

Jointly Published by Center of Excellence - IoT and Telematics Wire

ISSN 2454-8561

Autonomous Vehicles

Connected Vehicles

Cybersecurity

Safety Infotainment

FUTURE MOBILITY Safer_and Convenient

www.telematicswire.net/mag/2017 www.coe-iot.com

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Jul-Aug 2017

SMART AUTOMOTIVE

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Printed and Published by Maneesh Prasad on behalf of Aeyzed Media Services Pvt. Ltd. Aeyzed Media Services Pvt. Ltd. D-98, 2nd Floor, Noida Sec-63 Uttar Pradesh-201301 Email: <u>info@aeyzed.net</u>

Printed at

M/s Vinayak Print Media, D-320, Sector-10, Noida, Gautam Buddha (UP)-201301 and publication at A3/107, Block 12, Kailash Dham, Sector-50, Noida, Gautam Buddha (UP)-201301 *Please Note:* No material may be reproduced in whole or part without permission of Aeyzed Media Services Pvt. Ltd. Copyright 2016, **Aeyzed Media Pvt. Ltd.** All rights reserved Aeyzed Media Services Pvt. Ltd. and Smart Automotive does not necessarily subscribe to the views and articles in this magazine. RNI No. UPENG/2015/63476

Message

n the coming years, cyber physical systems will be key to smart infrastructure in the country. Information Technology is playing a growing role in the automotive sector and transport for public and goods mobility. We are seeing major companies of our country showcasing demonstration projects in futuristic vehicles. These represent the potential to provide safer and convenient mobility to our citizens. Vehicles with assisted driving technologies can help reduce accidents. According to WHO, road accidents account for the highest loss of lives amongst people aged between 15–29 years. Apart from enhanced safety, these developments will significantly improve mobility and reduce costs. Already, cab-aggregation platforms offer attractive options for public mobility in urban space. This will change further with semi-autonomous vehicles which may be used in closed and controlled environments, like in mining and others, to begin with, and autonomous vehicle thereafter.

The transition of mobility, will have its own set of challenges like cybersecurity, management of big data, data protection issues and more. There would be a need to exchange views and facilitate cross flow of ideas. It is my pleasure to see "Smart Automotive" publication that is bringing innovation and technology to the mainstream to help speed up digital transformation in this sector.

I wish this publication all the success!



Ajay Prakash Sawhney Secretary Ministry of Electronics &

Information Technology Government of India

Message



Dr. Ajay Kumar Addl Secretary Ministry of Electronics & Information Technology Government of India he automotive sector is emerging as a very dynamic sector. It has come a long way from the time when the vehicles were mechanically driven to the vehicles today, which are assisted by sensors and software. According to a report, 94 million connected cars are expected to be shipped in 2021, and 82% of all cars shipped in that year will be connected. The increased usage of software and machine learning in automotive is leading to new players joining the mobility segment; those who were not even remotely related to automotive a few years back.

Cities are bound to grow bigger and connected mobility in future would become more of a compulsion. 100 Smart cities will pave way for other cities to become smart. In a huge technological advancement, India is ready to offer indigenous positioning system - NavIC, which will be an important part of mobility. The commercial NavIC chipsets should be available in about a year. This will be a huge step in the Indian transportation system mobility paradigm.

Along with the increasing requirement for an IT induced road transportation environment, we need to look upon the current scenario and take a step forward towards the future with a technological outlook. The Center of Excellence-IoT jointly promoted by Ministry of Electronics and Information Technology, ERNET, Govt of Karnataka and NASSCOM provides a platform for India to develop and use sensor based M2M technologies, and I encourage stakeholders to take advantage of it. I congratulate the publication team for enabling a platform for all of us to connect and engage.

Foreword

n the rapidly changing world of automotive and transport, innovation will play a key role. Companies across the world are investing heavily in making a paradigm shift to newer emerging forms of mobility. India is rapidly moving up the curve of innovation in this sector as evidenced through the emergence of new products and services from some of the startups and large companies. Some of these innovations will have far reaching impacts, ranging from the reduction of road mortality due to driver errors to bringing down the cost of goods movement.

Automotive is now getting increasingly controlled by software. As some of the industry professionals say, the future of automotive will be 'Software Defined Vehicles'. This is going to open opportunities for the IT players in India to join hands with the technology leaders and contribute in the transition of mobility for the benefit of all.

