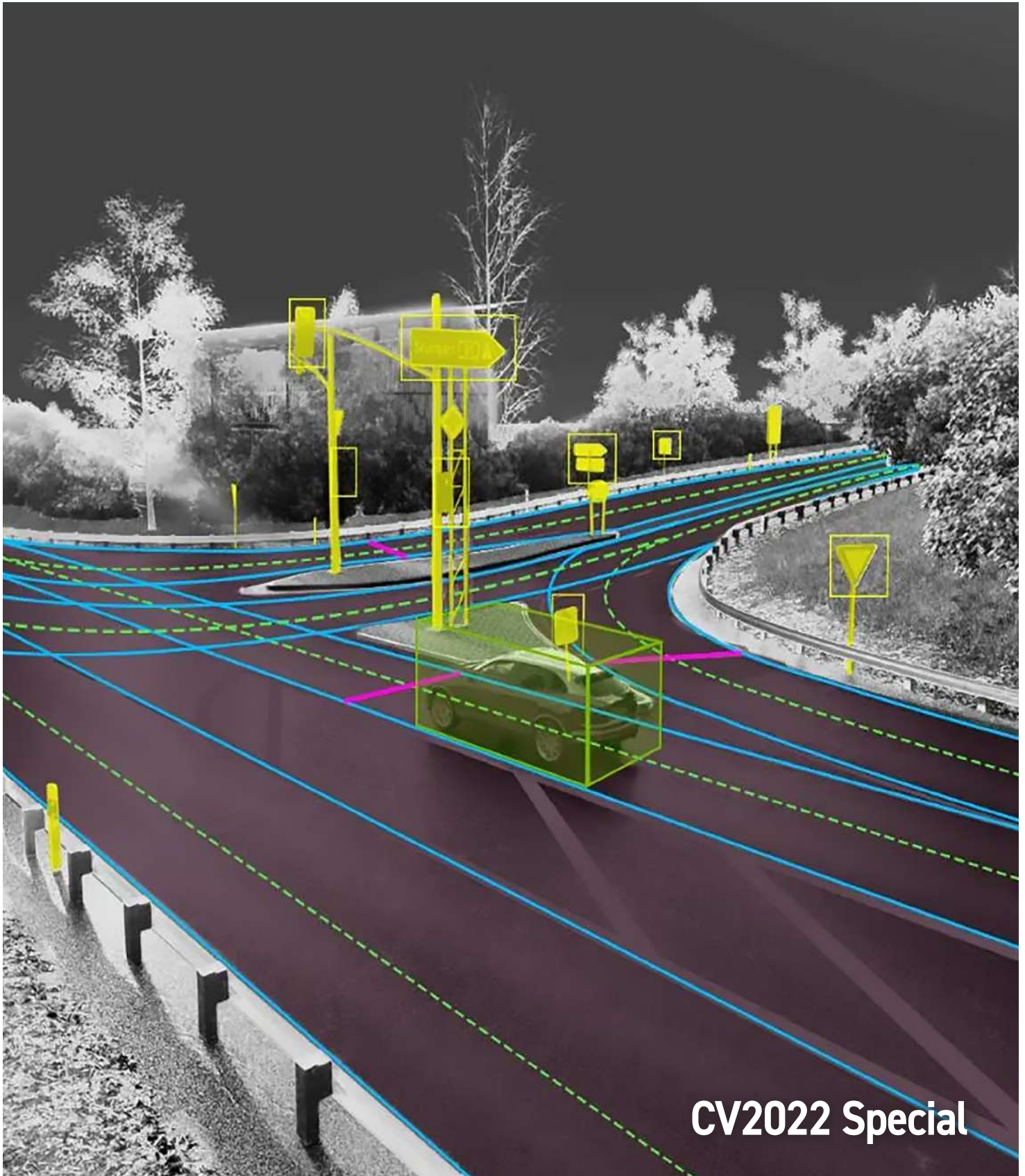


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Connected Vehicle 2022, organized by Telematics Wire, was the 6th edition of connected and autonomous vehicle conference and exhibition. It has witnessed the participation of more than 1200 registered delegates, 80 exhibitors and 60 speakers. The event hosted nine sessions discussing the pressing issues, trends and the future of the automotive industry, i.e., connected, autonomous, shared, electric & smart mobility.

Connected Vehicle 2022 covered topics such as Intelligent Connectivity, ADAS Adoption & Exploring Vehicle Autonomy, Simulation & Testing, Emerging Technologies like 5G, Telecom, Speech & Voice Recognition, Connectivity, Brain-to-Vehicle, HMI & UX, Edge to Cloud, AI & ML, Blockchain, Digital Cockpit, Augmented Reality and many of the hot topics that gave the audience an insight into the future of mobility.



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At their CV 2022 booth, Bosch showcased their digital platforms:

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Varroc presented capabilities of Varroc's AI-Powered Dual Camera. Driving experience in truck simulator with live demonstration of Advanced Driver-Assistance Systems (ADAS) and Driver Monitoring System (DMS). Varroc showcased detection of events like Front Collision Warning(FCW) or Driver's Distraction in real time environment.

DANLAW

Danlaw displayed their V2X innovations with Routelink Roadside Unit and AutoLink Aftermarket Safety Device, at their stall. Displayed how OEM and Aftermarket Telematics can help you with their OBD Datalogger and Telematics Control Units and demonstrated their "Plug-Configure-Play" platform Bitbrew, how it delivers secure cloud based connected vehicle services.

DYNAFUSION

- DARTS: The dSPACE Automotive Radar Test Systems (DARTS) enable easy-to-use but very realistic over-the-air tests. This is done by simulating radar echoes of objects in road traffic with programmable distance, speed, and size with unique signal integrity.
- MicroAutoBox-II: Compact and robust prototyping system for in-vehicle applications. MicroAutoBox II is a real-time system for performing fast function prototyping. It can operate without user intervention, just like an ECU.

ZELIOT

Zeliot showcased its products and its grand vision for the future of connected mobility at CV2022 via an experience zone providing visitors with a first-hand view of advanced telematics features such as Vehicle ECU OTA, Edge-based CAN Alerts and much more.

ELEKTROBIT

Elektrobit showcased their products; EB-assist, EB cadian, cyber-security, and stacks like EB tresos & EB corbos that enable OEMs, Tier1s, and other players to fast forward their development cycles and focus on their customer needs.

ENGINECAL

EngineCAL showcased its Domain-Aware AI based products and custom solutions for the CV2022 Event. The company is an OEM vendor and Aftermarket solution provider for 'Deep Vehicle Analytics'. EngineCAL's complete technology line-up and 2 vehicles for a live demo, including an EV.

THE EXHIBITION



THE CONFERENCE





Left to Right

- Image_1:** Maneesh Prasad (Telematics Wire), Vishal Bajpai (SecureThings), Prashant Doreswamy (Continental India), Guruprasad Mudlapur (Bosch Limited), Dr. Reji Mathai (ARAI)
- Image_2:** Maneesh Prasad (Telematics Wire), Sriram Natarajan (Tata Elxsi), Anandh Venkatraman (DELL Technologies), Zolzaya Chultembat (what3words)
- Image_3:** Ashim Sharma (Nomura Research Institute), Ravi Shenoy (LightMetrics), Supreetha H R (Elektrobit India), Sunitha Misra (Tata Elxsi), Amit Taneja, (Intel Corporation), Dilbagh Singh (DELL Technologies), Randeep Singh Khokhar (Tata Motors Passenger Vehicle Ltd.)
- Image_4:** Neeraj Bansal (KPMG India), Shivalik Prasad (Sibros Technologies), Nandagopalan C (Mahindra & Mahindra Ltd.), Vinayaka Nagaraja (Continental Automotive), Dr. Suryanarayana Prasad A N (Ashok Leyland), Prashanth A (Bosch Limited)
- Image_5:** Scott Morell (Danlaw Inc.), Bala Santhanam (Intel Corporation), Ajay Mittal (VE Commercial Vehicles Ltd.), Sudeep Nayak (ZELIOT)
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- Image_8:** Praveen Sasidharan (Deloitte), Vishal Bajpai (SecureThings), Vinitha Rajagopal (Volvo Group Connected Solutions), Saurabh Bisen (Tata Motors Limited), Olivier Guibert (Upstream Security), Deepak Gusain (Tata Communications), Srinivas Thimmaiah (Mercedes Benz R&D India)
- Image_9:** Raghavan Sampath (MediaTek), Surendar Kannan (Cavli Wireless)
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- Image_11:** Khushwant Pawar, Head, Escrypt (ETAS Automotive)
- Image_12:** Pravin Swaminathan (Stellantis), Vilas Wakale, (ŠKODAAUTO Volkswagen India), Dhananjay K, (MicroGenesis TechSoft Pvt Ltd), Karan Makhija (Intellicar Telematics)
- Image_13:** Giuseppe Rizzi (Hero Motocorp Ltd.), Markus Pfefferer (Tibil Solutions)

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Connected Vehicle 2022
6th Edition of Connected and Autonomous Vehicle Conference and Exhibition to be held in Bengaluru on 4, 5, 6 May
ANI Updated: Apr 27, 2022 18:47 IST
Noida (Uttar Pradesh) [India], April 27 (ANI/BusinessWire India): "Connected Vehicle 2022 (CV2022)," which is scheduled to be held on 4-5-6 May at Radisson Blu, Bengaluru, will witness the participation of more than 1200 registered delegates, 80 exhibitors and 60 speakers.
The event will host nine sessions discussing the pressing issues, trends and the future of the automotive industry, i.e., connected, autonomous, shared, electric & smart mobility.
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Company Name: Connected Vehicle 2022
Wednesday, April 27, 2022 4:18PM IST (10:46AM GMT)
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Noida, Uttar Pradesh, India

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Infrastructure to enable connected vehicles

▲ SIDDHARTH JAISWAL & FAIZAL SHAIKH
Netscribes

The emergence of vehicle-to-everything (V2X) communication has attracted participation from software, hardware, and connectivity solution providers for developing a network of vehicles for a host of advanced services. In recognition of the high potential of V2X applications, the current focus of government organizations, road transport authorities, automotive companies, transportation entities, city planners, and other stakeholders is to concentrate on the infrastructure requirements that form the backbone of the V2X ecosystem. The industry consensus to achieve zero road accident deaths (~1.35 million people die each year because of road traffic crashes in 2019) is also driving the upgrade of existing safety solutions by leveraging smart V2X infrastructure.

The meaning of connected vehicles has consistently evolved over the years, especially in the last decade. Initially, basic in-vehicle or wireless connectivity provision,

infotainment, or imply smartening up of some of the vehicular use cases was considered as a criterion for tagging vehicles as 'connected'. However, the order of vehicle connectivity is increasingly being defined by the level of cooperation capabilities, consistency, and automation that can be injected by leveraging V2X principles, as shown in Figure 1. The principle V2X terms include – vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), vehicle-to-network (V2N), and vehicle-to-pedestrian (V2P). Furthermore, sensor networks, roadside equipment, telecom networks, mapping and positioning solutions, cloud infrastructure, and other information and communication technologies (ICT) form the pillars of V2X infrastructure.

Over the years, the growing debate around the choice of communication technology between

802.11p and cellular networks have been a global concern. While General Motors and Volkswagen have selected the dedicated short-range communication

(DSRC) protocol and are advancing with their plans for DSRC-capable vehicles, a significant section of automakers are betting on cellular V2X (C-V2X) capabilities. Furthermore, for C-V2X, the future deployment scenarios will be dependent on how the complementary capabilities of side-link (PC5) and cellular interface (Uu) are utilized for suiting application requirements.

In any case, the need for a comprehensive communication infrastructure is inducing participation in exploring options that could help unlock the true potential of V2X, regardless of technology preferences. The different stakeholders are assessing potential business models utilizing DSRC and C-V2X technologies. Infrastructure operators including transportation departments and road operators can deploy DSRC units or build relationships with mobile network operators (MNOs) for leveraging cellular networks in disseminating connected car information.

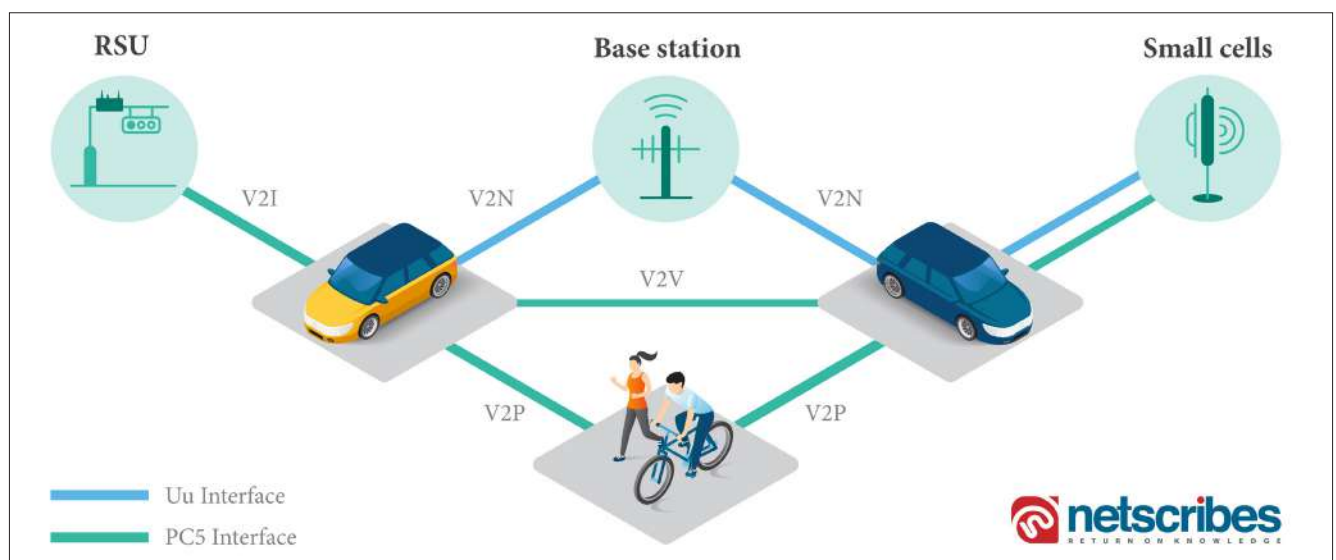


Figure 1: V2X communication ecosystem with different nodes and interfaces

"As V2X gradually gains traction, OEMs gear up to control the in-vehicle touchpoints by establishing a relationship with telecom providers and road operators who will ultimately interact with the end-user. The natural evolution of this relationship is with the road infrastructure player taking over the responsibility of providing connectivity, acting as a tenant to the MNOs."

Siddharth Jaiswal

The present roadmap for 5G-V2X communication has the potential to spur the deployment of automotive applications, a longstanding battle that has divided the automotive industry. An autonomous

vehicle is one such revolutionary example that promises a roadmap for success with the highest-profile efforts for scoring greater levels of autonomy. However, autonomous vehicles cannot achieve their true potential without achieving 360-degree and non-line-of-sight (NLOS) visibility, both of which help ensure safety and efficiency. Only V2X communication can help bridge this gap.

Infrastructure development – Global V2X trials

An assessment of global V2X trials with a focus on the connectivity base (i.e., roadside infrastructure and network equipment) indicates the initiatives undertaken by

different entities. These trials are focused on different aspects of the infrastructure including installation of RSUs, exploration of PC5/Uu for C-V2X, urban and rural deployments, interoperability, and harmonization of systems under C-ITS. The assessment highlights a continuous increase in trials and pilot projects undertaken in the V2X domain, indicating a clear sign of soaring demands for connected mobility solutions. The industry is aiming to integrate smart intersections and masts with wireless communication modules in urban and rural areas to optimize communication channels for thousands of vehicles.

The main driver for the surge in trials over the past two years has been

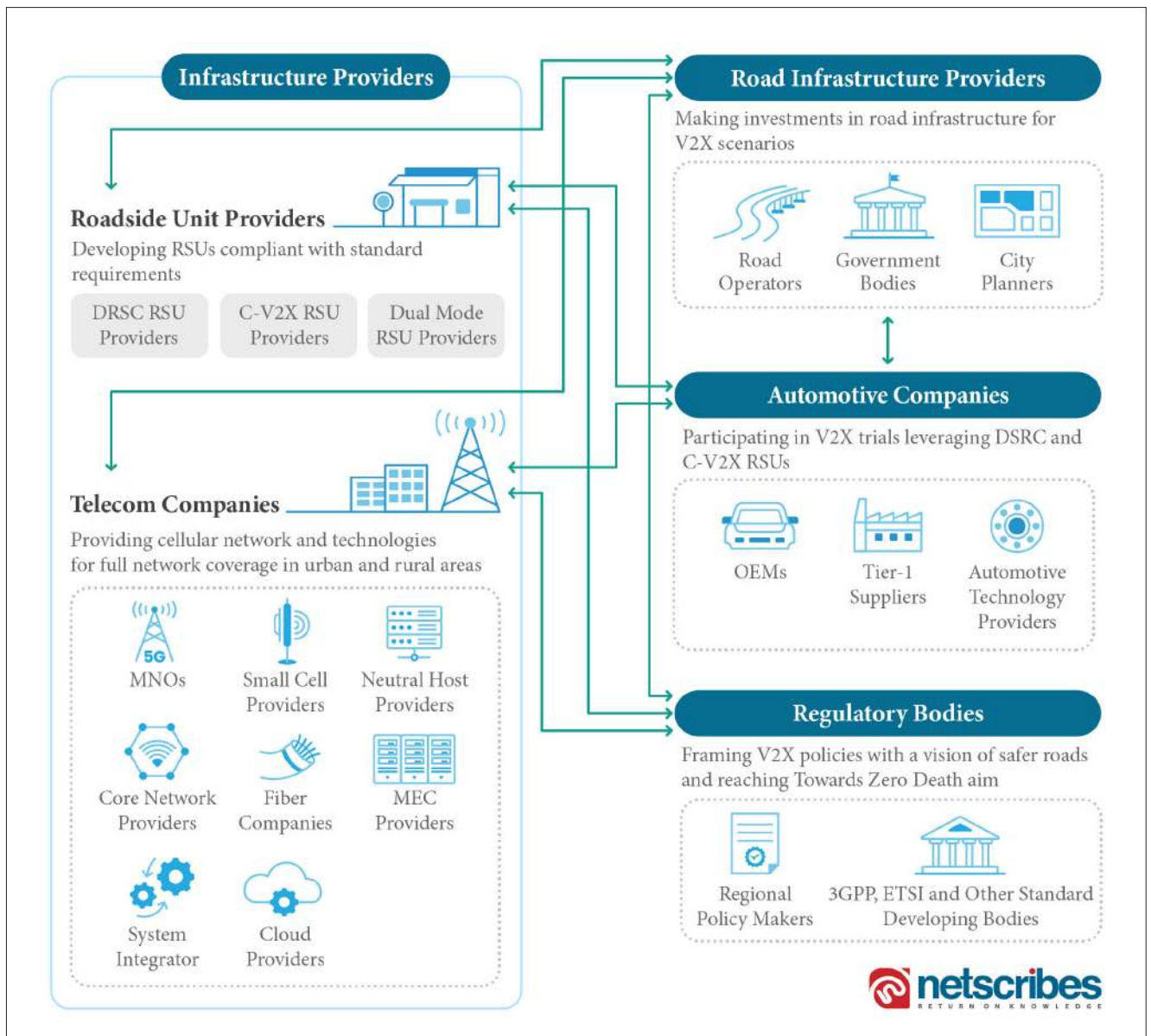


Figure 2: Stakeholders in the V2X ecosystem

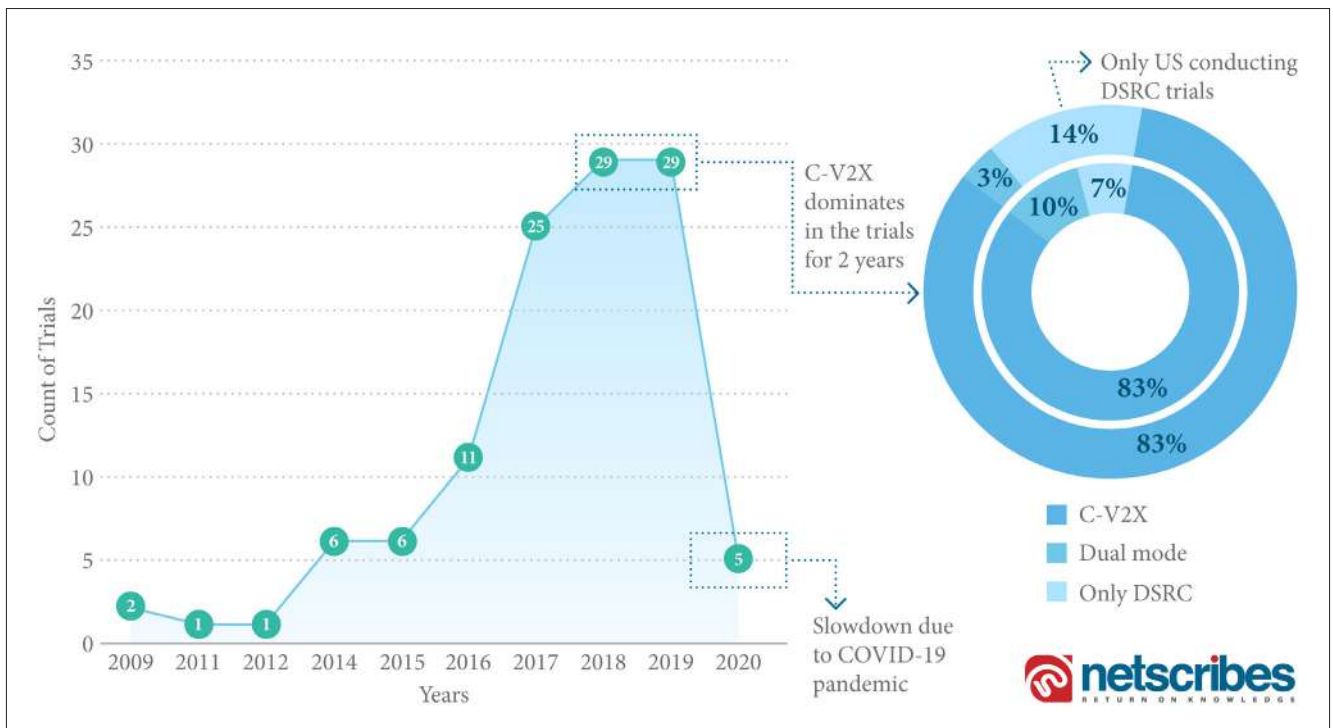


Figure 3: Yearly distribution of trials related to V2X infrastructure

the dominance of C-V2X technologies in comparison to DSRC. However, the global COVID-19 pandemic in 2020 has resulted in a slowdown and caused delays in the execution of planned trials, and there may be a major postponement in the installation and commercialization of planned RSUs and small cells targeted for V2X applications. As the COVID-19 curve flattens, it is expected that regional governments and automotive companies will proceed with their impending programs on smart transportation and intelligent safety solutions.

Globally, about 62% of the infrastructure-related trials are for C-V2X technologies and use cases. LTE is a natural choice for deploying C-V2X solutions owing to its maturity, and the coherent planning of 3GPP standardization cycles. Several LTE trials are currently underway with a focus on C-V2X infrastructure to enable a smoother transition to 5G New Radio (NR) with Rel. 15 and Rel. 16.

5G-focused V2X trials are significant in numbers with objectives that are aligned to advanced use cases including teleoperated vehicles, multimodal services (trains, automobiles, etc.), efficient use of mm-Wave spectrum, and effective network slicing solutions. These trials are the first-hand enablers of the know-how

that the industry needs for transitioning towards a resilient, long-term roadmap for 5G-enabled connected vehicles.

China: Leading the race for C-V2X trials

Proactive governance is a major reason for China’s leadership in the adoption and maturity of C-V2X technologies. The early standardization of policies and full support by the Ministry of Industry and Information Technology (MIIT), Ministry of Transport (MOT), and the Standardization Administration of China (SAC) permitted Chinese automakers, OEMs, chipset providers, and telecom companies to innovate, research, and develop beyond the short-range communication technologies, even as early as in 2016. Later, in 2018, MIT’s allocation of 20MHz spectrum (5905-5925MHz) for LTE C-V2X was motivated by the Internet of Vehicles (IoV) initiative that became a major driver for accelerating LTE based trials and demonstrations across the country. LTE-V2X has been a roadmap for the major local companies including SAIC Motors, Huawei, Datang, Autotalks, China Mobile, and China Unicom, resulting in the establishment of multiple testing sites and zones. China initially started testing on a campus and city level, and later expanded it to the highway and cross-border trials in

2018.

