurance Partners
- Mobility Platform Provider
- Big Data / Analytics Provider

This is currently just the tip of iceberg. This ecosystem is rapidly evolving and expanding across the automotive value chain. Considering the surge towards electric vehicle, this ecosystem is set to increase further with each stakeholder distinctly adding value to the ecosystem.

Where does 5G comes into picture in automotive industry value chain

The automotive value chain ranging from end suppliers to end customer is set to benefit from 5G. With more and more digital transformation and edge applications across the value chain, 5G is set to boost the new age applications and services.



USE CASES :

A. Product Design – Connected Cars, Mobility Platforms, Autonomous Driving etc.

ADAS: Lets take the case of ADAS (Advanced driver-assistance systems) which is a set of highly sought-after features assisting drivers and significantly increasing road safety. High speed connectivity has an increasingly important role in ADAS which adds to the on-board sensors with data that is either processed in the cloud at edge, or comes from sources outside the vehicle, such as infrastructure sensors, other vehicles or ADAS service providers. Such connectivity extends the ADAS capabilities of the vehicle beyond the limitations of on-board sensors and processing.

Software-defined vehicles: Software-defined vehicles need to be future ready and with hardware capabilities in terms of connectivity, sensors and processing power, in order to enable future updates as well as safely and securely deliver new services over the entire vehicle's lifecycle. That's essential for its success. In short, the vehicle needs to be relevant for the first, second, third, etc. owners of the vehicle. Telecom companies and operators are already offering these

capabilities with the seamless integration of 4G and 5G networks. The continuous migration of spectrum from legacy standards towards 5G, network slicing, dynamic policies across the globe and edge computing via cloud can address a wide variety of services.

B. Supply Chain – Virtual Part inspection, Real time inventory management etc. Connected gasoline / electric infrastructure, logistics etc.

The core of the Today's Supply Chain is end-to-end digital connectivity. The ability to track the movement of goods, services and information in real time throughout every touchpoint of the value chain anywhere and everywhere in the world is the ultimate objective. 5G enables the tracking of 10 times more devices with unprecedented speed and responsiveness. The movement of goods and services and the real time monitoring and performance monitoring of automated shopfloor equipment throughout the vehicle production processes (Industry 4.0), inbound logistics tracking ,

finished goods movement, warehouse and distribution hubs operations will be tracked and analysed in real time. Transportation modes, including autonomous vehicles and drones, will be tracked and routed optimally to reach their destinations safely and on time.

C. Manufacturing – Virtual Assists, Cognitive Quality Inspection, Automation, other Edge Applications etc.

5G already has enhanced presence in the vehicle production process. Faster connectivity enables services such as Automated Factory Parking (AFP), where vehicles are automatically moved and handled across shopfloor and plant areas and also at various logistics hubs being controlled remotely. Lot of customization is being done in this space as per needs of the OEM. Various private 5G networks





are offering opportunity to custom built solutions. Before the customer actually uses, the software-defined vehicle is already in action and a “digital twin” will follow it through its lifecycle, including expanded capabilities for “Over The Air” (OTA) software updates.

D. Customer Service – Roadside Assist, Virtual Manuals, Digital services & mobility services – security, ride sharing, connected services and subscription etc.

Today customers’ expectations are higher levels of in-vehicle services and entertainment, especially with increasing levels of automation. By 2025, the mobility services market is expected to exceed 230

b\$ worldwide, making it an important growth driver for the connected car market. A meaningful technological trend is the deployment of highly capable dual-SIM modems in the vehicle, where the passengers can utilize the vehicle’s embedded connectivity capabilities with their own data subscription for entertainment, while the vehicle uses the automotive OEM’s negotiated subscription for its own services using the same 5G modem.

Summary

The digital world is set to become faster, broader, intelligent and much more extensive. Every industry thus has immense scope to build its innovation and enhance

productivity via 5G platform. The key factor to growth here is cross-leveraging and collaboration amongst industries. The future of the connected world is not just about the new-age technologies such as 5G but is more dependent on how the ecosystems of collaboration develop. This will yield new opportunities of growth for every industry as a result of new revenue pools.

Today’s car is already a powerhouse of data with autonomous vehicles generating up to 1Tb of data per hour.

The new architectures of telematics enabled connected car have cloud and edge computing. Computing power, analytics and decision making at edge (in the vehicle), data storage and sensors are all growing more powerful and more affordable. As these trends converge, the connectivity ecosystem will be populated with more technologies, services, and providers than ever before. If we consider mobility, our vehicles will communicate with service providers, infrastructure, other vehicles, owner’s household devices and networks, improving both vehicle and driver safety, driving experience and traffic flow. In the production arena Vehicle Manufacturers can run highly precise, high-output, and largely automated operations using low-latency commercial and private 5G networks. Dealers, service companies and retailers can offer a more seamless and personalized in-store experience while making inventory management and warehouse operations more efficient. All allied industries like banking and payments, energy and utilities, services and of course telecom are all converging and yielding success stories like connected vehicles etc. With its improved speed, efficiency, latency, and coverage, frontier connectivity can produce the remainder by taking many existing use cases to the next level—and paving the way for entirely new ones that we cannot foresee today in the automotive world. The silos are disappearing and lots of overlaps and synergies are emerging. There is inter-dependence but at the same time there is mutual benefit and growth opportunities. There would be more convergence in coming days with scope across the value chain.

5G is speed, 5G is availability, 5G is connectivity, 5G is quality, 5G is growth! Above all 5G is convergence! □



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A DEVICE FOR ALL NEEDS
A ONE STOP SHOP

BASIC TELEMATICS

- Driving Behaviour
- Speed & Geo Fencing
- Supports Panic Button, Immobilizer, Fuel Sensor Integration
- Device based Configurable Alerts Module & Track & Trace

COMPLIANCE TELEMATICS

- All Telematics Features
- AIS 140 Certified
- Hassle Free Common Layer Activation
- Hassle Free E-Sim activation
- Empanelled in all AIS 140 active States
- Additional Advanced Features over and above AIS 140 Mandate
- Supports Panic Button, Fuel Sensor, Immobilizer, Integration

ADVANCED TELEMATICS

- Video Telematics
- Diagnostics
- Data Points for Prognostics of Vehicle/ Vehicle ECUs
- Vehicle ECU FOTA/COTA
- Live Diagnostics of Vehicle ECUs with J2534 standard
- CAN and Device based
- Configurable Alerts module

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- Vaahan Registration
- Common Layer Registration as per AIS 140 Mandate
- Sales Enquiries and Assistance



SO MUCH, FOR SO LESS

- Track & Trace
- All Telematics Features
- Support for CAN
- Battery Charge Status, SOC, Vehicle functional parameters on CAN etc
- Support for High voltage EV vehicle(9-90V)
- CAN and Device based Configurable Alerts module

EV TELEMATICS

INSURANCE TELEMATICS

- Accident Reconstruction using Video Telematics
- Driver Behaviour Analysis: Risk profiling of customers
- Data Points for Prognostics of Vehicle Consumables.
- Data points for Efficient Claims management

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Electric Vehicle: Vehicle to Grid (V2G) Test challenges and solution

DARSHAN MEHTA & HARSHA VARDHAN
 Ametek Programmable Power

The hybrid-electric and electric vehicle (HEV/EV) market has been growing rapidly in India. Electric vehicles are viewed not only as transportation with clean energy, but also as a mobile energy storage device. As the number of electric vehicles increase on the road, they will no doubt need to connect with the surrounding energy infrastructure to manage the load demand. In this paper we are going to talk about Vehicle-to-Grid, which is also called as V2G Technology and test requirements.

Currently power electronics, automotive testing and grid compliance tests are seen in isolation. But as new technologies like Vehicle-to-Grid evolves, the entire energy

eco-system is going to converge. The test solutions also need to converge to meet interoperability between automotive EV, grid system and infrastructure.

Electric Vehicle role in Energy Eco-system:

Electrical vehicles are going to play very important role in the energy eco-system. The growth of electric vehicles and the smart grid has led to the creation of vehicle-to-grid (V2G) technology. Imagine using your electric vehicle to power your home during a power outage, or transferring the energy from your car to a grid. This enables electric vehicles to serve as mobile energy storage devices. This would elevate the

energy economy as it looks to meet the peak load power requirements.

Vehicle-to-Grid Technology:

Vehicle-to-grid technology involves drawing unused power from the car into the smart grid. V2G, which is also known as vehicle-grid integration (VGI), can help the energy grid supply electricity during peak hours. It can also create an extra power source when weather-dependent renewable energy sources are not available. For example, a home that uses solar power cannot generate electricity at night, but an electric vehicle could provide a secondary source of power if needed.