The Center of Excellence-IoT has rightly identified automotive & transport as one of the growth areas amongst the many verticals, where we will witness opportunities for start-ups and existing OEMs/ T1 companies. CoE-IoT works closely with start-ups to make them a part of the larger ecosystem so that they can benefit from the innumerable opportunities and also contribute to the growth of the industry.

It is interesting to see how the work being done in India by the innovators in this sector is significantly reducing the gap in technology advancement with rest of the world. This opens up major opportunities for Indian companies across the globe to be at the forefront of mobility. Some of these new technologies are very likely to be adopted in India, with some of them even playing a key role in the global space.

It would also be intriguing to witness the evolution of these start-ups in the automotive and transport sector, as to whether they are going to play catch-up only, or will they play a vital role in catapulting India to the forefront of mobility.

Presently, the automotive telematics literature that we come across, primarily relies on studies and research in developed economies, which is important for us to understand the trend in mobility. It is also required to have a sustained sharing of knowledge, case studies and learnings in the Indian automotive environment for adoption of new technologies and the subsequently understanding of the associated opportunities and challenges. In this regard, I congratulate CoE-IoT and Telematics Wire for responding to this long felt need by developing this Smart Automotive eMagazine.



R Chandrashekhar President, NASSCOM

Editorial



Maneesh Prasad Editor et us innovate the transition for safer and convenient mobility. We in India have miles to go before we are able to improve upon our records on road accidents and lives lost due to it. Recently during a conference a speaker talked about how common it is to read news about road accident on near daily basis. A common citizen may have almost become insensitive to such news, due to its periodicity. Apart from the lives lost, there a huge economic loss. It is estimated that about 4 lakh crores is lost due to road accidents in India. In other words there is an insensitivity to economic loss which would dwarf many of the scams we have seen in past.

A fraction of this money which is lost, if recovered through system and process would lead to huge savings and more importantly saving of the lives lost on roads.

Easier said than done, lets see the state of our implementation.

In our country where application of regulatory issues are either confined to metros or urban areas, no wonder even after two decades of having seat belts becoming a compulsory fitting (1994 for front seats and 2002 for rear seats), and almost a decade since it has been mandated by law (138(3) CMVR 177 MVA), we have only about 26% of drivers wearing seat belts. Compare to this we have more than 90% of all vehicle occupants wearing seat belt in countries like US, Japan, Australia and Finland. Even if we have airbags, without seat belt, they would either not work or be ineffective.

Hence, before we step on the accelerator for ADAS, we need to take a pause and reason out what's missing. Is it education, sensitisation or fear of law. How we need to educate the masses about the regulatory compliance for their own benefit?

As we get into ePrint, we hear about our Honourable Minister of Roads Transport and Highways talk about driverless car, that it will not be allowed to happen in India. Not going into the debate or citing from past learnings how bank associations carried out a relentless agitation against the computerisation of bank in late 80s and early 90s and decades later, but today they are one of the biggest beneficiary. Moreover, the jobs in the banking sector have only grown. In this issue we have an article by Johan Sammy(pg 12-13), who opines how it is important for government to not only allow such a technology to be tested, but goes further to state that government should spearhead the development of this technology, so as to- "avoid conflicting priorities and ensure deep integration with public transportation networks in complementary, not conflicting, roles."



The cost of connectivity – What consumers are telling us

Capgemini Every year conducts extensive consumer entitled Cars Online. The new 2017 study has some fascinating results covering what consumers want and don't want, and what they are prepared to pay for or not. The good news is that consumers value connectivity and are open to share information, but the bad news is that they do not really want to pay for this service. When it comes to making that final choice of a vehicle, the incar technology is more important than the driving experience, but any retailer or manufacturer that tries to compromises the connected car features risks either not getting the signature or losing the sale.

I was recently with an automotive company that has launched a suite of connected car services for what seems like a very reasonable premium of £29 per annum. The initial take-up has been slow, and I hope that this is just early inertia, but I did wonder if this company might have the wrong business model, and that instead of charging consumers for the service, it would be better to bundle the cost into an overall service charge, and not make it a separate buying decision.

Companies like Onstar have struggled with this dilemma for many years, and to be honest never found the perfect solution. In the balance between wide consumer adoption of a free service, and limited take-up of a paid service, the digital economy tells us size matters, and it is better to go for market share first and revenue second.