Europe: Previously undecided on standards; upbeat with future endeavors

Europe has been evaluating competition for DSRC and cellular technologies since 2015. By early 2019, the European Commission (EC) announced the 802.11p standard as the central communication technology for V2X applications. This unexpected announcement regarding the support for 802.11p mode became a major concern for telecom companies, automakers, chip manufacturers, and other stakeholders who were favoring C-V2X technology. In July 2019, the EC reversed its decision to make the 802.11p standard the go-to technology for V2X indicating the promise of C-V2X in Europe.

Due to these uncertainties in European standards regularization, the trials related to DSRC hardly scaled up, resulting in a rise in the testing of dual-mode operation with both 802.11p and C-V2X. The dual-mode operation-based trials in Europe account for 30% of the total trials in the region, which is more than in any other geography. A majority of the remaining European trial efforts are dedicated to C-V2X. Several telecom companies, including Vodafone,

Deutsche Telekom, Ericsson, Nokia, and Telefonica, have participated in C-V2X trials with a focus to adapt to the requirements of the 5G networks in the future. Additionally, multiple European projects under C-ITS are also exploring cross-border use cases based on 4G and 5G networks, with a prime focus on interoperability and backward compatibility.

The USA: DSRC trials prevalent; shifting gears for C-V2X

In the US, trials that started before 2014 were DSRC tests led by USDOT or state-based transportation departments. These trials are primarily focused on ITS applications with basic enablement for V2V communication and electronic tolling-like services. After the release of C-V2X standards in 2017, the trial activities were divided into either DSRC or C-V2X with a small number of trials focused on dual-mode scenarios. Although the USA will not drop DSRC or dual-mode support immediately, the pattern of trials and government policies highlight the country's focus on pushing a single standard for the future of V2X communication.

Conclusion: Impact of V2X on infrastructure evolution

Near-term Impact: The industry's efforts to advance RSU deployment and to integrate it with cellular infrastructure are culminating in the exploration of virtual RSUs. Integration of cloud and core networks in the next few years will pave a path for cloud vendors to directly cater to the V2X ecosystem.

Mid-term Impact: The direct implication of the evolution of the infrastructure for V2X applications will be evident in the smartphone industry. The chipset providers will initially explore the development of DSRC capabilities for mobile phones and then eventually research at a later stage on the integration of PC5 for smartphones, thus transitioning existing smartphones into C-V2X-enabled smartphones. This model will also extend the likelihood to venture into new V2P use cases.

Long-term Impact: The C-V2X ecosystem provides the automotive decision-

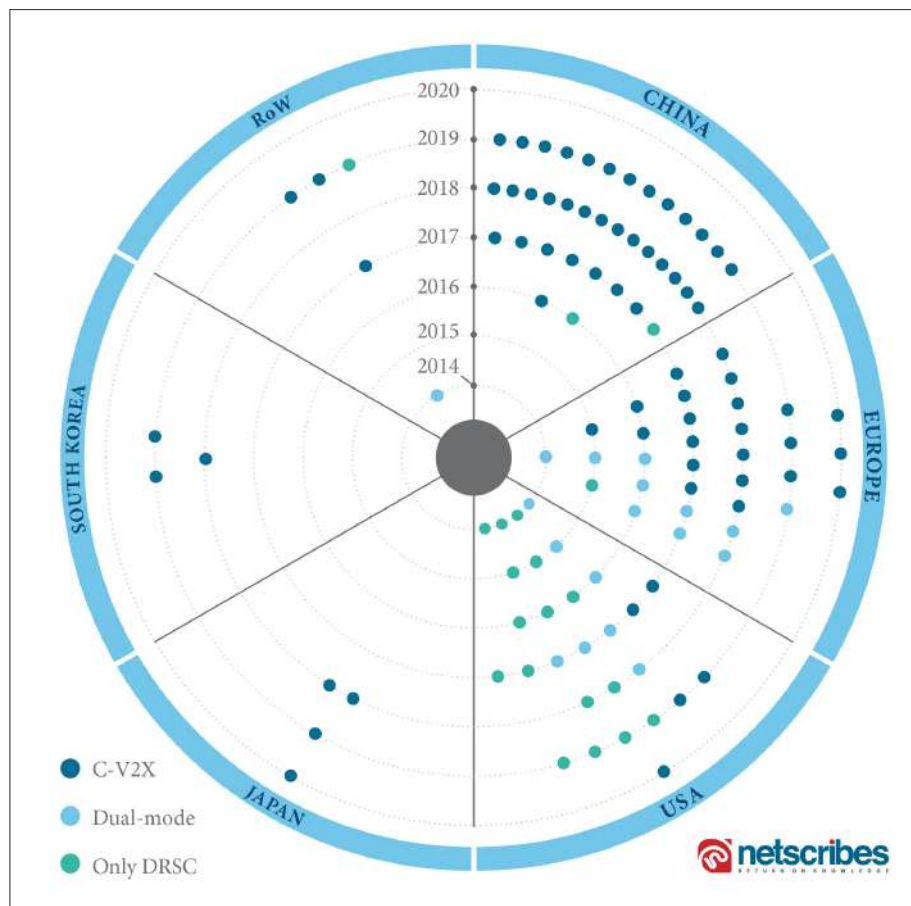


Figure 4: Representation of the type and number of trials across geographies

makers and the different stakeholders an opportunity to envision “car as a network”. Currently, the C-V2X technology is being rolled out leveraging the existing cellular networks. However, with the adoption of V2X capabilities, vehicles can transform into a moving network or data center. In

futuristic terms, vehicles can themselves perform the functionalities of a small cell by providing coverage for consumer as well as enterprise use cases. This trend is inevitable with the infrastructure evolution: from RSU to small cell to the core network and then, to the cloud. □

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Vinod Aggarwal

MANAGING DIRECTOR & CHIEF EXECUTIVE OFFICER
VE COMMERCIAL VEHICLES LIMITED

Telematics Wire in discussion with Vinod Aggarwal, CEO & MD, VECV on wide ranging topics including trends in vehicle telematics, new telematics features, diagnostics and maintenance, PLI and more.

What trends in the vehicle telematics segment do you visualize in 3 to 5 years?

Connectivity or connected vehicles will reshape the mobility landscape and have a profound impact in the way cities are built and how goods and people move. The ongoing developments in telematics technologies will continue to improve the management and efficiency of businesses with a vehicle fleet. Fleet operators in India have started to capitalise on the innovations related to

seamless communication with drivers, and field technicians to provide efficient services. Vehicle telematics technology allow vehicles to be monitored remotely thereby help prevent thefts, optimisation of productivity, maximise vehicle uptime, promote driver safety, and boost productivity. In the next 3 to 5 years there will be constant improvements in satellite systems, software and hardware developments and the adaptation of 5G which will further enhance fleet communication, safety and

economically. Telematics will make a valuable contribution to fleet owners and the overall commercial vehicle industry in India. The Internet of Vehicles (IoV) will be the next step in the evolution of connected vehicles wherein possibilities like better routing and navigation, traffic management and control of air pollution caused by vehicles will become a reality.

Do you plan to introduce telematics-based new features in

VECV vehicles?

We were one of the pioneers in modernising the CV industry in India with the industry-first proposition of 100% connected vehicles across our entire product portfolio. The portfolio was powered by our advanced telematics solution – Eicher LIVE. Eicher trucks and buses are equipped with pre-fitted hardware, which enables them to be completely connected on the road along with our industry-first ecosystem. This technology is designed specifically to reduce the overall cost of ownership for consumers and aims at improving efficiency in terms of operations. The fleet owners will be able to track trace and know the pattern of driving. All the Eicher vehicles are connected to Eicher's uptime centre that provides round-the-clock 24x7 remote diagnostics. This 100% connected ecosystem offers service support with a team of diagnostic experts offering Remote Diagnostics, Predictive Diagnostics, and specialised field support to all BS-VI Eicher vehicles. With IoT analytics platform, Eicher has significantly advanced the Predictive Uptime Services. It detects the potential issues on the truck and acts on the truck in coordination with the driver.

Do you think telematics solutions can bring down the cost of maintenance and lesser vehicle breakdown?

Eicher has always remained at the forefront of adopting new technologies and undertaking innovations and with the introduction of BSVI connected vehicles, we have taken the telematics technology to the next level. Unlike the older telematics systems, Eicher's advanced telematics system is fully integrated into the vehicle electronics and is engineered as a part of it. Telematics systems available across all Eicher BSVI trucks with several sensors and large amounts of data will enable deeper insight into driving and vehicle conditions creating a unique value proposition for the customers. With the help of advanced Eicher LIVE telematics, the fleet operators can track, trace, and know the pattern of driving this will help them in improving the efficiency of their business. Operating vehicles at maximum mileage with fewer breakdowns, reduced downtime and maintenance costs significantly helps fleet operators to do multiple trips eventually adding to the overall profitability of a fleet

owner.

In your opinion what will be the impact of the PLI scheme on the auto industry. How does VECV plan to leverage this opportunity?

The Production Linked Incentive (PLI) Scheme for the Automobile and Auto Component Industry in India has been successful in attracting significant investments and is expected to create additional employment opportunities. Incentives up to 18%, will encourage the industry to make fresh investments in the indigenous supply chain of Advanced Automotive Technology (AAT) products. The PLI scheme may also help revive the automotive sector after COVID. VECV aims to be a key stakeholder in the future mobility goals of India and therefore, are keen to take advantage of the productivity linked incentive (PLI) for the auto sector through our expansion plans for an aggressive foray into electric vehicles and fuel cells related technologies.

Is VECV leveraging the IoT and industry 4.0 solutions for its vehicle production?

VECV inaugurated a new state of art plant in Bhopal, this plant is setup on industry 4.0 norms. It is equipped with completely automated manufacturing process with MES control along with connected machines and supply systems. In line with VECV's vision of modernizing the CV industry, this plant is a fully digital facility complete with advanced technology such as automated manufacturing process & integrated command center. This allows us to achieve robust production processes and high utilisation rates. The plant will be able to deliver world-class engines for its wide range of EUTECH6 enabled BS-VI trucks and buses and will export vehicles to over 40 countries across the globe.

Does your commercial vehicle user benefit from predictive maintenance? Can you share any case or example?

Yes. VECV BS-VI connected vehicles are connected to Eicher's uptime centre which provides round-the-clock remote telematics-based real-time support along with 24x7 remote diagnostics. This means that the centre can offer predictive

maintenance data and other diagnostic-related advice on the go. With our Predictive Uptime Services, all customers, all applications, and all segments irrespective of fleet size stand to improve their uptime with fewer unexpected faults on the road. With our IoT analytics platform, we have significantly advanced our Predictive Uptime Services. We can detect potential issues on the truck and facilitate repair on the vehicle in coordination with the driver. On an average 4000 vehicles are supported real time every month, +98% concerns are resolved with 4 Hrs. ~ 4500 unplanned stops are averted every month by proactively updating the customers on issues and driver related actions.

How are fleet owners benefitting from telematics devices in terms of improved operational efficiency and lower total cost of operations?

Through our industry leading My Eicher App, telematics enables fleet owners, drivers and managers to effectively monitor all their vehicles collectively and individually in real-time. The data captured using telematics devices can include location, speed, engine-idling, harsh braking or acceleration, fuel consumption, temperature, and vehicle faults among other things. Fleet management software can read this data to send alerts to fleet owners on performance issues, emergencies, and critical events like route deviation or over speeding so that swift action can be taken. Based on telematics data, fleet managers can also gain insights into driving habits and patterns which can, in turn, help them create training programmes to improve driver safety. This technology helps immensely to save costs by rectifying trip hurdles and boosting operating profit for fleet owners.

A few years ago the government of India mandated AIS 140 vehicle tracking devices in all commercial and public transport vehicles, Has it led to an increase in VECV commercial vehicles factory-fitted with AIS-140 vehicle tracking devices, or still it is aftermarket driven?

As per the government mandate all Eicher Buses (public transport vehicles) come factory fitted with AIS 140 Devices since July '2020. For Eicher Trucks, there is a VECV approved Aftermarket solution that is available for customers. □

Artificial Intelligence For Road Safety : Reducing Road Accident Rate For Insurers, Fleets, Driving Schools

GERARD YAHIAOUI
NEXYAD

Introduction

Telematics for fleets and insurance started with essential questions concerning:

- geolocation of vehicles
 - fuel level monitoring
 - thenumberofkilometersonthedashboard
- These solutions are now fully operational.

We then saw applications while driving:

- eco-driving tips to save fuel
 - navigation, to save travel time or km
- Again, these elements are currently being deployed.

Similarly, eco-driving assistance applications are being deployed to try to reduce the cost of energy-related operations.

But the artificial intelligence that can be embedded in telematics systems (device, smartphone) can provide many other services. In particular, it is possible to significantly reduce the number of road accidents, thereby reducing operating costs.

COST OF ROAD ACCIDENTS

Road accidents cost fleets dearly:

- repair costs, if the fleet is self-insured, insurance costs otherwise
- cost of the immobilization period of the damaged vehicle
- cost of non-working time of injured personnel
- cost of late delivery
- brand image cost

It is clear that if a solution exists to significantly reduce the number of road accidents, this directly reduces operating costs.

This is what we are talking

about in this article.

HOW ACCIDENT HAPPENS

Accident can be seen as a « rare » event that comes from unsafe acts. Those unsafe acts sometimes lead to emergency situations, or near misses : accident is avoided but it almost happened. And for some emergency situations, accident happens, it may be severe, and even fatality.

This way of « thinking » the accident has been developed in what is called « theory of risk », proposed by the researcher Frank E. Bird in the 70's.

This theory presents the so-called « triangle of risk » :

Idea of NEXYAD was to detect unsafe acts, and then tell driver when it is time to come down and come back to a cautious behavior.

This was made through 12 international collaborative research programs, during 20

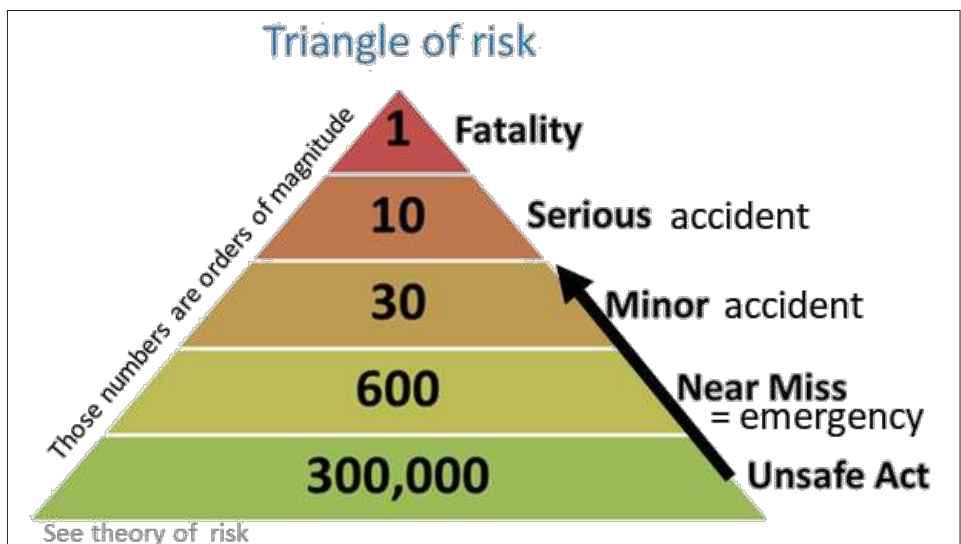
years, and in practice, it meant « putting the traffic regulation rules » into an AI. Of course, our AI also integrates deep learning and reinforcement learning technologies, but the main core is a cognitive AI applying Fuzzy logic and Possibility theory.

This AI is what Americans call a « XAI » (eXplainable Artificial Intelligence).

ARTIFICIAL INTELLIGENCE TO REDUCE THE NUMBER OF ROAD ACCIDENTS

NEXYAD has developed a new kind of AI for road safety. This AI aggregates all the data available on board, and can diagnose at any time the adequacy of driving behavior in the context, in terms of road safety.

This diagnosis is made by the AI SafetyNex which has integrated the rules of caution of the driving license of about twenty countries: as soon as a rule of caution is not respected (e.g. slow down slightly at an intersection with



priority on the right , or left), the AI realizes this and can tell the driver what to do. This explains why driving school companies are very interested in our SafetyNex AI.

When driver is informed, he can modify his driving behavior in order to return to safe driving. This completely changes the way driving risk is measured.

Indeed, attempts to measure driving risk have already been deployed in telematics:

- detection of brutal driving (severe braking, cornering)
- geolocated recording of risk areas called black spots.

The first approach was imagined more than 10 years ago and has been deployed by insurers and fleet managers. Its effectiveness is very low, because brutal driving is not synonymous with risk. A fluid driver who would always drive at a constant speed, 10km/h below the limit, but who would skip all the stops, would be a very well rated driver by this score. However, he is a very bad driver. In addition, severe braking can only be detected when it occurs, so too late to alert the driver and prevent him from taking risks. It's not predictive.

The second approach comes up against the mathematics of statistics. If on a stretch of road there has been no accident in the last 5 years (frequency observed in the past = 0), does this mean that the probability (value with predictive power of the future) is zero? In any case, few people will dare to affirm it and commit themselves. In summary, a null observed frequency does not mean that the probability is null (impossible accident). We understand that we can just say that the probability is very low.

Furthermore, if a very busy thoroughfare has had 1 serious accident in the last 5 years, and given the number of vehicles that pass on this thoroughfare per day, the observed frequency of serious accidents over the 5-year period is generally order of 10-8, or almost zero.

We therefore have a zero observed frequency which does not correspond to a zero probability, and a so-called black spot zone which gives an observed frequency almost zero. Without doing math, everyone will be able to understand that this does not have much predictive power.

NEXYAD has worked with traffic police services in 19 countries, and the diagnosis is the same everywhere: black spot areas change location every year.

This approach is therefore also a dead end.

This is why NEXYAD's artificial intelligence solution is both very innovative and very operational:

- driver is warned before encountering an emergency situation because his driving behavior is not careful and this is detected. You can drive recklessly and not have an accident, but sooner or later you end up having one. NEXYAD's AI detects each unsafe act, and informs the driver that he should modify his driving behavior (e.g. slowing down very gently). Our client BRIGHTMILE testified on our website about the effectiveness of our SafetyNex driving assistance solution, which reduces the number of road accidents by more than 25%. This drop in accidents significantly lowers operating costs.
- At the end of each trip, caution and risk statistics allow fleet managers to keep track of the improvement in the behavior of their drivers. This makes it possible to negotiate with insurers to further reduce operating costs.

APPLICATIONS AND FIRST DEPLOYMENTS IN INDIA

The artificial intelligence software brick SafetyNex, from NEXYAD, is currently integrated by the company MONTBLEU Technologies, which targets road safety markets:

- driving schools, which can use this technology in a MONTBLEU smartphone App, and which makes it possible to measure improvements in safe driving
- insurers who wish to include UBI clauses in their contracts and who therefore need to know how prudent the driving behavior of drivers is fleets: cars, trucks, two-wheelers, which need to reduce their operating costs

The MONTBLEU application is called ROAD and will significantly improve road

safety in India.

FUTURE

NEXYAD technology is also being integrated into new vehicles, for three types of applications:

- the safety score, like the one offered by TESLA in the USA. The safety score is made up of statistics of caution and lack of caution (called driving risk)
- the safety coach, which is the driver's alert application to help him better anticipate road difficulties, reducing the number of accidents by at least 25%
- the preventive ACC, which consists, instead of informing the driver that it would be necessary to slow down slightly to remain cautious in view of the context, to tell the vehicle itself because it is robotic. We can thus go from the preventive ACC to the autonomous vehicle whose level of caution is the key to explaining its behavior.

CONCLUSION

Professional fleets wishing to reduce their operating costs now have a new AI tool, integrated on each continent by talented companies that take into account the real context of operations in each country.

Similarly, non-professional fleets, made up of employees of large companies who come to work by car or two-wheelers, can benefit from this tool and reduce the number of accidents, within the framework of corporate social responsibility.

In addition, insurance companies all want to integrate digital technology into their mode of operation, by modulating their prices according to the behavior of the driver. NEXYAD's AI is a simple response that is easy to deploy on mobile phones.

Finally, driving schools have a new generation of tools to help students progress and monitor them over time, possibly with the help of insurers.

The technology has been validated by insurers, telematics companies, fleet managers and car manufacturers alike. □

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Home Automation with In-Vehicle Voice Assistant

ANJALI MISHRA, PANKAJ PANDE & SAI KRISHNAN
Elektrobit

Introduction:

How about instructing Voice Assistant in your “In-vehicle Infotainment System” to operate Smart home appliances while driving?

Home Automation operates the home appliances wirelessly and automatically; the article describes how to extend Home Automation by communicating to Home Appliances from car using Alexa.

The Elektrobit’s object-oriented and modular architecture, expertise in Alexa Smart Home skills and Elektrobit VAB give the reliable, flexible, faster, and maintainable In-Vehicle Home Automation Infotainment System.

Imagine a scenario that you are driving back home in your car, and you want to go for a shower once you are back at home. In this scenario you can ask the HMI in your Car’s Infotainment System to turn on the Geyser while still driving, so that you can immediately go for shower without waiting for water to heat once you reach home. Another plot could be if your home is locked, and some delivery boy comes to deliver a package, you will be notified about the delivery boy while you are driving, so that you can immediately instruct home automation system to inform delivery boy about placing the package

safely in your absence with the help of In-Vehicle Infotainment System (IVI) without compromising the safety while driving.

Elektrobit has the capability to develop a solution using Voice Assistant (VA) Alexa and Elektrobit Voice Assistant Broker (VAB) interfacing with Alexa Automotive SDK on non-android HMI or also possible for android HMI in case of other VAs, to achieve the above scenarios which showcases the use of Smart Assistants for Home Automation.

Workflow diagram:

How VAB is advantageous to integrate Voice Assistants to HMI?

In traditional way of integration, VAs is tightly coupled to HMI, hence HMI will be impacted while adding or removing the VAs whereas in EB way of integration, Elektrobit’s VAB Core makes VAs loosely coupled with HMI, by having only one common interface with HMI and having multiple independent interfaces at VAs side.

Elektrobit’s Voice Assistant solution for IVI applications consists of a dialog-tooling and -management framework to supplement the dialog modeling potentials of on-market VAs. This flexible approach will ease modeling complex voice user interfaces that integrate domain models from internal and

external knowledge sources.

Elektrobit’s dialog management and modeling framework provides an intelligent dialog management system that is independent of the existing VAs and can be integrated into Amazon Alexa and Google Assistant both at the same time. Thus, only a common, vendor-independent dialog model must be maintained, but it can be deployed to multiple VAs using “EB VAB Core” as shown in the below diagram.

The framework also simplifies coping with dialog phenomena such as anaphora or implicit confirmation, that can be addressed without writing code.

The article further describes how the home automation can be achieved using Alexa.

Alexa communication to Home Automation System:

To Turn ON the Geyser, let’s consider the user asks HMI, “Alexa, turn ON the Geyser”.

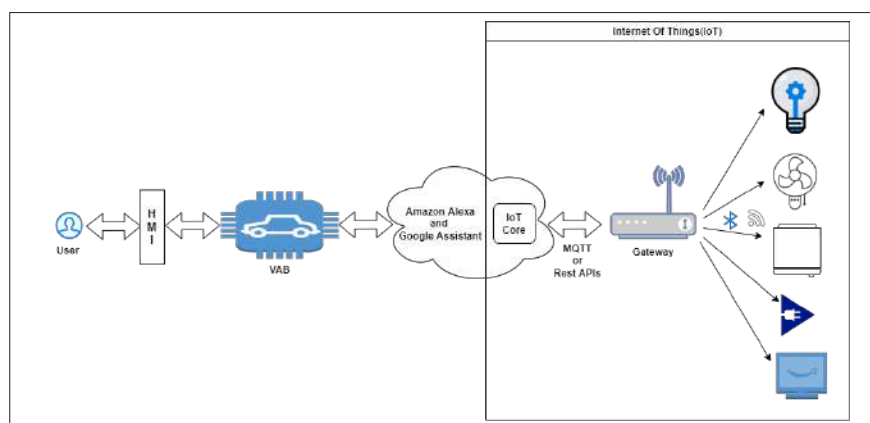
The Elektrobit VAB receives the dialog “Alexa, turn ON the Geyser” from HMI with the help of EB VAB Core and based on the wake word “Alexa” EB VAB core sends the dialog to the Alexa cloud using Alexa SDK interfaces (EB VAB Alexa Adaptor).