Electric vehicles will be used as mobile

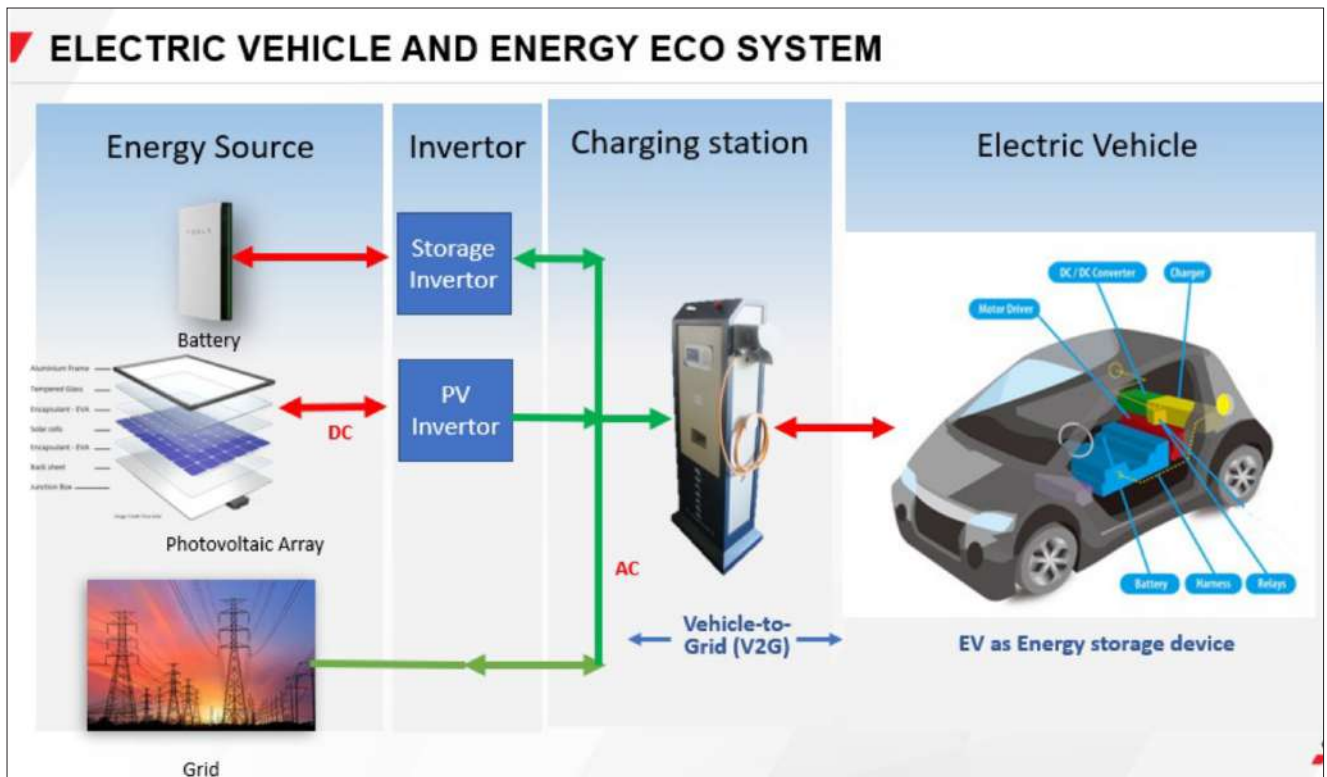


Fig.1: Electric Vehicle and Power Eco-system

energy storage devices to meet peak load power conditions.

Power Electronics Component for EV and Vehicle-to-Grid (V2G):

Electric vehicle power electronics include on-board chargers, battery, converters, powertrain inverters and the motor. AMETEK Programmable Power offers power test solutions for the above systems. V2G introduces new power electronics systems like smart grid and smart charging stations.

Although the technology to transfer power between EVs and homes is already in place, transferring power from EVs to the smart grid remains in the experimental stage.

The most important requirement for V2G is interoperability between EVs and the smart grid. Standardization of the smart grid and charging stations would be a key to success for the Vehicle-to-Grid technology, and IEEE is already working to standardize.

Test Challenges for V2G:

Safety, reliability, and interoperability are the most important requirements for a V2G system. Power testing plays a huge role to ensure that a system meets all safety and performance criteria.

- **Safety and compliance standards for Vehicle-to-Grid:** The concepts like V2G are young and the standards for performance testing are still evolving. The test instruments need to be flexible and future proof to meet the evolving standards requirement.
- **Interoperability between EV and Grid:** As EVs and charging infrastructure penetrate and integrate into the traditional electrical grid, the question about compliance with grid code of conduct and regeneration is becoming more relevant. While Vehicle-to-Grid integration is a challenge for low voltage electrical distribution due to the system's old infrastructure, it is also creating an opportunity to support the grid for peak load shaving.
- **Bidirectional test:** Vehicle-to-Grid tests brings new concepts of bidirectional flow for power between EVs and the grid. Testing bidirectional power flow demands equipment that can source and sink power to the converter.

- **Accurate Emulation of Real Scenarios:** The number of scenarios for testing are growing exponentially with grid and EVS. These scenarios need to be emulated accurately in lab environments to meet safety and performance criteria. Mimicking grid scenarios accurately to test EVs is very important to meet safety requirements.
- **Hardware in Loop Testing:** Automotive and power test require hardware in loop to test various scenarios.
- **Multiple Power System Test:** The ecosystem consists of V2G, renewable power systems, and storage devices. All these sub-systems need to be tested separately as well as at completely integrated system level.

Vehicle-to-Grid Testing:

To support Vehicle-to-Grid integration, EVs and chargers (also called as power conversion equipment) need to be smart and manage the charging & discharging in various grid scenarios. Performance testing requires a real bidirectional power source which can source & sync power in both directions and simulate various grid conditions. International standards are imposing strict and complicated test procedures which require a flexible tool to generate many grid scenarios. Grid interactive load/sources require testing to various standards such as IEEE 1547 / UL 1741 / UL 458 / IEC 61000-3-15 / IEC 62116 etc.

AMETEK MX/RS series Regenerative 3-Phase Grid Simulator

AMETEK Programmable Power's regenerative grid simulators (MX & RS series) are ideally suited for testing Vehicle-to-Grid requirements.

Compliance Test:

MX/RS can be programmed to emulate most types of grid power anomalies, including voltage dips, sags, swells, harmonics (even, odd, inter), interruptions, waveform phase shifts, waveform distortions, etc.

- It can support standard grid tests for standards IEC61000-4-11, and IEC61000-4-13.
- Emulate grid conditions and test scenarios:
- The support for arbitrary waveform

makes it easy to emulate various raw grid power waveforms, which are far from ideal sine wave.

- MX/RS can support generating & measuring voltage and current harmonics up to 50th order, which supports most stringent test requirements.
- MX/RS series offers Regenerative mode (bidirectional Power mode) which automatic crossover between Source and sync power in AC mode. It can Regenerate up to 100% of the rated output power back to the utility grid during sync mode operation with conversion efficiency of >85%.

Safety first: Anti-Islanding Test

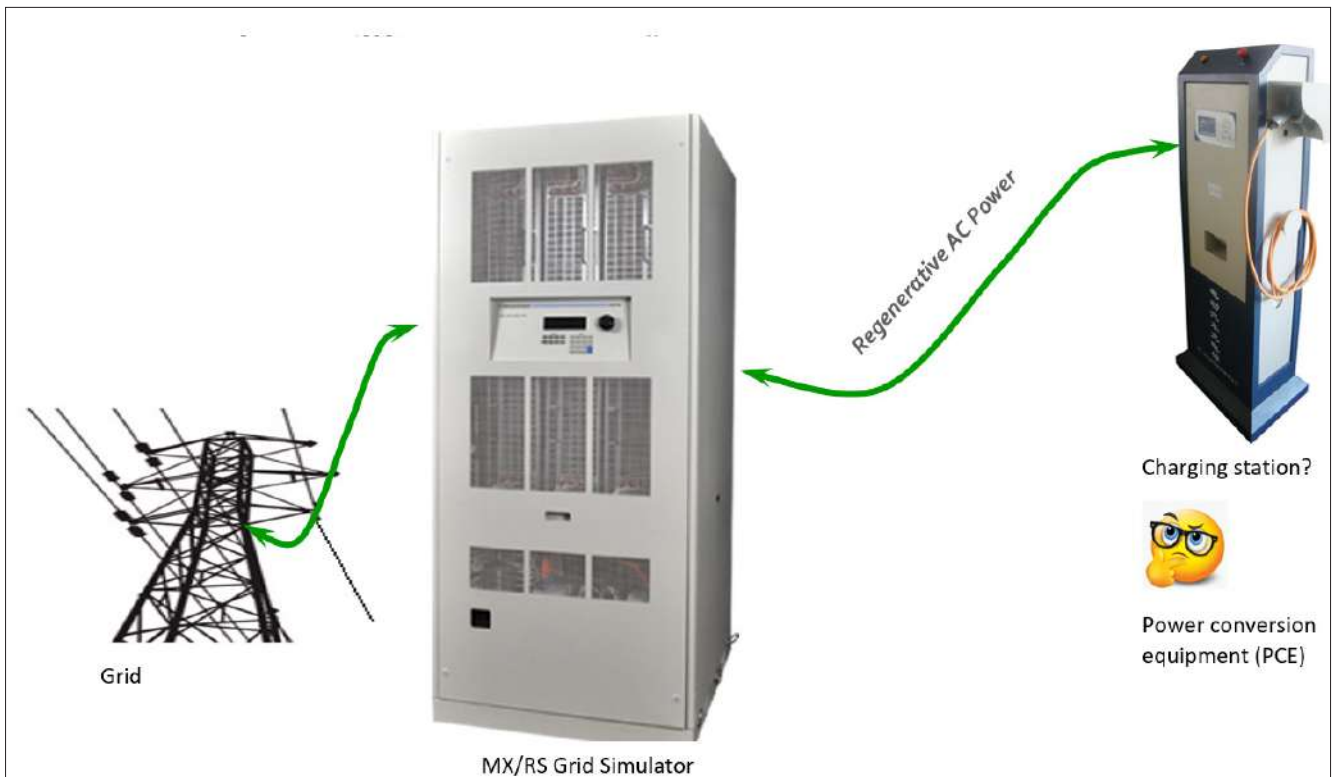
"Anti-islanding" is the ability of a generator to avoid supplying power to the grid if a circuit is opened. It is a necessary feature of distributed generation for two reasons. Without it, excessive current could be drawn from the device potentially damaging power electronics. More importantly, line workers may assume that circuits on the load side of an open line or open switch will not be energized, and if there was an active "island" of energized lines, this would pose a hazard to the line workers. Also, if the grid reconnects with the inverter out of synchronization, again there is a chance for damage to the customer/utility equipment. As per standard IS 16169/IEC 62116, power conversion equipment (PCE) shall cease the energy output within 2 seconds after grid disconnection (grid shutdown/offline). This function must be equipped with grid tied to vehicles. AMETEK Programmable Power's MX/RS series grid simulator offers procedures to test anti-islanding conditions.