It is often only clear how you will benefit from the quantity of customers and data at a later date, and trying to predict value in the digital world can often be difficult. Nearly all automotive companies are struggling with a traditional Return on Investment analysis for connected services, and just not getting the





Nick Gill Executive Vice President Capgemini

numbers to stack up. There are clearly benefits for consumers to have vehicle connectivity, but they are not seen as significant enough to justify a financial investment. So do you accept the cost of connectivity as a table stake, or price it as a value-added service? Furthermore, companies that offer a free trial period for their services are often fighting with a conversion rate of around 10%. They are not able to convince their customers to register themselves with their vehicles, maybe because retailers are not really interested in promoting these services on behalf of the OEM.

Many OEMs are talking about the transformation of the industry from product-based to services-based, and declaring that half of the company revenue in the near future will come from such digital services.

The automotive industry needs to look holistically at share of consumer wallet, and accept the argument that the value of the data collected will be valuable enough internally already to justify the investment, agree that the "killer app" for the data has not yet appeared, and realise that customer insights and intimacy is worth more than an annual service charge.....

Telematics is a paradigm shift for insurers and consumers alike



Nino Tarantino CEO Octo Telematics North AmericaOcto Telematics, North America

Nino is a leading player in advanced telematics systems and services to the automotive and insurance industries. He is also Board Director of the Connected Vehicle Trade Association (CVTA).

Maneesh Prasad, Editor, Smart Automotive & CEO of Telematics Wire explored the horizon of insurance telematics in discussion with Nino, where he gave an interesting insight of what lies ahead.



Congratulations on reaching 5 million connected cars under your Octo umbrella. What numbers do you expect in the next 3 to 4 years?

Thank you. We are excited not only about our growth of connected cars, but our A continued global expansion of clients and partners. Over the next 3 to 4 years Octo will continue to dominate the insurance telematics market, expanding our products beyond automotive, to serve insurers and their policyholders in other areas, such as home, health, and mobility. Adoption will align with awareness, so we'll continue to educate the market on the benefits of telematics and its application well beyond simply usage-based insurance (UBI).



A

Amongst various products in insurance telematics (like PPU, PHYD and others), which one has contributed most in growth of numbers for Octo and why? NINO?

Octo's solutions support all the various types of telematics-driven insurance, so we've seen growth in pay-as-you-drive, pay-per-use, and pay-how-you-drive insurance. We've also seen a surprising rise in the use of telematics for livery insurance (think Uber and Lyft) as these policies are a relatively new market for insurers. In states with strict rating requirements, like California, which only allow miles driven as a telematics rating factor, we see the majority of growth in pay-as-you-drive programs whereas in other markets most of our insurance partners offer pav-how-vou-drive programs. With our deep understanding of driver behavior, PHYD programs add far more value - and a far greater improvement in combined ratio - for personal, and increasingly, commercial lines.

While not an insurance product per say, a substantive amount of Octo's growth comes with the introduction of Octo's crash and claims capabilities to the North America market. According to the Insurance Information Institute, US auto insurance total loss costs have skyrocketed by 10x the rate of inflation. The benefits of telematics for insurers are fully realized when applied to not only risk and pricing but also crash and claims management.

Can you suggest the factors which will hasten the growth of insurance

telematics in general in its existing market?

Towers-Watson indicates that usagebased insurance policies only account for

around 8% of all auto insurance A policies in the United States today. This likely stems from an

overall lack of consumer awareness of telematics (one study suggesting only 25% of consumers being familiar with usage-based insurance) and carriers' strategic emphasis on retaining their best customers at stable rates. This focus leads to many policyholders never hearing about their insurer's telematics program out of insurers' worry that it will cannibalize their own book of business. This is in sharp contrast to the approximately 60% of consumers who would opt-into a usage-based insurance policy were they offered one. While adoption is low, it is growing as smaller insurers begin offering UBI programs. Critically, those policyholders using telematics - often those with traditionally high churn rates - tend to have a much higher customer satisfaction score (between 54 and 72 points higher), than those who don't, leading to improved retention rates.

Given the immense cost pressure associated with auto claims, we expect the next big wave of growth in insurance telematics to come from telematicsdriven crash and claims. Octo leverages proprietary algorithms fine-tuned using crash dynamics data from 397,000 crashes to drive its advanced crash and claims capabilities.

Insurance telematics will, in the near future, reach a tipping point where insurers who don't integrate telematics capabilities will fail from negative selection bias in their book of business, higher claims costs, and an exodus of profitable policyholders.

