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SMART AUTOMOTIVE

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Cover Page Image Courtesy: Nissan
With Nissan's Brain-to-Vehicle (B2V) technology, automated driving may henceforth be assisted by neuroscience; a milestone for the automotive industry.

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Editorial

Maneesh Prasad
Editor & CEO

Last May 2017, Niti Ayog in association with Rocky Mountain Institute published a document, 'India Leaps Ahead: Transformative Mobility Solutions For All'. The study mentions that shared passenger mobility, connected and electric mobility can cut the energy demand by 64% and carbon emission by 37%. This is quite in sync with the views which industry leaders share about the automotive industry- autonomy/ driver assistance, shared mobility, electric vehicle and connected vehicle.

Lets look at government's approach to electric, connected, shared and autonomous/ driver assisted vehicle.

"Thought leadership", a cliche, which has been overused at forums and conferences to drive the value of innovative and forward looking leadership. If we look at the year 2017, the Government displayed "Thought Leadership", with its forward looking approach towards electric vehicles. We would be amongst the select few countries which has set a humungous task for ourself. Although SIAM has come up with a moderate approach, in consultation with automotive majors, who would not like to rush-in with investments in electric vehicle. We do expect improvement in battery technology, charging infrastructure, its use-process and certainly power generation to meet the demand before we go full throttle on it. Re-stating what Prof Jhunjhunwala mentioned last year in Connected Vehicles 2017, 5% of land in Rajasthan can power the entire electric vehicle of tomorrow. The optimism is being matched with target to have 100GW of solar power by 2022, in addition to another 75GW from other renewable energy sources. So, while government may give in to the demands of SIAM of delaying the present time line of 2030 for all electric vehicle, but we are surely going to be there in couple of decades.

Connected vehicle- Depart of Telecom and their Telecommunication Engineering Centre had formed working groups to work in IoT/M2M needs for various industry verticals including automotive. Though DoT have been in dilemma(unconfirmed source) over the spectrum for DSRC standards to take up, but this should hopefully be taken care off with 5G, which is in horizon. But we will look forward to roll out of specific plan for V2V and V2X(possibly in association with ITS being deployed out under MoUD Smart City initiative).

Shared Mobility- A game changer from many aspects. Not just the passengers who are now forced to think if its worth taking personal vehicle and risk the waste of time in search of suitable parking space, but also from employment and micro-entrepreneurship perspective too. What we expect is Government to acknowledge the benefits being accrued to individual passenger and society in general and not use it as punching-bag when there is mis-happening with passenger. So far the shared mobility has survived the prejudice. A regulatory framework which could encourage more players/start-ups to join in for providing services, extending fiscal benefits and mandatory security and safety features is desirable.

Autonomous Vehicle- We do not need driverless vehicle, is what has been splurged by the media. Perhaps, we have huge population looking for employment and would opt for driving profession for a living. Similar fear of loss of job was echoed when computers where being introduced in late 1980s. Maybe we could have shown 'Thought Leadership' here too. Reduced loss of life, lower accidents, improved utilisation of capital investment(vehicle), optimal driving leading to reduced cost of maintenance and many more benefits would result from driverless vehicles.

CES 2018, points to automotive digital cockpit set for a change in the coming years. Digital Cockpit platform brings an entirely new generation of communication and ergonomics inside vehicles, allowing drivers to focus on the road ahead while intuitively and safely interacting with their in-car technology. Technologies such as artificial intelligence and virtual reality are starting to have an impact on automotive industry.

Automotive in Transition

Byton unveiled its first electric concept car which has Level 3 self-driving capability. With autonomous driving features, powerful battery pack and 5G connectivity, Byton has combination of automation, electrification and connectivity in its car.

Over a century old automotive industry, which transformed the way mankind moved on the earth surface, is now under transition. The transition can be marked by four trends shaping the global automotive industry- Automation, Electrification, Connectivity and Shared Mobility. These four trends are interdependent of each other and are mutually reinforcing. These are being driven by the increase in demand by the customers for features that revolve around these technologies. Companies are hence strategizing and incorporating these features in their cars to remain relevant in the market.

The autonomous car has emerged as R&D priority for almost all auto manufacturers. Although there are many technological and regulatory issues that need to be resolved before a fully autonomous vehicle can be made available in dealer showrooms, the automakers are working to develop these technologies and are optimistic to launch autonomous cars in coming years.

Several automakers have released cars with semi-autonomous features. In addition to the existing features, the companies are introducing features like lane departure warning systems, brake assist, smart navigation systems, parking and traffic assist, collision assist, etc., as it has increased safety, comfort, convenience and efficiency for the customers. These features also increase appeal among the customers by offering more personalised experiences to the driver.

Electric Vehicle is gaining momentum. Stricter emission regulations, fall in the battery prices, increasing penetration of charging infrastructure, and increasing consumer acceptance have contributed positively in creating strong momentum for electric vehicles. But there are also impediments like high capital cost thus low profit margins for automakers, less range

and inadequate presence of charging infrastructure. There is regulatory push along with fiscal and non fiscal incentives for electric cars in several countries led by increasing awareness about the environmental impact of IC engines. This has also caused the companies to change their strategy and introduce electric cars. Almost every automaker is working on electric vehicle strategy, many of them have introduced and many have plans to launch electric vehicles.

Connectivity is another trend, the smartphones have revolutionised the modern world and the customers accustomed to their smartphones are looking for a similar experience in their vehicle. This has led the companies to introduce these features in their cars, the features like OTA updates are evolving as the standard features in the cars and the companies are using it to keep their cars updated. In car shopping and in-car payment are also gaining ground and a number of companies are adding these features in their cars. The automakers are collaborating with different companies to achieve this.

The software content in the cars has increased remarkably and the automakers are forming partnerships with the IT industry and are also acquiring smaller companies and startups working in the field. This has also increased the vulnerability of the car to cyber attacks and hacking. Companies are also strategising to counter these cyber attacks. In the coming years, we will see more and more vehicles with a dashboard system that is easily updated, customised by drivers and laden with features that were unimaginable couple of years back.

The trend of shared mobility is being driven by the factors that are economic, technological and cultural. The newer advanced technology vehicles will come at a very high capital cost which may not be feasible for individual buyers but the operating cost of the vehicles will be low and more the vehicle will be used more economically viable it will be.

Huge traffic in the cities is also a contributing factor that may influence the future passengers in deciding against owning the vehicle. It is being predicted by several research firms that the individual ownerships of the cars may end in future. Therefore, the automakers are investing to develop their own mobility services to combat this fall in the sales of automotive. Automakers are investing and forming partnerships with the companies active in the mobility space like Uber, Lyft, Ola etc. Some companies are also planning to lauch their own mobility service and are acquiring smaller startups to develop capabilities in this field.

Indian automotive industry too is not untouched by these trends. There are various developments taking place in India that corroborate these trends but the pace of the change doesn't match that of the automotive industry in the developed world.

Autonomous and Driver Assistance

For self-driving/autonomous vehicle enthusiast, the cold vibes from policy makers in India was unexpected. Going by industry developments, we maybe little late but we are moving. The agreement between Delhi Govt. and Maruti Suzuki for having closed areas for testing autonomous vehicles is a positive and much needed step.

Automotive Research Association of India (ARAI) in association with Cognizant technologies has also developed India's first autonomous car prototype. The car has been developed

Juergen Hase

CEO
Unlimit

Elon Musk has revolutionised the way all transportation vehicles will be manufactured in the future – both for use on land and in space, starting with Tesla and culminating with SpaceX. So much so, that many Governments all around the world are now embracing this revolution and articulating their visions to move 100% to EVs (electric vehicles) in the next 10-15 years, including in India.

Travis Kalanick is another innovator who has disrupted the way global transportation was being done globally, by the launch of Uber and starting a revolution for ride sharing. It caught on like a raging wild fire globally and is now percolating down to many other forms of transportation like buses, two wheelers and even bicycles.

We are seeing an unprecedented demand for vehicle telematics by leading automotive OEMs to launch their connected car programs across many developed nations. This trend is getting proliferated with the advent of electric vehicles, that are designed for remote monitoring, upgrades and fixes. While most connected car programs are initially launched for their ability to gather basic telematics data for vehicle maintenance and usage history by the OEM's, they slowly but surely graduate to infotainment that includes WiFi hot-spots, popular games and entertainment content. Moving to infotainment and starting to monetize the enormous data being collected by connected cars, is the mega trend for 2018 globally, and we see that gaining momentum in India as well within 2018, on the back of massive pan India 4G LTE network rollouts. While all this looks very promising and can benefit many stakeholders to monetize the data so collected – OEMs for vehicle R&D and preventive maintenance, Insurance companies for Usage Based Insurance (UBI), telecom companies for connectivity & data, and content providers for rich infotainment content, municipal corporations for road condition and safety data; the real challenge lies in the effective segmentation of data traffic, rating and charging it and delivering it to the various stakeholders when and how they need it.

Dhananjayulu Dhaddhala

Sr. Vice President
Division Connectivity & Devices,
Giesecke & Devrient MS India Pvt. Ltd.

The global Automotive Telematics Market is poised to grow exponentially by 2022, owing to the increasing security concerns of users. Constant need of car tracking and fuel-efficiency is expected to fuel market growth. Increasing use of smartphone and tablets are also expected to be the major growth factor for the vehicle telematics market. Government safety rules and regulation favoring the use of telematics are further expected to provide positive avenues to market growth. Growing use of embedded system has increased the demand of vehicle telematics systems in personal and commercial vehicles. Increase in safety of the car, driver, and passenger is the main advantage of the vehicle telematics that has played a vital role in improving this market.

In India, vehicle telematics market is still at a nascent stage and commercial vehicle market dominates the overall market. Optimization of fuel costs as well as safety and security concerns are expected to drive growth in future. Also, this market is quickly getting extended to many other critical areas like Vehicle health monitoring, Passenger safety & Security, Traffic management & Insurance etc.

Vivek Tyagi

Director for India business development, SanDisk brand Commercial sales and Support at Western Digital Corporation

Today customers are looking for reliable, on-the-go data and chic infotainment systems. We see various companies, like ride-hailing services, elevating their customer experience by installing infotainment systems and making online videos and music accessible to their passengers. These digital systems have a high requirement for software and data. The automotive aftermarket is estimated to grow at around 10-15 per cent to become US$ 16.5 billion by 2021 and Western Digital is capitalizing on this rising demand for discrete flash memory .

We believe that data storage requirements will keep advancing with the automotive ecosystem adapting to newer technologies like the Advanced Driver Assistance Systems (ADAS), vehicle operating systems, module OTAs, vehicle-to-vehicle and vehicle-to-individual connected car interfaces. Safety along with these autonomous systems in a vehicle will only further drive the need for an efficient, high density, fast storage and Western Digital is well-prepared to address them.

Farhana Haque

Vice President & Business Head- IoT
Vodafone India

Imagine driving into a city and heading straight to the best parking space, avoiding traffic congestion and also being able to pre-empt the health of your car. These are some of the many capabilities of connected vehicles, being brought to life with the Internet of Things. Vehicles become more reliable, commercial fleets are better managed, entertainment is more personalized and radical new transport solutions are made possible. Telecom companies, like Vodafone, collaborate with diversified industries due to which they are able to help in cross-pollination of ideas, thus generating new business ideas and creating innovative industry ecosystems.

Telematics solutions need to be rooted in business realities, integrated with a diverse range of other systems and be carefully managed to generate a sound return on the investment. The role of telecom companies in bringing secure connectivity solutions to customers cannot be undermined, as it is extremely vital to ensure that connectivity in these solutions are not only extremely secure but ubiquitous, as we are talking about millions of unmanned device.

The Vodafone vision is that future vehicles will be connected, automated, and data shared. Big data and analytics is at the heart of the managed services products. Vodafone has around 60 Millions IoT connections globally and is working with 30 manufacturers in 49 countries offering end-to-end solutions for telematics control units (TCU) and its applications, SIM management and connectivity services wherever deployed.

indigenously and it is being reported that it is capable of performing functions like overtaking a stationary car, moving on a smooth road and turning left and right. Mahindra has developed a driverless tractor that will be available commercially from early 2018, in a phased manner. The range of tractors will be from 20 HP to 100 HP. The pioneering driverless tractor is equipped with state-of-the-art technology and boasts of several unique features.

The teams at the Indian Institute of Technology (IIT) in Kharagpur, Kanpur, and Bombay are working on 'autonomous vehicle solutions' or driverless solutions. The teams are developing technology for driverless cars keeping the Indian market in mind, in contrast to the global tech majors who are building and testing technologies in the Western market.

Indian software firm Infosys too has indigenously developed a 'driverless' cart at its Mysore center. The purpose of developing the autonomous vehicles is aimed at training employees on new emerging technologies like artificial intelligence.