We shall define Alexa Skill to understand this dialog to perform Home Automation for turning ON Geyser at Home with the help of AWS IoT.

What is Amazon Alexa?

Amazon’s Alexa is a next-generation voice-enabled IoT ecosystem based on the cloud. Compatible Amazon Echo alludes to the hardware which connects to Alexa services.

Alexa controls several smart devices using itself as a home automation hub. In the home automation space, Alexa can interact



with several different devices, from lights and plugs to thermostats and cameras, Alexa can help make your home smarter and more automated by simplifying your everyday routines with its AWS IoT feature.

All these abilities are achieved through Alexa Skills.

What is Alexa Skills?

Skills are voice-driven Alexa Capabilities like apps for Alexa programmed to do tasks and respond. With an interactive voice interface, Alexa gives users a hands-free way to interact with your skill.

What is AWS IoT?

AWS IoT securely connects our assets, gather data and take intelligent actions locally with the help of cloud based services.

AWS IoT facilitate to use other AWS services to build value-added IoT applications, in order to on board and support diversified fleet of devices e.g. in our use case AWS IoT can directly communicate with Geysers or Home Controller or even a Raspberry Pi.

How Alexa communicates with Home Automation System using AWS IoT?

AWS IoT provides device shadows which make it easier to build applications that interact with your devices/home appliances by providing always available REST APIs. These REST APIs are utilized by Alexa skills to interact with the state of the device. Meanwhile on device side, Device can be subscribed to AWS IoT MQTT Events, and on update of a state in the device shadow on the cloud, latest shadow will be published to the subscribed device like our Geysers.

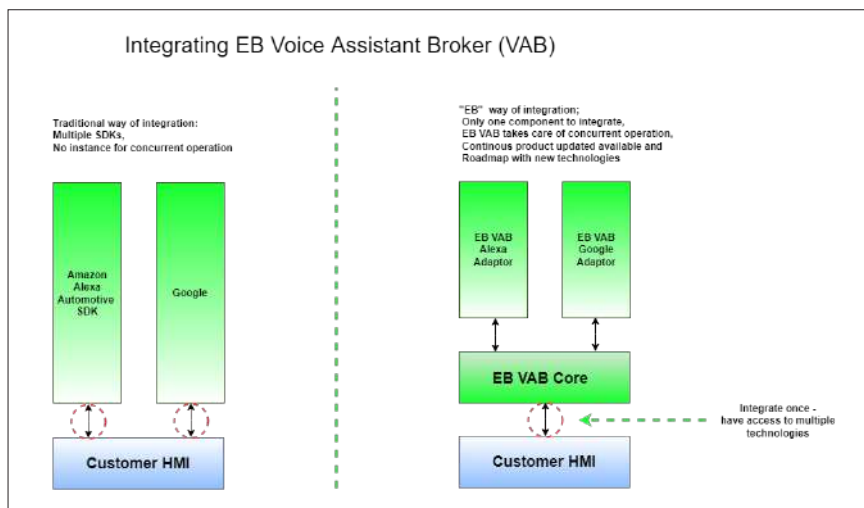
Steps to integrate Alexa with IoT ecosystem?

Step 1: Create Alexa skill for the voice command to communicate with cloud-connected devices.

Alexa skill can use existing Alexa skills from the skill store.

Step 2: Alexa API comprises a message which is sent to the AWS lambda where the voice is processed and confirms the action. The lambda function communicates the desired action to the AWS IoT.

Step 3: AWS IoT interprets the message and gives a signal of turning ON or OFF to home appliances.



Step 4: A message is sent back to the skills API to check whether it was successful or not.

Alexa uses the response to provide feedback to the user. IoT end devices can be robustly connected with a Gateway to perform various IoT applications in diverse industries such as home automation, industrial automation, retail, automotive, and many more.

Conclusion:

We articulated how the Home Automation can be achieved using ‘Elektrobit VAB’ and ‘Voice Assistant Amazon Alexa’ as part of “In-vehicle Infotainment System (HMI)”. Similarly, any Voice Assistants can be used to make our life smarter, as Elektrobit has the competency to develop VAB which provides

the flexibility of choosing different Voice Assistants and has the competency to develop various Alexa Skills to achieve versatile use cases in Home Automation.

Elektrobit recognizes that the VA vendors are more and more focusing on providing a native Android integration of their assistants, so that we still see a high value and strength of our VAB solution especially on non-android platforms.

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Connected Vehicle Data is Driving the Future of Auto Industry

 **DHRUV AGGARWAL**

CEREBRUMX - AI-Powered Connected Vehicle Data Platform

The 21st century we live in is flooded with vehicles of all shapes and sizes that keep the wheel of our economy turning. The automotive landscape today has reached far out from the constraints of mere transportation. It instead serves to industries that hold the potential to create great market value out of data-based services.

So much so that building on the impressive popularity of embedded connectivity in cars, analysts predict US new light-duty vehicles to see up to 90% increase in connected vehicles, while India to sustain 1 in every 4 cars with 5G connectivity, by 2025. With such an accelerated growth, it is estimated that connected cars will represent over 5% of all connected devices, in the same timeframe.

This transition to software has helped the auto sector get rid of its much-unwanted load, in form of analog and device-based data gathering solutions, and enabled dependence on software-as-a-service (SaaS) and subscription businesses. Besides providing a unique customer experience, such services deliver great value to numerous players in the market, and beyond.

Vehicle Data – Connecting the Masses

While transportation has almost always been a decentralized process of enabling travel between two points, the concept of connected vehicles brings in a sense of unification. But putting the interests of the drivers on the centre-stage, connected cars improve the automotive value chain and the whole ecosystem around it.

Software-driven vehicles consist the unique ability to record and share, with a centralized decrypting entity, numerous

attributes and parameters that evaluate the driver and vehicle performance, as well as the operational environment. It is this central entity that then unscrambles the vehicle data, that leads to truly personalized driving experiences. This data also boosts advancements in mobility solutions, vehicle services, safety, performance and the overall vehicle design pipeline.

Who owns this data?

Including parameters such as real-time location, speed, fuel tank level, vehicle health status, battery status, odometer readings, tire pressure and more, connected car data deals closely with information unique to each vehicle, its operation and the driver, usually based on consent. While end-users or drivers remain the sole *owners* of this information, the services they consume are delivered on grant of permission for the service provider/OEM to use and share this data, for a range of *connected* solutions.

Benefits of Connected Car Data

Mobility data acts as a unified solution to most auto industry challenges, with a single source of integration. Here are some top benefits of leveraging the power of connected vehicle data:

Reduced Dependency – One of the advantages of utilising the power of telematics-based vehicle data is that it eliminates the need to depend on several aftermarket devices, and lets businesses focus on key revenue generating activities.

Cloud integration – Very often, connected vehicle data is made available to auto businesses through quick cloud integrations and easy APIs, that not only expedite the

entire process but also bring in convenience. **No Onboarding Costs** - Service providers do away with tethered data devices, cables, long installation times and high upfront expenses. They experience quick and easy sourcing of data, directly from the OEMs, with optimized CapEx and OpEx.

Superior Quality Data – Without a doubt, the data collected directly from the source vehicles and their respective OEMs holds information that's more valuable, simpler and useful for the customers.

The Power of AI & IoT - While vehicle in itself might not yield much value to auto businesses, it is the hidden significance underneath that catches attention and empowers revolutionary solutions, unlocked through the application of AI and automotive IoT.

Other benefits of connected car data include, but aren't limited to:

- Easy and quick lifecycle processes, from diagnosis to resolution.
- Standardization of vehicle parameters for all makes and models.
- Enabling data analytics and value-added services to unlock sustainable business activities.
- Insights beyond OBD devices and applications, measuring a variety of attributes.

Why is this data important?

Data thus collected from connected vehicles holds great value for the development and improvement of a wide variety of services in the automotive ecosystem. It plays an important role in influencing the in-car experience, comfort level, maintenance as

well as safety of the passengers, and goes a long way in aiding service providers in delivering a fulfilling driving experience. By optimizing the vehicle operation, data paired with automotive IoT is a boon for the future of connectivity in automobiles.

Here is a brief look at how this data affects different industries within the auto sector, to make driving experiences worthwhile.

Fleet Management

Intelligent analysis of connected vehicle data yields greatly to serve the fleet industry. Fleet managers get the unique opportunity to get a bird's eye view of their entire operations as well as expenditure, all in real-time, with windows for improvement. Connected fleets work in harmony with AI technology to simplify the flow of information and bring any variables in sync, to develop fleet management strategies that nurture growth.

As a result, the effect of AI on fleet management is expected to reduce collisions by 60%, collision costs by 75%, boost performance uptime by 50% and reduce overall fleet costs by up to 40%. By creating a unified front against some of the most pressing challenges faced by fleet managers, connected vehicle technology has successfully brought transparency into driver and consumer needs.

Vehicle data enables fleet managers to:

- Easily monitor fleets in real-time, track live location, prevent thefts and more.
- Automate mundane tasks, such as invoicing and billing, routing, scheduling maintenance, etc.
- Manage fluctuating administrative and fuel costs to optimise operations.
- Evaluate driver performance and encourage safe behaviour through coaching opportunities.
- Monitor vehicle health, automate service reminders and track maintenance proactively.
- Reduce risk of human error and miscommunication.

Vehicle Service & Maintenance

Vehicle service providers get access to substantial amounts of vehicle data through onboard sensors that constantly monitor different aspects of vehicle health. This presents with a unique opportunity to keep

a watch on parameters that directly impact movement, key components as well as the ride quality and passenger safety, and get them fixed before breakdowns. This data can also be used to identify potential issues and avert malfunctions through predictive maintenance, reducing downtime by as much as 50% and maintenance costs by up to 40%.

Data-powered maintenance services ensure:

- Real-time monitoring of vehicles to prevent and assist with breakdowns.
- Real-time access of diagnostic codes generated by vehicle engines.
- Precise monitoring fuel level, tire pressure, air temperature, oil temperature, engine temperature, RMP and more.
- Delivering individualized, data-led and proactive interactions to the customer.
- Enhanced overall road safety and driving experience.

Auto Insurance

Another segment of the auto industry that gains highly from the concept of connected vehicles is the insurance industry. By enabling auto insurers to precisely measure driver behaviour, unsafe practices as well as miles driven, AI in vehicles has led to a new insurance product: usage-based insurance. As the name suggests, UBI solutions offer protection to car drivers based on their individual usage patterns, factoring elements such as rapid acceleration, swerving, over speeding, etc. and pricing policies correspondingly, leading to truly

personalised insurance solutions.

As a result, insurers get the flexibility to offer extra discounts to safe drivers, and hold unsafe drivers accountable, while policyholders get incentivised for driving safe. This has led to a 56% inclination among drivers towards adopting UBI models in the near future, with close to 20% drivers having already adopted UBI.

Access to both historical and real-time data enables insurers:

- Offer dynamic pricing models, such as Pay As You Drive (PAYD) and Pay How You Drive (PHYD).
- Establish deeper relationships with customers by offering customized insurance plans.
- Expedite claims processing with transparent collision data and information.
- Heightened road safety as a result of driver behaviour monitoring and incentive-based techniques to improve driving skills.
- Detect and prevent frauds and false claims by finding the actual cause behind collisions.
- Send new policy renewal alerts and expedite emergency alerts and road-side assistance.

Smart Cities

The cities of tomorrow require the technologies of tomorrow that can help the citizens lead a sustainable life. Mobility intelligence promises smart city planners crucial information that they need to gauge their efforts, to be able to conceive traffic





Surrounded by a myriad of vehicles around us, we rarely stop to think about the impacts they might have on our lives, that could change the future as we know it. Connected vehicles stormed the industry with a revolutionary product that targets wide-spread influence, promptly.

and architecture projects that aren't load-heavy on the future. Experts believe that AI technology and vehicle data can improve the quality-of-life by 10-30%, resulting in reduced health burden, shorter commutes, enhanced safety as well as lowered greenhouse gas emissions, all of which encourage a green and clean way of living.

Connected car data and advanced technologies such as AI and 5G support:

Real-time monitoring and control over traffic signals, toll booths, transit lanes and more.

- Dynamic traffic management to reduce congestion and increase efficiency.
- Learning based on changing mobility trends, to allow smooth traffic flow.
- Ensure safety in cases of emergencies and collisions, through shortened response time.
- Intelligent parking solutions and automated payment.
- Managing and boosting operations of public EV charging infrastructure.

Targeted Advertising

It is expected that connected vehicles will see 90-95% penetration into global new vehicle sales by 2030. Such a high market share of smart, connected vehicles has resulted in a new form of advertising that can be personalised based on who is driving the car as well as the passengers.

By analysing vehicle data, it can be ascertained what type of music or content is liked by a particular driver, where they shop, eat or work and how often they respond to ads on the in-vehicle entertainment system. They can then be presented with more targeted ads and marketing campaigns to convert into a buying customer, along with data measuring ROI at every step.

Electric Vehicles

Electrification is one the rise around the world, and on the minds of some of the most influential car manufacturers. While many believe that the EV ecosystem is yet underdeveloped, there's no doubt that rich vehicle data can change the industry's outlook. Data collected from connected and electric vehicles will come in handy in planning and deploying reliable charging stations, finding nearest station in real-time, monitoring charge demand, optimising charge time and battery performance, and encouraging consistent improvements. With a 160% increase in EV sales since the first half of 2021, there lies a great scope for the implementation of such solutions to further catalyse the EV industry.

Reversing the Value Chain

While conventionally the auto world has been implementing technologies on original equipment to make them

more efficient, connected vehicle technology brings the value back to the car manufacturers. By collecting and correlating key driver and vehicle attributes with real-time services, boosting uptime and reducing contingencies, connected vehicles essentially give back to the OEMs, analysed data and KPIs to improve on. Such transactions benefit the manufacturers as they get their hands on cutting-edge data, directly from the testing-field, while consumers get access to more extensively proven vehicles and products.

Is privacy a concern?

With the plethora of benefits that come with AI-powered connected vehicle technology, first-time users often worry about how privacy of their personally identifiable data (PII) can be maintained. And this is where choosing the right data partner makes the most difference, as it could result in your auto business thriving and winning the consumer's trust, or end up getting a class action lawsuit filed on basis of security breach. It is important to note that data privacy and security can very well be maintained while dealing with sensitive data, and should be made a priority if long-term viability is something to be expected.

Final Thoughts

With the demand for automotive connectivity growing at a tremendous pace, thanks to the emergence of on-demand services and heightened ease, there's no stopping the future of the auto world to get *connected*. The market also gains considerable influence from connectivity achieved in other aspects of life, such as smart homes and mobile devices, elevating the consumer's expectations.

All said and done, the connected vehicle data market is here to stay for the long haul, and expected to gain traction with the widespread adoption of EVs and autonomous vehicles. What remains vital for all the players in the ecosystem, however, is to stay on par with this transformation, that from where I see for the most part seems unidirectional.

It falls on the auto businesses to contemplate the change, fathom its effect and keep an eye out for a devoted data partner that can help unleash the benefits of intuitive connected vehicle data.



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An aspiring marketer and a total car fanatic, Dhruv has been working closely with several elements of the global automotive industry, since his days learning Automotive Journalism from Coventry, United Kingdom. He is an avid content creator in the auto space, and has been actively engaged in reinforcing the marketing efforts for a US-based start-up and a leader in the connected vehicle data domain.

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Getting India “EV-ready” with electric fleet management solutions

TUSHAR BHAGAT
Uffizio India Pvt. Ltd.

Introduction

According to the World health organization (WHO), India has the worst air quality index of all countries. Among rising environmental concerns, curbing the amount of vehicular exhaust is very important. Hence, getting India EV-ready is the next big goal of the Indian automotive industry.

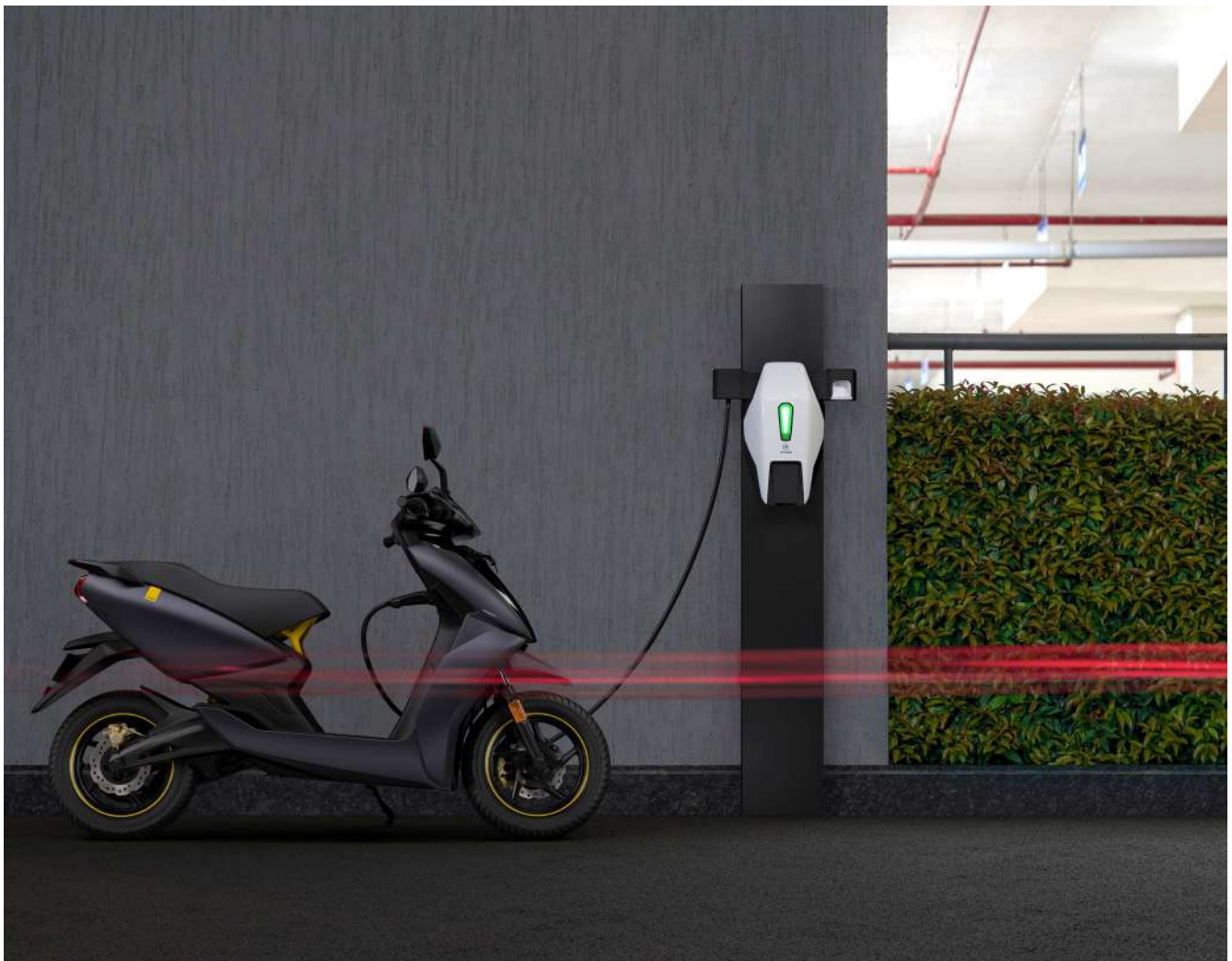
EVs operate on an electric motor, thus eliminating the dependency on an internal

combustion engine (ICE). It makes EVs one of the most practical alternatives to fuel-based vehicles. Truly, they play a significant role in lowering carbon footprints. But the switch from petrol-fueled fleets to electric fleets will not be easy. In recent years, the rapid development of charging infrastructure has led to a surge in EV sales. Consumers are being drawn to the exciting benefits of using EVs. Yet, EV manufacturers as well as users

have a lot of loose knots to tie before EVs can be fully realized.

The EV market in India

The Indian electric vehicle market was valued at \$1,434 billion in 2021 and is expected to reach \$15,397 by the end of 2027. Two-wheelers (e-scooters and e-motorbikes) and three-wheelers (e-rickshaws) are currently dominating the EV market. Inter and



intra-city public buses are also ripe for EV adoption. Several urbanized states of India, like Maharashtra and Delhi, have seen high EV penetration rates. These states also lead in electric three-wheelers and four-wheeler sales.

The high cost of ownership is one of the many barriers to EV adoption. To overcome it, the Government of India (GOI) subsidized e-rickshaws and 2-wheelers in low-income cities. In 2019, the GOI issued a budget of 10,000 crores INR to promote EV deployment and manufacturing. The central government also launched the FAME (Faster Adoption and Manufacturing of EVs) plan to encourage the use of EVs. Over 2,700 charging stations were installed all over India under the FAME II phase in 2019.

Impact on Indian consumers

Clearly, the Indian EV market promises growth and expansion. However, before pulling the plug on fuel-powered cars, we need to build a sustainable EV environment for the consumers. Being EV-ready means being able to plan effective routes and perform proactive maintenance. Electric fleet managers need tools to check on driving patterns to maximize utility. The inability to do so can pose an obstacle for consumers. For instance, not being able to track the state of charge or battery health can lead to unwanted breakdowns. Thus, affecting the fleet productivity. Not to mention, it makes transport inconvenient and significantly affects the user experience.

Tracking metrics is crucial for smoother electric mobility

1. Battery Use and the State of Charge

When it comes to fleet electrification, most metrics are centered around battery usage. Batteries are the largest and the most important component of your electric fleet. To optimize the performance of batteries, EV consumers need accurate analytics. They need tools to track EV charging and energy consumption patterns in real-time. They need a system to monitor battery health.

Imagine a fleet manager who has to look over 100 electric fleets. In this case, checking the battery health of every fleet manually is time-consuming and tedious. And for a single fleet manager to do this every day is practically impossible. Hence, some level of

software automation is certainly required here.

2. Thermal Management

The recent occurrences of electric scooters catching on fire have taught us anything, is to be extra careful with our EV batteries. Thermal management is crucial for electric fleets, especially when operating in torrid regions. Hence, knowing when your battery temperature spikes or drops is essential for driver safety. Without thermal management, businesses will face losses in the form of downtime and excessive repairs.

3. Range Anxiety

Optimizing daily trips is necessary for businesses that plan to use electric fleets over longer distances. With electric fleets, they no longer need to care about fuel mileage. However, they will still need tools to plan effective trips. Designing routes that take charging infrastructure into account is the key to efficient mobility. Doing this will help fleet managers address range anxiety. On the plus side, planning optimum routes eliminate the need to charge EVs during peak business hours.

Tools for EV readiness

India is taking active steps to develop EV charging infrastructures. Companies like the Tata Group, Mahindra, and Kia motors are trying to perfect the production of electric fleets. Yet, all this will fall short if EV owners don't get the tools to measure, track, and optimize electric mobility. Therefore, getting EVs connected to a digital platform is an inescapable part of fleet electrification.

Managing electric fleets manually will hamper India's EV readiness. Besides, EV management solutions will not only enhance the performance but also aid the transition to electric fleets. Here is how they will do that:

1. Energy utilization history

Consumers will see how energy gets utilized

by their electric fleets. Judge the efficiency of your EVs and obtain insights into optimizing energy usage.

2. EV charge and discharge reports

Get a detailed account of your electric fleet's charging status. See how much time they need to charge completely. Optimize charge times and monitor charging cycles. Get notifications when an EV is fully charged and prevent overcharging. Get alerts for battery overheating and enhance fleet safety by unplugging immediately.

3. Timely insights

Receive notifications when your EV battery reaches a critical level and needs charging. You can define and customize the battery limit at which you would like to get notified. Get battery maintenance and servicing reminders to prolong battery life.