Some people say that the connected car ecosystem is precursor to insurance telematics, what do you have to say on this? (Particularly for geographies that have not seen much action in this segment so far)

I would agree that connected A cars help consumers get used to technologies that gather data and information about both the car and their driving performance. As consumers become more connected - through their vehicles, their phones, and their homes - they become more open to sharing this data with third parties in exchange for value. Insurance telematics offers policyholders many benefits beyond just good driving discounts. There are many value-added services for policyholders such as roadside assistance, accurate collision liability, claims settlement acceleration, vehicle health, as well as weather, traffic and road conditions. The already connected consumer will be faster to adopt telematics, with a keen appreciation of the benefits.

For markets where consumers are less connected, insurers and auto OEMs need to make clear the value consumers are getting for the data they share. If real



value is offered, and privacy concerns assuaged, consumers will generally adopt a new technology. There will always be a small group whose privacy concerns preclude them from adopting new technology, but most people can be won over with a fair exchange of value and greater safety.

As they say, data is new oil, is Octo monetizing the data? Do you see auto manufacturers playing a role in this segment for having access to this data.

The data we gather is used to provide insurers and drivers with the information they agreed to collect as part of an insurer's telematics program. With privacy concerns still central in many consumers' minds, we do not share this data outside of the insurer-insured relationship and ownership agreement.

Our relationships with OEMs is all about helping them monetize their connected car investment. Octo automotive partners can monetize the data their connected cars produce, transforming it into the insights our 60+ insurance partners value most. We have a robust ecosystem into which auto OEMs can sell telematics data. Importantly, they can monetize this data without building relationships and integrations with individual insurers. This helps them monetize their data while cutting out a major structural cost, increasing profits for the OEMs and reducing the cost of purchasing this data for our insurance partners.

With your device in vehicle and access to whole gamut of data, do your insurance telematics players also provide services related to preventive maintenance or remote diagnostics? (Assuming they have access to

comprehensive diagnostic trouble code from the manufacturer)

Absolutely. Several of our solutions collect data directly from the OBD-II port, providing both policyholders and insurers with vehicle diagnostic data. Policyholders – from both personal lines and commercial lines – use this data to understand any vehicle issues as soon as they occur. We've built functionality on top of this to provide preventive and scheduled maintenance reminders and repair management functionality for fleets. Insurers are also using this data with use cases ranging from fraud prevention to recall notifications.

What would be your advice to players in emerging economies, trying to get into insurance telematics?

Telematics is a paradigm shift for A insurers and consumers alike. The largest and most innovative insurance companies globally are adopting the technology to price risk more accurately, process claims faster, and engage with their customers. Consumers are seeking telematics primarily for fair and transparent pricing. Insurance companies in emerging economies, unburdened by legacy systems, complicated processes, and policyholder expectations, are at a unique advantage. They can pivot quickly to this new technology and gain early advantage in their market. In emerging markets where auto insurance is still a relatively young market, insurers can use telematics to attract profitable customers as well as those that have avoided insurance due to lack of transparent and fair pricing. Now is the right time for insurers in emerging markets to build expertise in telematics.

Rising to the challenge: The quest to save over one million Indian lives in the next decade



Michael Hirsh Regional Director for India Mobileye Vision Technologies Ltd.

He heads Mobileye's operations in India and is based at the company's Corporate and R&D Headquarters in Jerusalem, Israel. His current focus is on establishing the infrastructure necessary to support Mobileye's Collision Avoidance Technology & Black Spot Mapping throughout India. Michael holds an MBA in Technology Management from Tel Aviv University.

THE NEED

50% in the next 5 years – This is the bold directive issued by Honourable Transport Minister Shri Nitin Gadkari for reduction in accidents on Indian roads.

Road accidents are now seen as a global epidemic, particularly so in India where almost 5 lakh crashes occurred in 2014, taking 1.46 lakh lives, and leaving three times that number of people, in addition to the deceased individuals' family, affected by the debilitating burden of injury. The human and financial toll impact is immense. 400 deaths take place every day on Indian roads, a rate with an annual increase of 4.6%. This represents, on average, a loss of 17 lives every hour, and a cost to the economy of 3% in GDP.