Hardware In Loop Test:

With its capability to work directly with DC voltage control inputs, the grid simulators can be used as Class-A amplifiers in HIL (Hardware-In-Loop) applications.

One stop solution for power testing:

AMETEK Programmable Power boasts one of the industries' broadest portfolios of programmable power products under the well-known and respected Sorensen, Elgar, and California Instruments brands. AMETEK Programmable Power's products serve a wide range of stimulus for Renewable Energy, Electric Vehicle, Grid and Battery



testing. AMETEK Solar Simulator, Grid Simulator (MX/RS), and wide range of Programmable AC and DC sources offers the most comprehensive solution for Electric Vehicle and V2G Testing.

Summary:

As EVs are on the rise, it requires infrastructure enhancement to meet the growing demand. Electric vehicles are capable of providing ancillary services and storage of energy to meet peak load

power requirements. Additionally, V2G can provide distribution system support when there is a concentration of parked V2G cars, along with overload elements in the distribution system. As the power electronics is growing with EVs and V2G, the test requirements are also growing exponentially. AMETEK offers a broad range of Programmable Power supplies as well as custom solutions. AMETEK Programmable Power solutions are designed to provide application specific



Comprehensive Test scenarios for EV and V2G testing using AMETEK Regenerative MX/RS series Grid Simulator enables to achieve compliance and safety requirements

solutions like solar array simulation, PV emulation for inverter verification, battery string simulator, and power compliance test. □

For more information about AMETEK Programmable Power solutions, please visit <https://www.programmablepower.com/>.



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Fuel

Tracking



Decrease fuel thefts
by up to

90%

Reduce fuel
costs by up to

15%

Optimize fleet
efficiency by up to

30%

Discover where your fuel goes

Fuel is typically one of the largest fleet expenses. Finding ways to minimize fuel spent can substantially improve the bottom line.

Callcomm BLE fuel level sensors (Escort) provides intelligent tools to keep track of fuel consumption and easily detect fuel thefts.



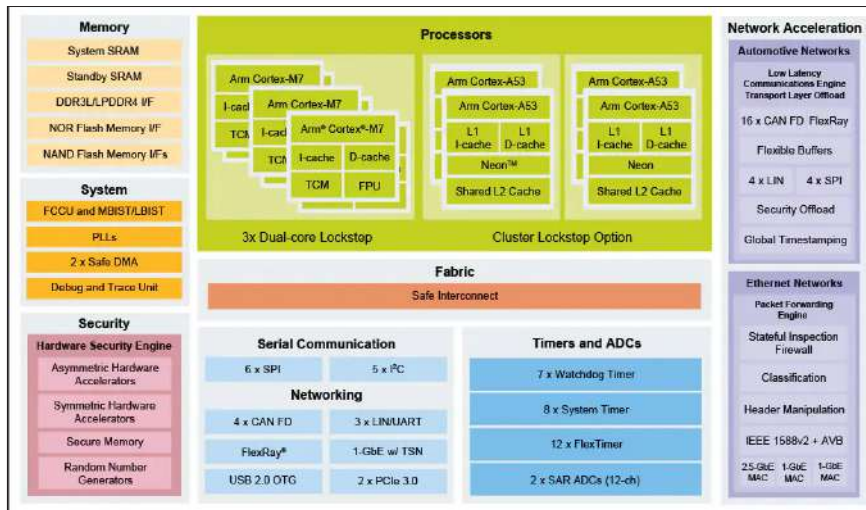
www.callcomm.org

Callcomm

TRACK | ANALYZE | OPTIMIZE

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MicroSys Electronics' miriac[®] MPX-S32G274A



The miriac MPX-S32G274A SoM comes with quad Arm Cortex-A53 cores plus triple Arm Cortex-M7 dual-cores and combines ASIL D safety and hardware security with more than 10 times the real-time performance and networking throughput of NXP's previous automotive gateway devices. The SoM offers multiple native CAN interfaces as well as comprehensive FlexRay, LIN and Ethernet support. Target markets are real-time connected vehicles, mobile machinery and automotive test and measurement equipment. Further applications include data loggers, edge gateways and fail-safe programmable logic controllers (PLCs).

With native support for a total of 18 CAN interfaces, the new MicroSys SoM is ideal for developing comprehensive vehicle networks. Alternative designs that use generic expansion buses to connect CAN controllers generate high interrupt loads on the main processor. FPGAs are not an inexpensive alternative either; they also require additional development resources for FPGA programming.

Features:

CPU

Architecture: Arm[®] Cortex[®]-A53

Processor: NXP[®] S32G274A CPU: 4 Arm[®] Cortex[®]-A53 64-bit cores at 1Ghz, 3 Arm[®] Cortex[®] M7 dual-cores at 400Mhz

DRAM: 4 GB 32-bit soldered LPDDR4 RAM at 3200MT/s

MEMORY

Flash: 64 MB QSPI Flash

Flash Card: Interface for external SD card multiplexed with eMMC

Boot Flash: Boot select: XSPI, eMMC or external SD card

eMMC: up to 32 GB

ETHERNET

RGMII: 3x

SGMII: 1x 2.5 Gbs

HIGH SPEED IO

SerDes lanes: 4x

ULPI-USB: 1x

PCIe: Yes

LEGACY IO

FlexSPI: 4x

UART: 2x

CAN FD: 18x

FlexRay: 2x

LIN: 4x

I2C: 4x

Analog Inputs (ADCs): 12x

GPIOs: Yes

JTAG Debug Interface: Yes

Aurora Interface: Yes

SECURITY / SAFETY

Security: Hardware Security Engine (HSE) for secure boot and accelerated security services

Safety: Advanced functional safety hardware and software for ASIL D systems AEC-Q100 Grade 2 device: -40 °C to 105 °C

OPERATING CONDITION

Power Supply Voltage: Single DC power input (+6 V to +36 V)

Typical Power Consumption: 3,5W

RTC: RV-3028-C7

Temperature: 0 °C to 70 °C

Optional Extended Temperature: -40 °C to 85 °C

MECHANICAL

Dimensions: 82 mm x 50 mm

Connector Type: MXM3.0

OTHERS

Software Support:

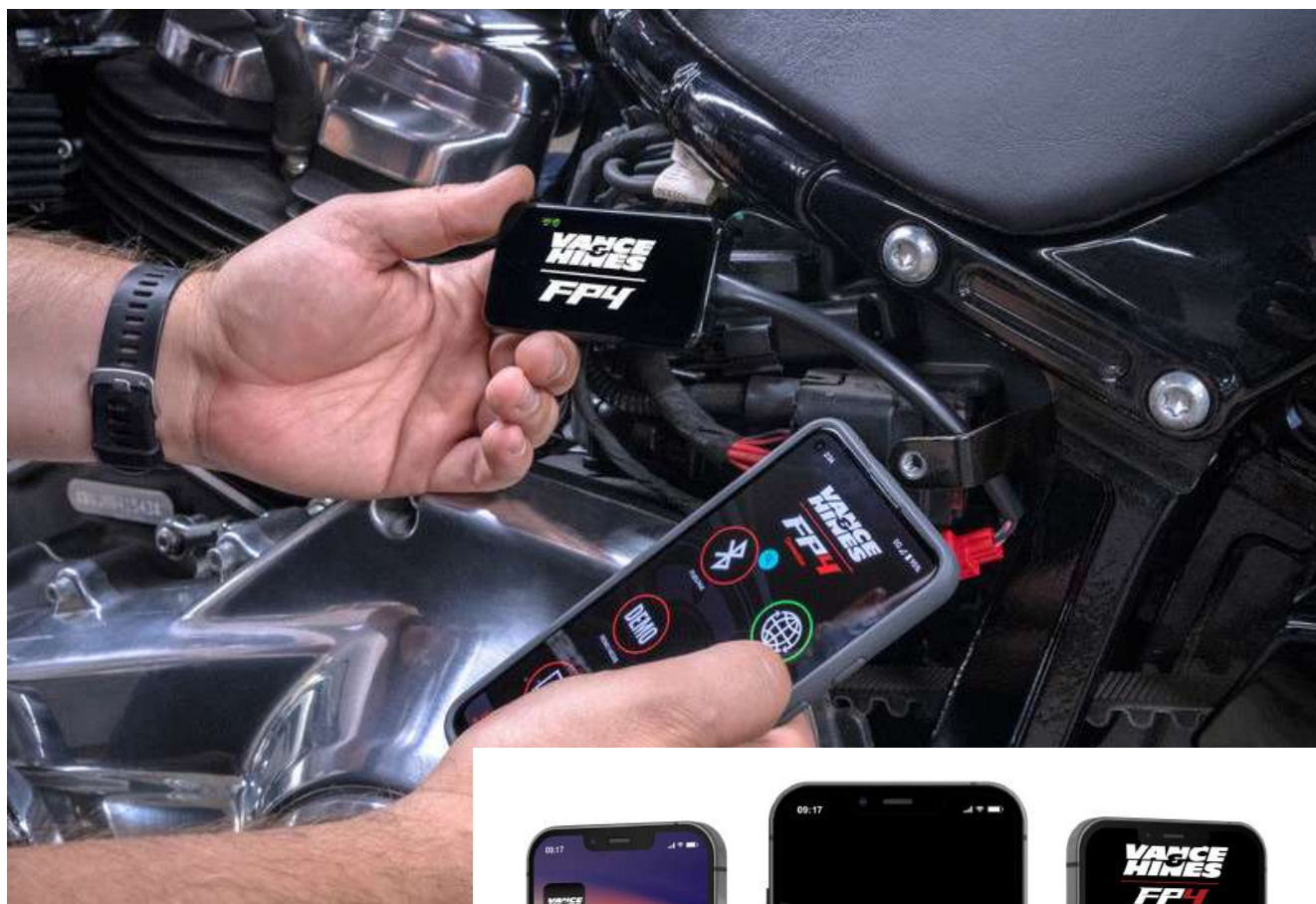
- Linux
- VxWorks (on request)
- Others (on request)

Additional:

- All I/O pins available on 314-pin edge connector
- Low Latency Communication Engine (LLCE) for vehicle networks acceleration
- Packet Forwarding Engine (PFE) for Ethernet networks acceleration
- Dev Kit available for immediate start, includes power supply, cables. Linux on SD card



Vance & Hines FP4



Vance & Hines announced the FP4, the next generation of its engine control module (ECM) flash tuning products. The FP4 features an all-new circuit board, case, firmware and mobile app, all of which were designed and manufactured in Santa Fe Springs, California. The FP4 brings greater control and optimum performance tuning to Harley-Davidson Touring and Softail models.

FP4 is the ability to dial-in the motorcycle's ECM tune to match the performance upgrades that a rider adds to their motorcycle, such as an aftermarket exhaust system and a high flow air intake. Owners of the FP4 may choose from a vast library of Vance & Hines maps created



in the company's dyno-tuning lab in California. Vance & Hines maps are model-specific and are created using actual parts on real motorcycles, not projections made from previous tests. Owners are able to further develop those maps with a number of customization options found in the FP4 app.

The Vance & Hines FP4 unit has a slimmer and smaller case and a longer wiring harness than its predecessor, Fuelpak FP3, allowing more options for locating the hardware on the motorcycle. It features simplified LEDs on the unit, which display the communication between the unit and the bike. The FP4 also uses the new red OBD II connector, which is now standard on 2021 and 2022 Harley-Davidson Touring and Softail models.



Gen 4 Automotive-Qualified PCIe® Switches

Microchip Technology Inc. announced the market's first Gen 4 automotive-qualified PCIe® switches. These Switchtec™ PFX, PSX, and PAX switch solutions provide cutting-edge compute interconnect capabilities for Advanced Driver-Assistance Systems (ADAS).

Switchtec Gen 4 PCIe switches provide the high-speed interconnect that supports distributed, real-time safety-critical data processing in ADAS architectures. PCIe is emerging as the preferred compute interconnect solution for the automotive industry for the same reasons it has become pervasive in the data center market. It provides ultra-low latency and low-power bandwidth scalability to CPUs and specialized accelerator devices.



Switchtec PFX Fanout PCIe Switches

Offering simple hardware configuration and advanced comprehensive diagnostics and debug capabilities, Switchtec PFX fanout PCIe switches enable PCIe solutions for a wide variety of systems from data center equipment, GPU workstations/servers, GPU arrays, pooled storage/compute/networking, multi-host architectures, Just a Bunch Of Flash (JBOF), PCIe SSD enclosures, Flash arrays, high-density servers and communications to any application requiring low-latency, high-performance and high-reliability PCIe switching.

Key Features:

- 32 Gigatransfers/sec (GT/s) Gen 5; 16 GT/s Gen 4; 8 GT/s Gen 3
- Up to 100 lanes, 52 ports, 48 Non-Transparent Bridges (NTBs) and 26 virtual switch partitions
- Low power and low latency

- High-reliability PCIe: robust error containment, hot- and surprise-plug controllers per port, end-to-end data integrity protection, ECC protection on RAMs, high-quality, low-power Serializer/Deserializer (SerDes)
- Comprehensive diagnostics and debugging: PCIe generator and analyzer, per-port performance and error counters, multiple loopback modes and real-time eye capture
- Secure system solution with boot image authentication (Gen 5/4)

This solution is good for data center, machine learning, automotive, communications, defense, industrial and a wide range of other applications.

Switchtec PSX Programmable PCIe Switches

The Switchtec PSX programmable PCIe switch is a customer-programmable PCIe switch enabling advanced capabilities to differentiate end products. Building on the PFX's PCIe switch feature set, the PSX provides a Software Development Kit (SDK) for custom development of unique solutions.

Key Features:

- Dynamically redefine switch partitions
- Support for custom PCIe enumeration
- Support for advanced error containment
- Customized error handling including surprise- and hot-plug
- Real-time monitoring of performance counters and signal integrity
- Access to on-board peripheral devices for enclosure management
- Support for external switch management



using in-band and side-band interfaces

Typical applications for the PSX family include data center equipment, GPU workstations/servers, GPU arrays, pooled storage/compute/networking, multi-host architectures, JBOF, PCIe SSD enclosures, Flash arrays, high-density servers



Switchtec PAX Advanced Fabric PCIe Switches

Switchtec PAX advanced fabric PCIe switches provide high-performance fabric connectivity for low-latency and cost-effective solutions to the disaggregation of computing, networking, Graphics Processing Units (GPUs) and NVMe™ storage resources. The PAX PCIe switch family also features advanced error containment, comprehensive diagnostics and debug capabilities, a wide breadth of I/O interfaces and an integrated MIPS®-based processor.

Key Features:

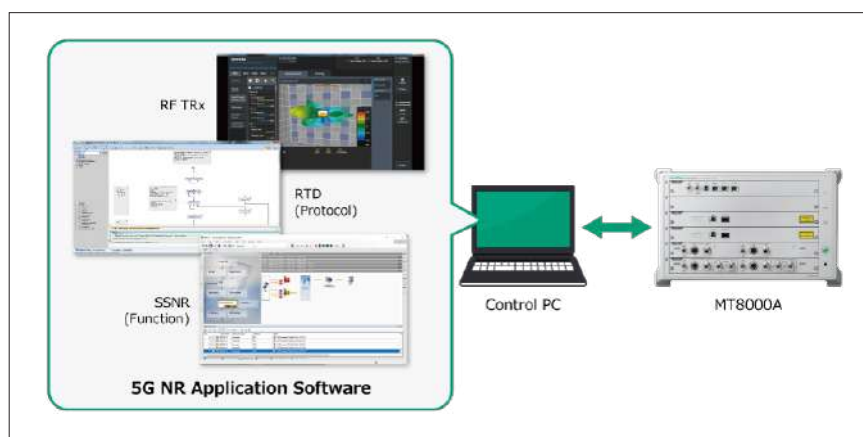
- High-density, power, 16 GT/s customer-programmable Gen 4 advanced fabric PCIe switch
- PAX SDK enables customization and support for vendor-specific SR-IOV endpoint sharing and virtualization
- 100-, 84-, 68-, 52-, 36- and 28-lane PCIe switches
- Features also include robust error containment, hot- and surprise-plug support, comprehensive diagnostics and a secure system solution with boot image authentication

Applications for the PAX family include scalable multi-host systems, SR-IOV-enabled JBOFs, composable GP-GPU fabrics, disaggregated systems, rack-scale architectures and automotive interconnect.