Netradyne has recently launched an ADAS solution trained for Indian road conditions as part of its Driveri platform. Driveri is a four-camera, vision-based system mounted on the vehicle windscreen that helps fleet managers recognize positive driver performance and enhance driver safety for commercial vehicles. Netradyne is the first company to launch a vision-based ADAS solution specifically trained for Indian road conditions. Continental is readying passive safety systems like ABS and airbags to go in cars that cost less than $10,000 in India. Mahindra and Renesas have also partnered to jointly work on EVs, powertrain, ADAS, and other systems in India as well as in other emerging markets. Revv has also partnered with Mobileye, to install ADAS in their cars with the aim of reducing accidents and casualties on India's roads.

There are also number of startups like Hi-Tech Robotics, Swaayatt Robots, Flux auto that are working to develop autonomous vehicle solutions.

Electric Vehicle

Electric Vehicle has been an area that has gained focus of late after the Govt of India announced its plans to have only electric vehicles manufacturing by 2030. The government has announced FAME- Faster Adoption and Manufacturing of Hybrid and Electric vehicles in India –as part of the National Electric Mobility Mission Plan.

The step by the government has created a momentum in favour of electric vehicles, a number of public and private bodies are taking steps to move closer to the ambitious target

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Abhishek Binaykia

Global Head – Marketing
einfochips

Today, it is not out of the ordinary to imagine sitting in the passenger seat of a car and being driven to your destination without a human (or robot) at the driving wheel. This is how far the automotive industry has come in the last few years, with no signs of slowing down. The advent and subsequent growth of telematics has significantly altered the dynamics of this industry. Market reports peg the CAGR of the global telematics market from now through 2025 at 25-30%, which would translate to a market size of $150B-$200B by 2025!

What are the factors fuelling this level of growth? Government regulations pertaining to safety, growth and adoption of wireless communication systems within automobiles, and commercial economic considerations are the key drivers for growth in this sector. Autonomous cars and the conversion of non-connected cars into connected cars are influencing market dynamics. Connected cars are the norm today, as are fleets equipped with advanced tracking, monitoring and video systems. Advanced Driver Assistance System or ADAS is changing how we view security and reliability in vehicles, through use of sensors like RADAR, LIDAR, infrared and cameras that provide precise data capture and enhance the safety quotient. Another relevant trend is the advent of Value Added Services in telematics, including roadside assistance, vehicle diagnosis and smart maintenance services. All these advancements in technology- making the vehicle smarter & safer- will alter automobiles as we know them today and change the automotive landscape in the coming decade.

Satish Sundaresan

Managing Director
Elektrobit India Pvt. Ltd.

Imagine driving a coupe, with the roof open, into a 3 km tunnel with 22 degrees Celsius at the entrance. Let's assume there is a thunder or snow storm at the other end which you obviously don't know about.

When you do come out on the other side; in addition to shock … your roof needs to be closed, windows rolled up, wipers started, climate control working overtime & your active safety systems kicked in to prevent road slip. Imagine if the car could read the weather report & hence prepare itself even before it came out of the tunnel. Science fiction? Not really as the technology is here!

I place my personal bets on 'Mobility as a service' & 'Connected mobility' as future trends. This is an integration of highly automated driving, internet connectivity, car-to-car and car-to-infrastructure communication. All this with the possibility to upgrade the vehicle's 'digital image' regularly, just like a smart phone. This is an integration of safety, security & privacy <- Automotive engineering integrated with the latest digital technologies to tackle not just on the road but also a new cyber-connected world. Let's hope we do it right!

set by the government. In this line, the government agency Energy Efficiency Services Ltd (EESL) had called for bids for procurement of 10000 EVs that was won by TATA Motors and Mahindra. NBCC, a blue-chip Government of India Navratna Enterprise under the Ministry of Urban Development has also signed a Memorandum of Understanding (MoU) with Fortum, a lFinnish company, for developing electric vehicle charging infrastructure across the country.

Automotive Research Association of India has announced plans for setting up the E-mobility Centre of Excellence in Pune. The center will have state-of-the-art facilities for development, evaluation, benchmarking, validation and certification testing of electric and hybrid electric vehicles, and related sub-systems and components.

The National Thermal Power Corporation Limited (NTPC) in India has also forayed into the new business segment of setting up charging stations for electric vehicles (EVs) and has installed first such points at its offices in Delhi and Noida. The state owned body has said that it is planning to set up many such charging stations across Delhi/NCR and other cities in near future.

Mahindra and Mahindra Ltd and has also signed an MoU with Ford to procure a vehicle platform. The Indian automaker plans to build an all-new electric sedan upon this platform. The company is also partnering with mobility companies like Ola, Uber and ZoomCar to deploy electric vehicles on Indian roads.

Honda is planning to set up a lithium-ion battery manufacturing unit in India. Toyota and Suzuki also have joined hands to bring electric cars in India. These companies are also setting up their manufacturing plants for electric vehicles in the country. Suzuki, Toshiba, and Denso have also reached basic agreement on establishing a joint venture company for the production of automotive lithium-ion battery packs in India.

Connectivity

The automakers are introducing connected car features in the country. Nissan India, Indian subsidiary of the leading global car manufacturer, is collaborating with Pointer to provide part of the technological solution of the NissanConnect platform, in cooperation with InfoTrack Telematics. Nissan's connected car solution is an integrated information and communications platform that connects with the customer's smartphone, offering a variety of in-car convenience services, navigation and safety features. Similarly Toyota Kirloskar Motor recently has

launched a smartphone application -Toyota Connect India – to provide connected service to its customers with that of Toyota's global standards. The app is said to be fully integrated cloud-based connected service platform supported by a dedicated and specialised call centre, Toyota's dealer networks and service providers.

In another development, Honda Cars India is collaborating with IBM Watson IoT. The purpose behind this collaboration is using IBM Cloud for 'Honda Connect', Honda's connected car platform.

Minda iConnect Pvt Ltd and Microsoft India are collaborating to drive connected vehicle technologies for the automotive industry in India. The companies will also be working on technologies for both the passenger car and commercial vehicle automobile manufacturers to significantly enhance customer experience across – safety, security and entertainment.

Microsoft India is also working with the Indian automaker Tata Motors to redefine connected and personalized driving experiences for Indian customers. Tata Motors will leverage Microsoft's connected vehicle technologies that bring together artificial intelligence (AI), advanced machine learning, and the Internet of Things (IoT) capabilities on the global hyper-scale Azure cloud, to traverse the digital and physical worlds and create a highly personalized, smart and safer driving experience across the digital life of a vehicle owner. Automotive manufacturers like Maruti Suzuki have been working on integration of their apps via the telematics unit of the car by allowing customers to use Car Play and Android Auto. While Audi MMI infotainment system will now incorporate the Audi smartphone interface which caters to both Android and Apple in Audi Q5, Volvo will be running its Sensus Connect system on Android, and Ford is ready with Sync platform in its cars in India, with the AppLink feature, and Jaguar Land Rover introduced the InControl Apps platform.

Bosch Ltd, in partnership with Tech Mahindra Ltd and telecom operator Vodafone Group Plc, has developed a cloud-based connected vehicle platform.

Indian telecom provider Reliance Jio Infocomm Ltd (Jio) is partnering with AirWire to provide AirWire's Connected Car IoT Device incorporating AirWire's patented antenna technology to customers in India. The AirWire Connected Car Device will operate in Jio's pan-India advanced 4G/LTE Network enabling Connect Car apps and services such as hotspot features, location

Shinto Joseph

Director- South East Asia Operations
LDRA Technology Pvt. Ltd

Automotive systems are becoming more connected, complex and intelligent. Connectivity and telematics will be playing a critical role in a smart automotive system to make real-time decisions, especially when innovations like E-vehicles & infra, V2V/V2X communication, driverless/autonomous vehicles seem to be the next big thing. We also need to understand that, as the systems get more connected and sophisticated this simultaneously give rise to increased software vulnerabilities.

Interdependence of safety and security would be one of the key driving factors in our industry in 2018. Increasing software content in vehicle subsystems at ECU level as well as in on-board applications and connected systems take telematics beyond our conventional definitions. This trend opens a new world of opportunities as well as challenges.

Looking at the legal implications of the functional safety standard ISO 26262, major OEMs have started implementing functional safety guidelines very recently. However, updating existing automotive software is going to be a herculean task. Recent hacking incidents in the automotive industry has inspired the industry, standards bodies and regulatory organisations aware of the potential risks on vehicle safety as well as the social and national security challenges; it could pose. These incidents have also led organisations like SAE to come up with cybersecurity standards like SAE J3061, aimed at improving vehicle cybersecurity. ISO 26262 is also getting amended to address security concerns. As hackers could use the weakest links, we need to look at the onboard applications and all connected systems in this context.

These new challenges are coming up at a time when the industry is working on ADAS and finally to fully autonomous vehicles. Most of the existing players would find it very difficult to adjust to this new reality. This disruptive period would open doors for many new players as well. We will have to relook at design considerations entirely from a fresh angle, looking at safety and security implications and that too from an internationally acceptable practice. Risk assessments teams need to look at subsystems level, vehicle level and finally to overall business risks.

We have noticed that many automotive players are now hiring veterans from the aerospace industry, as the aerospace industry comes with proven practices in safety and risk management. India, as a country would stand to gain substantially during this disruptive transition period, as a lot of engineering work is going to be driven out of India.

We are now working very closely with the captive units of major OEMs, their suppliers and semiconductor players with our qualified tools and consulting services. Of course, our domestic industry would wait for some time, until appropriate regulatory norms are established here for functional safety and security. In my opinion, national security concerns might trigger upgrading of security standards before even functional safety standards get updated in India.

Shyam Maller

Executive Vice President
Light & Medium Duty Trucks & Buses
VE Commercial Vehicles

New age digital technologies and fleet management platforms will be key drivers for enhancing customer profitability and capturing the aftermarket opportunities in the commercial vehicle segment. The Indian telematics market is already growing (slowly yet steadily) with increased demand for vehicle tracking and monitoring systems from the logistics and transportation in both cargo as well as passenger segments. Going forward, we will see applications to track and analyze driving behaviour and patterns, so that live alerts and warnings can be produced in case of any violation.

Further, in the coming years, telematics will play a critical role in revolutionizing the industry and create a system of intelligent traffic management for live traffic updates, parking management, updates on stolen vehicle recovery and vehicle diagnostics. Such applications, data management and IoT will be critical for an enhanced driver experience and brand differentiation. For instance, data such as driver profiles and patterns, vehicle information and other types of external information will build a knowledge base for personalized apps and services.

based apps, automobile telematics, security and safety.

Telecom operators are developing IoT connectivity networks, adding capabilities and working with the entire automotive telematics ecosystem. Plug-and-play IoT components are providing a wide range of infotainment and connectivity features for users, making the automotive industry a leader in adopting IoT based driving experience.

Shared Mobility

Shared mobility is gradually gaining traction in urban India as well as in tier cities. Indian mobility market is dominated by Ola and Uber. The shared mobility industry is expected to expand further in the coming years in the country. Shared mobility companies are also partnering with the electric vehicle companies in India. The ride sharing companies are planning to extend value added services to their customers thus creating demand for these services in the Indian market. Ola has recently launched Ola Play, a connected car platform for ride sharing.

Uber India too plans to connecting its cars to cloud services for virtual control of their movements, while also sending information on the vehicle's location and health in order to make its drive safer for customers. The company has developed Autohawk, a system to connect its cars to cloud which will update the car's location on the map in real time, but will also give information about the condition of the vehicle's engine, gearbox etc.

According to a report by NITI Ayog making India's passenger mobility shared, electric, and connected can cut its energy demand by 64% and carbon emissions by 37%. The Automotive mission plan 2016-26 by the government is dedicated to increasing the size of the Indian automotive industry to 3.5 to 4 times of the current value of USD 74 billion to USD 260 billion to 300 billion and establish India among the top three automotive industries in the world.

It is expected that the government in the coming years will come up with policies that will further develop the automotive industry and will get rid of the factors that are acting as impediments for the industry. As the Indian auto industry further matures and gets more integrated and aligned with the global industry, it is expected that these trends will be seen in a more pronounced way in the Indian market and the changes will occur at a more rapid rate. ▪▪■

Ayush Banka

Director of Products & Research
Leaf

Today, we have the most powerful navigation system that has been built on crowdsourced data of real time location coordinates. Google Maps is now an indispensable part of millions of people who commute on regular basis. Similarly, with the deeper integration of internet and embedded sensors with the automotive industry, the trends are evolving faster than any time in the past.

Self Driving cars

Tesla has been the best example so far in the domain of connected cars. Considered as a platform and not a vehicle, it has power to generate thousands of data point and communicate with the servers for improvements on real time basis. We can also see the Indian automotive industry moving a step beyond the basic definition of connected cars, where millions of data points will enable the cars to take over erroneous and distracted driving by humans. Thus the cars will stay connected to other vehicles on the grid and can obtain real time updates of traffic, accidents, weather conditions.

Safety of Passengers

Apart from safety of the vehicle, telematics is now focusing more on the safety of passengers inside the vehicle. We can see more companies adopting video telematics solutions to monitor the overall driving behaviour that includes drowsy or distracted driving, over speeding, lane jumping. This enables the system to provide immediate feedback to the driver and send video snapshots to the cloud for monitoring and training purposes.