Conclusion

The need for an EV management solution is imperative. In fact, it may be as important as the electric fleets themselves. With the spike in petrol prices and the impending climate crisis, EVs are not just an eco-friendly choice but a necessity. But, for EVs to be an effective replacement, they need to be connected. User experiences can only be enhanced with OTA data and analytics. Until we build an analytics that supports consumer-related metrics, the switch to EV will feel like a distant dream. □

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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.



The ADAS and DMS Explainer

RAJEEV RAJASEKHARAN
Intel Corporation

Autonomous Driving (AD) has been a buzz word for a few years now and a lot of progress has been made towards getting to a true ‘Driverless Car.’ While fully autonomous cars are a long way away, especially in a country like India, there is another term that is catching the fancy of the public: ADAS—or Advanced Driver Assistance Systems.

Unfortunately, the terms ADAS and AD are used interchangeably, which has led to an impression that a vehicle with ADAS is a semi-autonomous or a fully autonomous vehicle. Another offering that is popular today is the Driver Monitoring System

(DMS). DMS systems are intended to monitor a driver through an inward facing camera and attempt to identify driver distraction, drowsiness, and compliance items through the use of AI based algorithms. This article debunks the myths and misunderstandings of ADAS and how a DMS System can complement an ADAS system to help enhance vehicle and driver safety and reduce likelihood of accidents.

ADAS Systems

We will start with the ADAS system. In order to understand ADAS systems, one must first be familiar with the different levels in the path to fully autonomous

driving. This is fairly standardized, although there maybe slight variations of the same put out by different entities.

Keeping these 6 levels in mind, let us come back to the concept of ADAS. An ADAS system in a vehicle can be a Level 0 System, or it can even be a Level 3 system. Where an ADAS system fits in is decided by the features and the assistance it provides. As we move across the levels mentioned above, we progress from a ‘Driver Assistance System’ to a fully ‘Autonomous Driving’ System. In this article, we will limit our discussion to Level 0 to Level 2.

One of the fundamental metrics for any ADAS Systems is Time to Collision

Metric (TTC). TTC is a threshold based on which a system decides what intervention needs to be done. For example: The TTC threshold for a collision warning is 3 seconds. This is based on several internal and independent studies which have shown that 2-2.5 seconds of warning to a distracted driver can prevent or mitigate 80-90% of all rear end collisions.

Let us now dive a little deeper into ADAS Systems and examine typical features at Level 0 to Level 2 and how these are differentiated.

Level 0 ADAS Systems

Level 0 systems have no autonomous safety assist features. Such systems are usually ‘warning or passive’

	L0 No Automation	L1 Driver Assistance	L2 Partial Automation	L3 Conditional Automation	L4 High Automation	L5 Full Automation
DRIVER	In charge of all the driving	Must do all the driving, but with some basic help in some situations	Must stay fully alert even when vehicle assumes some basic driving tasks	Must be always ready to take over within a specified period of time when the self-driving systems are unable to continue	Can be a passenger who, with notice, can take over driving when the self-driving systems are unable to continue	No human driver required—steering wheel optional—everyone can be a passenger in an L5 vehicle
VEHICLE	Responds only to inputs from the driver, but can provide warnings about the environment	Can provide basic help, such as automatic emergency braking or lane keep support	Can automatically steer, accelerate, and brake in limited situations	Can take full control over steering, acceleration, and braking under certain conditions	Can assume all driving tasks under nearly all conditions without any driver attention	In charge of all the driving and can operate in all environments without need for human intervention

Sources: Society of Automotive Engineers (SAE), National Highway and Traffic Safety Administration (NHTSA). Copyright © 2018 Intel Corporation. All rights reserved. Intel, the Intel logo is a trademark of Intel Corporation in the U.S. and/or other countries.

systems. They can assist by constantly monitoring the road in front primarily through vision sensors and can provide appropriate warnings for the driver in the form of audio and visual alerts. The key point to note here is that Level 0 systems do not take any action automatically. The vehicle is fully under the control of a driver and the driver is expected to take steps to prevent or mitigate an adverse event from happening.

Level 0 ADAS systems usually provide the following kind of alerts:

- Forward Collision Warning (FCW): Alerts up to 3 seconds before an imminent rear-end collision with a vehicle or a motorcycle
- Pedestrian Collision Warning (PCW): Alerts up to 2.1 seconds before an imminent collision with a pedestrian or a cyclist
- Headway Monitoring & Warning (HMW): Helps keep a safe distance from the vehicle ahead, alerts the driver if the distance becomes unsafe (tailgating)
- Lane Departure Warning (LDW): Alerts when there is an unsignaled deviation from the driving lane
- Level 0 ADAS Systems are mostly aftermarket systems. The major advantage is that such systems can be installed on any vehicle running on the road today. A good example of a Level 0 ADAS system is the Mobileye® 8 Connect which is now available in India for commercial fleets through Intel® Onboard Fleet Services.

Level 1 ADAS Systems

Level 1 Systems usually have one or more active safety features. The system will give a warning like in the Level 0 system, but if the driver has not responded to the warning and the situation warrants it, the system can do an active intervention on behalf of the driver. Level 1 systems normally can do only one intervention at a time by controlling either one of the brakes, accelerator or steering depending on the situation.

Level 1 ADAS Systems provide the following interventions:

- Automated Emergency Braking (AEB): The System can automatically apply the vehicle brakes without driver intervention. AEB is usually triggered after 2 levels of warnings and there are

controls on how much braking is done. For example: If the vehicle is at speeds of >50kmph, the AEB trigger will only be to bring down the speed to 30kmph and will not attempt a complete halt.

- Adaptive Cruise Control (ACC): Once a cruise control at a certain speed is set, based on the headway to the vehicle in front, the system can automatically decrease speed if headway falls below a threshold and will increase speed to the set level once the headway increases to a safe level.
- Lane Keep Assist (LKA): If the system notices an unintentional deviation from the driving lane, it can automatically correct this by controlling the steering and bringing the vehicle back into the lane.
- Level 1 ADAS systems are normally integrated by the OEM (Original Equipment Manufacturer) itself as part of a vehicle design. Because of this it can provide 'active features' as described above, but on the downside, the design cycle is long and hence vehicles with ADAS Level 1 systems are very limited and have just started coming into the Indian market. An example of a vehicle with a Level 1 System is the Mahindra XUV 700 which has ADAS technology implemented by Mobileye.

Level 2 ADAS Systems

In addition to providing the active safety features of Level 1, Level 2 systems can automatically control more than one aspect of the vehicle. This enables a level 2 system to not just assist the driver in emergency situations, but also help in regular driving situations. The system can control the accelerator, steering and brake in unison which sets the stage for 'hands and legs free' driving in limited situations. Level 2 systems usually have multiple sensors including Vision and Lidar based sensors.

Some situations where Level 2 Systems can independently handle the vehicle are:

- Automatic Parking: The system can help automatically park the vehicle into a designated slot without any input from the driver.
- Traffic Jam Assist (TJA): In slow speed-stop start situations, the system can take control of the vehicle without the need

for the driver to intervene.

- Level 2 ADAS Systems are the starting point towards true autonomous driving. Distinctions in Level 3,4 and 5 are continuously changing as this is an evolving space, but the progress is towards enhancing and refining these to get to the fully autonomous goal.

DMS - Driver Monitoring Systems

DMS systems complement ADAS systems by providing Distraction and Drowsiness related alerts to the driver. A typical DMS system consists of an inward facing camera mounted facing the driver. The DMS system constantly scans key parameters of the drivers face like face position, eye movements, eyelid closure and uses this information to identify if a driver is distracted or drowsy. In addition, the camera can also identify compliance related activities like seat belt status, smoking and phone use. Below are some of the standard alerts a DMS System provides.

While DMS as a stand-alone system is very useful for identifying and alerting drivers, the real power of DMS comes to light when it is combined with an outward facing ADAS system. For example, a drowsiness alert along with a Forward Collision Warning Alert can help a drowsy driver take preventive action in a timely manner.

It is also important to note that DMS systems are focused on identifying and alerting in adverse situations. A DMS system typically does not record audio, nor does it do a continuous recording of the driver.

In conclusion, as ADAS is becoming more popular and relevant in the Indian context, the focus should start with Level 0 systems which can be enabled via an aftermarket installation. Intel in partnership with Mobileye (an Intel company) which is the world leader in ADAS and AD systems have now launched Intel Onboard Fleet Services targeted to bring the technology of ADAS into the aftermarket space in India with special focus on the commercial segment. In addition, by working with our DMS partner, we also enabled the integration of data from the DMS and ADAS systems through an integrated cloud portal that gives consolidated analytics and reports through one single interface. □

Telematics enabling EVs for smarter and sustainable road mobility

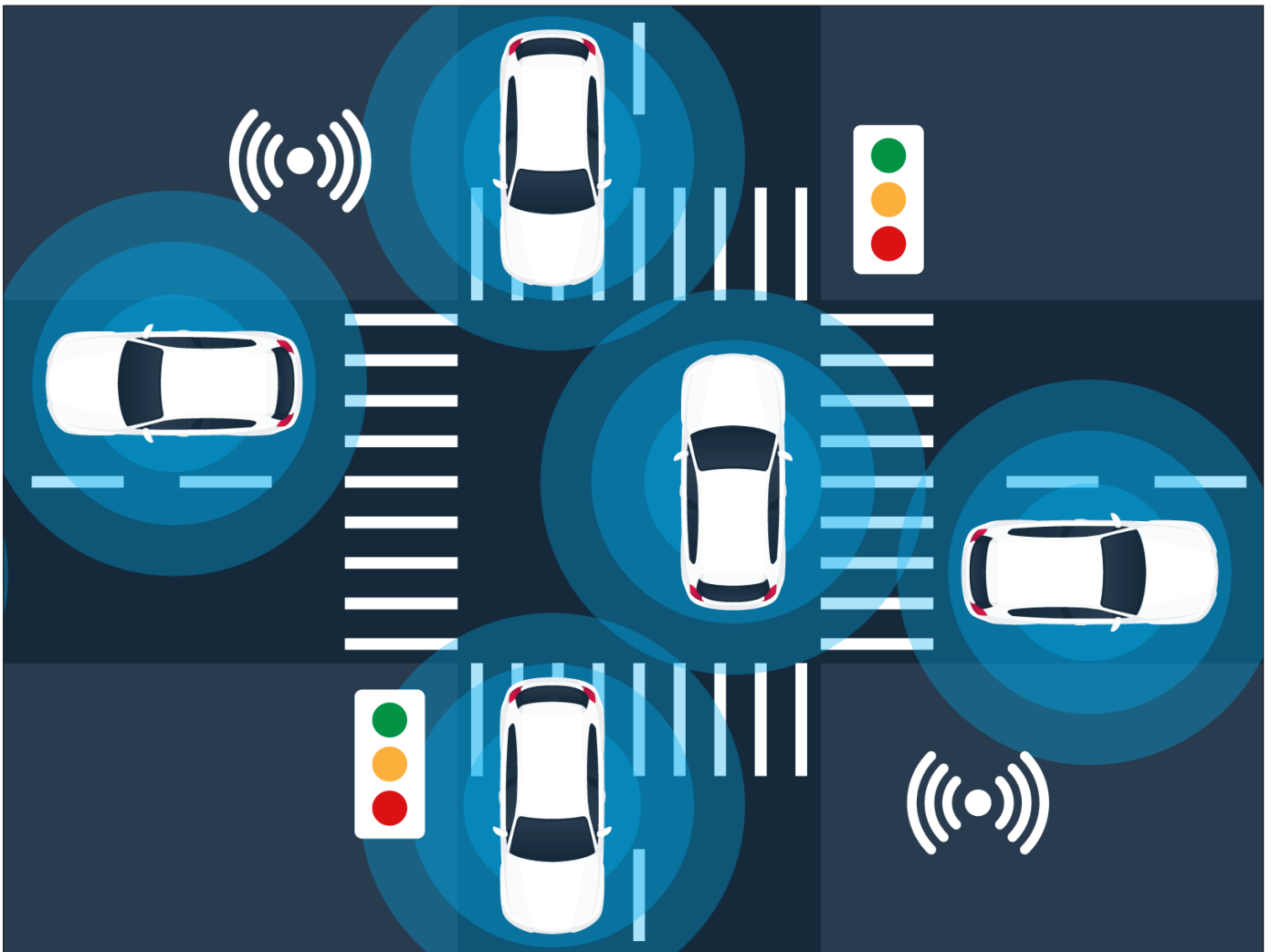
 **KARAN MAKHIJA**
Intellicar

We are living in a digital world, where being connected constantly has become a need rather than a luxury. This is now the same for all machines around us, including our vehicles. Vehicles are getting more connected and this too is becoming a requirement rather than a luxury. The world is quickly transitioning

to EVs, aided by the pandemic, increasing fuel costs and pollution, the acceleration towards more sustainable mobility options, the requirement for these vehicles being connected is imperative.

There is a lot of data being generated by vehicles these days, in all practical purposes, vehicles are computers on wheels, and as they move around, they generate a lot

of data. Electric vehicles, having fewer moving parts compared to their internal combustion counterparts, resemble more of a smartphone on wheels. They require an operating system (just like smartphones), which not only helps interact with the user but also controls all systems and subsystems of the EV from the drivetrain, battery management system, motor control unit



etc., the Lithium-ion battery, which is the most crucial part of the vehicle, determines both the cost and range of the vehicle.

In every survey conducted, range is the top reason that consumers and business would consider before buying an electric vehicle. This is known as range anxiety. While advancements in battery technology will continue to chip away at this problem, there is one technology that can help alleviate some of this anxiety: Telematics and IOT. It can also help in solving some of the current transpiration, mobility and safety challenges that we face today.

Telematics collects information and data from the vehicles systems and subsystems like location, speed, pedal positions, G-forces, state of charge, battery health, range, distance to empty etc., and relays this information to the cloud using cellular and satellite connectivity. This data is sliced and diced into meaningful information and is presented to the vehicle owner and/or an authorized third party, like service stations or insurance providers to action upon.

For example: Specific data from the vehicles could be sent to the government and civic bodies of locations of bad roads, pot holes and constant bottlenecks that are causing traffic jams. This data can be captured from the vehicles G-sensor, GPS and speedometer and can be relayed to them under the smart city initiatives. They would be able to leverage this data to make better decisions on road infrastructure, maintenance and upgrades. As a result, they could spend their budgets more effectively while improving safety and contribute positively to the environment as vehicles would spend less time idling in traffic jams.

Data is the new oil & Information is power:

During the industrial revolution, oil was the fuel to propel our technological aspiration and advancements, similarly data will be the new catalyst to propel us through the Digital Revolution.

India is a highly populated and diverse country, with one of the world's fastest growing automotive markets and still possess immense untapped potential. India will generate more data than most countries, which can be leveraged to develop more accurate region- specific applications as a country.

There are several ways the government

can leverage telematics to help consumers and business transition to EVs. One of which is to setup public charging infrastructure for the EVs. Currently there are very few public charging stations which exacerbates the range problem as EV owners worry about not being able to find charging stations as they run of charge. The data on vehicle movement can help the government and businesses setup charge station at appropriate points across the city to help alleviate the range anxiety problem.

Telematics for instance, could help in real time to identify when an EV has finished charging and also help predict the availability of slots at charging stations based on the EV load and schedule. They can send out real time notifications to vehicles in the area, and route those EVs with range exposure to the nearest charging/swapping stations. As a result, you can better optimize the use of limited charging stations. Giving real time information to EV owners on how much charge they would need to travel certain distances can end up being very crucial information so no one vehicle is taking up a spot for too long. We at Intellicar are acting as trailblazers to address these very problems using telematics and IOT. With a state-of-the-art hardware and software, using the data generated from these vehicles, we can connect the vehicles to their owners, provide them with actionable information and insights to help them make better decisions, and more importantly, connect them to the entire ecosystem (Finance companies, insurance companies, charge stations, OEMs, service centers) to provide various value-added services in real time and more effectively.

If finding charging stations becomes less of a concern, mobility companies such as taxi operators and delivery companies will be more likely to transition to EVs as both operational and maintenance costs are significantly lower than internal

combustions engines. They can use telematics to track state of charge and distance to empty of the vehicles in their fleet and use that information to better manage their operations, helping dispatchers and by automating dispatch systems, to make informed decisions, such as identifying vehicles which have enough charge to make certain routes and back.

Telematics enables fleet owners to track battery health in real-time. This enables them to make decisions on which batteries are no longer able to hold charge and have reached end of life, or batteries that are running hot, enabling them to replace them before breaking down or causing operational roadblocks. We can also build historical databases to identify which batteries performed best in certain conditions to make better buying decisions. This information is also very useful to battery OEMs to aid them in making faster advancements in battery technology. Telematics is also extremely crucial in making advancements and in monitoring battery safety.

The sharing of anonymized & aggregated data can create a larger value across the entire ecosystem. For example, sharing of anonymized data can help identify where charging stations should be added and also help electricity companies identify where infrastructure should be upgraded. Anonymized data sharing can help accelerate the worlds transition to more sustainable and greener forms of mobility.

India as a country is known to be ingenious and we find our unique ways to innovate. The data we generate will only act as a catalyst to accelerate our capacity to build more affordable and world class EVs in the country, for the country and for the world! This, in essence, is the true power of data and telematics is the foundation of connecting this data.□

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Karan Makhija is an automotive engineer and comes with vast and diverse experience during his initial part of his career working with Ashok Leyland and Nissan in a JV, Jaguar Land Rover and Garret turbochargers and also a brief management consulting stint with Accenture focusing towards innovation and product development in the automotive sector. He has also founded Intellicar in 2015.



Tata Nexon EV Max

Tata Motors launched the new Nexon EV MAX, at starting price of INR 17.74 lakh (ex-showroom All India). With this launch, Tata Motors is taking the lead in expanding the appeal of electric vehicles and expanding the market with a new offering for customers.





SPECIFICATIONS

Safety Features:

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

Engine & Transmission:

- ◆ Fuel Type – Electric
- ◆ Driving Range (Km) - 437
- ◆ Drivetrain – FWD
- ◆ Transmission - Automatic - 1 Gears, Sport Mode
- ◆ Emission Standard – BS6
- ◆ Battery - 40.5 kWh, Lithium Ion, Battery Placed Under Floor Pan
- ◆ Battery Charging - 6.5 Hrs @ 220 Volt
- ◆ Electric Motor - 1 Permanent magnet synchronous Placed At Front Axle
- ◆ Regenerative Braking, Pure Electric Driving Mode

Braking & Traction:

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

- ◆ Electronic Stability Program (ESP)
- ◆ Hill Hold Control
- ◆ Traction Control System (TC/TCS)
- ◆ Hill Descent Control

Locks & Security Features:

- ◆ Engine immobilizer
- ◆ Central Locking - Remote
- ◆ 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 Car Light Flashing & Honking Via app

Entertainment, Information & Communication Features:

- ◆ Smart Connectivity - Android Auto, Apple Car Play

- ◆ Touch-screen Display
- ◆ Integrated (in-dash) Music System
- ◆ 6+ Speakers
- ◆ Steering mounted controls
- ◆ GPS Navigation System
- ◆ Bluetooth Compatibility (Phone & Audio Streaming)
- ◆ USB Compatibility
- ◆ Aux Compatibility
- ◆ AM/FM Radio
- ◆ Wireless Charger
- ◆ Voice Command
- ◆ iPod Compatibility

Instrumentation:

- ◆ Instantaneous Consumption
- ◆ 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
- ◆ Digital – Tachometer

Honda City eHEV

Honda Cars India Ltd. unveiled New City eHEV, India's Supreme Electric Hybrid. The eHEV technology supports real driving performance while achieving amazing fuel economy and low emissions.





SPECIFICATIONS

Safety Features:

- ◆ Overspeed Warning - 1 beep over 80kmph, Continuous beeps over 120kmph
- ◆ Lane Departure Warning
- ◆ High-beam Assist
- ◆ Lane Departure Prevention
- ◆ 6 Airbags (Driver, Passenger, 2 Curtain, Driver Side, Front Passenger Side)
- ◆ Middle rear three-point seatbelt
- ◆ Middle Rear Head Rest
- ◆ Tyre Pressure Monitoring System (TPMS)
- ◆ Child Seat Anchor Points
- ◆ Seat Belt Warning

Entertainment, Information & Communication Features:

- ◆ Smart Connectivity - Android Auto, Apple Car Play
- ◆ Touch-screen Display
- ◆ Integrated (in-dash) Music System
- ◆ 6+ Speakers
- ◆ Steering mounted controls
- ◆ GPS Navigation System
- ◆ Bluetooth Compatibility (Phone & Audio Streaming)
- ◆ USB Compatibility

- ◆ Aux Compatibility
- ◆ AM/FM Radio
- ◆ Voice Command
- ◆ iPod Compatibility

Engine & Transmission:

- ◆ Fuel Type - Hybrid (Electric + Petrol)
- ◆ Max Power - 97 bhp @ 5600 rpm
- ◆ Max Torque - 127 Nm @ 4500 rpm
- ◆ Drivetrain - FWD
- ◆ Transmission - Automatic (e-CVT) - CVT Gears, Paddle Shift, Sport Mode
- ◆ Emission Standard - BS6
- ◆ Battery - Lithium Ion, 172.8 Volt
- ◆ Regenerative Braking, Idle Start/Stop

Locks & Security Features:

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

Braking & Traction:

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

- ◆ Electronic Stability Program (ESP)
- ◆ Hill Hold Control
- ◆ Traction Control System (TC/TCS)

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 Car Light Flashing & Honking Via app
- ◆ Alexa Compatibility

Instrumentation:

- ◆ Instantaneous Consumption
- ◆ 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
- ◆ Analogue - Tachometer

Opportunities And Challenges For The Growth Of Connected Mobility In India

 **ANUJ CHANDNA**
EY Global Delivery Services

Imagine a scenario where you are driving on a foggy winter morning, and you get a (voice-based) warning notification from your car regarding a vehicle pile-up ahead, and a potential crash is averted. While this may sound unrealistic to most of us right now, this, beyond doubt, would be among the vehicle features in a not-so-distant future. It is a widely known fact that over 90% of road accidents are attributable to human error. Connected mobility is likely to transform this and make road travel much safer. The full potential of the modern-day safety features depends on how information is shared among stakeholders. And connected cars boast of the capabilities to efficiently disseminate such information in milliseconds.

There was a time when people bought cars just to move from point A to B safely, conveniently, and economically with very few available models to choose from. Then came the next generation, when the availability of options became plenty, and OEMs started to differentiate themselves based on engine technology and capability, horsepower and speed, fuel efficiency, braking, and other safety features. While all these aspects are still important, how OEMs differentiate themselves and customers choose cars will not be the same in the coming years. Connectivity features are set to redefine our relationships with our cars. The rise of 'Apps' turned cell phones into versatile devices with unimaginable capabilities. In the same way, the car connectivity features could be disruptive. Personalization and focus on the consumer are expected to revolutionize product manufacturing.

Technology is evolving rapidly, and the internet has changed the way people communicate or handle their day-to-day

tasks. The world is 'connected,' and answers to the most difficult questions can now be found on the internet. Why would cars not do the same when almost everything is connected through the internet?

The government mandates regarding connected technology in vehicles are further driving this change. The Indian government (through AIS140) has mandated connected services (including vehicle tracking and emergency buttons) for all public service vehicles, including public, private taxis, and buses. This has also boosted connected mobility, at least for commercial fleets. This space will likely see more regulatory action given that road accidents kill more than 325[1] people every day in India, and traffic congestion costs the economy 1.44 lakh crores[2] in just four metropolitan Indian cities - Delhi, Mumbai, Bangalore, and Kolkata. It is indeed a frightening statistic that India tops the world with 11% of global deaths in road accidents[3]. Connected mobility presents an enormous opportunity to prevent accidents and reduce fuel consumption and delays during daily commutes.

A new future for the Auto industry

With intelligent automation enabling new entrants to sense the opportunity and make fast moves to tap the potential, a new future is being written for the industry. Companies that have spent decades perfecting the art of vehicle production are also reinventing themselves. Automakers have been rolling-out connected car offerings to Indian consumers for some time. These connected features/technologies are positioned as differentiators.

In the last year, there has been an increase in the launch of SIM card embedded cars.