Radio Communication Test Station MT8000A



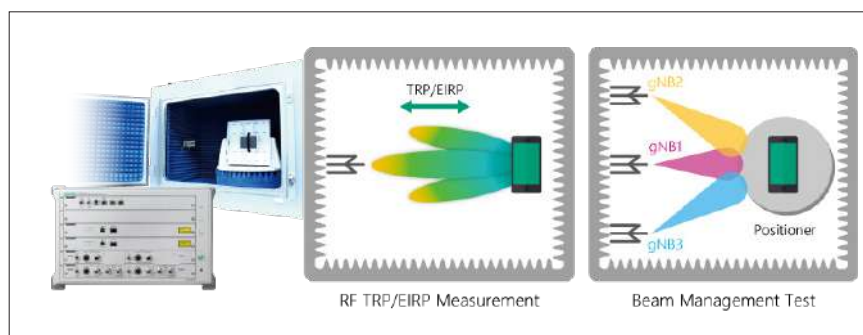
With a 5G base station emulation function, a single MT8000A test platform supports both the FR1 (to 7.125 GHz), including band n41, and the FR2 (millimeter-wave) bands used by 5G. Combining it with the OTA Chamber enables both millimeter-wave band RF measurements and beamforming tests using call connections specified by 3GPP. With the SmartStudio NR MX800070A, various functional tests by GUI operation only without requiring difficult scenario development are supported, also combining it with the Shield Box MA8161A supports functional tests in FR2 bands.



RF TRx Test and Protocol Test Environment Image

Features:

- All-in-One Support for RF Measurements and Protocol Tests in FR1 (to 7.125 GHz) and FR2 (Millimeter Wave) Bands
- Supports mm-wave band RF measurements and beam forming tests combined use with the RF chamber.
- Flexible Platform using Modular Architecture
- Supports Existing LTE Test Environment
- Supports various functional tests by GUI operation only without requiring difficult scenario development (SmartStudio NR MX800070A)



Example of Millimeter-wave Band RF/Protocol Test in Combination with RF Chamber



Sensata Technologies' TPMS Solutions meet worldwide commercial vehicle safety regulations

Sensata Technologies announced its Tire Pressure Monitoring Systems (TPMS) have been selected by multiple commercial tractor and trailer manufacturers to meet new and emerging vehicle standards and regulations worldwide.

Specifically designed for the commercial vehicle market, Sensata's TPMS solution is a complete system consisting of wireless sensors, receivers and an Electronic Control Unit (ECU) that communicates with the vehicle over the Controller Area Network bus (CAN bus). The system provides tire pressure and temperature monitoring that meets regional legislation requirements and helps to reduce roadside tire events, automate tire checks, improve tire life and increase vehicle fuel economy. A proprietary auto-location function enables the automated identification of the sensor's position on the vehicle which reduces the need for additional tools and time required to program sensors during tire changes and maintenance for commercial vehicle operators such as automatic emergency braking, vehicle collision avoidance, and fail-safe mechanical braking.

NEXCOM partners with Hailo to launch next-generation vehicular telematics solution chip

Hailo announced its partnership with NEXCOM to launch NEXCOM's VTC 1021, their next-generation AI vehicular telematics solution. NEXCOM's AI solution features the compact Hailo-8™ AI accelerator module, enabling breakthrough performance and empowering in-vehicle computers to run state-of-the-art AI applications more efficiently.



enhanced capabilities such as ADAS. The in-vehicle solution's compact, fanless design fits perfectly in cabins with limited space and is designed to withstand demanding automotive conditions, helping bring public transit vehicles and fleets into the smart era. The in-vehicle computer VTC 1021 powered by the Intel Atom® x5-E3940 processor is also versatile, with the flexibility to power a variety of telematics applications such as infotainment, fleet management, ANPR, and mobile video surveillance.

NEXCOM and Hailo's joint solution facilitates operational efficiency in public transit and fleet management, including

Vorto launches 5F to optimize and improve the entire trucking ecosystem

Vorto announced the launch of 5F, the fully-integrated transportation platform set to create more opportunities for drivers and reliable capacity for shippers and brokers.

Through the 5F platform, Vorto produces operational efficiencies for the whole trucking ecosystem. Brokers and shippers gain access to the largest platform of cross-industry owner operators. Asset owners gain networks of both owner operators to lease to and maintenance yards to manage and maintain assets, all in one place. The platform is focused on maximizing the utilization rate and earnings for drivers, while reducing cost inflation for shippers and brokers.

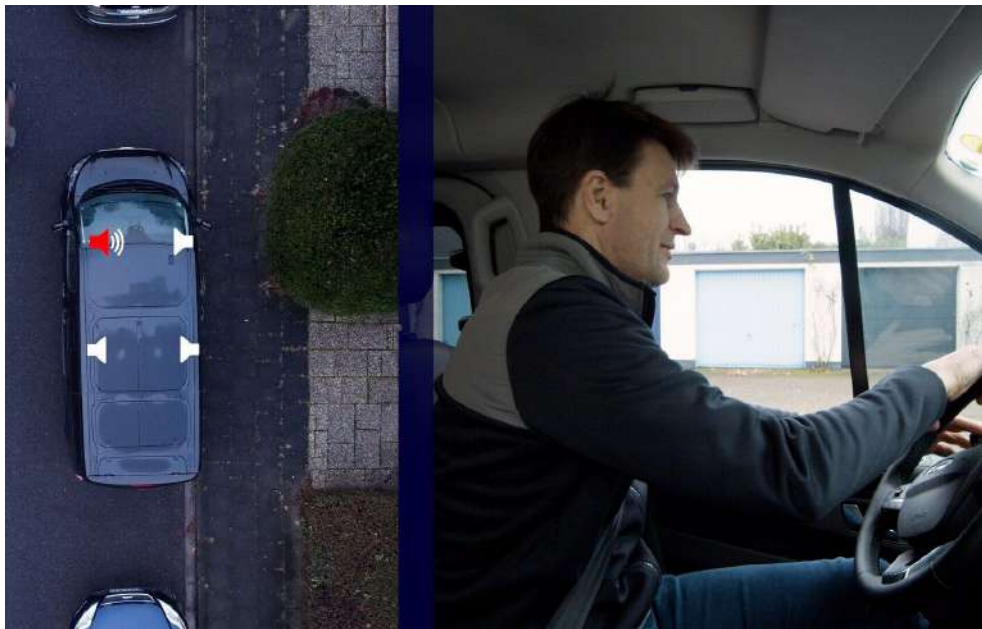
HEADLINES

- Viewer software for OBD-2 diagnostic data in new version
- 3Dtracking expands its driver fatigue and distraction monitoring portfolio with new offering powered by Cipia
- NextBillion.ai to leverage Otonomo's mobility intelligence platform to enhance its Map Data and AI Platform offerings
- Nirvana Insurance launches to aid imperiled trucking industry with data-driven, insurance platform on back of \$25-million
- State Farm® and Ford team up to introduce usage-based insurance to new vehicle owners

Ford testing directional audio alerts to convey location of hazards

Ford in Europe is testing smart driver alert technology that could indicate the direction from which people and objects are approaching. The engineers are also testing intuitive sounds such as bicycle bells, footsteps and vehicle noises to warn drivers when other road users or pedestrians are nearby.

Initial tests revealed that drivers using Directional Audio Alerts were significantly more



accurate when it came to identifying potential hazards and their position.

Ford vehicles currently feature driver assistance technologies that use a suite of sensors to identify when pedestrians, cyclists and other vehicles are nearby. These technologies offer visual and audible alerts and if necessary, apply emergency braking.



Cox Automotive launches vAuto ProfitTime GPS with the multichannel inventory sourcing system

Cox Automotive announced its latest innovation, vAuto ProfitTime's Global Acquisition, the multichannel acquisition system to help dealers optimize their inventory sourcing from non-traditional channels. vAuto ProfitTime's Global Acquisition system, part of the all-new vAuto ProfitTime GPS (Global Profitability Solution), helps dealers solve this problem by enabling them to create an investment value-based acquisition strategy that guides appraisers and buyers as they acquire inventory in distinct channels. The Global Acquisition system was developed by Cox Automotive's data science team and uses vAuto ProfitTime's data-driven insights about each vehicle's investment value to recommend an acquisition price and retail asking price at the point of appraisal.