Insurance

Very few insurance companies till now have experimented with the pay-as-you-drive insurance model. But with integration of sensors, advanced telematics system and robots taking over the driving, it makes much more sense for the insurance industry to move towards insurance premiums based on driving behaviour rather than based on gender, age, marital status etc. In a recent example, a UK based insurance company started offering lower premiums to the Tesla owners that will let Autopilot drive their Teslas. Makes sense! It is not unusual to see such disruptions in the automotive industry in this era of technological advancement. Days are not far when a vehicle will become a place of work/ leisure/meetings and the driving will be taken care by strong telematics and robotics system.

Telematics Wire Editorial Team with inputs from industry.


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Automated Driving to Change Lives & Societies

Vikram Pawah
President
BMW Group India

Vikram Pawah took over as the President, BMW Group India on March 1, 2017. He brings more than 25 years of international experience both in the automotive and non-automotive industry. Most recently, he was the Managing Director of Harley-Davidson India.

Q What are your thoughts about mobility in transition?

A The world we live in is changing and a changing world constantly demands new ideas. What will customers expect of a mobility company ten or twenty years from now? That's what we always ask ourselves, because the aspirations and needs of our present and future customers always come first. The global automotive industry is witnessing a paradigm shift from the conventional combustion engine to sustainable mobility solutions. This iconic change is inevitable. Even here in India.

BMW i is a comprehensive and ground-breaking concept for sustainable mobility. It represents visionary electric vehicles and mobility services, inspiring design and a new understanding of premium that is strongly defined by sustainability. BMW has launched the future of mobility in the Indian market in the shape of iconic BMW i8, the most progressive sports car. A plug-in hybrid drive with the heart of a sports car and a mind of a responsible citizen, the BMW i8 paves the way for performance oriented emission-free mobility. The BMW i8 has received a good response in India. It is the perfect vehicle of choice for the modern urban customers who want to embrace the best mobility experience with a clear conscience.

Q How is BMW-Intel-Mobileye-Delphi self-driving car partnership empowering BMW's vision of introducing its first fully self-driving car in 2021?

A BMW Group, Intel and Mobileye have joined forces to make self-driving vehicles and future mobility concepts become a reality. The three leaders from the automotive, technology and computer vision and machine learning industries have collaborated to bring solutions for highly and fully automated driving into series production by 2021.

The future of automated driving promises to change lives and societies for the better. But the path to get to a fully autonomous world is complex and will require end-to-end solutions that integrate intelligence across the network, from door locks to the data center. Transportation providers of the future must harness rapidly evolving technologies, collaborate with totally new partners, and prepare for disruptive opportunities. Together with Intel and Mobileye, the BMW Group will develop the necessary solutions and innovative systems for highly and fully automated driving to bring these technologies into series production by 2021. The BMW iNEXT model will be the foundation for BMW Group's autonomous driving strategy and set the basis for fleets of fully autonomous vehicles, not only on highways but also in urban environments for the purpose of automated ridesharing solutions.

The goal of the collaboration is to develop future-proofed solutions that enable the drivers to not only take their hands off the steering wheel, but reach the so called "eyes off" (level 3) and ultimately the "mind off" (level 4) level transforming the driver's in-car time into leisure or work time. This level of autonomy would enable the vehicle, on a technical level, to achieve the final stage of travelling "driver off" (level 5) without a human driver inside. This establishes the opportunity for self-driving fleets by 2021 and lays the foundation for entirely new business models in a connected, mobile world.

Mobileye will contribute through its expertise in sensing, localization, and driver policy to enable fully autonomous driving in this cooperation. The processing of sensing, like capabilities to understand the driving scene through a single camera already, will be deployed on Mobileye's latest system-on-chip, the EyeQ®5, and the collaborative development of fusion algorithms will be deployed on Intel computing platforms. In addition, Mobileye Road Experience Management (REM) technology will provide real-time precise localization and model the driving scene to essentially support fully autonomous driving. Intel has a comprehensive portfolio of technology to power and connect billions of smart and connected devices, including cars. To handle the complex workloads required for autonomous cars in urban environments Intel provides the compute power, that scales from Intel® Atom™ to Intel® Xeon™ processors, delivering up to a total of 100 teraflops of power efficient performance without having to rewrite code.

In 2017, Delphi was also on-boarded as a development partner and system integrator for their State-of-the-Art autonomous driving platform. All partners intend to jointly deploy a

cooperation model to deliver and scale the developed solutions to the broader OEM automotive industry and potentially other industries.

Taking this to a higher level again in 2017, BMW, Mobileye and Intel also signed a memorandum of understanding with the intention for Fiat Chrysler Automobiles (FCA) to be the first automaker to join them in developing a world leading, state-of-the-art autonomous driving platform for global deployment. With FCA as our new partner, we reinforce our path to successfully create the most relevant state-of-the-art, cross-OEM Level 3-5 solution on a global scale.

Q What are your views about the scope of autonomous vehicles in India?

A Globally the automotive industry is just at the start line of developing solutions for autonomous and connected mobility. The adoption of these technologies and their mass production will take some time. These technologies are designed to reduce human effort in mobility. These technologies will be extremely smart but at the end of the day their viability will depend on government policy, customer preferences and infrastructure.

Q What steps the company has been taking for localization of production? What are the impediments?

A The BMW Group has always looked towards India with a long-term perspective and our strategy is based on an inclusive approach. BMW Group India has constantly increased the number of its locally produced car models. Presently, the plant locally produces eight car models and has an annual capacity of 14,000 units.

BMW Group has further strengthened its commitment to the Indian market by increasing the level of localisation at BMW Plant Chennai to upto 50 percent. The cars locally produced at BMW Plant Chennai now feature very strong local content. Strong localisation benefits BMW in terms of cost optimization and value addition. At the same time it creates business and profitability for our suppliers resulting in a win-win situation.

Some of the major auto components sourced for local production of cars at BMW Plant Chennai are: Engine and Gearbox from Force Motors; Axles from ZF Hero Chassis; Door Panels and Wiring Harness from Draexlmaier India; Exhaust Systems from Tenneco Automotive India; Heating, Ventilating, Air-conditioning and Cooling Modules from Valeo India and Mahle Behr and Seats from Lear India. In addition, the International Purchasing Office (IPO) established at BMW India's Headquarters in Gurgaon identifies and assesses potential suppliers for BMW, MINI, and BMW Motorcycles, taking into account BMW Group's requirements for quality, technology and logistics. The IPO strongly focuses on increasing the sourcing of production material (components) as well as IT and engineering services from India to the BMW Group International Production Network.

The Make in India initiative is a positive step by the government towards encouraging business in India. India is a growth market and presents huge opportunities both in terms of demand and supply. The Make in India initiative has created a certain positive vibe in the business environment. Businesses are ready to take this forward and now need to be supported with on-ground facilitation. The availability of the right resources, manpower and skills is present. We believe that policies promoting ease of doing business will further enhance India's viability as a global business destination and will attract new investors towards setting up operations here. At the same time, existing investors will rethink before shifting and outsourcing operations to other countries.

But to turn this into a long-term success, the taxation regime needs to have a stable outlook. Frequent changes in government policies and tax structure are not viable for business as the realignment involves a lot of effort, time and cost. A set long-term direction in this area helps businesses to create and implement a long-term strategy which in turn leads to sustainable and profitable growth. Companies will commit to the Indian market in a much stronger way if taxation laws are firm, clear and transparent.

Q What is required for success of electric mobility?

A The deciding factor in the success of electric mobility is the infrastructure availability. Uninterrupted supply of power to charge the cars at any time is a necessity. There should also be enough public charging stations so that customers are confident about taking their electric cars anywhere whether in the city or for a long-drive. To realise the dream of green mobility, development of a sustainable web of on-road facilities and maintenance services on a large scale is essential.

Q Could you tell us about value system which helps achieve high standards?

A At the BMW Group, efficiency and quality are of utmost importance. We deliver cars that are known for their perfection and extremely high quality standards. Indian workforce can compete with the best global players when it comes to quality and cost efficiency. BMW Plant Chennai takes pride in producing cars that have the same international quality standards as any of the 30 BMW Group production and assembly facilities worldwide. Highly skilled employees, advanced manufacturing processes along with state-of-the-art machinery and technology provide all the necessary ingredients to achieve these tough standards. We believe that employees are our core strength. BMW India has heavily invested in training and development of associates at all levels at BMW India and across BMW India dealerships and will continue to do so. Intense training in management of sales, service, spare parts and business systems has been provided to BMW India dealerships to ensure that the customer gets the best-in-class pre and post sales experience. Dealer associates have also been trained at BMW Group's training centres in Singapore, Malaysia and Germany.

Next Generation Automotive Cybersecurity with Software Defined Perimeter & Blockchain

Mahbubul Alam
CTO and CMO
Movimento Group

Alam has been reinventing technology and strategy at Movimento since 2015. Prior to this, he spent 14 years as a technologist at Cisco were he was leading its IoT and M2M platforms since 2012.

The emergence of autonomous vehicles is radically changing the automotive business. This change is bringing in new revenue generation opportunities for the whole industry, but with it, also new risks - specifically cybersecurity. Since autonomous vehicles are completely dependent on connected software for all aspects of their operation, they are vulnerable to a broad spectrum of cybersecurity attacks. As we see in the news every day, even well-established sectors like the financial industry and government agencies are still struggling to deal with the same issues. Subsequently, the automotive industry will actually have to leapfrog existing approaches to cybersecurity to ensure that all existing threats are mitigated but also that future "unknown" threats are prevented. Automotive cybersecurity is much more than ransom, data breach, stolen personal records, etc. - it is about the safety of our lives!

The recent sanction of an automotive-specific cybersecurity bill in the US congress, H.R. 3388, also known as the "Self Drive Act", and the Senate's advancements on the AV START Act have sent a clear signal that the automotive industry needs to get serious about cybersecurity. The immediate security risks to connected cars and long-term risks to autonomous vehicles must be addressed. The "Self Drive Act" outlines the cybersecurity plan for autonomous driving systems.

Traditionally, the automotive industry only adopts mature technology. Unfortunately, the rapid pace of software development requires the automotive industry to become more innovative with respect to how it views software. More importantly, the dramatic increase in cybersecurity attacks demands cooperation among OEMs, Tier-1 suppliers, software developers and cybersecurity firms at a scale that has never been reached before. Today's automotive cybersecurity solutions in the marketplace are at best an after-thought. There are still many unanswered questions including how to safeguard internal vehicle systems from attacks, ensure data integrity while also providing data privacy and secure vehicle-to-cloud communications in millions of vehicles that each supports hundreds of ECUs, sensors, domain controllers, radars, LiDAR and ADAS. In order to deliver cybersecurity solutions to address these specific questions for connected and autonomous vehicles, a number of factors must be considered such as scaling globally to a massive number of vehicles, detecting software tampering and malware, support an array of telematics, information and safety applications, enabling precision access control to vehicle software suppliers and meeting regional safety, privacy and driving regulations.

Fortunately, there are two new emerging technologies, Software Defined Perimeter (SDP) and Blockchain, that offer a path forward. SDP enables the provisioning of secure communications between the software process within the vehicle and cloud-hosted applications while Blockchain enables secure messaging. By combining the any-to-any connectivity of the SDP with the scale of the Blockchain, an efficient cyber security model for connected and autonomous vehicles can be created. In order to further provide secure connected and autonomous vehicles in a systematic manner and provide the required safety, a number of practices should be adopted:

- Incorporate an industrywide Automotive Cybersecurity Lifetime (from cradle to grave) Compliance Certification program. Make cybersecurity a mandatory part of a vehicle's product development process.
- Establish a joint automotive cybersecurity taskforce that is responsible for proactive prevention, mitigation and correction of threats and attacks.
- Provide regulatory agency access to vehicle metadata (non personally identifiable information) for random cybersecurity compliance checks and validation.

What is a Software Defined Perimeter (SDP)?

SDP is a new approach to cybersecurity that is designed to provide on-demand, dynamically provisioned secure network segmentation, that mitigates network-based attacks, by creating perimeter networks anywhere in the world, whether it is in a cloud or in a data center. The architecture comprises of three main components:

- Virtual Gateway: A SDP virtual gateway is deployed in a cloud, data center or a connected gateway in the vehicle depending on the use case. This SDP virtual gateway combines the functions of a Firewall, VPN and application layer gateway in a single virtual appliance by only allowing approved software on authorized devices to connect to protected applications inside the vehicle as well as to the cloud.
- Client: To allow vehicle software processes to connect to protected applications, they must utilize the SDP client which can be embedded inside e.g. an over-the-air (OTA)

software management and data client. This SDP/OTA client has three distinct purposes. Firstly, it allows the automotive policy engine to determine the vehicle identity. Secondly, it allows the remote analysis of software and system processes to detect the presence of malware. And lastly, it provides a secure application layer connection between a software process or ECU inside the vehicle to a software process on a cloud application server.

- Controller: Tying the SDP/OTA client and gateway together is a controller. The SDP controller functions as a hub between the client and the gateway as well as external policy systems.