While earlier this was limited to premium vehicles, embedded connected mobility is quickly permeating down to the economy segment vehicles. However, overall, the connected car market is still in its nascent stage in India and is expected to grow faster as industry participants look to tap the enormous potential. The trend toward vehicle electrification further provides a boost to connected mobility and will remain one of the key drivers in the mid to long term.

OEMs current connected car offerings in the mass market could be categorized into the following three broad buckets:

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

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

Safety and security - SOS SMS to emergency contact in case of accident and remote immobilisation when car is stolen

Key challenges and risks

While the connected car market in the country is poised for solid growth over the next few years, a few areas (provided below) could impede its growth.

Cybersecurity: While car connectivity has significant advantages, there is also a flip side. As connected cars generate an increasing amount of data exchanged, processed, and stored, it leads to a potential rise in the number of attack vectors. As a result, our personal, financial, and car data can attract hackers. In extreme scenarios, hackers could also gain access to and control the vehicle. Globally, security researchers have shown how cars could potentially be hacked remotely. Automakers in mature

markets such as the US, and Europe have launched bug bounty programs to be prepared against this threat. In summary, cybersecurity is the most important factor (especially since the Indian market is nascent), and a single breach can create fear in the mind of customers and reverse the growth of the connected mobility market.

Data privacy: The issue of data privacy has also not been adequately discussed and addressed yet. Customers' data is being shared with the car manufacturer and the mobile service provider. And currently, there's little or no clarity on whether the carrier (and, for that matter, even the car manufacturer) can or cannot share that data with external third parties for profit. In most cases, the automotive data is not encrypted and can be shared with third parties. For example, data on media content we consume in the car could potentially be shared with e-commerce players, enabling targeted advertising on our digital devices.

Reliable network coverage: Another significant challenge for automakers is achieving reliable connectivity. Maintaining broader coverage, state-of-the-art connectivity, and network security are challenging and require an excellent understanding and long-standing relationship between Automakers and Mobile Network Operators (MNOs). A slight lag or smallest lapse in connectivity services can ruin the customer experience and could potentially lead to inappropriate judgment in case of emergencies.

Global semi-conductor shortage: Supply chain issues, including the semi-conductor shortage, has dealt a big blow to the auto industry. We are seeing a situation where manufacturers and tier 1 suppliers have to do with what they have rather than develop what they need or, most importantly, what consumers want. In some cases, automakers have been forced to ship out cars without some of the connectivity and other technology features.

Considerations for industry stakeholders

While connected mobility offers numerous opportunities, the journey is fraught with several challenges. So, what are the key ingredients of success or significant considerations that could support the wider adoption of connected mobility services in our country?

Change in mindset – focus on software-driven innovation: Despite a huge revenue generation opportunity for the industry, various studies have shown that most Indian customers are still not aware or ready to pay extra for the connected services. Currently, most connected services are provided for free for one to three years, followed by an option to renew the subscription. There are numerous customer complaints about the poor user interface, unsatisfactory customer experience due to non-intuitive and complicated apps, weak network connectivity, and lack of real-time vehicle information.

Automotive is a more than 100-year-old industry focused on products, hardware, production techniques, and operational efficiencies. However, automakers are lagging in merging the two worlds of hardware and software. The lack of new ways of working results in the development of connected services that are still not meeting the expectations of a broad customer base. Therefore, it is high time for the Auto industry participants to focus on software-driven innovation and services. The training of dealership sales and service personnel on connectivity and other tech features is also critical. The rise of connected, green, shared, and autonomous mobility leads to a tectonic shift in revenue and profit pools for the industry, and incumbents must evolve along with it.

Partnerships: For convergence themes such as connected mobility, automakers need to work with an 'Ecosystem Approach' rather than an auto-centric mindset. How automakers can stitch cross-sector partnerships (with players from Technology, Telecom, and Energy domains) is the key to offering a wholesome connected car experience to the customer. Many OEMs might still see the new automotive entrants as competitors. Depending on their strategy

and on a case-by-case basis, OEMs need to accept and work with new players as contributors to the connected services portfolio to gain a competitive advantage.

Focus on Indian consumer: India is a unique market, and we have often seen that the rules of thumb which work globally often do not work in the Indian context. Therefore, focusing on the needs and aspirations of the Indian consumer remains critically important. For example, a few automakers coming up with voice assistants interacting in local Indian languages (and accents) is a welcome move. Similarly, a focus on local apps and vernacular content could be helpful to drive further uptake.

User experience: Smartphones have become an integral part of our lives; thus, seamless car integration with the smartphone is essential. Rather than a debate on leveraging smartphones vs. cars for connectivity, the focus needs to shift toward how they can complement each other to improve user experience and help the driver remain focused on the road. The use of voice commands and physical buttons in the car rather than having to look at a smartphone every time will also help reduce driver distraction.

References:

- [1] National Crime Records Bureau data, annual 'Crime India' report for 2020, released September 2021
- [2] Report by Uber, "Unlocking Cities: The impact of ridesharing across India, released April 2018
- [3] World Bank report, released February 2021

The views reflected in this article are the views of the author and do not necessarily reflect the views of the global EY organization or its member firms. □

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Decoding Sensors in AD/ADAS

SAURABH CHATURVEDI & SANKALP SINHA

IBM Consulting

Growth in AD and ADAS Vehicles

Total economic impact of the Automotive Industry to the Global Economy is reported to be 3% of global GDP. In emerging markets like India and China it is around 7%. For a long time, cars and vehicles were about mobility, thrill of ride, status, and style. In past decade and a half, the automotive industry's imperative has changed drastically. The industry has become a hotbed of innovation, and creation of exciting products and solutions. The sectors that were not part of automotive ecosystems are now integral to it, for example, electronics, software, etc.

One of the key features that is driving innovation is Autonomous Driving; understood to be the situation where

that assist the drivers and that is known as Advanced Driver Assist System.

AD/ADAS market is expected to grow at a CAGR of approx. 70% to reach 6.9 million units by 2030. So far, the major use case for Autonomous Driving have been individual passenger cars, however there are several other applications envisioned for Autonomous Driving technology such as:

- Self-owned Passenger cars
- Trucking
- Taxi, Buses, Delivery Services
- Autonomous Flying
- Farming and Agriculture
- Construction and Mining
- Logistics
- Platooning

Today's AD/ADAS vehicles provide far more security than human driving.

There is an ongoing debate on the way

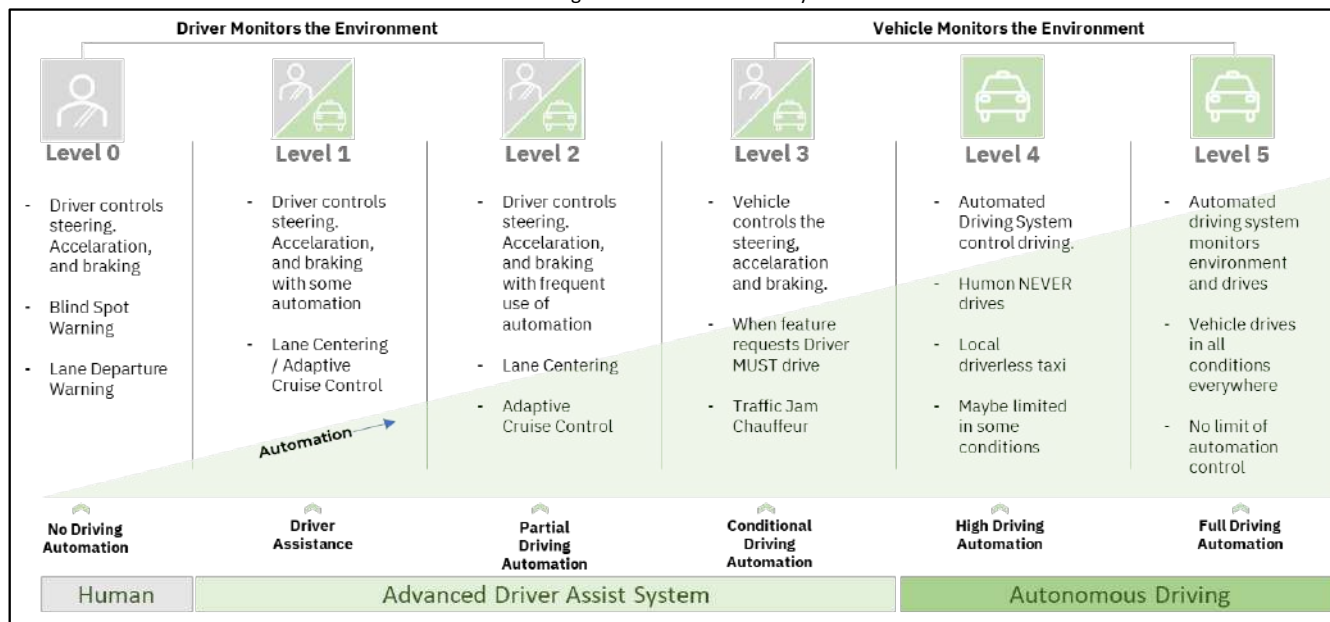
parking view. Major benefits of AD/ADAS technology across industry are:

- Safety. It is predicted that by 2050 when fully automated driving will be the preferred driving mode, there will be a drop in accidental deaths by 90%.
- Mobility to disabled and elderly persons.
- Better lane capacity utilization.
- Better Fuel economy.
- Reduction in emissions. Due to better driving behavior, and due to better lane capacity utilization emissions are estimated to be dropped by 60%.
- Accuracy and productivity benefits in industries like mining, agriculture, etc.

Level of Automations defined for Automated Driving

Globally accepted levels of automations

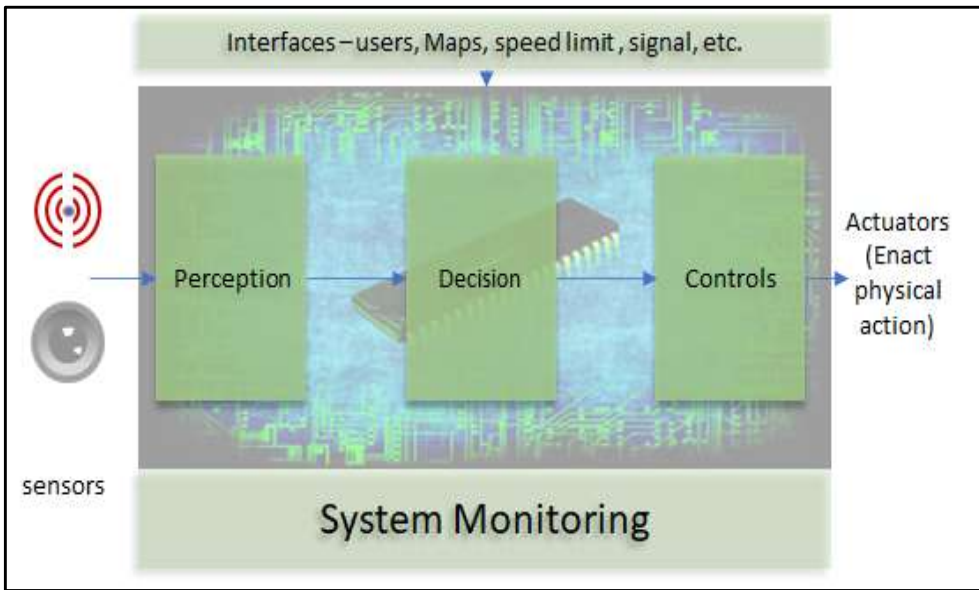
Level of Driving Automation described by SAE J3016



car fully drives itself in any conditions, anywhere. While it is not common yet, we already have several automation features

automation is implemented to keep it to the human limits or to extend beyond. Several luxury car OEMs are already providing features beyond human perception like rear

are defined by SAE which are used by OEMs, suppliers, and governments to have common understanding while advertising, designing, policy making etc.



the information and sends to the vehicle control system. The humans use only eyes and ears as major perception sensors, but the brain can process that information in many ways that only camera and mic in autonomous vehicles could not have. Here AI within drive processing comes in play.

There are different types of sensors used in ADAS primarily based on their strengths and weakness to provide input to the vehicles' perception layer under various conditions, at various speed of vehicles, speed of communication limits, reliability, ability to capture different parameters and at different distances.

Level of Driving Automation described by SAE J3016

Sensors in AD/ ADAS technology

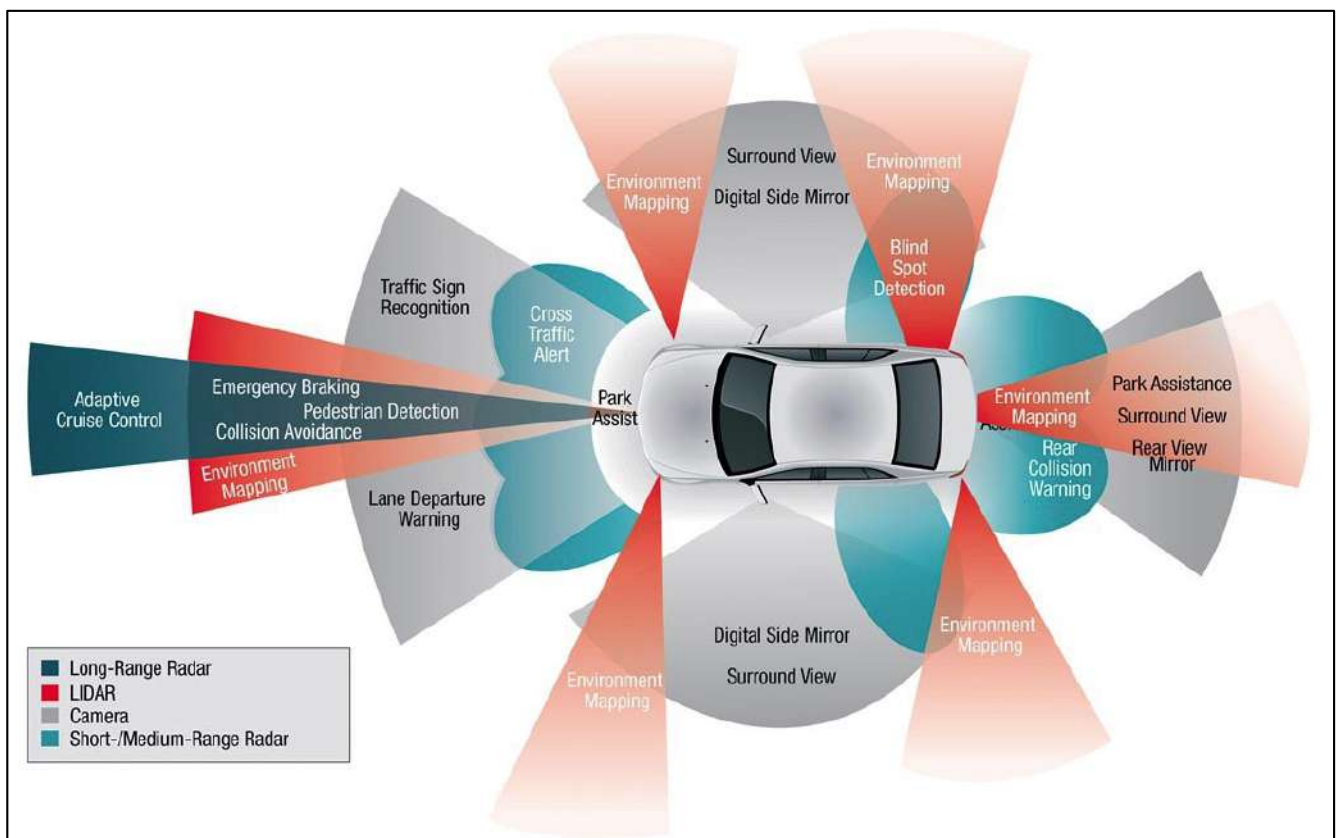
From sensors point of view, AD/ADAS technology is enabled by Perception and Reaction sensors. Reaction sensors like pressure sensors are the biggest gainer in terms of usage over the years and its market

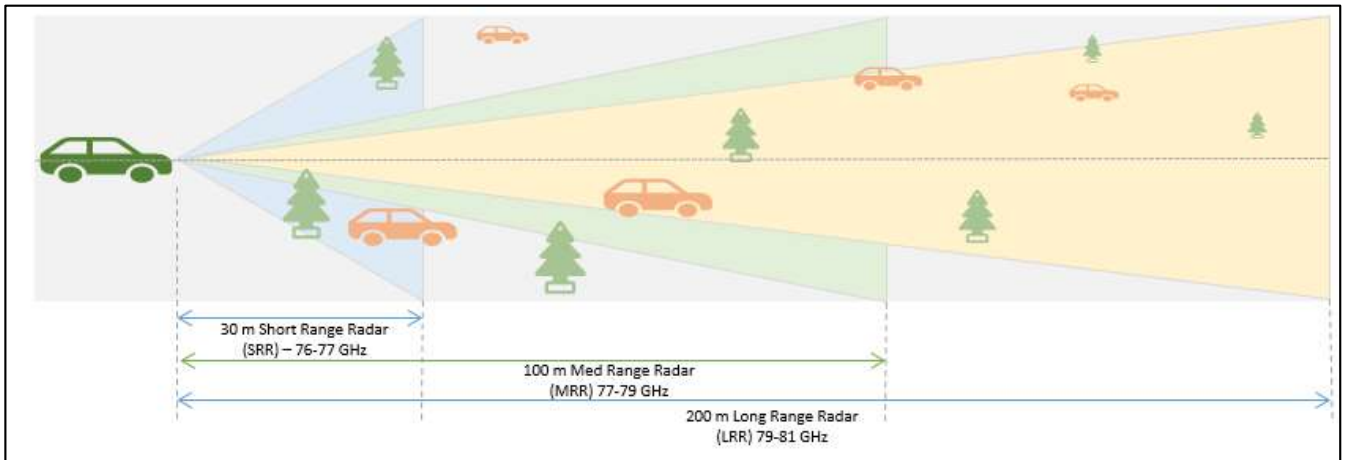
size is going to grow more than any other. These are actuators that enable action based on instruction from car's computing unit.

AD/ADAS's perception layer needs inputs of the environment around the car and it has been the biggest challenge to achieve during the development of the autonomous driving. These sensors provide environmental information around the car to the perception unit that combines

These are sensors based on the functions required in the AD/ADAS vehicles are

- Camera
- Long Range Radar
- LIDAR
- Short and Medium Range Radar/Sonars
- Other
 - GNSS
 - IMU





Sensors have advanced in their ability to gather information at speed, reliability, and accuracy over the years. Some OEMs focus on one type of Sensors then others. Also, Sensor Fusion, i.e. combining the data from all sensors and then computing the controls is continuously evolving. Artificial Intelligence has played a huge role in identifying the road conditions and interpreting them accurately. Distance of the objects from the vehicle plays the primary role in picking up the Sensor type utilized.

Tesla famously tends to depend on camera more based on their AI programming to accurately perceive the road conditions supported by Sensors. Their arguments have

been that Autonomous Vehicles only need sensors as much as humans can perceive after all that is all we do in a human driven car today. Use of advanced sensors however provides safer and sustainable driving

Radars are other set of sensors that are used extensively. Which ones can be used depends on distance, speed, overall architecture of interpretation and the goals of the Autonomous Driving.

Data collected by sensors is also being used for training machine learning models and development of better interpretation and handling the AD/ADAS system.

Ultrasound

Short range sensing can be done through

Sonar/Ultrasound sensors it is accurate and has small form factor and are relatively cheaper.

Radar

For medium range, AD/ADAS vehicles use Radar because Sonars cannot be used for navigation due to their short range. Radar however can be used widely for navigation, and they are not impacted by bad weather, fog, etc.

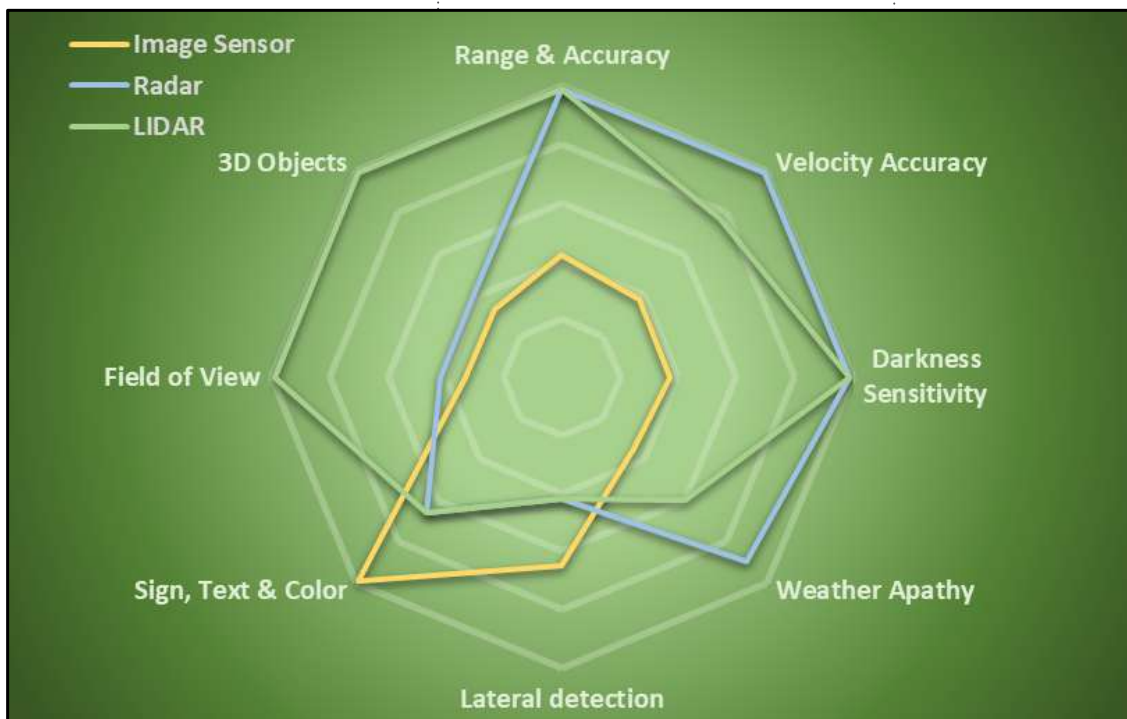
Camera

Camera is a natural choice for a sensor due to the parallel with the human eye. Practically, there are multiple cameras positioned at different places in the vehicle

and their inputs are combined to provide an overall image of the road. The image is labeled with the object identifiers like, pedestrians, sign boards, and other cars by the sensor perception unit of the AD/ADAS system.

LIDAR

LIDAR provides the highest range and 3-dimensional object recognition along with velocity and



Sensor types and their typical effectiveness

surface reflectivity with recent developments, but it is more expensive, and some OEMs have concerns that with LIDAR rain, dust etc. can cause interference. Nevertheless, LIDAR manufacturing companies and OEMs continue to have joint ventures and develop further as one of the most reliable sensors. Recent development in LIDAR is Solid State 5D technology that provides 3-dimensional position, velocity, and surface reflectivity which in turn provides highly accurate object identification at the vehicle's speeds of up to 500Km/h.

LIDAR is not impacted by darkness, sunlight etc. due to its reliance on the low intensity laser. It also means that LIDAR requires higher energy than other sensors. There are two types of LIDAR sensors used today, one that uses "Time of Flight" mechanism to identify the 3D location and velocity and the others are FMCW (Frequency Modulation Continuous Wave) that use solid state array.

Path of evolution for sensors

LIDAR is used by more OEMs today for AD/ADAS because of its accuracy, speed and details. It is however more expensive and larger in size despite reduction in size in recent times. Compute devices and platforms also need to modify every time there is a major advancement in sensor capability. Major computing platforms like NVIDIA Drive PX2, NVIDIA Drive AGX (SoC – System on a Chip), Texas Instruments TDA3x, Mobileye EyeQ5, Google TPU v3 are some of the computing hardware that utilize the sensor data.

Some factors are important to consider while predicting the future of sensors and their computing systems in AD/ADAS.

Cost

There is an additional cost to the consumer and OEM for AD/ADAS vehicles. In post COVID-19 era, the struggling supply chain, the reducing margins due to record high inflation, and the growing geo-political tensions are likely to increase cost burden to the car. On the positive side for sensors, electronics industry has been joining hands with Automotive and Automotive ancillaries. The joint ventures are still betting big on continuous innovation and scaled production to reduce cost to the car.