DriveU.auto announces remote operation platform for robots

DriveU.auto announced it has joined the NVIDIA Partner Network and the availability of its new remote operation solution for robots. The solution is available on the NVIDIA® Jetson™ platform for robotics, powered by Jetson AGX Xavier™, Jetson Xavier NX and Jetson Nano GPU-accelerated systems-on-module.

Remote operation is a key component in enabling rapid robot deployment, be it for delivery services, on-road snow removal, off-road landscaping or industrial logistics. It is used in numerous models ranging from direct operation to supervision. DriveU.auto is a Preferred Partner in the NVIDIA Partner Network. The company's platform supports both cloud and hybrid cloud architecture, allowing it to support large-scale robot and autonomous vehicle deployments. It is already in use on sidewalks, public roads and off-road applications.

G-PAL secures strategic investment from Bosch's Boyuan Capital

G-PAL (Shanghai Geometrical Perception and Learning Co., Ltd.) announced successful closing of a strategic investment round exclusively led by Bosch's investment platform, Boyuan Capital.

The automotive supply chain is undergoing significant transformation to meet market demand for smarter vehicles and relevant autonomous driving technologies. Industry clustering and coalescing are becoming the main themes of the current and future development of the automotive industry.

As a member of the autonomous driving industry chain, G-PAL provides hardware and software integrated systems for L2-L4 based on machine perception and deep learning, which can meet the requirements of "low budget, all-weather, reliable, mass production-oriented" autonomous driving. Facing increasingly complex traffic environments and personalized autonomous driving needs, G-PAL always believes that future autonomous driving solutions should be diversified, and industry cooperation is the best way to achieve it.



Volkswagen in talks with Huawei on autonomous driving unit

Volkswagen is in talks with Huawei about acquiring an autonomous driving unit for billions of euros, Manager Magazine reported on Thursday.

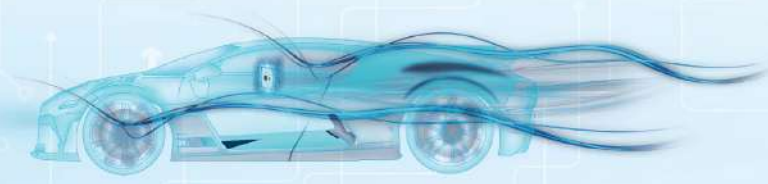
Automakers and technology firms are investing billions of dollars in autonomous driving, aiming to take an early lead in what many consider the future of mobility.

Group leaders have been negotiating the deal, which also involves technology systems Volkswagen is not yet proficient in, for several months, Manager Magazine said, citing inside sources.

Black Sesame Technologies selects Elektrobit AUTOSAR Classic Platform for developing high-performance autonomous driving solutions

Black Sesame Technologies announced to support Elektrobit's AUTOSAR Classic Platform (CP) and use EB tresos in AUTOSAR CP software development on its autonomous driving platform. Elektrobit is a visionary global supplier of embedded and connected software products for the automotive industry, and the use of their technology by Black Sesame will accelerate the development of a new generation of vehicles.

Black Sesame Technologies is one of the first domestic autonomous driving chip manufacturing companies in China to utilize AUTOSAR technology. Already, Black Sesame's A1000 series chip is able to support Elektrobit's AUTOSAR CP, including OS, BSW, RTE, and more basic software. With cutting-edge functionality and performance capabilities, the A1000 series chip will power a generation of autonomous driving vehicles and enable smart cockpit features and functions.



Continental transfers head-up display for cars to trams

Continental has developed a head-up display (HUD) for trams. The display solution from the in-house development and production service provider Continental Engineering Services (CES) is aimed at making intra-urban traffic safer by ensuring that tram drivers can focus their full attention on what is happening on the road. This also enables, for instance, a reduction in the number of emergency braking maneuvers. Trams mostly operate in heavy and frequently challenging inner-city traffic, an environment in which the number of unprotected road users is increasing: More people are cycling or riding e-scooters or compact electric mopeds. Moreover, many road users allow themselves to be distracted by their cell phones. According to information from the transport services, this has resulted in an increasing number of accidents, including those involving trams.



HEADLINES

- Greenland Technologies chooses Cyngn to bring autonomous vehicle technology to their fleet of lithium-powered electric forklifts
- Software-definable flash LiDAR complements software-defined vehicle
- Scania invests close to a billion SEK in new test track for autonomous and electrified vehicles
- Automated with Velodyne program grows ecosystem to 100 partners

Sonatus unveils next generation of its Digital Dynamics Vehicle Platform

Sonatus announced the release of the next generation Sonatus Digital Dynamics™ Vehicle Platform, which lives both in-vehicle and in the cloud. Following a successful debut in the Genesis GV60, Sonatus has further enhanced the cloud-side of its platform to bolster automakers' ability to build software-defined vehicles that can be updated with new features and functionality throughout their entire lifetimes – without requiring new software development.

Since its initial launch with the Genesis GV60, the cloud-side of Sonatus' platform has been enhanced with a brand new user interface to further simplify the creation and deployment of policies for dynamic data collection. The company also introduced new software functionality that enables myriad collection configurations to occur simultaneously, while allowing OEMs to grant access securely to users across the organization.



Motorq raises \$40 Million to advance connected vehicle data platform

Motorq has raised \$40 million in its Series B round of funding. The round was led by New York-based global private equity and venture capital firm Insight Partners, with participation from existing investors including Story Ventures, FM Capital, Monta Vista Capital and Avanta Ventures. Funding will be used to grow the product development and engineering teams, increase collaboration with the automotive OEMs, establish sales and business development in Europe and Japan and enhance the core Motorq platform for new markets, including insurance, automotive rental, and dealer services.

Motorq's cloud-based system ingests and monitors embedded data from a vehicle's onboard computers, runs advanced analytics and machine learning models, contextualizes the insights with other information sets and delivers those insights to customers via application programming interfaces (APIs) and other infrastructure tools.

Cox Automotive introduces DRiVEQ, the data intelligence engine

Cox Automotive launched DRiVEQ, the official branding of the company's dynamic data intelligence capabilities that powers the industry's largest portfolio of automotive solutions and services. DRiVEQ combines Cox Automotive's broad portfolio of first-party automotive data, sourced from the company's many end-to-end automotive solutions, with cutting-edge artificial intelligence technology. DRiVEQ is the engine that powers Cox Automotive's ability to deliver valuable business insights, services and solutions not only to the company's many clients but to the auto industry as a whole.



Nexperia expands its portfolio of ESD protection solutions for automotive Ethernet

Nexperia announced an expansion to its portfolio of automotive ethernet ESD protection devices. The three new devices are AEC-Q101 qualified and OPEN Alliance IEEE 100BASE-T1 and 1000BASE-T1 compliant ElectroStatic Discharge (ESD) protection devices designed to protect two bus lines from damage caused by ESD and other transients.

PESD2ETH1GXT-Q, PESD1ETH1GLS-Q and PESD1ETH1GXLS-Q are silicon-based and offer several advantages over alternative ESD protection solutions like varistors. They provide greater reliability, and an improved diode capacitance of 1 pF (max) ensures better signal integrity. Since these ESD protection devices are fully compliant with the IEEE OPEN Alliance 100BASE-T1 and 1000BASE-T1 test specifications which means there is no requirement for customers to perform their own qualification. Under test conditions, they outperform the AEC-Q101 qualification standard by a factor of 2x so customers can be assured to meet the highest automotive quality profile and provide the highest degree of reliability. Their combination of silicon technology and snap back behaviour reduces clamping voltage and residual current when compared to other competing products. These ESD protection devices are available in a choice of the smallest possible leaded (SOT23) and leadless (DFN1006BD-2 / SOD882BD) packages to provide maximum design flexibility. The leadless package has side-wettable flanks which enables automatic optical inspection (AOI), resulting in higher assembly yield.

Mojio launches 4G connected car Program for automotive OEMs as sun sets on 3G network technology

Mojio has launched a new program and upgraded 4G connected car service specifically designed to help automotive OEMs navigate the imminent shutdown of 3G cellular networks. These shutdowns will impact millions of American drivers and disrupt critical, telematics-based emergency services.

Mojio's 4G Upgrade Program gives OEMs the ability to purchase vouchers to be exchanged for an 18 month subscription to Motion by Mojio, which includes a plug-and-play 4G LTE telematics device, new automatic crash notification and e911 emergency response service, plus access to a growing range of app-based features that enhance the driving experience.

HEADLINES

- Cybellum makes continuous product security and rapid compliance a reality with the latest release of its platform
- Smart Driving Labs (SDL) launched SDL Tools, a set of pre-built ready-to-use modular elements
- Sotero shares top 5 predictions for data security and privacy in 2022
- Anritsu announces 5G Standalone NEMs' vTAP support on MasterClaw for Encrypted Traffic Monitoring
- New family of Time-Sensitive Networking (TSN) Ethernet switches provides solution for industrial automation networks



New Mercedes-Benz Wallbox charges electric vehicles connected and intelligently

The new Mercedes-Benz Wallbox charges electric cars and plug-in hybrids fast, intelligently and conveniently. This unit is optimized for charging with up to 22 kW. New feature is the integrated energy meter. In addition, it is technically possible to receive software updates “over-the-air” via the customer’s own Internet connection in the future. This makes the wall-mounted charging station particularly future-proof.