The SDP's interlocked security controls protect software systems within a vehicle and their data from cybersecurity attacks. All SDP transactions are cryptographically certified to mitigate real time tampering while the architecture scales to millions of vehicles supporting billions of software modules and ECUs.

What is Blockchain?

Blockchain, also known as Distributed Ledger Technology (DLT), is a decentralized database for ledgers and transactions. Bitcoin, also known as cryptocurrency, is one of the most famous and widely adopted global virtual currencies in the world and is based on Blockchain. Users gain access to their Bitcoin balance using their private key.

Being immune to a single point of failure and security issues provides a lot of advantages to Blockchain compared to traditional databases. The main advantages of the Blockchain are its immutability, scalability with data security, high data integrity, super transparency (all nodes have visibility into every messaging/transaction metadata) and its ultra-low cost per message/transaction making it very suitable to e.g. micro-payments. Deployments of Blockchain can be either public or private, where, in a public Blockchain (permission-less), any node on the Internet can read from and write to the ledger with appropriate application whereas, in a private Blockchain, all the nodes in the network are known and have explicit permission to read and write the ledger.

The above-mentioned Blockchain characteristics make it ideal for automotive use cases and OEMs could use a private Blockchain as a platform to enhance their overall cybersecurity for vehicles, validate software bills of materials, enable cost effective micro-payment, strengthen identity management and improve data validation. Examples include pooling of data from vehicles, fleet management, optimize business processes, enable peer-to-peer mobility sharing capabilities that can all disrupt existing business models and improve overall operations.

Combining Software Defined Perimeter and Blockchain for Automotive

Blockchain enable secure messages that can carry a wide variety of payloads from the status of sensors to the delivery of private encryption keys while an SDP provides secure in-vehicle and Internet links. Thus, blockchain messages can be used by ECUs to signal management systems on their status. If a situation requires a secure bi-directional link, an SDP connection can be provisioned from a vehicle-to-cloud resource and, once set up, Blockchain can be used to transmit messages between internal vehicle systems. The combination of SDP and Blockchain technology creates a system that is very lightweight and scalable, and yet has the ability to create secure enclaves when required. In addition to supporting telematics and safety applications, this Blockchain/SDP platform can also support multiple cryptocurrencies such as Bitcoin or Ethereum and thereby be a critical digital payment foundation for the automotive ecosystem.

A simple, but powerful example, of how short Blockchain messages and SDP connections complement each other, is the challenge of driving an autonomous vehicle in the snow. As an autonomous vehicle drives through a snowstorm, it can continuously send Blockchain status messages to cloud-based safety monitoring systems. However, if the vehicle gets stuck in the snow and is unable to dislodge itself, a secure SDP connection can be provisioned which will backhaul all the vehicle image sensors to a specialized cloud application for processing.

Key Takeaways

Both SDP and Blockchain represent the cutting edge of technology. For example, Gartner listed SDP as one of the most important new technologies in 2017 to reshape the enterprise market. Similarly, Blockchain is being adopted as a secure messaging protocol in a wide variety of applications due to its low cost and high scalability. The automotive industry could adopt both technologies as a foundation for secure OTA software/firmware/content updates, secure data exchange and autonomous driving communications. Both Blockchain and SDP are open license free public domain standards and both concepts are proven in large-scale critical deployments in areas such finance and tele communication. This restriction-free model means that there is no barrier for the automotive industry to adopt and innovative on top of them.

With attacks rising every year, cybersecurity has become one of the most important focal points for the automotive industry. A disruptive approach must be incorporated to battle the threat of cybersecurity attacks that are becoming more sophisticated each day. With the Blockchain-based SDP, OEMs have a unique solution that can empower the global automotive industry to secure connected cars and autonomous cars with confidence. ▪▪■

Junaid Islam
CTO
Vidder

Junaid Islam is the CTO and founder of Vidder, which provides distributed access control solutions to Fortune 500 companies. Prior to Vidder, Junaid founded Bivio Networks, which developed the first Gigabit speed software-based security platform in the industry. Earlier in his career, Junaid helped create networking standards such as Frame Relay, ATM and MPLS at StrataCom and Cisco.

Automated Driving- the Future of Mobility Globally and in India

Rahil Ansari
Head
Audi India

Rahil Ansari took over as the Head of Audi India on February 1, 2017.

He brings with him a broad range of experience in Finance, Sales and Aftersales, Marketing, Network Development and Retail Operations.

AUDI AG globally this year unveiled the new Audi A8 in Barcelona, a production automobile for highly automated driving.

I knew that the technology was in the offing but to see it in a production car, which is going to hit roads soon was amazing.

I am equally excited at the prospect of driverless cars on the streets in India – the advantages of driverless cars in a country like India is huge.

According to statistics, nearly 1.5 lakh people were killed in accidents in India last year as compared to 1.46 lakh in 2015.This means almost 410 Indians lost their lives every day because of accidents, while many others were injured. Experts say nearly 78 per cent of these accidents happened because of the driver's fault.

This is one area where automated driving can really make a difference since chances of human error reduce with automation. Globally, researchers estimate that driverless cars could, by mid-century, reduce traffic fatalities by up to 90 per cent. Consider North India, where the fog in winter reduces visibility on roads. This is where the Audi AI traffic jam pilot can help as it takes charge of driving in slow-moving traffic at up to 60 kmph on freeways and highways where a physical barrier separates the two carriageways.

From a technical perspective, the traffic jam pilot is revolutionary. During piloted driving, a central driver assistance controller (zFAS) permanently computes an image of the surroundings by merging the sensor data.

All-round sensors

Apart from radar sensors, a front camera and ultrasonic sensors, Audi also uses a laser scanner. By the end of the day, driverless cars can control the car a lot better, thanks to their sensory capabilities.

The automated driving technology will also help those who need cars but have difficulties in driving; as in the case of disabled and old people, who can now enjoy mobility. The traffic jam pilot manages starting, accelerating, steering and braking. This increases efficiency and reduces fuel usage and, consequently, carbon footprints. According to a McKinsey report, autonomous cars can reduce vehicular CO2 emissions by 300 million tonnes annually.

Since the traffic jam pilot manages it all, drivers no longer need to monitor the car permanently. They can take their hands off the steering wheel and focus on any other activity like watching onboard TV. As soon as the system reaches its limits, it calls on them to take back control of the vehicle. Today's drivers spend an average of about 50 minutes per day at the wheel. Audi is investigating how this time could be used better in a self-driving automobile as part of the 25th Hour project. This is based on the assumption that an intelligent human-machine interface will learn the user's individual preferences and adapt flexibly. In this way, customers gain full control of their time.

In a first step, the project team looked at people in Hamburg, San Francisco and Tokyo, focusing on two aspects — how is infotainment used in the car today? And what would people like to do with their free time in the car of the future? The results were then discussed with a variety of experts, including psychologists, anthropologists, and urban and mobility planners. In a second step, the team defined three time modes that are conceivable in a self-driving car: Quality time, productive time, and time for regeneration. In the first case, people spend time with their children or telephoning family and friends. In productive time, they usually work while downtime sees them relax by reading, surfing the web or watching a film.

Driverless cars, likewise, allow people to use their time in the manner they wish to. In a country like India where there are long distances to be travelled everyday, this will be a boon as people can reach their offices/homes in a happier state of mind.

Job loss fears

History has shown us that technology, which at first seems to threaten jobs has actually led to creation of many more. Take the example of computers where I remember the resistance to use them fearing job losses. However, look at how computers have revolutionised people's personal and professional lives. They have created a string of jobs that were non-existent before they came along.

The other example is mobile phones, when there were concerns that people who had phone booths would lose out on their earnings. There is no denying the fact that mobile phones have created millions of additional jobs in India. There are mobile galleries, recharge-shops, handset retail, technology jobs, among others.

Even when mobility apps were launched, there were fears that businesses of taxis and autorickshaws would suffer, but today they coexist with each other and the customer has benefited. Similarly, we need to wait and watch for the potential of driverless cars while welcoming opportunities that emerge.

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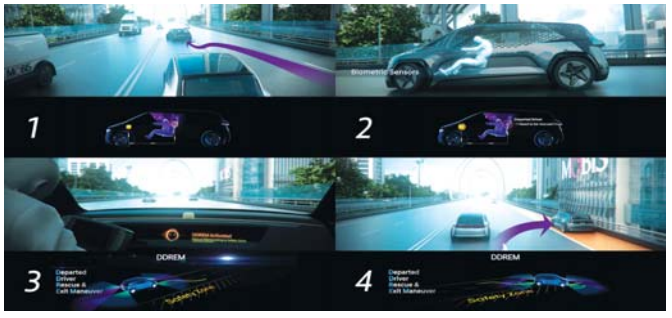


Hyundai Mobis unveiled DDREM (Departed Driver Rescue & Exit Maneuver) technology at CES 2018. It detects when a driver has dozed off and has begun to depart the road, it autonomously guides the vehicle to safety. DDREM uses checkpoints to determine if a driver begins to depart from the driving role, and requires assistance. If departure is detected, DDREM technology takes over driving controls, scans the environment and guides the vehicle to a safe stopping point away from traffic. ▪▪■

BYTON's autonomous electric vehicle

BYTON's autonomous electric vehicle made its global debut at CES 2018. Its features are

- **Shared Experience Display:** BYTON is equipped with multiple display screens, with the traditional center console replaced by a Shared Experience Display enabling content shown to be shared with other passengers in the car.
- **Human-Vehicle Interaction:** In addition to voice recognition, touch control, biometric identification and necessary physical buttons, the car features proprietary Air Touch sensors, enabling front and rear passengers to control the Shared Experience Display with hand gestures.
- **BYTON Life Cloud Platform:** This platform seamlessly connects a driver's or passenger's apps, data, and devices, allowing them to take full advantage of their travel time whether for work or entertainment. BYTON Life also provides personalized services and configurations that are automatically adjusted to users' preferences.
- **BYTON Intuitive Access:** This advanced secure unlocking method uses facial recognition cameras to recognize the driver or passenger in unlocking the door.
- **Interior and Exterior Digital Design:** Among other digital design features, unique BYTON Smart Surfaces composed of front and rear LED lights and a luminescent logo can switch to different display modes to suit different driving scenarios. ▪▪■

Intel's first autonomous vehicle

Intel CEO Brian Krzanich at CES 2018 unveiled Intel's first autonomous vehicle in its 100-car test fleet. He mentioned that BMW, Nissan, and Volkswagen are moving their Mobileye-based mapping design wins to actual deployments. Two million vehicles from BMW, Nissan and Volkswagen will use Mobileye Road Experience Management (REM) technology to crowdsource data to build and rapidly update low-cost, scalable high-definition maps throughout this year.

Further he announced new collaborations with SAIC Motor and NavInfo to extend crowdsourced map building to China. Navinfo and Intel will work together to build and distribute Mobileye's Road Experience Management (REM) product in China. Specifically, the partnership's purpose is to use Mobileye's REM technology to generate a RoadBook in China that is integrated and aligned with NavInfo's mapping solutions.

Focused on the future of AI, Krzanich announced a partnership with Ferrari North America to use Intel's AI technologies to apply data from the racetrack to enhance the experience for fans and drivers. Krzanich also disclosed details for the company's new automated driving platform, which combines automotive-grade Intel Atom processors with Mobileye EyeQ5 chips to deliver a platform with industry-leading scalability and versatility for L3 (Level 3) to L5 (Level 5) autonomous driving. ▪▪■

AE 100 iDAR based robotic perception product for autonomous vehicles

AEye has announced the AE100, a robotic perception system for autonomous vehicle, ADAS, and mobility markets. The AE100 is a solid state, costoptimized system based on AEye's iDAR (Intelligent Detection & Ranging) technology, a new form of intelligent data collection that enables rapid, dynamic perception and enhanced path planning. ▪▪■

Cognata launches cloud-based simulation engine for autonomous vehicle validation

Cognata is launching cloud-based simulation engine for autonomous vehicle validation powered with technologies from NVIDIA and Microsoft. The announcement was made at CES 2018 in Las Vegas.

The Cognata platform leverages artificial intelligence, deep learning, and computer vision to provide the solution capable of validating autonomous vehicles with unlimited scalability today. The NVIDIA DRIVE platform supports autonomous applications with software that helps developers and researchers optimize, validate, and deploy their work. Cognata will run the combined technologies on the Microsoft Azure cloud-based platform.

Car makers are required to accumulate 10 billion miles worth of test drives, which can take years to complete. Cognata's simulation platform can advance that process by enabling autonomous vehicle manufacturers to log highly realistic virtual test drives on the virtual roadways of its simulated environment, thereby trimming years off the road-testing process.

Cognata was founded in 2016 by a team of experts in deep learning, autonomous vehicles and computer vision. The company is headquartered in Rehovot, Israel. ▪▪■

Cisco and Hyundai to produce next-gen hyperconnected car

Cisco and Hyundai Motor Company announced the production of a next-generation, hyperconnected car at CES 2018. Hyundai will feature this new in-vehicle network in their premium 2019 vehicles.