Cybersecurity & privacy

The amount of data sensors generated can go up to 4000 GB per day according to intel's reports. Controlling vehicles through data processing and computing has an inherent risk of cyberattacks. The impact can be from the data privacy to the serious take over of the vehicle control, especially in the uses like platooning.

Protecting investment from new disruptive tech

High additional cost and need for accuracy and efficiency in the ongoing early levels of automated vehicles is driving continuous innovation and changes to the sensors and sensor fusion industry. Every 6 months there is a new generation or new products announced and new JVs, mergers and acquisitions announced. To the Automotive OEMs keeping up with the tech during Product Lifecycles is going to be a constant challenge for a few more years to come.

Energy consumption

Sensors can cause direct and indirect energy consumption. In the times of EVs and FCEVs (Fuel Cell Electric Vehicles), economics of energy consumption becomes very important. To process 8k video, 5-7D Lidar, GPS, Radar data in real time the single SoC unit may need to deliver up to 320 trillion operations per second and can only be optimized up to 500 watts.



Social and government posture

Alliance for Automotive Innovation in the USA recently released a recommendation to the Department of Transport focused on Autonomous driving. The recommended law modification proposed to consider scenarios in which there may not a driver in the car. Similarly, the human drivers need to evolve to understand how to deal with a car without drivers and in some cases even without any human passengers. Industries like transportation, insurance, emergency service providers will need to extend their thinking to handle the autonomous cars on the road and also to standardize data points to process claims, provide service etc.

Summary

Only a few decades back, it was impossible to imagine that Cars driving themselves is even a possibility. There are L4 cars on the road. ADAS has already changed the way consumers look at driving. It does have challenges from regulation, cost, electronics and other dependent industries.

Despite all its challenges, there is no stopping AD/ADAS adoption to the higher levels of automation. The higher level of automated vehicles will continue to drive the innovation and exciting product roll-outs in the market. Sensors market is flooded with startups and new age companies and over time some have been acquired by big tech and auto companies as well. Global sensors market is likely to grow by around 7% CAGR between 2021-2028 and it would mean that economy and innovation around it is not relenting any time soon!

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MAPPING CITIES TO POWER AUTONOMOUS MOBILITY

▲ SIDDHARTHA BAL
iMerit

Imagine self-driving cars in a city like Mumbai. They would have to be intelligent enough to navigate through the eternally busy streets. And, to navigate right, these vehicles would need data —lots of it.

This data usually comes in the form of detailed maps that can be interpreted by sensors and onboard computers. These maps are the Rosetta Stone for autonomous vehicles and are one of the most important aspects of the whole equation.

Mapping is key to autonomy

Self-driving vehicles are technology-enabled smart machines. They struggle to understand the nuances of driving, unlike humans. Understanding local rules, location-wise norms, signages in different languages (especially in India) and local symbols that may vary from place to place may be difficult for artificial intelligence (AI) systems to keep up with. A human, even if new to a place, will have the intelligence to build an understanding of local traffic laws or the ability to deconstruct a sign that says: *“On odd dates, park on the left. On even dates, park on the right.”* But this could be difficult for the current technology to comprehend and act on in real time.

For self-driving cars to navigate without hindrances, it is important for technology developers to map the world's roads as a blueprint. The idea is to build high-definition maps with all the information in advance. This way, self-driving vehicles can know the common signs and symbols, thus reducing the reliance on computer vision systems to detect the sign or symbol, understand it and act accordingly on the go. Such high-definition data and information will boost accuracy and reduce dependency

on real-time processes for better navigation. It will not only help build trust for self-driving vehicles in public, but also aid in securing regulatory approval to bring this technology on the road soon.

Enabling mapping – process, opportunities, challenges

For an autonomous vehicle, our traditional maps are insufficient. For a self-driving car, a map has to give a lot more detail – for example, the height of a speed breaker, distance of the pavement from the driving lane, width of the road, exact location of a traffic light, etc. This needs a completely different way of mapping cities, and it requires a lot of data collection to make it into a meaningful piece of information for the autonomous system.

For example, if we were to create a map for a self-driving car to be used in Mumbai, we would build a detailed picture of what is around using sensors and cameras. As the car drives through the city, laser pulses would create a three-dimensional picture of Mumbai. Through this, the car would determine the distance between locations and between two speed breakers, and dimensions of other road features based on the amount of time required for the light beam to bounce back to the sensors. This data is turned into useful information by the mapping and tracking team to categorise vital features on the road, such as intersections and traffic signals, tolls, school signs and many more.

This high level of detail assists the car to exactly know its position and navigate with higher accuracy. As it autonomously navigates the streets, smart software can help it to match the built maps with real-time data captured by the car. This also

reduces dependency on technologies such as GPS or conventional maps to navigate. This further allows the car to concentrate on moving pedestrians, animals, other vehicles, construction zones, etc, and avoid accidents or risky situations.

However, our roads are ever-changing and thus self-driving cars need the ability to recognise real-time conditions and adjust accordingly. For example, in Mumbai, a self-driving car needs the ability to recognise signs of road or metro construction (work in progress, uniform of construction workers, written messages on a board) and understand that a road might be closed or diverted, so that an alternative path is identified.

To keep these maps updated, self-driving cars can send automatic reports of their journey to the mapping teams and feed in new elements or changes on the roads. These can be quickly updated into the system maps and the information can be shared with the autonomous fleet which is on the road. Similarly, a connected car (a vehicle equipped with internet access) can gather data on its journey and share the same with other connected cars and update them in real-time. This way, the fleet of self-driving cars can learn of new information and update the same in their systems to navigate better. Some ride sharing companies are using this method to update navigation maps for their fleet and improve the transit for travellers.

MobilEye, an Israel-based company, is the world's largest supplier of advanced driver assistance systems (ADAS). These systems use an array of sensors such as cameras, radar or lidar and an advanced computer chip to power the safety features that, for example, beep when a driver is about to back into a wall or automatically

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- 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

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- 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

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brake to avoid a crash. Of the roughly 100 million driver assistance systems on the road today, about 80% of them are built by MobilEye, which sells ADAS chips to more than 30 carmakers.

The company has been reported to test an early version of its software, which operates a fleet of robo taxis in Tokyo, Paris, Shanghai, and Detroit. Key to this effort is MobilEye's plan to map out traffic lights, crosswalks, and other key features of streets around the world, which the company believes will help it meet safe driving standards before other self-driving car developers.

Companies like Tesla, however, primarily rely on cameras, believing computer vision will improve enough within a few years so that AI can navigate roads by just using visual data from onboard cameras. This technology is nascent and requires further development.

Technology and approaches for mapping

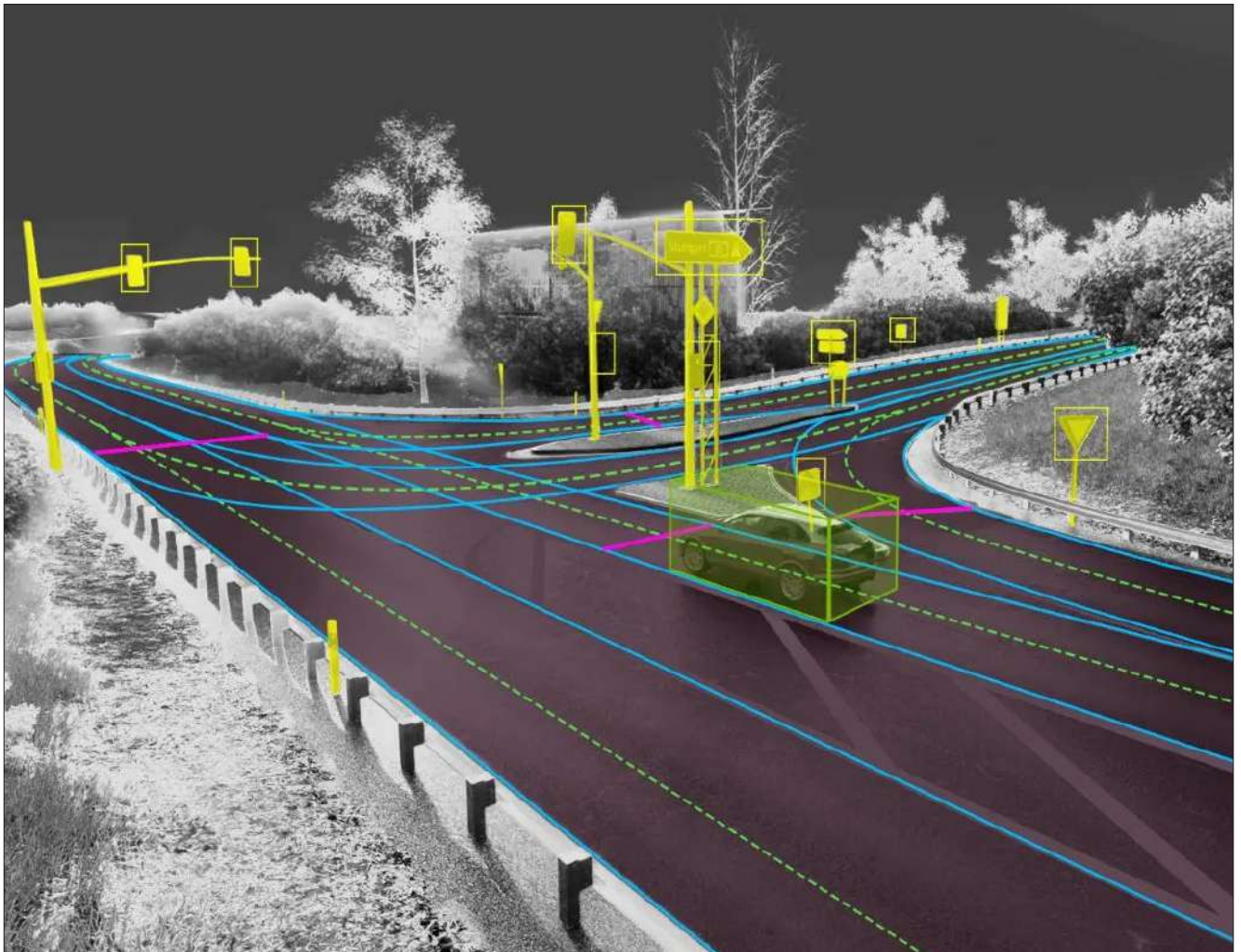
In March 2022, Nvidia launched a new mapping platform with a vision to provide the autonomous vehicle (AV) industry with ground truth mapping coverage of over 300,000 miles of roadway in North America, Europe, and Asia by 2024. The platform, Drive Map, is built to enable high levels of autonomous driving. Drive Map enhances the company's existing solutions for the industry.

Nvidia has also announced its next generation of Drive Hyperion, a sensor and compute self-driving toolkit used by automotive giants such as Mercedes, Volvo, JiDu, BYD and Lucid Motors to provide a variety of smart driving and advanced driving assistance features. Along with these, AV companies like TuSimple, WeRide, Zoox and DeepRoute.ai also use Nvidia's Drive Hyperion.

Drive Map provides centimetre-level

accuracy by combining DeepMap's (a high-definition mapping start-up acquired by Nvidia in 2021) accurate survey mapping with anonymous mapping data crowdsourced from all the vehicles that use Nvidia's Hyperion architecture. The mapping tool features three localisation layers — camera, lidar and radar — to provide the accuracy needed for autonomy.

All the data extracted from Nvidia customers is constantly uploaded to the cloud as vehicles drive. It is then gathered and stacked onto Nvidia's Omniverse, the company's open platform built for virtual collaboration and real-time physically accurate simulation to update the map so vehicles can achieve proper localisation. In the process, Nvidia can more quickly scale its mapping footprint. Additionally, Omniverse uses automated content generation tools to build a detailed map, which is then converted into a drivable simulation environment that can be used



NVIDIA's Drive Map using LIDAR point clouds for mapping

Photo Credit: Nvidia

with Nvidia Drive Sim, an end-to-end simulation platform for autonomous vehicles.

Another good example is Mapbox, a company founded in 2010. It provides a platform and software development kit that uses AI and augmented reality (AR) to overlay information on its maps. Mapbox then builds tools that allow developers to use its maps in their own services in a wide range of industries, including media, logistics, agriculture, government, real estate, and drones. It's being used for Snap Maps on Snapchat, the Weather Channel App, the Washington Post election results, and visualising data in Tableau.

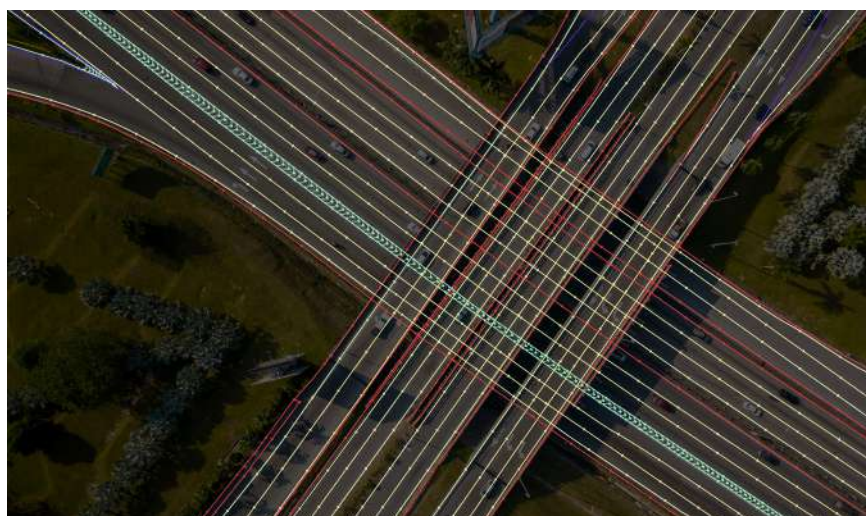
In addition to powering these third-party services, the maps collect and anonymise the data and feed it back to Mapbox's main platform. The company has more than 400 million map endpoints in use, gathering a constant stream of data to enrich those maps.

These companies proposing high-definition maps offer more ready-to-use solutions, but customers cannot self-edit or update the data as the maps are owned by the mapping companies. Furthermore, it is also a time-consuming process to update maps as customers depend on and wait for vendors to cover newer regions. For lack of a viable readymade option, many companies prefer to build their own maps. Ascending the process to generate large volumes of tremendously precise annotated map data creates the same challenges as scaling data pipelines for any other AI application.

Extending mapping capabilities to the skies

Most of the mapping is terrestrial but, with new technologies such as drones mapping, the techniques are being extended to the skies. These drones are capable of capturing ground data (geospatial data) to build maps of the ground below. However, a sky full of unmanned objects could pose a challenge. So, the need is to bring order and regulation up above.

Leading this evolution, AirMap, based in Santa Monica, California, has created an unmanned traffic management (UTM) platform for drones to help them navigate the complex regulatory and geographical challenges they encounter when flying. AirMap works by combining mapping technology with sophisticated databases



HD Maps to power autonomous driving applications

it has created of public regulations around drone use. These regulations could be especially complex and extremely specific. For example, limits on how close a drone can fly to a school means that a drone operator needs to know where every school in a region is located.

Need for human experts

Technologies like self-driving cars, drones, coupled with AI systems, are carrying out the mammoth task of collecting data and feeding intelligent systems to build maps for autonomous mobility. But they still need human assistance to learn and deploy functions efficiently. Humans are needed also to monitor and track processes such that the data is expertly processed, and edge cases are identified and solved quicker.

In the case of self-driving cars, the autonomous system lacks the human ability to understand certain nuances. For example, a self-driving car may not have the ability to judge a road blockage correctly. A temporary blockage due to a public procession or other reasons could be fed into a system as a permanent one. When a human is monitoring the data collected by cameras on a self-driving car, the human

can differentiate the blockage correctly and improve the systems mapping process. This way, companies can utilize human intelligence to avoid errors and unnecessary elements when mapping for autonomous vehicles.

For example, iMerit collaborates to deploy AI and machine learning in the computer vision, natural language processing and content services ecosystems by enriching, annotating and labelling data. The iMerit workforce extracts intelligence from remote sensing datasets such as satellite, aerial, and drone imagery to power the development of AI technology in mapping.

Mapping technologies and companies working towards building the most efficient tools are still exploring the right ways to build accurate maps of the world. However, the task is more challenging than one can imagine. With the advent of emerging technologies, we are entering an exciting time of experimentation with some of the smartest innovations ever to empower autonomous mobility. The day is not far off when self-driving cars will be the norm, safely navigating megacities like Mumbai. □

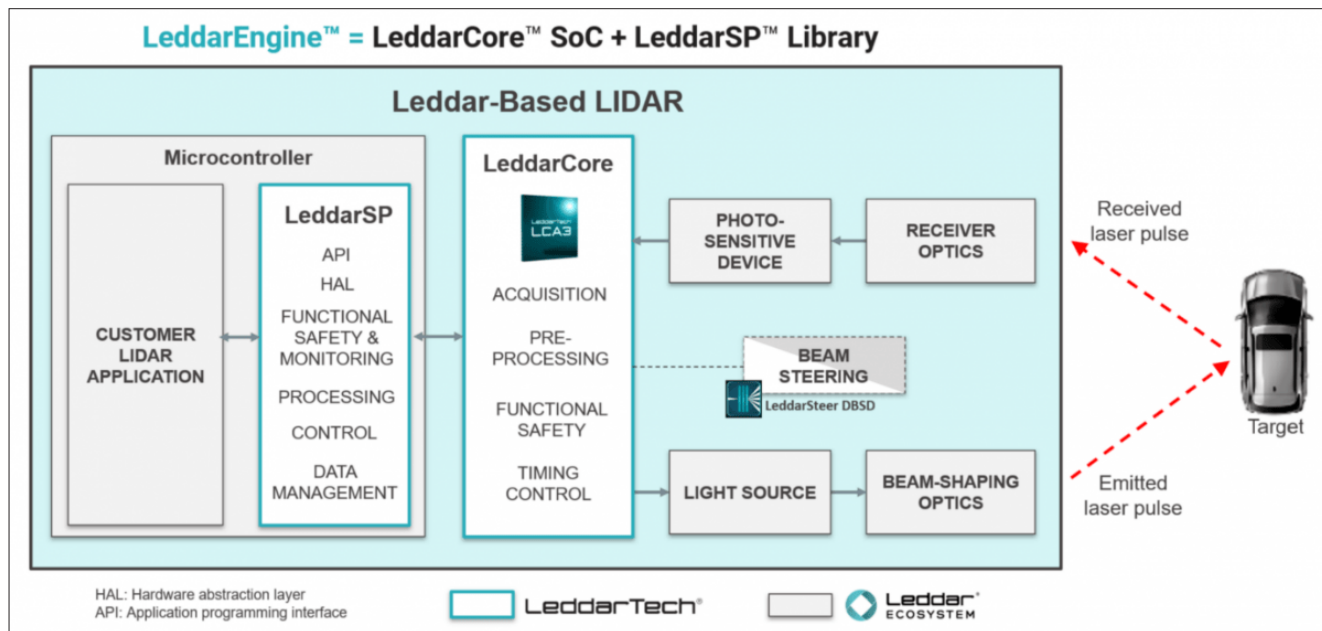
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SIDDHARTHA BAL
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iMerit

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



LeddarTech's flexible and modular LeddarEngine



LeddarTech® announced the availability of a completely new version of the LeddarEngine software to enable and accelerate LiDAR sensor development. The LeddarEngine sets a new standard for developing highly integrated and flexible solid-state LiDAR solutions optimized for high-volume production. This complete solution comprises the

LeddarCore™ LCA3 system on chip (SoC) and LeddarSP™ signal processing.

This new version specifically introduces several new integration tiers for the LeddarEngine software and compatibility with new hardware platforms. LeddarTech is introducing a separation of the control, signal processing and point-cloud processing, which can be used

independently or in combination, enabling customers to maintain greater control over their final solution.

LiDAR developers that presently have signal processing toolchains implemented for their current products will benefit from using only the control kernel for easier and faster integration of the LeddarCore into their next-generation products. Tier 1-2s, system integrators and new LiDAR makers will still benefit from the complete offering by leveraging LeddarTech's proprietary signal processing and expertise.

This version of the LeddarEngine is compatible with Xilinx Zynq UltraScale+ MPSoC, in addition to the already supported Renesas R-Car SoC.

Key Benefits

- Easier integration into existing architectures, enabling retrofit to improve cost, power consumption and size
- Enables Tier 1-2s and LiDAR makers to leverage existing signal processing toolchain and to develop their algorithms
- Support for new hardware platforms and easier porting to new operating systems
- Fully scalable and modular software offering available to accelerate development and time-to-market



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.



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Callcomm

TRACK | ANALYZE | OPTIMIZE

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SmartWitness launches KP2 dashcam

SENSATA Technologies announced that recently acquired SmartWitness is bringing modular flexibility to video telematics with its new KP2 dashcam. The KP2 is a compact road-facing camera with a snap-on driver-facing camera option that enables commercial fleets to add driver-facing video at any time with no wiring changes, no added installation cost, and no downtime.

KP2 includes a choice of real-time ADAS (Automatic Driver Assistance System) and DSM (driver state monitoring) features for accident prevention, plus cloud-based AI event analysis software that eliminates hours of time that is often wasted in reviewing false alerts of risky driving behavior.

Driver-facing now, later, or never: The KP2's modular design provides an easy upgrade path for fleets that want front-view video documentation in the event of an accident but are not yet ready to record driver behavior inside the cab. The camera can be purchased as a road-facing solution with or without driver-facing functionality. Later

if needed, the 1" x 1" snap-on driver-facing module can be added in seconds, eliminating the time and expense of adding a separate camera or replacing the entire system.

The KP2 can be installed in as little as 15 minutes by either a fleet technician or a professional installer, saving hours of deployment and associated costs. The base unit attaches to a windshield-mounted bracket, uses a mobile app and auto-calibration for setup and configuration, and connects to the vehicle's OBDII port. The driver-facing module can be added with plug-and-play ease. If repair or replacement is required, the entire device detaches from the bracket with no need to remove wiring from the initial installation or rewire the new or repaired unit.

Safety features with natural voice notifications: The KP2 offers a choice of real-time ADAS collision avoidance and DSM in-cab behavior detection features to help avert accidents. ADAS options include real-time tailgating, forward collision, solid lane departure and pedestrian presence

alerts, while DSM capabilities available with the driver-facing camera include fatigue, distraction and phone use. Real-time alert notifications are delivered in a choice of natural voices, audio beeps or chimes.

AI event analysis to reduce false alerts: Every KP2 deployment includes SmartWitness' cloud-based Artificial Intelligence Driving Events (AIDE) software, which significantly reduces erroneous reports of poor driving behavior by applying telematics data and a wide range of contextual factors to refine the results. Decreasing false positives limits the number of events requiring manual review by fleet managers and also reduces conflict with drivers unfairly flagged for safety violations.

The SmartWitness KP2 is a 4G/LTE camera that records HD video at up to 30 FPS per channel with a 140-degree forward-facing and 130-degree driver-facing field of vision, contains a 64GB SD card upgradable to 128 GB storage, and measures just 126mm x 82mm x 64mm including the driver-facing camera.



SYSTECH unveiled CAREU UW1, UA1 trackers and Intelli FleetWeb software



Construction & Mining Equipment tracking, ATMs Tracking etc.

Key Features of CAREU UA1:

- Data transmission through LTE / GPRS / EDGE, SMS, FTP, USSD
- Global band 4G LTE Cat.M1/NB1/2G version
- Built-in 3-axis accelerometer
- Detects harsh acceleration / harsh braking / impacts / Flip over
- Main tracker available with or without internal battery
- Take out the internal battery and add to the main unit up to 3 external NON rechargeable batteries to extend the life up to 6 years
- Rather go green? You can add 1 RECHARGEABLE battery to the main tracker and recharge it multiple times
- IP67 water and dust proof
- Monitors assets anywhere to increase theft protection
- Multiple easy installation methods
- IoT data logger
- Tamper detection through bottom on the base on the tracker
- Wireless configuration via Bluetooth
- FOTA firmware via FTP
- Small and compact size
- Optional Features
- Ambient light detection
- Ambient pressure detection
- Supports BLE 4.0
- Optional I/O cable connected to USB-C

Systems & Technology Corporation "SYSTECH" is IoT Solution provider in Taiwan. SYSTECH unveiled its CAREU UW1, UA1 trackers and Intelli FleetWeb fleet management platform software.