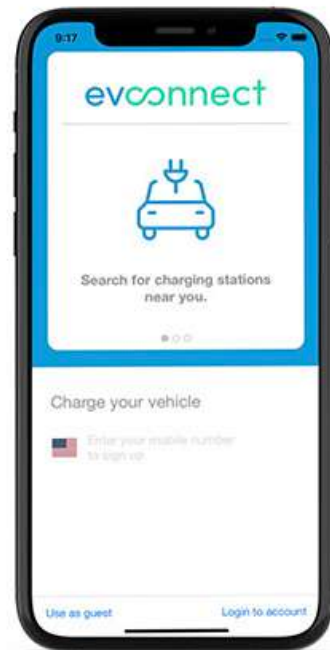
With the new Mercedes-Benz Wallbox, the intelligent power grid at home is already becoming a reality to a certain extent. Users can connect it to their own Internet connection via Ethernet cable or WiFi. In this way, they can conveniently operate the wallbox with the Mercedes me App on their smartphone

HEADLINES

- Biden-Harris Administration issues guidance for Infrastructure Law’s EV Charging Funding
- Tips on battery expertise from Chalmers University of Technology
- Electreon announces public electric road system for wireless EV charging in the US
- ABB E-mobility increases majority stake in Chinese EV charging provider Chargedot
- £500 million loan guarantee supports Jaguar Land Rover’s electric vehicle plans
- Gogoro manufactures one-millionth battery, demonstrates success of open battery swapping ecosystem
- Volta Trucks confirms €230 million of Series C funding as it prepares the full-electric Volta Zero for production
- Audi new EV plant in China; 150k cars annually
- Redwood Materials creates the pathways for end-of-life electric vehicles in California
- Volvo Trucks leads the electric truck market in Europe

Itron launches software solution for comprehensive management of electric vehicle charging

Itron, Inc. announced the launch of its Electric Vehicle Charging Optimizer solution, which enables EV charging assets to work in harmony with the grid. Available globally, the solution is charger and vehicle agnostic, cloud-based and integrates EV charging management and grid management systems to provide comprehensive EV charging and energy management for utilities and EV charging operators. Itron’s initial focus for the solution will be on the fleet segment to address potential locational capacity constraints and the need for charging operators to optimize their energy consumption. Itron has found the solution can save end customers more than 35% on their energy costs through managed charging and can save utilities more than 20% annualized considering grid infrastructure investments and ongoing management.



EV Connect expands EV Charging-as-a-Service program

EV Connect announced the expansion of its EV Charging-as-a-Service (EVCaaS) program. Backed by investor Mitsui & Co., Ltd. (Mitsui), the program creates a one-stop shop for worry-free EV charging by combining hardware, software, and service offerings with flexible payments to EV Connect customers. Customers can leverage the EVCaaS program to add EV charging with low risk, flexible options, and small monthly expenditures while enjoying the interoperability, reliability, and support for which EV Connect is known.

The EVCaaS program removes the burden of ownership and maintenance from the charging host. Enterprise customers such as Dell, Inc leverage this plan to reduce the upfront costs of deploying charging stations through a comprehensive, OPEX-based model, and a hassle-free approach to managing charging stations and driver support.



Envoy Technologies launches first electric car share in Hawaii

Envoy Technologies announced the launch of its first electric car share in Hawaii in partnership with Kowa American powered by the Envoy Mobility app. The Nissan Leaf will be available to residents at Halekauwila Place Apartments located in Kaka'ako, a vibrant urban island community in Honolulu. Envoy's Mobility as an Amenity™ service and technology platform provides residents with freedom of movement without the expense of traditional car ownership or hassle of renting a car. This also directly addresses the car rental shortages experienced throughout the United States. Plus it helps to reduce emissions and improve air quality through an eco-friendly and sustainable mobility option.

Wejo makes its data available in Operating System for electric vehicle infrastructure

Wejo Group Limited announced the availability of the electric vehicle (EV) Infrastructure Operating System, a first-of-its-kind, integrated solution for new EV charger site selection and charger network management, built on and available through Palantir Foundry. The EV application enables the integration of Wejo's data alongside an organization's proprietary data. The application can be deployed by government agencies, automakers, charging network operators, retailers and more.

When used with Wejo data, the new OS enables organizations to efficiently and effectively plan site placement and

operate charging networks by combining real-time vehicle data with their own relevant data, ensuring all their specific needs are accounted for. Following chargepoint installation, the application's network operations tools help maximize revenue and increase network reliability. Organizations can manage networks of chargers at scale with tooling that connects to chargers' IoT sensor data, monitor and improve the performance of individual chargers, and more.



HEADLINES

- Mercedes-Benz puts batteries on a green track with DB Cargo
- Renault Group, Valeo and Valeo Siemens eAutomotive join forces to develop and manufacture a new-generation automotive electric motor in France
- Siemens collaborates with Ford on customized electric vehicle charger for all-electric F-150 Lightning retail customers
- 4. Toyota Spain partners with LoJack España to offer its customers a best-in-class stolen vehicle recovery service
- Parkopedia partners with Passport to expand its parking payment services in North America
- Avass Group signs MoU with HRH Prince of Saudi Arabia to manufacture electric vehicles, lithium batteries
- Lightning eMotors joins with General Motors to electrify medium duty trucks
- BMW of North America and Electrify America announce collaboration providing two years complimentary 30-minute charging for BMW EV customers
- Automotive software company ITTech Auto to raise a USD 285 Million investment from Aptiv and Audi
- Faurecia announces the completion of the acquisition of Hella
- Cybellum announces new technology partnership with SIEMENS Polarion
- Baraja and Tier IV collaborate to create the future of autonomous vehicle sensing
- Chakratec signs an agreement for installation of three additional ultra-fast EV charging stations in Germany
- Ansys announces strategic collaboration with AWS to transform cloud-based engineering simulations
- Uhnder and Spartan deliver robust, all-weather, high-resolution sensing solutions for ADAS and automated vehicles
- Motional and Via launch on-demand robotaxi service in Las Vegas
- StradVision acquires ISO 26262 for automotive functional safety management
- Veniam joins forces with TomTom to solve the data bottleneck problem in connected cars
- Jiuzi Holdings, Inc. signs strategic cooperation agreement with electric vehicle manufacturer in China
- Siemens and Nexii unveil easy-to-deploy and sustainable electric vehicle charging concept
- Audi of America, Verizon partner to bring 5G to vehicle lineup
- Universal Technical Institute and Ford team up to prepare nation's future technicians for electric vehicle repair and maintenance
- Anritsu and dSPACE accelerate simulation and testing of 5G automotive applications
- Autoliv provides exterior airbag for Nuro's autonomous vehicle
- Nuvve and 2021.AI announce plans to increase artificial intelligence capabilities of Nuvve's V2G Platform
- Ansys supports LG Electronics to advance their sustainability and digital transformation efforts
- QUANTRON takes off emission-free with the CIZARIS electric bus
- Fleetio integrates with contactless key management system leader Keycafe
- Hertz expands global electric vehicle commitment with new UFODRIVE partnership
- Nauto partners with Navistar to bring fleet AI-safety technology to the heavy-duty truck segment
- C.R. England and Platform Science partner to bring greater efficiency and a superior driver experience to national fleet
- FleetPride acquires MTR Fleet Services of Cumming, Georgia



Porsche acquires stake in Fazua and plans joint ventures with Ponooc

Porsche is further expanding its involvement in the rapidly growing market for eBikes. The Stuttgart based sports car manufacturer acquires a stake in Fazua, an innovative manufacturer of eBike drive systems, and establishes a strategic partnership with Ponooc Investment B.V.

The Dutch company focuses on sustainable energy and mobility solutions. Ponooc is part of Pon Holdings B.V. – a trading and service company with around 16.000 employees worldwide, which is also active, amongst others, in the bike industry and the automotive business.

Porsche is acquiring 20 percent of the shares in Fazua GmbH. In addition, there is an option to purchase further shares, which will allow Porsche to take over Fazua completely. The company from Ottobrunn near Munich was founded in 2013 and is a pioneer in the development of lightweight, compact drive technologies.



Reimagining Modern Luxury: NVIDIA announces partnership with Jaguar Land Rover

Jaguar Land Rover and NVIDIA are redefining modern luxury, infusing intelligence into the customer experience.

As part of its Reimagine strategy, Jaguar Land Rover announced that it will develop its upcoming vehicles on the full-stack NVIDIA DRIVE Hyperion 8 platform, with DRIVE Orin delivering a wide spectrum of active safety, automated driving and parking systems, as well as driver assistance systems built on DRIVE AV software. The system will also deliver AI features inside the vehicle, including driver and occupant monitoring and advanced visualization, leveraging the DRIVE IX software stack.