Both the companies were working to develop a vehicle with a new approach to communication since 2016. The companies have created a flexible and more secure platform that offers a path to innovate and build on smart-vehicle solutions. The features of the platform are:

- The platform provides 'over-the-air updates' and accelerates the time it takes to bring new capabilities to market.
- It uses a Software Defined Vehicle (SDV) architecture. This new, in-vehicle network sets the stage for adaptive technologies.
- It offers integrated, multi-layer security, as well as full end-to-end networking – allowing for true sensor integration.
- It will also enable new, high-speed services through an integration layer between software and legacy hardware.
- The development of first-generation solutions to enable 1Gbps Ethernet will significantly increase the in-vehicle bandwidth.
- The solutions will provide flexibility, lower costs, and improved security.
- By enabling IP and Ethernet services, legacy buses and devices will work together with the new Ethernet attached devices and services. ▪▪■

AI powered capabilities for Dragon Drive automotive platform

Nuance Communications announced new artificial intelligence (AI) powered capabilities for its Dragon Drive automotive platform. The conversational automotive assistant listens, understands and responds to drivers. Dragon Drive's new features include: Multi-modal usage; Enhanced interoperability via cognitive arbitration; AI integration with car sensors; Enhanced multi-passenger interaction; Just Talk. ▪▪■

Panasonic working with Amazon to offer the next generation of invehicle infotainment (IVI) systems

Panasonic is working with Amazon to offer the next generation of invehicle infotainment (IVI) systems with the Alexa voice service, including certain capabilities natively embedded. The integration will change the experience OEMs can offer to incar users, allowing them to interact with the voice service from the vehicle.

Panasonic will deliver an Alexa experience optimized for in-car use, with select Alexa capabilities available with no Internet connection required. The companies demonstrated the technology during the Panasonic CES 2018 .

Amazon's Alexa Onboard technology works with the Panasonic Skip Generation (Skip Gen) IVI technology announced at CES 2017 and enables drivers to use the familiar "Alexa" wake word to interact with the intelligent voice service for a variety of in-vehicle functions such as car controls like HVAC, media, communication and navigation. ▪▪■

Bosch puts the voice assistant behind the wheel

Bosch has put the voice assistant behind the wheel. The newly developed technology frees drivers from distractions so that they can concentrate on their essential task making driving safer as well as more comfortable.

Voice command functions of the past offered little help in preventing driver distractions and thus accidents. The Bosch assistant no longer responds to rigidly worded commands. The voice recognition system understands natural sentence structures and can even handle accents and dialects.

More than a decade of work has been invested in the development of the voice control. The driver can make phone calls, find destinations, control lighting etc and the assistant also has the ability to think ahead and learn. The Bosch assistant has no need whatsoever of an external data connection. The infotainment system in the car takes over the calculation without sending any data to the cloud. Casey even stays with the drivers in tunnels, when far away from areas with good mobile network coverage, or in other countries when the smartphone is offline.

Regardless of whether it is called “Casey”, “Michael”, or “Linda”, the Bosch voice recognition system understands and speaks 30 different languages with a total of 44 female and 9 male voices. The driver activates the assistant by calling out “Hey, Casey” or uses the new name given to the assistant. The driver starts every new dialog simply by speaking directly to the assistant; no longer does the driver have to wait for a peep before starting to talk.

Harman and Samsung unveil autonomous and connected vehicle solutions

HARMAN International and Samsung Electronics unveiled at CES 2018 connected car solutions. These key innovations showcase an integrated approach to a rich digital car experience, including:

New HARMAN Digital Cockpit Platform

The new Digital Cockpit platform is available in standard and advanced system configurations and can integrate the instrument cluster with center console via voice, haptic feedback, and physical knobs and steering wheel controls in a single, center screen for all vital vehicle information and features. This also supports a multi-modal approach for interactions with different human-machine interfaces to allow customization in terms of HVAC, media and user settings.

The Digital Cockpit platform allows to focus on the road ahead while interacting with their in-car technology, through a projection mode for services and apps via a user’s smartphone, allowing for increased personalization.

It has multi-display layout based on HARMAN’s Ignite Platform. In-car user experience can be personalized for the driver and passenger via services such as virtual personal assistants, portable profiles, augmented reality and more. This also allows for the Android OS to be integrated on four displays.

By leveraging the phone as a key service, the system can automatically access subscription services associated with user profiles while Bixby offers intelligent personal assistance to help occupants complete tasks by voice, touch, gesture and context-based triggers.

First 5G Automotive Telematics Solution

HARMAN and its parent company Samsung are developing modular approaches for advanced telematics, capable of 1 Gb/s bandwidth. They are working on 5G-ready automotive solution and multi-band conformal antenna to enable secure, fast and reliable data communications. The solution consists of a telematics control unit with a modular design accommodating a network access device (NAD) supporting LTE CAT 16 connectivity today and 5G in the future leveraging the same hardware design. 5G represents a paradigm shift in the future of mobility.

Advanced Driving Solutions

Samsung announced its new DRVLINE platform, an open and modular platform for autonomous driving designed to scale from Level 3 automation up to Levels 4 and 5. HARMAN/Samsung have developed ADAS product which will be having a forward-facing camera featuring lane-departure warning, adaptive cruise control, collision warning and pedestrian warning algorithms. The new system is based on HARMAN’s ADAS 360 solution. It will begin shipping in 2018.

Nissan unveils BraintoVehicle technology

Nissan has unveiled research that will enable vehicles to interpret signals from the driver's brain, redefining how people interact with their cars. Nissan's BraintoVehicle, or B2V, technology promises to speed up reaction times for drivers and will lead to cars that keep adapting to make driving more enjoyable. B2V is the result of research into using brain decoding technology to predict a driver's actions and detect discomfort:

- **Predict:** By catching signs that the driver's brain is about to initiate a movement – such as turning the steering wheel or pushing the accelerator pedal – driver assist technologies can begin the action more quickly. This can improve reaction times and enhance manual driving.
- **Detect:** By detecting and evaluating driver discomfort, artificial intelligence can change the driving configuration or driving style when in autonomous mode.

Other possible uses include adjusting the vehicle's internal environment, for example, the technology can use augmented reality to adjust what the driver sees and create a more relaxing environment.

The driver wears a device that measures brain wave activity, which is then analyzed by B2V. By anticipating intended movement, the systems can take actions – such as turning the steering wheel or slowing the car – 0.2 to 0.5 seconds faster than the driver, while remaining largely imperceptible. ▪▪■

Nvidia announces multiple parterships and agreements

Nvidia and Volkswagen announced about working together to make AI assistants for voice, gesture and facial recognition using NVIDIA DRIVE IX technology. The VW I.D. Buzz will use DRIVE IX technology to create "Intelligent Co-Pilot" applications, which will include convenience and assistance systems based on processing sensor data from both inside and outside of the car.

NVIDIA will be working with, ZF and Baidu to create a production-ready AI autonomous vehicle platform designed for China. The collaboration is based on the new NVIDIA DRIVE Xavier, ZF's new ProAI car computer and Baidu's Apollo Pilot, an autonomous driving product targeted for mass production. NVIDIA DRIVE Xavier, which will be made available this quarter, is(as claimed) world's most complex and advanced SoC, it is capable of performing 30 deep learning TOPS (trillions of operations per second), using only 30 watts of power. ZF's new Xavier-based ProAI will process inputs from multiple cameras, plus lidar and radar, paint a 360-degree view around the vehicle, locate it on an HD map, and find a safe path through traffic.

Baidu's Apollo open autonomous driving platform provides a comprehensive, secure and reliable all-in-one solution that supports all major features and functions of an autonomous vehicle. Apollo Pilot is an autonomous driving product targeted for mass production. NVIDIA is working with Aurora to create a new Level 4 and Level 5 self-driving hardware platform based on NVIDIA DRIVE Xavier processor. ▪▪■

QUICK CES UPDATE

- Qualcomm Technologies and Ford working together for the development of advanced connectivity systems
- Savari working with Qualcomm Technologies to deliver a comprehensive Cellular VehicletoEverything (CV2X) solution
- TomTom and Zenuity join forces on "Zenuity Connected Road" for autonomous vehicles
- Airbiquity's OTAmatic to be integrated with Arity's driving behavior analytics modules
- Jaguar Land Rover to use Qualcomm Snapdragon automotive platforms to power various advance vehicle features
- Blackberry operating system (OS) to be the foundation for Baidu's Apollo autonomous driving open platform
- JVC Kenwood showcases wireless Android Auto
- Garmin's scalable infotainment platform for automotive
- Molex 10 Gbps Automotive Ethernet Network & Aquantia parter to accelerate data bandwidth in connected vehicle
- Excelfore demonstrated its eSync system with ZF
- Argus Connectivity Protection and Argus Lifespan Protection integrates with Renesas' R-Car H3 system-on-chip
- Innoviz Technologies launches high-resolution, solid-state automotive LiDAR solution InnovizPro
- STMicroelectronics with Cinemo demonstrates the full capability of the ST Accordo5 car-infotainment processor platform
- Volkswagen Group and Aurora Innovation, announce strategic collaboration to realize self-driving EVs
- Hyundai and Aurora announce strategic partnership to bring self-driving Hyundai vehicles to market by 2021
- Seeing Machines demonstrates its FOVIO Driver Monitoring Platform
- Blackberry operating system (OS) to be the foundation for Baidu's Apollo autonomous driving open platform
- Aptiv and Lyft partner to demonstrate self-driving car rides
- JVC Kenwood to showcase wireless Android Auto Kia Motors presents its future mobility vision 'Boundless for all'
- Hyundai and Aurora announce strategic partnership to bring self-driving Hyundai vehicles to market by 2021
- Seeing Machines demonstrates its FOVIO Driver Monitoring Platform
- Blackberry operating system (OS) to be the foundation for Baidu's Apollo autonomous driving open platform
- Aptiv and Lyft partner to demonstrate self-driving car rides
- JVC Kenwood to showcase wireless Android Auto

Cybersecurity is One Word

Steve Tengler
Senior Director
Connected Vehicle Cybersecurity
Honeywell

Steve Tengler is the Senior Director of Connected Vehicles for Honeywell's Transportation Systems business. He has been working on automotive electronics and telematics for more than 25 years for companies such as OnStar, Nissan, Ford and Honeywell, and has taught at Wayne State University. Steve has more than 30 patents and 50 industry papers on telematics and associated technologies and has a Masters in Industrial Engineering from The University of Michigan.

The automotive community seems to believe that cybersecurity is something new; something discovered amidst their strategizing, discussions and planning for unchartered technologies like autonomous cars. They errantly assume no cyber-physical engineers have already ventured down these complex paths; and humorously, they even debate whether cybersecurity is one word or two (e.g. "cyber security"). News flash: cybersecurity is one word (see the dictionary if you don't believe me), and engineers within my company and others have worked on cyber-physical security for more than 30 years.

So what lessons has the community learned in that timeframe? Many. I would be sophomoric to think I can know and relay all of them – let alone in one article – so here are three:

Cybersecurity is Either Going to Cost You, or Really Cost You

I joke that the only way you can avoid a cost from cybersecurity is selling air via a door-to-door salesman accepting only cash payments. That's it. Otherwise, you should have an annual line item for cybersecurity and a Chief Information Security Officer to oversee operations. Facts to support this? Accenture's white paper states "… [average number] of successful breaches per company each year has risen more than 27 percent, from an average of 102 to 130." Kaspersky also recently reported that the average data breach for a U.S. enterprise grew from $1.2 million in 2016 to $1.3 million in 2017, which equates to an 11 percent increase in the cost per breach. And what is not even accounted for in these studies is the long-term effect to customer sentiment: a 2016 study found 82 percent of automotive customers would be unlikely to buy a vehicle from an automaker that had been hacked.

Yet, the problem for many of the companies is "How do I pay for the cure when I cannot charge the patient for it?" Few companies can sell cybersecurity with a marketing trifold stating they have built-in bulletproof cybersecurity since A) customers want to believe intelligent corporations have quietly dealt with such unpleasantries, and B) such marketing hubris only puts a target on the company's back (*sorry Target, no breach-pun intended).

The simple answer: cybersecurity is either going to cost you a little in prevention, or it will cost you a lot in clean-up. Convincing the Chief Financial Officer (CFO) only takes a little web searching in these adjacent industries where they have experienced connectivity in the previous few decades and the naiveté of "It won't happen to me" will disappear.