CAREU UW1 is a compact 4G GPS tracking device with water and dust resistance to withstand the harsh outdoor environment (IP 67), as well as a rich I/O interface that Supports fuel consumption sensor, temperature sensor and Driver's identification Sensors (RFID or i-Button). The main applications of the CAREU UW1 are for Logistics and Car sharing.

Key Features of CAREU UW1:

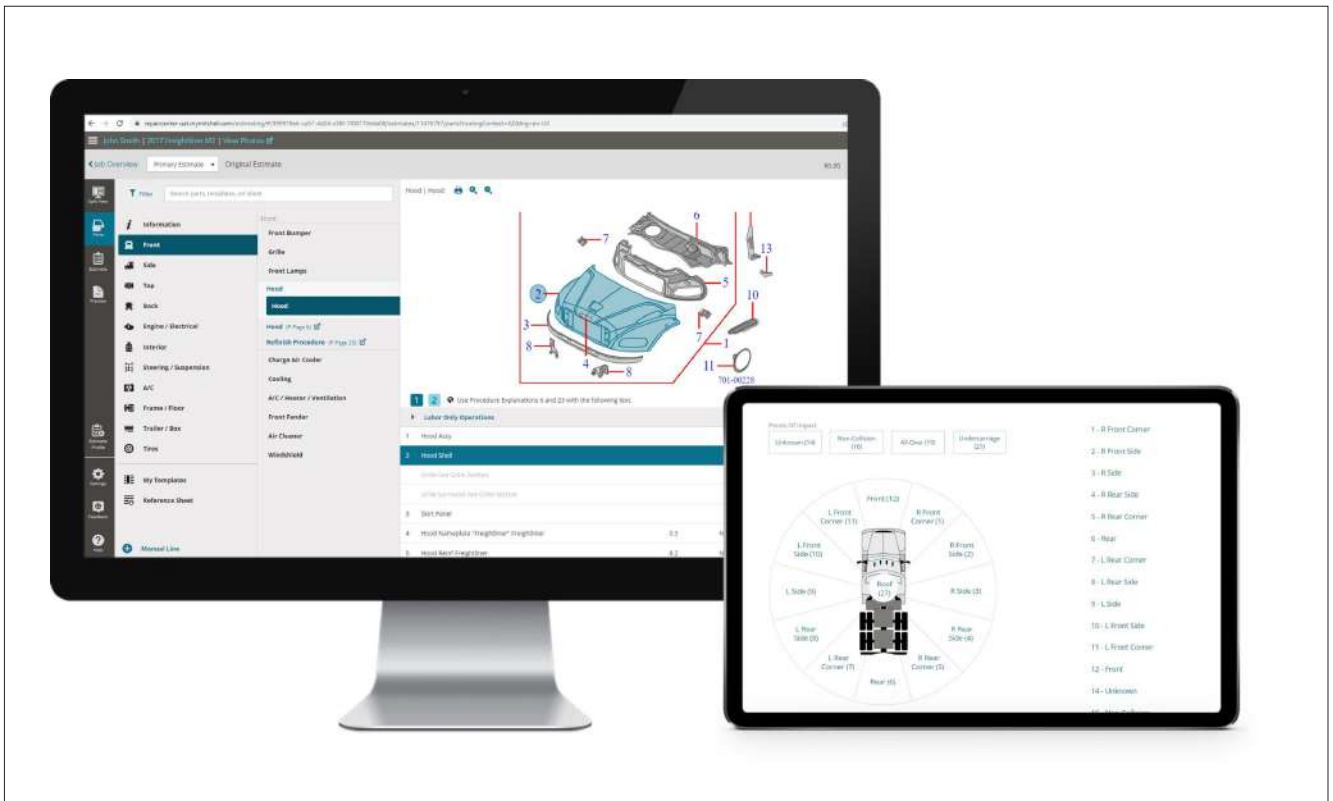
- IP67 waterproof casing
- Data transmission through LTE / UMTS / HSPA / GPRS / EDGE, SMS, FTP, USSD
- 4G / 3G / 2G networks (Middle East version available)
- Supports GPS / Glonass Satellite System
- Built-in 3-axis accelerometer

- Detects harsh acceleration / harsh braking / impact detection
- Supports 1-Wire® for temperature control and driver identification through i-Button
- Geofence report in circular and polygonal types
- Remote configuration or through USB cable
- FOTA firmware via FTP
- Power low / lost alarm
- GSM jamming detection
- Records up to 200,000 position logs
- Super deep-sleep mode saves battery power

Optional Features

- Built-in 6-axis accelerometer
- Harsh Driving Behavior Detection
- Harsh cornering detection / Flip over detection
- RS232 Interface
- CAN BUS Interface
- The main applications of the CAREU-UA1 are the Asset Tracking, Warehouse,





Mitchell introduces new commercial truck estimating solution

Mitchell introduced Mitchell Cloud Estimating TruckMax. The company's newest, cloud-based solution gives U.S. and Canadian carriers and repairers the ability to complete estimates on the best-selling medium- and heavy-duty trucks. Mitchell also expanded its coverage of motorcycles, ATVs and RUVs, providing the market with an essential special lines appraisal platform.

Mitchell Cloud Estimating TruckMax features integrated aftermarket parts pricing directly from suppliers. Its detailed exploded diagrams, in-house authored procedure pages, extensive labor data and intuitive paint refinish calculations are designed to streamline the estimating process. When combined with the company's photo-based appraisal technology, Mitchell Cloud Estimating TruckMax allows insurers to complete estimates virtually. This remote workflow can improve appraiser productivity by eliminating appointment drive time and leveraging photos of the collision damage in place of in-person inspections for low severity claims.

Cambridge Mobile Telematics expands DriveWell® platform to connected vehicles

Cambridge Mobile Telematics (CMT) announced the expansion of its AI-driven telematics platform, DriveWell®, to connected vehicles. The platform gathers sensor data from millions of IoT devices, including smartphones, proprietary Tags, dashcams, third-party devices — and now, connected vehicles with DriveWell Auto™ — and fuses them with contextual data to create a unified view of policy risk from driver and vehicle behavior. The normalization of driving data across disparate data sources provides auto insurers, automakers, rideshare, fleet, wireless, and safety companies an unparalleled, physics-based view into what's actually happening on the road and behind the wheel.

The addition of connected vehicle data to DriveWell® comes amid significant disruption in the auto insurance and automotive industries. IoT Analytics projects the total number of global IoT devices to surpass 27 billion by 2025. Analysts expect 7.2 billion active smartphones and over 400 million connected vehicles on the road in the same time period.

One Step GPS announces tracking one million vehicles by 2025

One Step GPS announces a new target of equipping 1 million vehicles with their GPS technology by 2025. The announcement made by the company comes just after receiving a place on the 2022 Inc 5000 Regionals Pacific list on March 15th. One Step GPS is channeling greater resources to become the first-choice GPS tracking software provider on the market, with keen focus on customer support.

One Step GPS specializes in software that provides real-time, live tracking features for vehicles. A user can access a wide variety of information like ETA on a particular vehicle and tracking its movement along the map. The software also records driving time, idle times, and 2 years of past driving history. It manages information and boasts an assortment of notifications in the form of 20 different alerts and 25 customizable reports for customers. Users of the software can sign up to get emails and text messages alerting them about risky driving practices, such as driving at odd hours or outside of the designated service region.

Cambridge Mobile Telematics introduces the next generation of telematics risk segmentation

Cambridge Mobile Telematics (CMT) announced Advanced Risk, a risk segmentation solution that delivers next-generation telematics variables. Auto insurers use Advanced Risk to derive proprietary insights from customer driving behavior. With Advanced Risk, insurers can analyze and measure driver risk using innovative new variables like Contextual Speed, Advanced Distraction, Compound Events, and more.

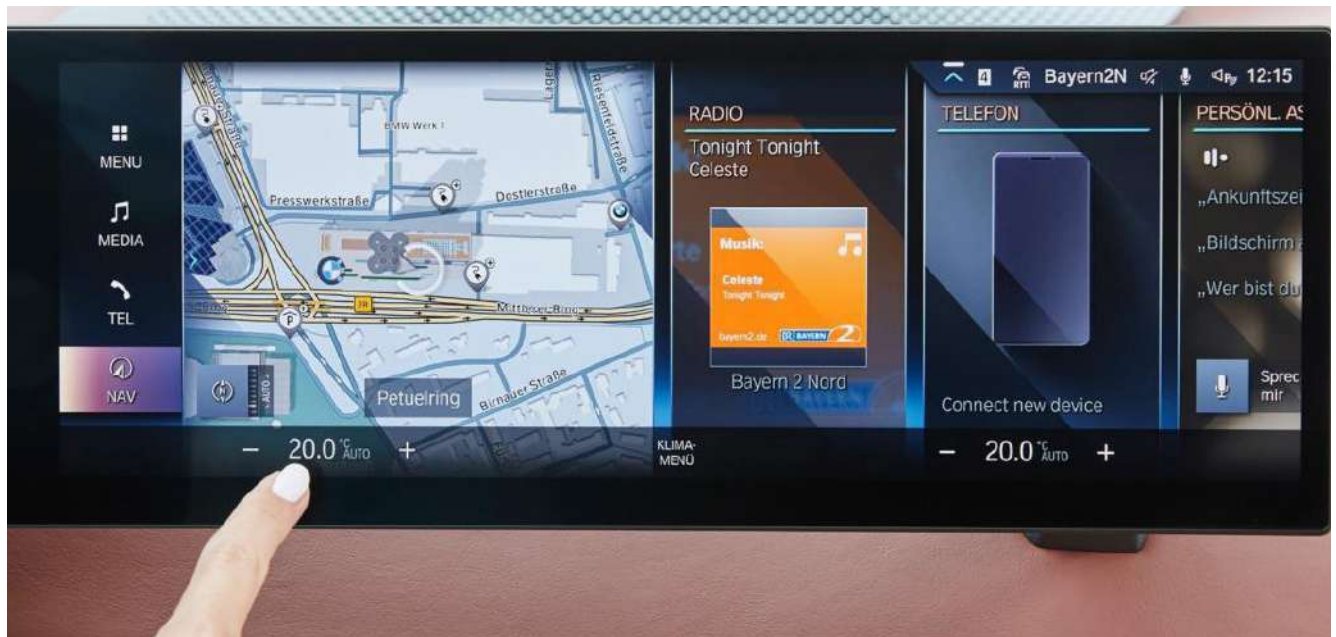
Advanced Risk gives auto insurers powerful new variables like Contextual Speed, Advanced Distraction Variables, and Compound Events:

- **Contextual Speed:** Contextual Speed, which CMT has patented, measures a driver's speed compared to historic speeds on a road segment. Speed distribution metrics for road segments are dynamically updated based on driver speeds across the CMT DriveWell® platform.
- **Advanced Distraction Variables:** Advanced Risk offers multiple dimensions of distraction, beyond phone motion and handheld and hands-free phone calls. For example, the Context Switching variable identifies distraction-induced acceleration and braking events.
- **Compound Events:** Advanced Risk includes new variables of overlapping events that generate the most value in a predictive risk model. Multiple combinations of risky events are available for carriers to test and analyze out of the box.

HERE powers BMW Maps with predictive routing

HERE Technologies announced its latest predictive routing capabilities are powering the innovative "Learning Navigation" feature of BMW Maps as part of the BMW Operating System 8.

HERE Predictive Routing gives in-car navigation an individual touch. The functionality learns an individual driver's mobility patterns to improve and personalize the driving experience. The system applies the lessons learned from analyzing mobility patterns to generate predictions for upcoming journeys, departure times, destinations, and routes. HERE Predictive Routing also actively monitors traffic conditions along regularly taken routes. Based on the up-to-date road conditions and traffic environment, it will automatically offer alternative routes or departure times.



HEADLINES

- Geotab and Utilimarc to provide best-in-class fleet BI solution for government and utility fleets
- TruTac provide compliance One-Stop Shop
- AES helps operators tackle mis-aligned HGVs with sustainable Josam solution
- TomTom's maps gain greater visual context from expanded agreement with Maxar
- Nationwide, Razor Tracking partner to boost fleet safety and efficiency
- Zurich chooses 12 startups to work together on the insurance of the future



Pony.ai receives a taxi license in China

Pony.ai announced it is the first and only autonomous driving (AD) company to obtain a taxi license in China. Pony.ai was awarded a permit to operate 100 autonomous vehicles as traditional taxis in Nansha, Guangzhou. In May, Pony.ai will start charging fares in the entire 800 square kilometers of Nansha with 100 robotaxis and intends to gradually expand the scale and scope of service to other areas of Guangzhou to benefit more residents. Passengers can hail rides and pay for the service through the PonyPilot+ App. While the Pony.ai robotaxi currently retains a safety driver, the company expects to remove the driver over the short to intermediate time frame.

This signals the Guangzhou government's formal implementation of AD mobility services similar to traditional taxi and ride-hailing platforms. The announcement reinforces Pony.ai's progress toward commercial autonomy: with the robotaxi fee-charging permit received in Beijing in November 2021,

Waymo offering driverless rides to San Francisco employees

Waymo confirmed that it has started giving employees driverless rides in San Francisco in a Jaguar i-Pace SUV. To date, the company has been testing autonomous vehicles, which work via Lidar sensors, with a safety driver.

Waymo also said that it would be expanding its testing operation to Downtown Phoenix, Arizona. Since 2020, the company has been using autonomous Chrysler Pacifica minivans with human back-ups to carry passengers in a 50-square mile area of suburban Phoenix.

Now the program will be extended to include rides for employees in a more central area, although safety drivers will still be present. The intent is to ultimately make driverless rides available to residents who join a "trusted tester" program, although there is no indication yet when Waymo might remove the human safety drivers from the service.

Nissan's in-development driver-assistance technology aims to dramatically enhance collision avoidance



Nissan announced a new driver-assistance technology, which is currently in-development, that utilizes highly accurate, real-time information about the vehicle's surrounding environment to dramatically enhance collision avoidance. At a Nissan facility here, a test vehicle was used to demonstrate how this technology can automatically perform collision-avoidance maneuvers.

Nissan's "ground truth perception" technology fuses information from next-generation high-performance LIDAR, radar and cameras. The technology can detect the shape and distance of

objects, as well as the structure of the area surrounding the vehicle, in real time with a high degree of accuracy. Utilizing this information, it is possible for the vehicle to instantly analyze the current situation, judge and automatically perform required collision-avoidance operations. This technology can also detect slowed traffic and road obstacles in the distance and execute lane changes accordingly. Importantly, the technology can also provide increased support to drivers in areas where detailed map information is not available.

HEADLINES

- Senmiao Technology launches ride-hailing platform in four additional cities
- Waymo offering driverless rides to San Francisco employees
- Pony.ai becomes the first autonomous driving company to receive a taxi license in China
- Magna's new Slovakia facility to support growing ADAS and electrification market
- Baidu wins first driverless permits in China for autonomous ride hailing services on public roads



A brainwave technology from Hyundai Mobis proven to reduce drowsiness and inattentive driving by up to 1/3

Hyundai Mobis, together with the Gyeonggi Research Institute, announced on March 18 the results of an analysis on the practical effects of "M.Brain," which has been applied on Gyeonggi-do public buses as a pilot project for the past year. M.Brain is a driver monitoring system that uses brain waves and was first developed by Hyundai Mobis last year.

As a result of the pilot application, it was demonstrated that drivers who put on M.Brain showed higher concentration levels and were less exposed to the dangers of being inattentive. M.Brain is a technology that grasps the driver's condition in real time by monitoring the brain waves around the ears through a pair of earsets the user wears. When a driver becomes inattentive, M.Brain uses visual, sound, and haptic alerts to help the driver recover his/her attention.

Cyngn launches DriveMod Kit, a fully-equipped autonomous vehicle hardware integration module

Cyngn announced the official launch of DriveMod Kit, an autonomous vehicle solution for which Cyngn filed a patent in February 2022. Containing all the advanced sensors and hardware components needed for AV technology integration, DriveMod Kit is designed to streamline retrofitting of existing industrial vehicles or simplify integration onto newly manufactured vehicles. By eliminating traditional barriers to autonomous vehicle adoption, such as high costs and complex installations, DriveMod Kit will facilitate rapid adoption of autonomous vehicles across a wide range of industrial and commercial domains.

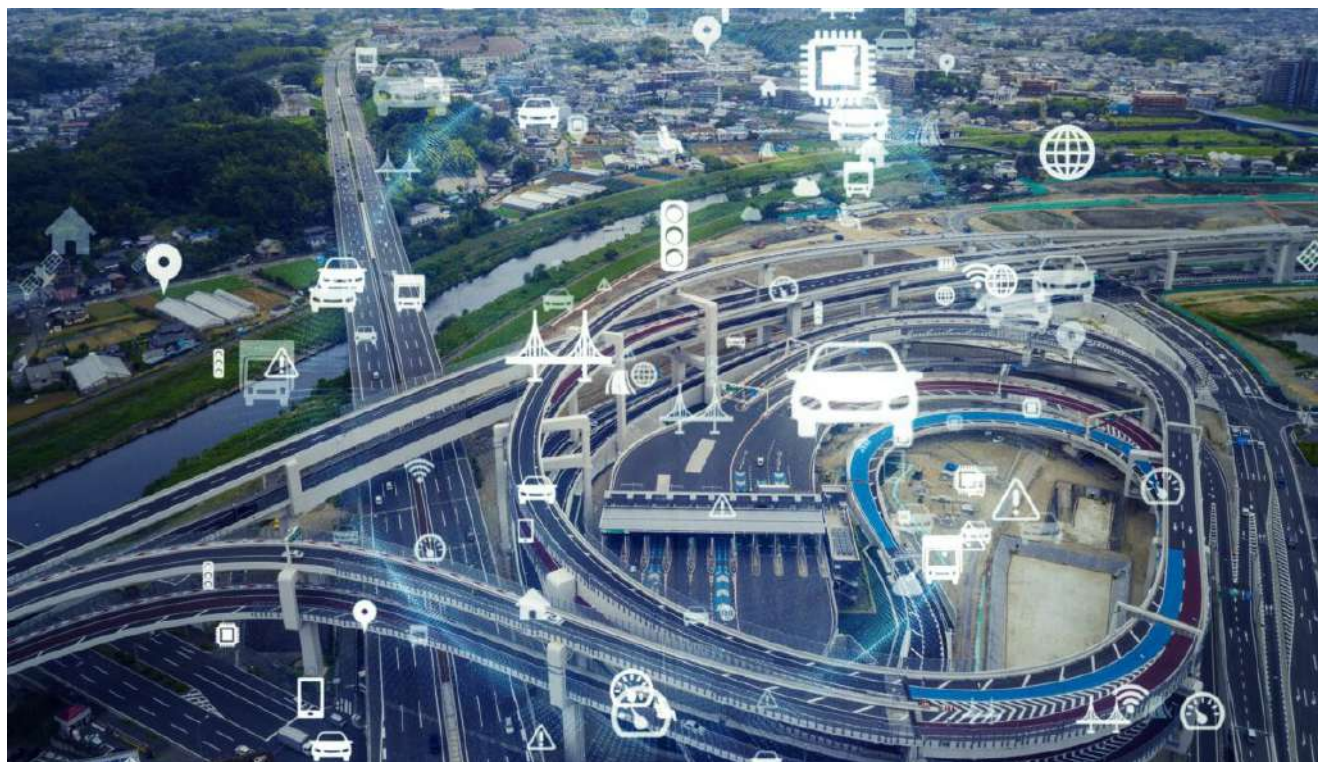
Partnering with Columbia Vehicle Group, Cyngn originally developed DriveMod Kit as an efficient AV integration package for Columbia's Stockchaser vehicles. The kit technology can easily be adapted to fit other industrial vehicles.



Baidu wins first driverless permits in China for autonomous ride hailing services on public roads

Baidu, Inc. received the first-ever permits in China authorizing the company to provide driverless ride-hailing services to the public on open roads in Beijing. This regulatory approval marks a significant milestone for the autonomous ride-hailing industry in China, indicating a regulatory openness to taking a further step toward a fully driverless mobility future.

With these permits issued by the head office of the Beijing High-level Automated Driving Demonstration Area (BJHAD), ten autonomous vehicles without drivers behind the steering wheel will offer rides to passengers in a designated area of 60 square kilometers in Beijing. These licensed cars will join an existing fleet provided by Apollo Go, Baidu's autonomous ride-hailing service, in the capital city of China.



Live trial of 5G Connected Car Concept launches in Blacksburg, Virginia (VA)

On March 24th the Commonwealth of Virginia will host a live trial of new driver and pedestrian safety concept that allows near-real-time notification of roadway hazards through 5G and edge technologies. This trial is one of three conducted internationally by a historic public-private collaboration, organized by the 5G Automotive Association (SGAA) and eight member companies representing leading technology companies from around the globe. A related European live-trial was conducted in the city of Turin, Italy. The North American live trial will be conducted on the Virginia Smart Road operated by the Virginia Tech Transportation Institute in Blacksburg, VA. It is the first of its kind in North America.

5G transmission speeds and so-called “Edge” servers—locally installed, high-powered computers capable of running Artificial Intelligence programs—open the door to smart city technologies like near real-time traffic management and innumerable other business applications. The connected car concept uses this high-speed and Edge computing technology to communicate with car sensors and pedestrian smartphones, via a user-authorized mobile app—about traffic hazards, like accidents and road construction—for Pedestrian and in-vehicle driver safety and efficient navigation.

Vaisala provides Volkswagen Group with global infotainment weather service to enhance driver safety and experience worldwide

Vaisala announced the Volkswagen Group has integrated Vaisala’s top-of-the-line weather intelligence into its infotainment systems. This relationship further demonstrates the commitment of the companies to incorporate innovative and proven solutions to optimize safe driving experiences.

With Volkswagen Group brands Audi, Bentley, Porsche, Skoda and Volkswagen passenger cars utilizing Vaisala weather information. This information is now fully integrated into the Volkswagen Group’s in-vehicle digital experience allowing owners to easily discover precise weather insights to maximize convenience and support travel planning using the following weather service features:

- Hyper-local forecast and nowcast – Location-based weather feed provides detailed information for where you are and where you are going.
- Precipitation information – Drivers can see where rain or snow is falling to plan and adjust routes accordingly.
- Severe weather warnings – Helps drivers pre-empt local weather-related hazards with potential impact on their travels.



Global Certification Forum (GCF) and 5G-ACIA sign a cooperation agreement to explore industrial 5G certification needs

The Global Certification Forum (GCF) and the 5G Alliance for Connected Industries and Automation (5G-ACIA) – as a working group of ZVEI – Electro and Digital Industry Association – announce the signing of a cooperation agreement (COOP) to jointly investigate industrial 5G certification needs. This cooperation agreement brings together experts from operational technology (OT) companies and information and communication technology (ICT) companies with experts from the Global Certification Forum. It is the beginning of a collaboration to share information on Industrial IoT use cases and related requirements for testing and certification of 5G products. Another main goal of the COOP is to evaluate applicable testing and certification programs for 5G Industrial IoT products. Both parties are also interested in ensuring interoperable devices, networks, and services to enable the high-quality, reliable, and secure wireless communications required for industrial use cases in automation, factories, etc. worldwide.

HAAS Alert announces launch of connected work zone digital alerting powered by WZDx

HAAS Alert's Safety Cloud digital alerting platform now delivers real-time safety alerts from WZDx-compatible work zones to connected vehicles and infrastructure, the company announced. Using data feeds developed by state Departments of Transportation (DOT) and other authoritative roadway operators in compliance with the latest WZDx format, Safety Cloud is connected safety platform delivering advance work zone warnings to drivers on the road today using the vehicle's embedded capabilities.

Vehicles from Stellantis brands Chrysler, Dodge, Jeep, RAM, and Alfa Romeo equipped with Uconnect® are the first automobiles capable of receiving these safety alerts directly in the vehicle's infotainment screen. HAAS Alert expects additional connected vehicles to begin receiving these alerts later this year. In addition, drivers using Waze and Apple Maps will also receive alerts through Safety Cloud's integration with those platforms.



Mapbox delivers next-gen navigation enhancements in Toyota and Lexus vehicles

Toyota and Lexus are utilizing Mapbox's technology to deliver next generation navigation features. Mapbox launches in select Toyota and Lexus vehicles equipped with a next generation multimedia system developed by Toyota. It includes elevated navigation enhancements that are designed with meticulous attention to the end user experience and unlocks the ability to receive data and design updates over the air, enabling driver experiences to keep pace with the driver's evolving needs.