Cyber security: The UK is the most safety conscious nation

According to a 2016 cybercrime report, cyber security will cost the global economy an estimated \$10.5 trillion on an annual basis by 2025.

Last year was the biggest year for data breaches so far, with some of the world's largest platforms being impacted. LinkedIn's data breach saw 93% of its members' data put for sale online. Facebook, meanwhile, had 533 million accounts and personal information of users from across 106 different countries leaked.

People leave themselves vulnerable to such attacks by recycling passwords and using simple combinations, such as "123456". So, to see which country is most safety conscious when it comes to their online information, VBQ Speakers has looked at how many people search on Google for a 'password generator' – a tool that creates unique, strong passwords to protect accounts and data – in the past 12 months.

They analysed global search data in 138 countries around the world (with populations over 1 million), and the results suggest that people in the United Kingdom were the most security conscious when it came to protecting their online information, with 'password generator' terms being searched an average of over 157,000 times each month (2.326 per 1,000 of the population).

This was followed by Singapore (2.190) and the Netherlands (2.123). At the bottom of the top 10 was New Zealand (1.491).

Despite 72% of people admitting recycling passwords for several of their accounts, specific terms that appeared most commonly within the research were 'strong password generator', 'random password generator', 'online password generator' and 'google password generator'.

Rising demand for connected cars set to propel India's Automotive Human Machine Interface Industry

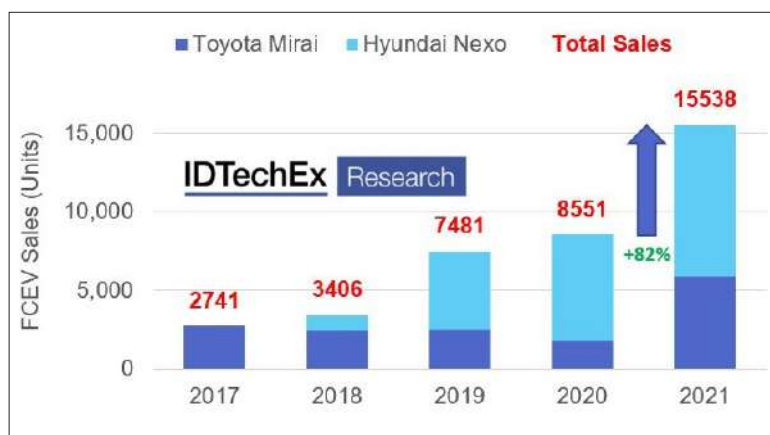
Frost & Sullivan's recent analysis of the Indian Human Machine Interface (HMI) Industry finds that consumer demand for comfort, safety, and security in their cars contributes to the Indian HMI market growth. The surge in demand for advanced connected features in vehicles from the country's growing tech-savvy population will further drive growth for larger and feature-loaded HMI systems. As a result, the Indian HMI market is estimated to reach \$1.67 billion by 2027 from \$980 million in 2020.

From a market segment perspective, navigation units will increase their market share to approximately 50% by 2027 from 40% in 2020 because of the launch of new vehicles offering navigation on their top variants. Similarly, with 46% penetration by 2027 compared to 44% in 2020, display audio units will still be relevant, as OEMs will provide navigation through smartphone integration on their low variants or mid-range models.

Fuel cells are not the problem, the hydrogen fuel is, says IDTechEx

On the face of it, 2021 was a good year for fuel cell electric vehicles (FCEV) in passenger car markets. Toyota, with their second generation Mirai FCEV, and Hyundai, with their NEXO FCEV, both had record sales, which largely made up for Honda announcing in June 2021 that it had decided to pull the plug on production of their Honda Clarity FCV.

For both Toyota and Hyundai, the increase in sales makes for impressive reading. The release of the second gen Mirai, saw Toyota's global fuel cell car sales more than triple, from 1,770 vehicles in 2020 to 5,918 in 2021, and eclipse their previous best sales year in 2017 when they sold 2,741. Similarly, for Hyundai, they built on a strong 2020, where they sold 6,781 fuel cell NEXO, increasing sales by 42% to 9,620 vehicles in 2021.



At face value, this seems positive for the fuel cell industry. But when you look closer at the drivers for this growth, it shows the lengths to which Toyota, Hyundai, and the governments supporting the rollout of fuel cell vehicles are having to go to build this momentum.

HEADLINES

- 1 in 3 automotive cyber incidents result in car theft or break-ins
- Advanced Driver Assistance Systems (ADAS) Sensors and related services growth opportunities in the European Aftermarket
- Automotive LiDAR Sensors Market: Segmentation by application and geography – forecast till 2025
- Worldwide Electric Two-Wheeler Charging Infrastructure industry to 2026 – Focus on AC and DC
- Charging operating system EcoG | OS grows significantly faster in 2021 than the overall e-mobility market
- Global and China Automotive Cockpit SoC Industry Report, 2022 – Local chip vendors will rule the roost in the 10-billion-Yuan Market
- Adoption of electric vehicles to boost sales of battery management systems by 19.6%
- Europe and North America reached 27.9 million active insurance telematics policies in 2020
- Electric vehicles and charging stations are Engines of growth as Autotech M&A holds steady during Covid – Hampton Partners' report

Ford to come back into India as an electric vehicle manufacturer



According to a report of the Indian Government's PLI scheme, Ford is reconsidering manufacturing cars in India. The Indian arm of the American carmaker had applied for the PLI scheme for the automobile sector and has been shortlisted as one of the twenty names in the scheme.

The news has been confirmed by Kapil Sharma, Director, Communications at Ford India, who has thanked the Government of India for shortlisting the proposal of Ford India for the PLI scheme. In his statement, Sharma also confirmed that Ford is evaluating possibilities of using one of its two plants in India as a base for making electric vehicles and exporting to different countries.

While Ford India has confirmed that it will resume using one of its two plants in India for making electric vehicles, it has not confirmed which of the two plants – Sanand or Chennai – will be exactly used for the purpose.

Pricol, Sibros Tech announce strategic tech partnership

Pricol announced a strategic technology partnership with Sibros Technologies to deliver deep connected vehicle solutions in the Indian and ASEAN markets.

Sibros' connected all-in-one platform will complement Pricol's suite of products on driver information systems (DIS) and telematics to offer end-to-end solutions to the OEMs.

Besides, the cloud based platform of Sibros combined with the next generation products of Pricol will enable features such as OTA software and firmware updates, vehicle data insights for analytics, diagnostics and troubleshooting for the OEMs to make the best use of the connected solutions.



Reliance Industries to acquire stake in EV technology firm Altigreen



Reliance Industries Ltd announced the acquisition of a stake in electric vehicle technology and solutions company Altigreen Propulsion Labs Pvt Ltd for Rs 50.16 crore. The company did not say how much equity shareholding will it get against the investment. The transaction is proposed to be completed before March 2022.

Based out of Bengaluru, Altigreen is an electric vehicle technology and solutions company for commercial last-mile transportation through 2/3/4 wheeled vehicles. It has developed an E3W vehicle, and its vehicles are built in-house in Bangalore on a mobility platform that is 100 per cent indigenous.

Its current patent portfolio spans 60 countries with 26 global patents, the firm said, adding some of Altigreen's current technologies include electric motors and generators, vehicle controls, motor controls, EV transmissions, telematics & IoT and battery management.

HEADLINES

- India small commercial vehicle market Report 2022-2027: Market is anticipated to grow on account of increasing logistic services in the local market
- SKF India declares its financial results for Q3 FY22
- Continental India strengthening safety solutions portfolio for 2-Wheelers
- India's largest EV charging station set up in Gurugram
- Hero MotoCorp and BPCL joins hands to electrify the country



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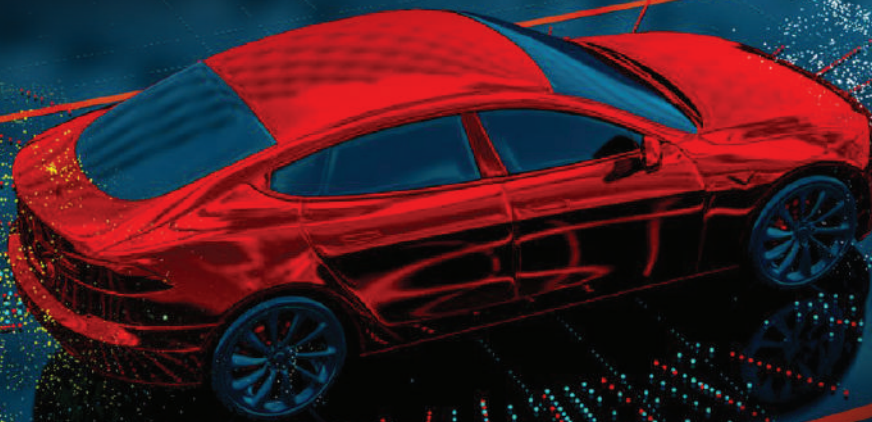
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