Think of Cybersecurity Just Like You Think of Security

Providing cybersecurity for an airplane, a truck or a passenger car can be best explained to CFOs in considering existing physical security systems for secured buildings (e.g. military facility). Proper protection requires a multifaceted approach where the intruder is confronted with a series of repellants. First you start with the outer perimeter: if you are going cheap, you might keep it to a barbed wire fence, or you might increase your reliability via elevated lighting, guard dogs, and a security shed with personnel monitoring the entrance ways. Then you focus your efforts on the building's exterior defenses: door locks, personal identification access points, and window sensors. Last but not least, you secure the inside by providing hallway cameras in concert with roaming security guards who are in communications with the operations room where the cameras are being monitored. All of this represents cost, but securing the precious contents

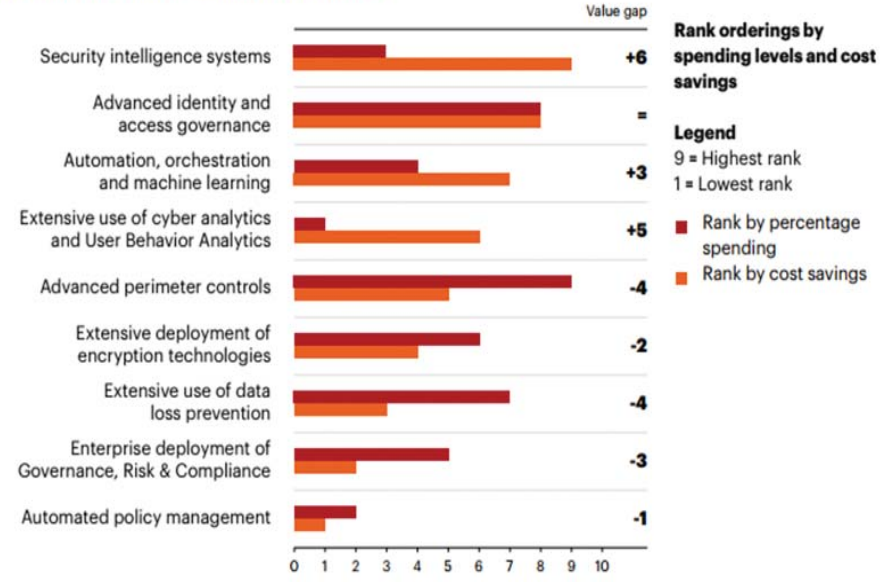
of the building are important, and one simple door lock could easily be picked by a thief.

Cybersecurity is tiered as well, and shall be for vehicles in the next few years. The outer defenses are wireless encryptions, certificates and firewalls to protect the invisible areas around the vehicle and the entrance ways into the vehicle (e.g. telematics/cellular connection). Then the outer defenses are various protections for the individual modules, which are analogous to locks for the individual doors: the hope is to prevent the attacker from entering the vehicle at any given portal. If you keep the attacker out of the first module, then he must find another way in.

The last is the inner defense, which will again be translated from other markets to automotive in the next one to two years: an Intrusion Detection and Protection System (IDPS) or "hallway monitor" in concert with Security Operations Centers. This will look for communication anomalies on the vehicle networks (e.g. CAN, CAN-FD, Ethernet, Flexray). If it is an obvious intruder, it blocks the message from proceeding down the "hallway" akin to the security guard. If the anomaly is a curious one, it flags it to artificial intelligence engines and/or cybersecurity data scientists in the Operations Center akin to the cameras.

The Operations Center then collects the clues from several vehicles, recognizes the likely root cause, and works with the automotive manufacturer to address the issue by updating or re-flashing vehicle software. Therein, just like the secured building, the security force descends upon the intruder who made it past the outer defenses and exterior locks and eradicates the unwanted assailant.

THE POSITIVE OR NEGATIVE VALUE GAPS ASSOCIATED WITH SECURITY INVESTMENTS



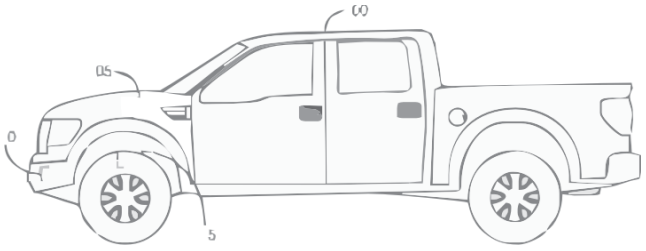
Not All Cybersecurity Dollars Are Created Equal

So now the CFO is really paying attention: "We need a tiered defense to avoid hundreds of millions in future costs, but I want to spend my dollars wisely." Engineering starts to research the problem and hundreds of start-ups come knocking on the door hoping to get a piece of the pie. They each provide one portion of the solution that solves a portion of the problem, but Engineering gets lost in comparing apples to oranges of various solutions that stops unknown, future threats. How does one measure the Return on Investment (ROI) of any given solution without a perfect crystal ball of who might be attacking, and how?

The good news is that some of this ROI investigation has already been done in previous studies via post mortems with hundreds of companies. The 2017 Cost of Cyber Crime Study shows that Security Intelligence Systems, Cyber Analytics and Automation/Machine Learning are the best rankings for spending levels versus cost savings. This should suggest to the automotive companies that they are moving in the right direction with the IDPS and SOC strategy: monitor and protect the fleet via ongoing analytics. And as those analytics are shared more and more among the corporations within cooperative organizations like the Automotive Information Sharing and Analysis Center (Auto-ISAC), the power of those invested dollars shall improve the equation even further.

So now the debate is evolving towards conscientious: cybersecurity is not only one word, but also an important word where the automotive community should continue to learn from previous improvements in other industries. Doing so will make the CFO happier. ▪▪▪

Ford Global Technologies patents an off-road autonomous driving system



US Patent and Trademark Office has granted Ford Global Technologies a patent for an off-road autonomous driving system. According to the patent, the system would utilize wide-ranging sensors like radars, Lidar, and cameras, it will also have detectors to detect road conditions, which will be supported by data like topographic maps etc. The vehicle system includes a processor with access to a memory storing instructions executable by the processor.

Microsoft AirSim for testing of vehicle AI system

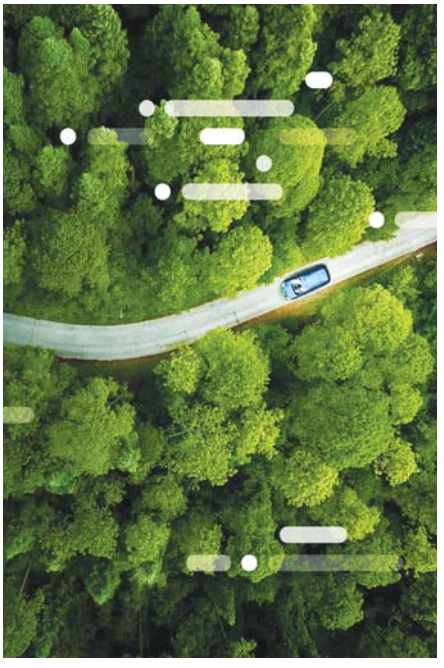
Microsoft has expanded its artificial intelligence simulator to include autonomous car research. The AirSim (Aerial Informatics and Robotics) system can now be used for testing the safety of vehicle artificial intelligence systems. AirSim is an open source artificial intelligence simulator which enables interfaces to common robotic platforms such as a Robot Operating System (ROS).

Tesla Semi and Roadster

Tesla has launched a new version of its sports car- Roadster, which can speed up to 60 mph in 1.9 sec. The car has a 200 kWh battery pack that offers 630 miles of highway driving range. It will be available in 2020 at $200,000.

Tesla also unveiled its truck- Tesla Semi. It has a range of 500 miles on a single charge. Tesla Semi will go into production in 2019.

Arity offers accident prediction



Arity has introduced a suite of three new data products designed to help reduce the number of collisions and fatalities on roads. Called Risk Data Stream, Drive Shield Routing and Drive Shield Alerts, these new offerings from Arity help enable automotive OEMs, telematics service providers (TSPs), insurance providers and other vendors to predict risk of accidents – and boost safety.

Hyundai Mobis comes up with autonomous reverse-driving technology

Hyundai Mobis has developed reverse driving support technology that autonomously steers when a car goes back without the driver having to operate the steering wheel.

It stores the speed and travel paths when a car moves forward and automatically turns the car back by calculating the speed and travel paths in reverse. Under this method, a steering angle sensor, a wheel sensor and a yaw sensor installed inside a vehicle measure the car's speed, distance and degree of rotation.

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Uber patents a system that would prevent travel sickness

Self Driving Uber

Uber is apparently developing a system that would prevent travel in cars especially self-driving cars. According to a patent application published this month, the system would make it comfortable for the passengers to multitask.

The car would use data from its self-driving cars to create a "sensory stimulation system" that syncs up passenger's eyes and ears, thus taking care of nausea that arises due to a mismatch between what our eyes see and what our body feels.

It would also make use of air flowing on the face and another part of the body of passengers; vibrating and moving seats; create visual stimulation such as an augmented reality live stream of the surrounding environment etc for the purpose. The company also plans to introduce "light bar," visible within the cabin, which would emit lights at different colors and brightness settings to mimic a direction change. ▪▪■

Infiniti unveils the new 2019 QX50

Infiniti unveils the new 2019 QX50, equipped with ProPILOT Assist technologies that supports single-lane highway driving. ProPILOT Assist is designed to add to driving enjoyment and confidence, and is available at the push of a button. ▪▪■

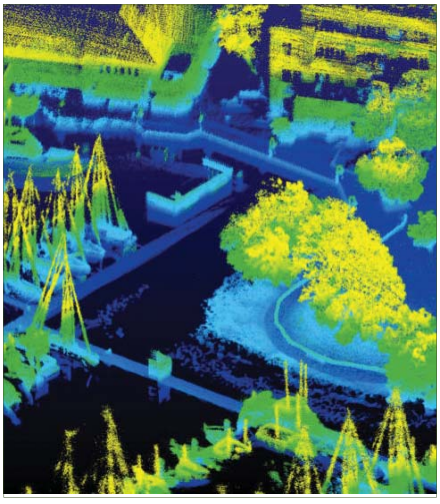
AWS offers connected vehicle solution

The AWS Solutions team now offers the connected vehicle solution, a reference implementation that provides secure vehicle connectivity to the AWS Cloud, and includes capabilities for local computing within vehicles, event rules, data processing and storage. The solution is designed to provide a framework for connected vehicle services, allowing to focus on extending the solution's functionality rather than managing the underlying infrastructure operations. Customers can build upon this framework to address a wide range of use cases. ▪▪■

AUTONOMOUS VEHICLE UPDATE

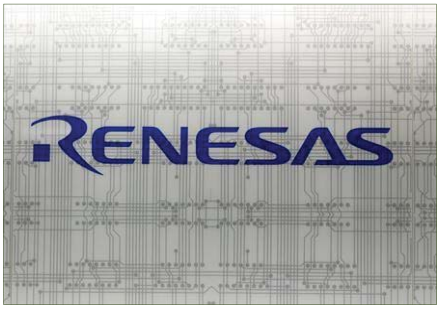
- Renesas and Dibotics to together develop an automotive-grade embedded solution for LiDAR
- Renovo and Samsung Electronics to jointly work for the development of vehicle technology
- BlackBerry and Qualcomm collaborate to develop and produce cutting-edge automotive platforms for the next gen connected vehicles
- SenseTime signs agreement with Honda to build smart AI cars
- Yandex is testing its self-driving cars in extreme winter conditions
- GM plans to launch autonomous ride sharing within 2 years
- Apple may test autonomous vehicles at an old Fiat Chrysler testing ground in Arizona
- Waymo has driven 4 million miles autonomously on public roads
- Parkopedia to provide in-car parking service on legacy vehicles of Toyota and Lexus
- SelfDrive.ae launches a new segment of all electric cars to its online fleet of Self Drive car rental in Dubai
- Spark EV launches AI-based journey prediction telematics solution
- Lyft gets permit to test its driverless cars in California
- Singapore: Autonomous buses and on-demand shuttles will serve commuters in Punggol, Tengah and the Jurong from 2022
- Apple scientists reveal self-driving car research
- Uber will purchase 24,000 XC90 SUVs from Volvo to form a fleet of driverless cars
- Jaguar Land Rover tested its driverless car on the UK roads
- Tesla to have new hardware in order to make its car capable of Level 5 autonomous driving
- Fujitsu and HERE to link their technologies into integrated solutions for advanced mobility services and autonomous cars
- A driverless shuttle got involved in a minor crash while testing in Las Vegas
- Self-driving cars will be on the road within 3 years, says Nvidia CEO
- LG Electronics demonstrates safety technologies for autonomous driving
- Volvo Cars developing autonomous drive cars; gaining support from Swedish families
- Velodyne LiDAR announces a significant cost reduction for VLP-16 Puck
- LG and HERE partner to offer a next-generation telematics solution for autonomous vehicles
- Qualcomm gets permission to test self driving cars in California
- Quanergy to mass produce solid state 3D LiDAR sensors
- Baidu tests self driving cars in China
- Renesas and Airbiquity announce a secure, high-performance automotive solution for ADAS, V2X, and automated driving applications
- UK sees self-driving cars operating freely on its streets from 2021
- The cost of the self-driving cars may come down by 90% by 2025: Delphi CEO ▪▪■

Velodyne announces new VLS-128 LiDAR sensor



Velodyne LiDAR has announced its new VLS-128 LiDAR sensor for the rapidly expanding autonomous vehicle market. Featuring 128 laser channels, the VLS-128 is a step forward in LiDAR vision systems, featuring the trifecta of highest resolution, longest range, and the widest surround field-of-view of any LiDAR system available today, claimed the company. ▪▪■

Renesas and HELLA Aglaia announce open and scalable front camera solution for ADAS and automated driving



Renesas Electronics Corporation and HELLA Aglaia have announced their open and scalable front camera solution for ADAS and automated driving. Renesas is a supplier of semiconductor solutions, and HELLA Aglaia developer of intelligent visual sensor systems. ▪▪■

Hybrid sensor for autonomous cars

Startup, AEye, has built a new kind of hybrid sensor that aims to give the autonomous cars a human-like view of the surroundings. The device uses a solid-state lidar, a low-light camera, and chips to run embedded artificial-intelligence algorithms that can reprogram how the hardware is being used in the real time. That allows the system to prioritize where it's looking in order to give vehicles a more refined view of the world.