Mapbox worked closely with Toyota Motor North America and its affiliates to bring to market a driving experience that will exceed customer expectations. The Mapbox Maps software development kit incorporates a map design that complements Toyota's next-generation multimedia system, making turn-by-turn navigation intuitive for drivers. TMNA's designers are able to modify the look and feel of the navigation experience via Mapbox Studio, enabling map design updates to be rolled out to all vehicles instantaneously.

HEADLINES

- Vaisala provides Volkswagen Group with global infotainment weather service to enhance driver safety and experience worldwide
- Mapbox delivers next-gen navigation enhancements in Toyota and Lexus vehicles
- Garrett highlights next-gen electrification and connected vehicle innovations



Nissan unveils prototype production facility for all-solid-state batteries

Nissan unveiled its prototype production facility for laminated all-solid-state battery cells, which the company aims to bring to market in 2028. This prototype facility, within the Nissan Research Center in Kanagawa Prefecture, is aimed to further promote the development of all-solid-state batteries.

Under its long-term vision, Nissan Ambition 2030, Nissan aims to launch an EV with all-solid-state batteries developed in-house by fiscal 2028. It plans to establish a pilot production line at its Yokohama Plant in

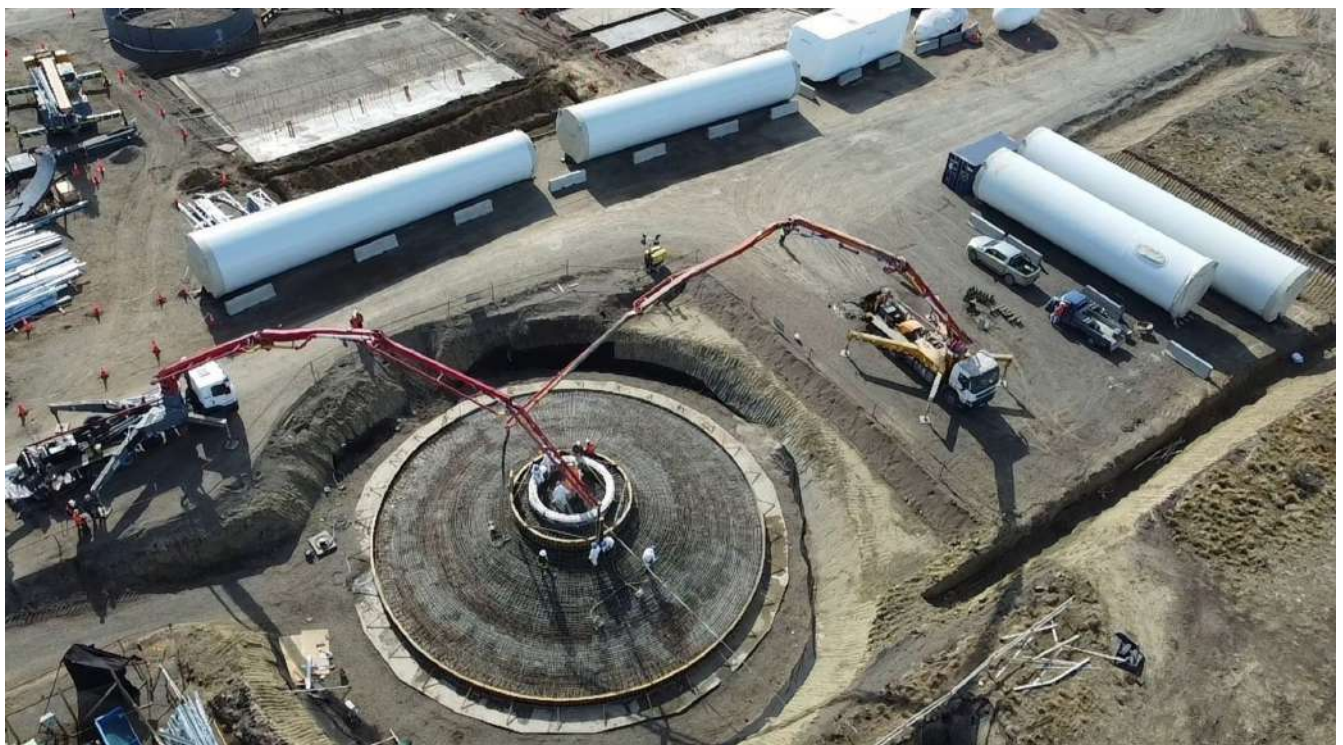
fiscal 2024, with materials, design and manufacturing processes for prototype production on the line to be studied at the prototype production facility. Nissan believes all-solid-state batteries can be reduced to \$75 per kWh in fiscal 2028 and to \$65 per kWh thereafter, placing EVs at the same cost level as gasoline-powered vehicles.

Porsche strengthens commitment to industrial production of eFuels

Porsche is investing USD 75 million in HIF Global LLC. In return, the sports car manufacturer is acquiring a long-term stake in HIF Global LLC, a holding company of internationally active project developers of eFuel production facilities.

Among other projects, the Santiago de Chile-based company is building the Haru Oni eFuel pilot plant in Punta Arenas (Chile). Initiated by Porsche and implemented with partners including Siemens Energy and ExxonMobil, production of eFuels from hydrogen and CO₂ using wind energy is expected to start there in mid-2022. These electricity-based synthetic fuels allow combustion engines to be operated in a potentially almost CO₂-neutral manner.

With its investment in HIF Global LLC Porsche is participating in an international financing round alongside the Chilean company Andes Mining & Energy (AME) and the American companies EIG, Baker Hughes Company and Gemstone Investments. In total, an amount in the low nine-figure USD range is flowing into HIF Global LLC.



Leviton introduces new smart Evr-Green EV charging station for fast, DC charging

Leviton announced the launch of the Evr-Green DC charging station, the latest expansion to its portfolio of electric vehicle supply equipment. Ideal for rest stops, retail locations and other commercial and public applications, the Evr-Green DC provides a smart solution for high-power direct current (DC) charging for the latest electric vehicles on the market.

The Evr-Green DC station's self-contained AC to DC power conversion system provides EVs with direct DC power, which unlike AC charging stations, does not require the vehicle to convert power. According to the Alternate Fuels Data Center of the Department of Energy, DC charging stations can average 60-80 miles of range in only 20 minutes of charging, which is more efficient when compared to 2-20 miles of range per hour for an at home Level 1 AC station or more common Level 2 AC station. Built with CCS1 and CHAdeMO charge connectors, the Evr-Green DC allows the latest EV models to charge. An LCD screen on the front of the unit allows drivers to easily interact with instructions and information, making the stations easy to use.



QUANTRON presents the QUANTRON QARGO 4 EV light truck for the first time and introduces its extended portfolio

With the QUANTRON QARGO 4 EV, Quantron AG is launching a second vehicle in the newly designed QUANTRON brand on the market. The all-electric van will be presented to a select audience of investors, members of the press and customers at the Q-Days 2022 in Gersthofen/Augsburg. In addition, the company is providing numerous other insights into its broad portfolio of zero-emission commercial vehicles and e-mobility options.

With the QUANTRON QARGO 4 EV: The light transporter from QUANTRON offers a battery-electric cargo solution, ideal for sustainable deliveries over the last mile, in plant traffic and for municipalities. With its flexible wheelbase featuring 3.3 m of excellent manoeuvrability and thus a very small turning radius, the compact vehicle is ideal for inner-city traffic. The QARGO not only stands out because of its modern QUANTRON design in accordance with the company's brand values – "reliable", "energetic" and "brave". The performance of the environmentally-friendly transporters is also impressive: an operating range of up to 350 km as well as a payload of 2,300 kg – without producing any emissions or noise. The battery capacity is 81 kWh and is fully recharged within 1.2 hours. Cobalt-free batteries from CATL are used.



Amsted Automotive Group brings E-axle Disconnect technology to automotive electric vehicles

Early 2021 marked the formation of the new Amsted Automotive Group, which combined Amsted Industries with two of its core Tier 1 automotive supply business units, Means Industries and Burgess-Norton. This innovative powerhouse got to work immediately on developing a revolutionary E-axle solution for electric pickup trucks and SUVs. Just one year later, the cutting-edge technology is now leading the advancement of EV propulsion worldwide.

The Dynamic Controllable Clutch (DCC), an Electro-Mechanical E-axle Disconnect system, addresses the need for new torque-management solutions for EVs, providing seamless shifting technology and performance, while significantly extending the battery range. Amsted Automotive adapted the technology for the customer's EVs, since traditional clutches are not conducive to the demands of electric propulsion systems.

HEADLINES

- A double premiere: The compact Mercedes-Benz Intouro K hybrid inter-city bus
- Mercedes-Benz opens the Electric Software Hub, a software integration factory at the Sindelfingen site
- President Biden's invocation of the Defense Production Act will aid in accelerating critical mineral production, strengthen the EV supply chain
- Pratik Kamdar, Co-Founder, Neuron Energy weighs in on the recent developments in the EV sector
- Next-generation electric vehicles to be developed using new digital twin of the Nardò handling track



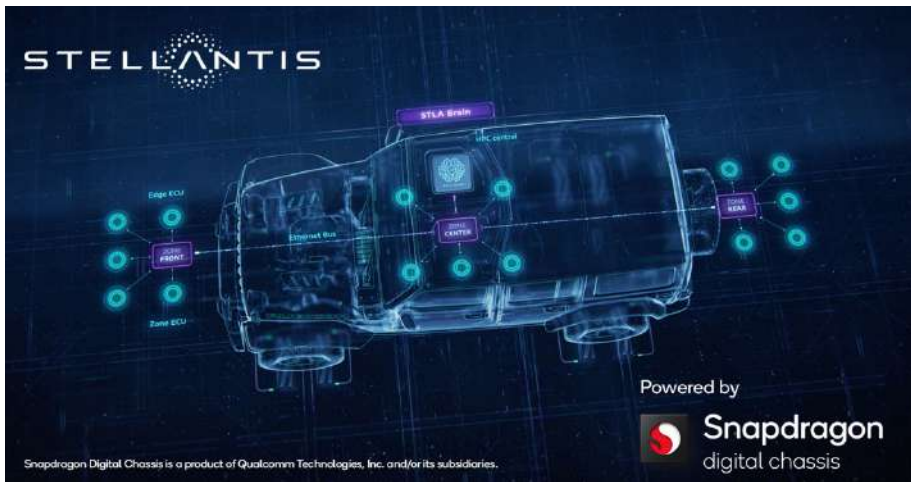
IonQ and Hyundai Motor expand partnership to use quantum computing for object detection

IonQ and Hyundai Motor Company announced a new project designed to apply quantum machine learning to image classification and 3D object detection for future mobilities. Image classification and 3D object detection are foundational steps toward the next generation of mobilities, including autonomous vehicles. Together, IonQ and Hyundai will look to improve computational functionality through more efficient machine learning on quantum computers, as they can process enormous amounts of data faster and more accurately than classical systems.

Using a breakthrough in encoding images into quantum states, IonQ is already well underway in classifying 43 types of road signs using IonQ's quantum processors. The next phase will see the two companies apply IonQ's machine learning data to Hyundai's test environment and simulate various real-world scenarios.

HEADLINES

- Atlys Motor Vehicles and VCST announce e-drive collaboration to support electric vehicle commercialization
- Bosch and AWS enter into collaboration to digitalize logistics
- VinFast and Electrify America announce charging agreement and mobile app integration for electric vehicles
- Bosch accelerates software development for automated driving with acquisition of Five
- eDriving announces international collaboration with Bosch and Sfera
- Kodiak Robotics and U.S. Xpress announce partnership
- LocoNav joins forces with Locus as a strategic partner to enable digital transformation in the global logistics industry
- GM and Honda will codevelop affordable EVs targeting the world's most popular vehicle segments
- MVG and Anritsu announce support for IEEE 802.11ax 6-GHz-Band (Wi-Fi 6E) OTA measurements
- AAMP Global, manufacturer of vehicle aftermarket technology, acquires AudioControl
- Hertz selects AWS to accelerate digital customer experience and sustainable mobility
- Seeing Machines, Magna develop rear-view mirror-based Driver Monitoring System
- The U.S. DOE, General Motors and MathWorks announce the EcoCAR EV Challenge
- Audi and Navistar partner to improve emergency vehicle and school bus safety
- Honda signs MoU with Teito Motor Transportation and kokusai motorcars as part of aim to launch autonomous vehicle mobility service in central Tokyo



Stellantis and Qualcomm collaborate to power new vehicle platforms with Snapdragon Digital Chassis solutions

Stellantis N.V. and Qualcomm Technologies, Inc. announced a multi-year technology collaboration to utilize the latest Snapdragon® Digital Chassis advancements to deliver intelligent,

customizable and immersive in-vehicle experiences to millions of vehicles across Stellantis' 14 iconic automotive brands beginning in 2024. Leveraging the Snapdragon® Cockpit Platforms and 5G capabilities for telematics systems, Stellantis will have the capability to meet customers' evolving expectations for personalized and cutting-edge experiences that are continually upgradeable.

This agreement will facilitate Stellantis' plan to merge all software domains into High Performance Computers, leveraging the high-performance, low-power Snapdragon Automotive Platforms across all major vehicle domains as well as contribute to securing Stellantis' supply chain on strategic components.

MiX Telematics and CANGO partner to deliver advanced fleet data experience

MiX Telematics is pleased to announce an innovative partnership with CANGO Mobility. MiX Telematics provides modular and scalable connected fleet SaaS solutions to customers in more than 120 countries, delivering transformative outcomes, with a return-on-investment of typically 10:1 and collision reduction of 60% with their premium telematics and video solution.

CANGO's comprehensive rich vehicle data CANBUS Library augments the MiX solution by unlocking the full potential of fleet vehicles' raw data sets, for extensive analysis and customer outcome creation within MiX's SaaS solution.

StoreDot gets strategic investment from Volvo Cars Tech Fund

Volvo Cars, through the Volvo Cars Tech Fund, has made a strategic investment in StoreDot. StoreDot is on track to begin mass producing its '100in5' cells as early as 2024, achieving 100 miles of charge in just five minutes. The investment gives Volvo Cars the opportunity to collaborate closely with StoreDot on exciting new battery technology, as it aims to become a pure electric car company by 2030.

Volvo Cars was the first established car maker to commit to all-out electrification and aims to sell only pure electric cars by 2030. As early as 2025, the company is aiming for half of its global volume to consist of pure electric cars.



SSW Partners completes acquisition of Veoneer

Veoneer announced that SSW Partners has completed the previously announced acquisition of Veoneer, Inc. for \$37.00 per share in an all-cash transaction, representing a total equity value of ~\$4.6 billion. SSW Partners expects to sell Veoneer's Arriver business to Qualcomm Incorporated and retain Veoneer's Tier-1 supplier and integrator businesses.

SSW Partners will work closely with Veoneer's management to ensure the pursuit of Veoneer's business plan and to lead the process in identifying strong, long-term strategic owners for Veoneer's Restraint Control Systems and Active Safety businesses. In the interim, Veoneer remains well-positioned to continue executing its strategy and focused on delivering best-in-class innovation, products, and services to its customers.



Tata's hydrogen bus gets nod for roadworthiness trials from government

The road transport and highways ministry has approved two hydrogen-powered buses manufactured by Tata Motors for roadworthiness trials. The hydrogen-based proton exchange membrane (PEM) fuel cell buses are being manufactured under a special contract for Indian Oil Corporation.

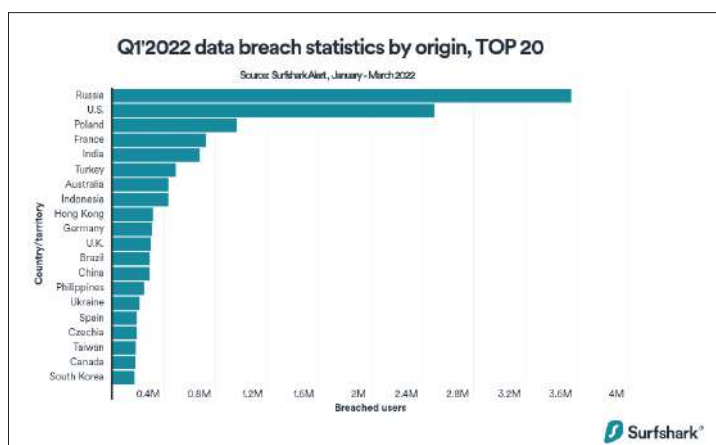
Tata Motors had won a tender for 15 hydrogen fuel cell buses from IOCL. Besides, IOCL had also signed an MoU with Tata Motors for two buses for demonstration purposes. IOCL is in process of seeking other required clearances and the trials will commence once approval processes are complete.

India is the 5th most breached country of 2022, but has 1M less victims QoQ

Cybersecurity company Surfshark's study found that Russia is first in terms of breached unique accounts from January-March 2022, with more than 3.5M internet users affected. The second place is claimed by the US, followed by Poland, France, and India. In general, approximately 18.2M accounts were breached in 2022 so far, meaning that the data of two users was leaked every second.

Surfshark Alert's database analysis determined that the first quarter of 2022 was lower than the last in terms of data breach cases. To put it in real numbers, 18,174,132 email accounts were breached in 2022'Q1. Whereas, there were 43,169,912 breaches in the previous quarter, signaling a decline of 58% quarter-over-quarter.

India has followed the downwards trend, showing -62% less breached accounts than in Q4 '2021, amounting to 1M less victims as figures improved from 1.77 M to 675K, according to the database.



HEADLINES

- Biliti Electric to setup an electric three-wheeler manufacturing facility in India's Telangana state
- Hero Electric and ElectricPe collaborate to expand access to charging infrastructure across India
- Fisker selects Hyderabad as headquarters for initial operations in India
- Tata Motors showcases its Electric SUV Concept – CURVV
- Alpha Motor Corporation enters MoU with Hinduja Tech to develop electric vehicles for mass production
- Bosch to acquire 14% stake in Zeliot Connected Services Private Limited
- Tata Motors launches the all new Tigor EV Sedan with Ziptron technology in Nepal
- Hero Electric & BOLT to set up 50,000 EV charging stations in India
- Prime Minister Boris Johnson praises Switch Mobility's investment during trade visit to India
- Tata Motors signs an MoU with Lithium Urban Technologies for one of the biggest EV fleet deployment in India
- MoRTH refutes report on halting electric two-wheeler launches

Bosch to acquire 14% stake in Zeliot Connected Services Private Limited

Bosch Limited has acquired a minority stake of 14 percent in Zeliot Connected Services Private Limited, a Bengaluru-based B2B start-up. This investment will enhance Bosch Limited's role in the mobility landscape through offerings on digital platforms in personalized and connected mobility.

The combination of Bosch's Mobility Marketplace and Zeliot Micro services platform will create a one-stop-shop for the new age mobility players while improving vehicle ownership experience for all stakeholders. Zeliot will leverage the SaaS portfolio of Bosch's mobility platform to augment its digital product lifecycle from development to customer experience. The investment, supplemented with Bosch Mobility Marketplace will additionally enhance Zeliot's ability to offer microservices as APIs to offering deviceagnostic solutions deployed for a wide range of customers in India.

Prime Minister Boris Johnson praises Switch Mobility's investment during trade visit to India

UK Prime Minister, Boris Johnson, praised Switch Mobility and its investment in the UK and India during his trade visit to India. As part of his visit to Delhi and Gujarat, the Prime Minister took the opportunity to highlight Switch as an example of a business strengthening bilateral trade between the countries. UK and Indian businesses confirmed more than £1bn in new investments, with Switch confirming its plans to invest £300m across the UK and India to develop its range of electric buses and light commercial vehicles.

With the Company expecting to create over 4000 skilled jobs in the UK and India as part of the investment, the Prime Minister's visit also coincided with the launch of the Company's new 12m electric bus for India and the



MG Motor India partners BPCL for EV charging infrastructure

MG Motor India has entered into a partnership with Bharat Petroleum Corporation (BPCL) to expand its EV charging infrastructure. The move makes MG Motor India one of the first passenger car companies to tie up with the PSU to promote the adoption of green mobility.

Both companies will install EV chargers across highways and within cities by combining their individual expertise to strategically identify sites, garner consumer insights, devise loyalty programs, and create technology to manage the charging systems.

BPCL is setting up fast-charging corridors across major highways inter-connecting major cities, and economic hubs and aims to have a network of 7,000 conveniently located fast-charging stations in the country in the next 2-3 years.



New report shows need for privacy protections from connected cars says Consumer Watchdog

A new report details the privacy problems posed for consumers from connected cars and points to new rules to be developed in California as a potential model across the country, if the rules can withstand lobbying by the powerful auto and insurance industries. And while location data can be turned off on your cellphone, there's not yet an opt-out feature for your car. However, California is poised to be the first in the nation with an "opt-out" for precise geo-location that is set to take effect in California by 2023.



New rules to be promulgated this year under Prop 24—the California Privacy Rights Act (CPRA)—should preclude insurance companies and automakers from using precise geolocation without consumer permission. If the geolocation rule and

other privacy regulations withstand industry lobbying, it will prevent a host of privacy abuses identified by the report, "Connected Cars and The Threat to Your Privacy." The report was presented to the California Privacy Protection Agency at public hearings.

Electric Vehicles models projected to rise 2X to over 130 by 2024

Americans will soon have a wider pool of electric vehicles to choose from. Legacy automakers are pushing their E.V. production. According to a StockApps.com presentation, that will more than double the current E.V. offering by 2024. The analysis suggests that Americans will be able to choose from 134 different models by then.

The move by legacy automakers is a response to the growing demand for E.V.s. Besides expanding the E.V. pool for American consumers, it portends more pressure on market leader Tesla. The development suggests that the average E.V. prices will significantly drop as competition intensifies.

While most production has focused on sedans, analysts expect a shift towards trucks and SUVs. These, they say, offer automakers higher margins.

HEADLINES

- Guidehouse Insights estimates more than 1.2 million automated trucks and buses will be deployed globally each year by 2032
- ENT need for real-time data tracking for vehicle management to push fleet management market past US\$ 239 Mn by 2032
- Europe and North America reached 37.8 million active insurance telematics policies in 2021
- Vehicle battery market awaits upbeat growth prospects, battery technology to remain instrumental: New Study
- Guidehouse Insights expects Global spending for IoT on transportation to grow at a compound annual growth rate of nearly 15% through 2031
- The installed base of video telematics systems in North America and Europe to exceed 8 million units by 2026
- The installed base of fleet management systems in South Africa to reach 3.6 million units by 2026

E-Bikes, fleet management, traffic management, LEDs and AI-based solutions growth opportunities 2022

The "Growth Opportunities In E-Bikes, Fleet Management, Traffic Management, LEDs, and AI-Based Solutions" report has been added to ResearchAndMarkets.com's offering. The Mobility Technology Opportunity Engine (TOE) for 2022 covers innovations in E-bikes, fleet management, traffic management, LEDs and AI-based solutions. Some of the innovations profiled include E-bikes for ride-sharing services, Internet of Things (IoT)-based fleet management solution, AI-based AR solution, LEDs for automotive lighting, and AI-based eye tracking solutions for enhanced driver safety.

The purpose of the Mobility Technology TOE is to raise awareness of global technology innovations in self-propelled ground-based mobile platforms that are not only technically significant but potentially offer commercial value. Each monthly TOE provides subscribers with valuable descriptions and analyses of 10 noteworthy innovations. The main focus is on highway-licensed motor vehicles (light, medium, and heavy). Passenger cars, trucks, buses, motorcycles, scooters, and railway locomotives are within the product scope, energized by any fuel. Many of the innovations concern powertrains, as well as drivetrains (including transmissions), interiors—seating and displays, advanced materials—as for body/chassis, wireless connectivity, and self-driving technology that is currently receiving so much attention. The Mobility TOE outlines and evaluates each innovation, notes which organizations and developers are involved, projects the likely timing for commercialization, furnishes a patent analysis and provides valuable strategic insights for industry stakeholders.



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Charging Status

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Range Anxiety

Know how long your EVs can operate before they run out of charge. Get alerts for low ranges. Locate nearby charging stations.



Energy Consumption

Measure, manage and optimize EV charging & increase EV efficiency. Access detailed analytics about EV charge & discharge patterns.



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