And all this in a country that succeeded at the first attempt – where others have failed – to send an operational mission to Mars. At the current rate, road accidents will kill 3.21 million Indians by 2030. The human and societal cost is catastrophic, and as such Shri Nitin Gadkari's vision for a safer India must be embraced head-on and with urgency.

THE CAUSE

Driver error has been revealed as the single biggest cause of road accidents in India, accounting for some 78% of cases. This tallies with findings worldwide, showing that more than 90% of collisions are caused by human error. Typically, it is driver inattention in the crucial 2-3 seconds prior to an imminent accident, and the driver's consequent failure to take corrective action, that leads to accidents.

Further research has shown that a mere 1.5 seconds' early warning could prevent 90% of forward collisions, and that 2 seconds' warning could prevent nearly all forward collisions.

Moreover, distracted driving is on the rise. Nobody gets into a car with the intention of having an accident, but the causes of inattention – whether they be busier daily schedules, mobile phones or simply more traffic – are many, and more distracting than ever. For example, bus drivers in busy urban environments are expected to keep their eyes on the road, all while managing passengers' boarding and disembarking, receiving payment and maintaining the route schedule – often in dangerous road conditions or in challenging weather.

Equally so, long-haul truck drivers, who are fighting a constant battle to meet delivery schedules and navigate difficult roads, are often distracted and fatigued. Complicating such already dangerous situations further, is the growing phenomenon of distracted pedestrians those looking down at their mobile phones or unable to hear properly due to headphones, while walking in and around traffic.

"...road accidents cause a loss of 17 lives on an average every hour, and a cost to the economy of 3% in GDP"

THE SOLUTION

We are all aware of, and excited by the promise of, autonomous driving. As selfdriving vehicles become a reality, we can look forward to a drastic reduction in accidents, and hopefully even an eventual end to this scourge forever. But, if predictions are correct, we will need to wait until the next decade for autonomous driving to enter even the first stages of commercial availability. The task is enormous, requiring a joint effort by developers, car manufacturers, lawmakers, regulatory agencies, planners and providers of national and urban road infrastructure, and more.

Driver error has been revealed as the single biggest cause of road accidents in India, accounting for some 78% of cases.

However, the good news is that the technology leading the autonomous driving revolution is already available to help combat road accidents and to identify accident-causing infrastructure deficiencies, right now, today. Retrofitted Collision Avoidance Technology is available for almost any vehicle today.

COLLISION AVOIDANCE SYSTEMS

Collision Avoidance Systems (CAS) utilise the sensing technologies already developed for autonomous driving to provide real-time warnings to drivers of dangers arising during their journeys. Foremost of these are:

- Forward Collision Warning (FCW): Alerts the driver of an imminent collision with the vehicle ahead.
- Headway Monitoring & Warning (HMW): Shows the driver the distance to the vehicle ahead (in seconds) and alerts if the distance becomes dangerous.
- Pedestrian and Cyclist Collision Warning (PCW): During daylight hours, alerts the driver of an imminent collision with a pedestrian or cyclist.
- Lane Departure Warning (LDW): Alerts the driver of unindicated (and presumed unintended) lane departure.
- Speed Limit Indication (SLI): Recognises and reads speed limit signs (including electronic signs) and notifies the driver if he or she is speeding.

Until recently, such life-saving features were only embedded in OEM platforms, and were thus available only to owners of top-end vehicles. However, the technology is now available as a retrofit for almost any vehicle – cars, LCVs, buses and trucks – and the results are dramatic. It has been shown that Collision Avoidance features, such as LDW and FCW, reduce accident claims by 45%.

THE HIDDEN VALUE IN AN ACCIDENT THAT DID NOT HAPPEN

In addition to helping drivers avoid accidents in real time by means of audible, visual and haptic (vibrational)





warnings, Collision Avoidance Systems may also be integrated with telematics or FMS. This winning combination provides invaluable data for driver monitoring and performance, allowing fleet managers to easily identify and interact with those drivers who are an "accident waiting to happen", due to tailgating, speeding, lane jumping and additional dangerous behaviours. Additionally, when "near misses" - because that's what real-time warnings show – are overlaid onto a map, we gain a 'big-data' driven comprehensive nationwide view of Black Spots, i.e. the exact locations of high-risk sites. Until now India's Black Spot map has been based on accidents that already occurred. But now we can track the vast body of data about potential accidents, but were avoided. This provides decision-makers with crucial information regarding where best to invest their resources in the most efficient and cost-effective way.