The company claims that the device should be able to see as far as 300 meters with an angular resolution as small as 0.1 degrees. ▪▪■

Renault Samsung Motors (South Korea) unveils SM3 Z.E. concept car

Renault Samsung Motors has unveiled its new zero emission concept car, SM3 Z.E, with upgraded electric vehicle range.

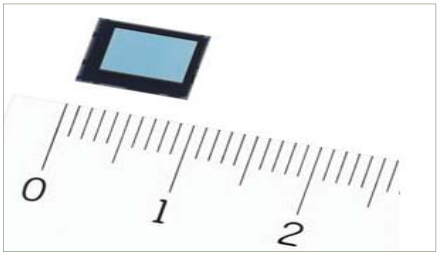
This increase in autonomy and the model's spacious cabin will enable SM3 Z.E. to address the market need of autonomous and electric vehicles. ▪▪■

Hyundai working with SoundHound to develop 'Intelligent Personal Agent' voice-control technology

Hyundai Motor Company is working on equipping future connected vehicles with the voice recognition technology necessary to keep pace with growing, real-time data needs of drivers. Hyundai's "Intelligent Personal Agent," a voice-enabled virtual assistant system, will be deployed in new models set to roll out as early as 2019. ▪▪■

Sony releases a back-illuminated, time-of-flight ("ToF") image sensor

Sony has released a back-illuminated, time-of-flight ("ToF") image sensor which is 1/2-type, VGA resolution and it delivers improved depth sensing performance. ▪▪■



Avis launches "Mobility Lab"

Avis has launched its first-ever "Mobility Lab" that serves as a test bed for fully connected vehicles and operations in the greater Kansas City, Missouri area. The Mobility Lab comprises more than 20 Avis Car Rental locations, and features a fleet of 5,000 connected cars.

Volkswagen and Google announce comprehensive research cooperation on quantum computing

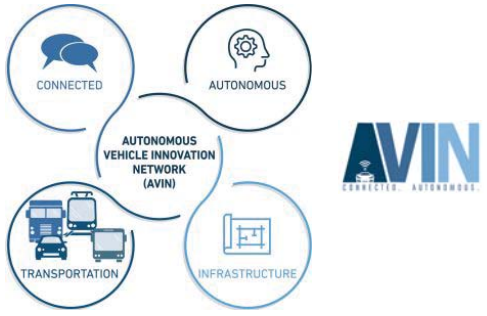
Volkswagen and Google have announced comprehensive research cooperation in the field of quantum computing. As part of this collaboration, a team of specialists from Volkswagen and Google will work together using a Google quantum computer in three specific areas:

- Development of traffic optimization
- Explore structures for new materials
- To work on artificial intelligence with new machine learning processes.

CCC launches CCC X connected data exchange

CCC Information Services and its affiliates announced the general availability of CCC™ X, a data exchange that helps convert connected data into actionable insights and makes it available for use across the CCC network. CCC also announced that it is set to expand its network to include 14 new companies.

Ontario launches the Autonomous Vehicle Innovation Network (AVIN)



Ontario has announced an $80 million government investment for the development of the vehicles through the launch of the Autonomous Vehicle Innovation Network (AVIN).

In addition to the Demonstration Zone, AVIN includes a:

- Research and Development Partnership Fund
- Talent Development Program
- Central Hub

Waiting for perfect autonomous vehicles may cost lives, says RAND research

A report by RAND research shows that putting AVs on the road before they're perfect improves the technology more quickly—and could save hundreds of thousands of lives over time.

The researchers used the model to examine 500 different future scenarios. Under most scenarios, introducing autonomous vehicles sooner rather than later saved more lives in the near term, and under all scenarios, introducing AVs early would save more lives over the long term.

Virgin Hyperloop One joins the GENIVI Alliance

Virgin Hyperloop One, the only company in the world that has built and successfully tested a full-scale hyperloop system, has joined the GENIVI Alliance. The company aims to work with the strong GENIVI ecosystem and leverage its proven history of open source software collaboration.

INDUSTRY UPDATE

- Ford to shift its autonomous, EV business and strategy teams to Detroit
- Upstream Security announced closing of $9 million in Series A funding
- Lear Corporation to acquire EXO Technologies
- Didi Chuxing plans to expand into Mexico next year, say reports
- Renesas joins as the official technology partner of the Mahindra Racing Formula E team
- Mercedes-Benz opens R&D center in Tel Aviv
- Trak Global partners with Gift Cloud for Carrot customers
- Volkswagen to invest more than € 34 billion on future technologies
- TomTom Route Monitoring launched to address congestion challenges faced by smart cities
- Ouster announces the launch of OS1 LIDAR; raises $27 million in Series A funding
- HERE plans to acquire ATS
- Velodyne LiDAR partners with Unmanned Solution, Korea
- DENSO and BlackBerry jointly develop first integrated HMI platform
- TomTom's API's are powering Microsoft Azure's newly launched location based services

Connected Vehicles

- Chery and Linkmotion to together develop a technology platform for the connected vehicles
- Honda and SoftBank to work on connected cars
- PSA Group and Huawei Technologies enter into a partnership to develop a secure connected vehicle system
- Tampa hosts first demo of a connected vehicle technology research project
- Denso and NEC platforms launch a new joint venture, Denso Next
- Hyundai Blue Link and Smartcar to jointly connect myriads of businesses to Hyundai vehicles
- Waze now available on IVI systems powered by Abalta's WebLink software
- DENSO acquires InfiniteKey to develop smartphone-based automotive access
- Audi adds Amazon Music to its infotainment system
- CruiseConnect, vehicle connectivity device and app developed by ZTE and Modus respectively
- Neura release solutions for two new solutions for Connected Car and Transportation

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INDUSTRY UPDATE

Insurance Telematics

- Europe and North America to reach 65.2 million active insurance telematics policies in 2021- Berg Insight
- Vodafone becomes digital telematics partner of Admiral car Insurance
- Octo surpasses three million usage-based insurance (UBI) users in North America
- Octo Telematics completes acquisition of the usage-based insurance assets of Willis Towers Watson
- Zurich Insurance Group acquires Bright Box
- Waymo partners with Trov, an on-demand insurance technology company

Electric Vehicles

- Toyota and Panasonic to jointly study automotive batteries
- BMW working on FastCharge, aims to reduce recharging time to 15 minutes
- Nidec and Groupe PSA to set up a joint venture dedicated to electric traction motors
- Honda to develop electric vehicles capable of running 240km on a single 15-minute charge
- Shell and IONITY to offer charge points across ten European countries
- Toyota Motor may sell locally designed and manufactured all-electric vehicle models in China
- GM relies on cheap battery and all new vehicle platform to bring profitable EVs
- WiTricity to use TI automotive-grade semiconductor components in its DRIVE 11 wireless charging systems
- Continental plans to enter electric vehicle battery market
- Tesla opens its largest Supercharger stations in California
- Honda installs bi-directional charging technology at European R&D centre
- Ford aims Chinese electric vehicle market
- Toyota aims more than 5.5 million electrified vehicles by 2030
- Digital payment for charging electric vehicles approved by the Govt of India
- Honda planning to set up a lithium ion battery manufacturing unit in India

Toyota's research projects on acceptance of CVs and AVs

Project Title	Description	Institution
A Neuroergonomic Evaluation of Mental Model Development of Future Automated Driving Technologies	This project is aimed at objectively determining (through neuroergonomic methods) how different factors impact mental model development and evolution of advanced safety technologies.	George Mason University
A Naturalistic Driving Evaluation of Mental Model Development of Future Automated Driving Technologies	This project will develop a taxonomy of mental model development of automotive safety technologies by determining in a naturalistic driving setting how users develop and maintain mental models as AV safety technologies are integrated into the vehicle.	Rockville Institute
Effectiveness of Short and Long Term Education Methods to Enhance Risk Mitigation and Associated Safety-Related Driving Skills	The aim of the project is to develop analytical models that can capture and identify changes in driver performance that are indicative of risk mitig ation behavior and to assess the effectiveness of candidate behavioral countermeasures aimed at curbing future risk.	University of Washington
Guidelines for Development of Evidenced-Based Countermeasures for Risky Driving	The overall project objective is to create a set of guidelines that can be used to inform the development of risky driving countermeasures that are evidence-based, guided by theory, and lead to sustained behavioral change. This will be done by identifying the underlying constructs of current, and future, risky driving behaviors, identifying driver attributes that contribute to the performance of these risky behaviors, and finally, ascertaining the behavior change theories that are mostly likely to create lasting change.	University of Michigan Transportation Research Institute
Effective Stimuli and Behavior for Driving Safety in Automated Driving	This project provides a proof of concept that appropriate behaviors toward perceived risks can be generated automatically and effortlessly after a short form of training that links stimuli to adaptive behavioral dispositions.	San Francisco State University

Toyota's Collaborative Safety Research Center (CSRC) has announced five new research projects focused on better understanding of how drivers use and respond to advanced vehicle technologies, including automated driver assistance systems. The new projects, undertaken in partnership with five U.S. research institutions, will be launched as part of CSRC Next.

Elektrobit, Tomtom, TISA join forces to facilitate the deployment of dynamic location referencing for navigation and automated driving

TomTom, Elektrobit and the Traveller Information Services Association (TISA), have founded the Open-LR association. OpenLR is an open standard for procedures and formats for the encoding, transmission, and decoding of local data irrespective of the map. Dynamic location referencing is particularly important for providing high-quality traffic information in densely populated conurbations, and in rural areas.

Shared self-driving cars could cut demands for sedans in US to half by 2030

According to study by KPMG, self-driving cars from ride hailing services could cut demand for sedans in US to half by 2030. The firm used cellphone data to map commuter travel in three large U.S. cities –namely Atlanta, Chicago, Los Angeles-San Diego– and came up with this conclusion.

Intel and Warner Bros partner to develop in-cabin, immersive experiences in autonomous cars of future

Warner Bros has announced a collaboration with Intel. Both the companies will be working together to develop in-cabin, immersive experiences in autonomous vehicle (AV) settings. Called the AV Entertainment Experience, the companies will be creating a first-of-its-kind proof-of-concept car to demonstrate what entertainment in the vehicle could look like in the future.

Waymo partners with Trov

WAYMO

Waymo has entered into a partnership with Trov, a leading On-Demand Insurance technology company. Trov will power trip insurance customized for passengers of Waymo's soon-to-be-launched service. The insurance coverage will be underwritten by a non-admitted affiliate of Munich Re and will include several protections for passengers for the duration of each trip including lost property, trip interruption benefits, and medical expense reimbursement. This partnership marks Trov's– a five-year-old insurance tech startup based in California– entrance into the mobility space, the first in a suite of solutions tailored to serve both today's and tomorrow's modes of transport. Trov is pioneering a cutting-edge approach to insurance that's ideal for ride-sharing because it's customized for every trip. Although the self-driving cars are predicted to be safe and less prone to accidents but riding in it will have some risks involved as with any transportation medium. This step by the company will induce trust in the passengers as this is a very new technology. Waymo will launch its first commercial ride-hailing service in early next year in Phoenix where it is already testing its driverless vehicles carrying passengers around. The company also recently inked deal with AutoNation on maintenance and repair of its self-driving cars.

Foxconn asks for autonomous vehicle lane as part of I-94 expansion

The Wisconsin Department of Transportation (WisDOT) is constructing the I-94 North-South corridor in southeast Wisconsin. Foxconn Technology Group has asked for an autonomous vehicle lane to be included in the expansion of Interstate 94 North-South in Racine County.

FCC plans to repeal net neutrality rules, automakers favor the move

Federal Communications Commission, plans to repeal a landmark 2015 order that barred internet service providers from blocking or slowing down consumer access to web content. The automakers had taken a stand against this rule and argued that such regulations stifle the development of connected vehicle technologies for vehicles. The FCC was urged by companies like AT&T, Verision along with automaker GM to revoke the rules.

INDUSTRY UPDATE

Shared Mobility

- Kansas: Avis car rental fleet equipped with Continental's Key-as-a-Service (KaaS) technology
- nuTonomy and Lyft offering self-driving rides in Boston
- Element to provide maintenance and accident services for Maven's car-sharing fleet in US
- Denso enters into strategic partnership with Ridecell
- Toyota to establish new mobility services company

Cyber Security

- The automotive cybersecurity market to grow at a CAGR of 27.99% to 2021 - Research and Markets
- Kaspersky Lab security experts list threats facing the automotive sector over the coming 12 months
- International Cyber Security Smart Mobility Analysis and Research Test (SMART) Range launched by Harman and other companies in Israel
- WISeKey launches advanced ISTANA PKI platform
- Honeywell, Alpine, IAV and Karamba Security partner to create multi-layered solutions to secure cars
- Cybersecurity a concern for connected car customers: YouGov

BlackBerry lays down framework to secure connected and autonomous vehicles

BlackBerry has laid out a recommended framework to harden connected and autonomous vehicles against cyberattacks.

- **Secure the supply chain:** Establish a root of trust by ensuring every chip and electronic control unit (ECU) in the automobile can be properly authenticated and loaded with trusted software, irrespective of vendor or manufacturer. Scan all software deployed for compliance to standards and required security posture. Conduct regular evaluations of the supply chain from a vulnerability and penetration testing perspective to ensure they are certified and "approved for delivery."
- **Use trusted components:** Create a security architecture that is deeply layered in a defense in depth architecture, with secure hardware, software, and applications.
- **Employ isolation and trusted messaging:** Use an electronic system architecture that isolates safety critical and non-safety critical ECUs and can also "run-safe" when anomalies are detected. Additionally, ensure all communication between the electronics in the automobile and the external world are trusted and secure. Further, ECU-to-ECU communication needs to be trusted and secure.
- **Conduct in-field health checks:** Ensure all ECUs have integrated analytics and diagnostics software that can capture events, and are able to log and report the same to a cloud-based tool for further analysis and to initiate preventative actions. Moreover, automakers should confirm that a defined set of metrics can be scanned regularly when the car is in the field, as well as be able to take actions to address issues via secure over-the-air (OTA) software updates.
- **Create a rapid incident response network:** Share common vulnerabilities and exposures among a network of subscribing enterprises so expert teams can learn from each other and provide advisories and fixes in shorter time frames.
- **Use a lifecycle management system:** Proactively re-flash a vehicle with secure OTA software updates as soon as an issue is detected. Manage security credentials via active certificate management. Deploy unified endpoint policy management to manage applications downloaded over the lifetime of the car.
- **Make safety and security a part of the culture:** Ensure every organization involved in supplying auto electronics is trained in functional safety and security best practices to inculcate this culture within the organization.

BMW & Alibaba join forces to develop a range of digitalized experiences for the car & home

BMW and Alibaba are joining forces to develop a range of "digitalized experiences for the car and home" for all new BMW models sold in China from the first half of 2018.

As per the deal, the BMW car owners in China will be able to use smart speakers to remotely access information about their cars, such as how far they can still drive with what is left in the gas tank and whether doors and windows have been left open or closed etc.

UK saved approximately £160 million in car insurance costs through adoption of usage-based insurance policies in 2017

Octo Telematics has released data showing that drivers across the UK in 2017 saved approximately £160 million in car insurance costs through adoption of usage-based insurance (UBI) policies – an average of around £167 each, or the cost of an MOT and service.

Ford and Alibaba to jointly explore solutions for sustainable mobility and identify new retail opportunities

Ford and Alibaba Group have entered into an agreement to explore a strategic collaboration to jointly identify new opportunities to redefine consumer retail experiences and explore solutions for sustainable mobility. The 'Letter of Intent' was signed between the two companies at Alibaba's headquarter in Hangzhou. Under the three-year agreement, both companies will jointly explore areas of cooperation that are re-shaping the automotive industry in China and around the world. Ford will cooperate with Alibaba's four business units, namely AliOS, Alibaba Cloud, Alimama and Tmall – and jointly explore a variety of areas of cooperation including mobility services, connectivity, cloud computing, artificial intelligence and digital marketing.

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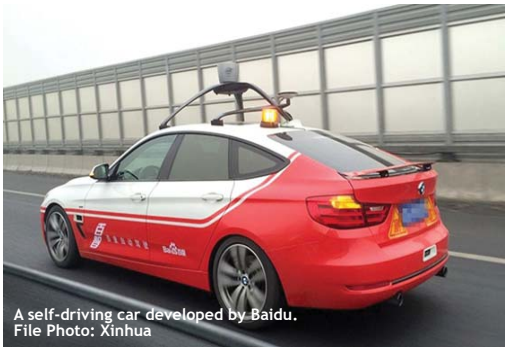
NAVYA partners with NTU, JTC and LTA to open Singapore's first Autonomous Vehicle test centre

To support the research for the safe deployment of Autonomous Vehicles (AVs) on Singapore roads, NAVYA has partnered with Nanyang Technological University (NTU), JTC and Land Transport Authority (LTA) and opened Singapore's first Autonomous Vehicle test centre. Named- Centre of Excellence for Testing and Research of Autonomous Vehicles (CETRAN), it has been set up with an investment of $3,6 million. ▪▪■

Five Korean companies form consortium for connected car commerce

Five Korean companies– KT, E1, Lotte Card, BC Card and Smartro– have come together to form a consortium for the connected car commerce. The companies have signed a memorandum of understanding for the same. The consortium will work to develop services like where cars can be used as payment tools and authorization of payments instead of plastic cards. ▪▪■

Baidu to start small-scale production of fully autonomous minibuses


A self-driving car developed by Baidu.
File Photo: Xinhua

Baidu is planning to start small-scale production of fully autonomous minibusses from July next year, according to some media reports. It aims to launch its self-driving cars before 2020 with Chinese automakers JAC Motors, BAIC Motor in 2019, and Chery Automobile. Baidu is currently working on the mass production of self-driving cars with these companies. ▪▪■

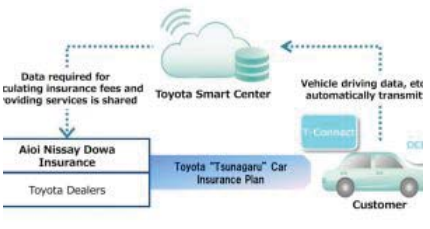
Taiwan: ARTC preparing to put driverless cars on the road

Based in Taiwan, Automotive Research & Testing Center is preparing to put driverless cars on the road. The center has been working on ADAS since 2007 and has now gained the technological expertise to develop self-driving cars. Before launching the cars in real life conditions, the center is training them in controlled environment. ▪▪■

China allows self-driving cars on its roads

China is allowing self-driving cars on its roads. According to a statement released by the Beijing Municipal Transport Commission, companies registered in China will be able to test their autonomous vehicles on certain roads and under certain conditions. However, the roads on which these vehicles will be allowed has not been made public yet. ▪▪■

Toyota and Aioi Nissay Dowa Insurance jointly bring telematics insurance product



Toyota and Aioi Nissay Dowa Insurance have jointly developed Japan's first driving behavior-based telematics automobile insurance. The plan is available to owners of certain units of Toyota connected cars and uses driving data gathered via telematics technologies to adjust insurance premiums based on the level of safe driving every month. ▪▪■

Netradyne launches ADAS solution trained for Indian road conditions

Netradyne has announced the launch of ADAS trained for Indian road conditions as part of its Driveri platform. Driveri is a four-camera, vision-based system mounted on the vehicle windscreen that helps fleet managers recognize positive driver performance and enhance driver safety for commercial vehicles.

Nissan India selects Pointer to provide part of the technological solution of the NissanConnect platform

Nissan India has selected Pointer to provide part of the technological solution of the NissanConnect platform, in cooperation with InfoTrack Telematics. Nissan's connected car solution is an integrated information and communications platform that connects with the customer's smartphone, offering a variety of in-car convenience services, navigation etc.

Mahindra and Uber to explore the deployment of EVs on the Uber platform in India

Mahindra is collaborating with Uber to explore the deployment of electric vehicles (EVs) on the Uber platform in several cities across India. Earlier this year, Mahindra also had entered into similar partnerships with Ola and Zoomcar to launch electric car cabs in Nagpur and Hyderabad respectively. To begin with, the companies will deploy electric vehicles in Delhi and Hyderabad. Mahindra's electric vehicles on the Uber platform will include the e2oPlus hatch and the eVerito sedan. As part of this collaboration, both the companies will also explore deployment of Mahindra electric vehicles to other cities.

SIAM lays down roadmap for the complete shift towards electric vehicles

The Society of Indian Automobile Manufacturers (SIAM) has laid down a roadmap for the complete shift towards electric vehicles in India. Roadmap suggests that the country should focus on taking the sales of electric vehicles to forty percent of all new vehicle sales by 2030. The remaining sixty percent of the new vehicle sales in 2030 should be vehicles based on cleaner fuels. The body has also recommended that by 2030 all the intra-city public transport fleets should be electric vehicle. SIAM has called for a collaborative effort from all stakeholders of the industry for this transformation to take place and said that the government needs to have a sustained policy for all new vehicle sales to be electric vehicle by 2047.

Mahindra First Choice Wheels launcahes Konnect First - a connected car device

Mahindra First Choice Wheels Ltd has launched Konnect First – a connected car device designed to upgrade your car into a Smart Car. Conceptualised by MFCWL, the device has been developed by Wipro.

ARAI to set up E-mobility Centre of Excellence

Automotive Research Association of India has announced plans for setting up the E-mobility Centre of Excellence in Pune. The center will have state-of-the-art facilities for development, evaluation, benchmarking, validation and certification testing of electric and hybrid electric vehicles, and related sub-systems and components.

Startup Corner

RydeAssist Technologies

Introducing the founding team

RydeAssist was launched by Sharad Bairathi (BTech, NIT and MBA, London Business School), Vidya Sagar (BTech, NIT) and Shruthi Bhatt (BE, VTU). The three of them – coming from various backgrounds and generations form a team and work towards bringing out the best in each other!

The founding team at RydeAssist Technologies (L to R) Vidyasagar, Sharad Bairathi and Shruthi Bhatt

The Genesis

The young group having experience in Head Unit Display and telematics solutions, started to build a complete HUD (Head up display) solution in-house to cater to needs of larger market. As ideas began to pour in and more brainstorming was done, the founders were convinced that not just the HUD, the concept of complete connected car solution has got greater market potential and propensity to expand rapidly. Hence, RydeAssist was spun off from Embitel Technologies with the vision of tapping the unexplored connected car solution market in India.

Moving forward

Launching of RydeAssist Technologies was a well thought decision. It took the founding team close to two years to make the prototype ready for their first product- Rydo, and eventually they started company registration. Rydo is the Gesture and Voice Controlled Head up Display (HUD) right in driver's field of view for Connected Vehicles.

RydeAssist's RYDO

RYDO consists of GPS, GSM/GPRS, WIFI, Bluetooth, Quadcore processor and DLP projector. On top of the hardware, Android software stack is built by the product team.

The main idea behind the HUD concept is to reduce driver's distraction towards other activities thus enabling more focus on driving and hence more safety on road. HUD caters to drivers by combining different screens, be it GPS on mobile, fuel, over speed alert and others on Instrument cluster, calls on mobile, text message, blind spot issue, entertainment etc. onto single screen, in front of driver's eyes without the need of driver to take their gaze off the road.

Challenges faced

When RydeAssist Technologies was launched, the team had set a goal to bring out the first working prototype within 3 months followed by fundraising for the development and launch of full scale product. Product roadmap was carved out for 2 years with a provision of launching low cost variant of HUD after one year.

Talking about the challenges, Shruthi says, "Our initial plan was to go after OEMs and tier1 companies for marketing Rydo. Breaking into the OEM segment of market or partnering with OEMs is a tougher challenge. Now we have partnered with one of the leading OEM for testing our products. Also, we have realised that we have to diversify our business model to consumers as well. Hence, we have started working on low cost variant which will have competitive pricing and affordable to all car segments. The present plan is to launch low-cost variant product in mid of 2018 directly to consumers."

Future plans

Being a young and dynamic company (www.rydeassist.com), RydeAssist's road map includes plans to build effective products and customised solutions in Head up Display, vehicle connectivity, ADAS, telematics & mobility management.

RydeAssist is targeting to enter and play in the market in two ways. One is approaching OEM and tier-1 companies to partner with RydeAssist. The second approach is to tap into Aftermarket segment with low cost variant for consumers.

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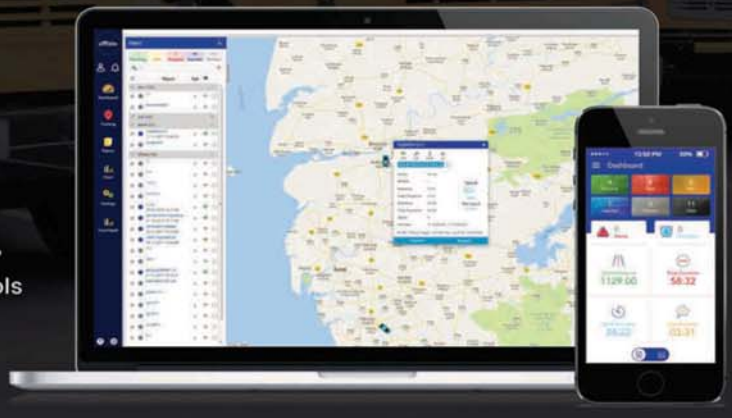

GUARDIAN APP

- Be connected with your child
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- Can monitor driving behaviour

DRIVER APP

- Replaces GPS device
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