THE VISION

Practical steps are already taking place on the ground, with one of India's foremost automotive research bodies preparing for a 100-vehicle trial of Mobileye's Collision Avoidance and Black Spot Mapping Technologies in Q4/2017, fleet owners and operators have already begun to take the initiative and install retrofitted Collision Avoidance in their vehicles. Passenger and freight fleets may be retrofitted with the technology for well under a half lakh Rupees per vehicle. With the resultant reduction in accidents and their associated costs, ROI is typically realised in less than one year. There is no doubt that improving road infrastructure is an important building block in achieving India's road safety objectives. But infrastructure development requires time and vast resources. And more importantly, it requires the precise and effective allocation of those resources. By contrast, retrofitted Collision Avoidance, coupled with real-time data collection and Black Spot Mapping, can provide an immediate and cost-effective means to prevent accidents now; all the while assisting drivers and fleet managers with improving driving performance and, most importantly, showing infrastructure developers exactly where to invest their resources. Transport Minister Shri Nitin Gadkari's vision is of utmost importance and CAS technology is a well-tested, cost efficient and effective way to move one step closer in making India's roads safer.

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Autonomous Vehicle -A Solution to Traffic Congesation

The pursuit of self-driving cars is well and truly underway, with the who's who of automakers mostly targeting around 2020 or 2021 to roll out vehicles that are at least Level 3 automation (according to SAE International's classification). Some, like Tesla, are even more ambitious with sights set on 2018 onwards.

Self-driving cars are the ultimate transportation dream inspired by decades of science fiction — once the technology is ready, no one will want a regular, boring car and the first to roll it out will have a distinct sales advantage.

However, leaving the development of autonomous vehicle (AV) technology to the private sector is unlikely to be a sustainable way forward, according to the International Association of Public Transport (UITP).

Unforeseen consequences

At the heart of the potential issue is the inherent interest of automakers in promoting personal car ownership. A future with fully developed AV tech driven by automakers may simply see cars today be replaced with self-driving alternatives.

That is not a sustainable scenario, according to UITP, as the added convenience, safety and comfort of AVs would even encourage a surge in vehicle ownership. The logical conclusion is a future where everyone is wellincentivised to own a self-driving car.

In other words, AVs would compete, not complement, public transport. It would

be a critical problem for the world's growing population centres, which are now moving towards transit-oriented developments and growing public transportation networks — essentially pushing for car-lite mobility to improve urban liveability.

Therefore letting commercial interests drive the pursuit of self-driving cars without public sector influence may create trouble down the road from booming personal car ownership, evolving road networks and traffic issues, especially given how some self-driving cars being tested today are struggling to cope with existing road systems.

Government input crucial

Instead, it is crucial that AV technology development is spearheaded by the government. This will avoid conflicting priorities and ensure deep integration with public transportation networks in complementary, not conflicting, roles.

This approach is already seen in Singapore and the Netherlands, In February, the Netherlands removed legal barriers to testing AVs on real roads while the Singaporean Ministry of Transport has also publicly outlined its vision for an AV-driven future.

This is arguably a more sustainable approach towards promoting affordable AVs — government support for start-ups focusing on AV technology to enable Level 4 and Level 5 autonomous driving.

Start-up advantages

Working with start-ups, as opposed to automakers, presents some crucial advantages for the government. The first is speed and focus — their small sizes and founder-driven ideals mean less bureaucracy and more focus in respect of innovation, idea development and implementation.

Second, being start-ups also mean these companies are lean and nimble, with natural interest in looking for cheaper ways to make AVs compared to automakers who would be incentivised by their existing capacity to load any product with value-add to increase profits.

A third advantage is that many autonomous urban mobility start-ups are already naturally aligned towards public transport integration in terms of their core research and development focus, as seen with the following examples:

It makes a visible difference: Dutch start-up Amber Mobility, which enjoys local government support alongside other partnerships, is already planning to roll out self-driving cars on Dutch roads by mid-2018 that specifically caters to vehicle sharing.

Additionally, the Singapore government is now looking to roll out self-driving electric buses by 2020, a world first. The agreement between the Land

Amber Mobility	Providing AV electric car sharing platform for commuters
OSVehicle	Open-source EV platform offering white-label AV solutions to transportation service providers
ST Kinetics	To roll out AV electric buses using designated lanes
Navya, EasyMile, BestMile	Using AVs to service short routes and provide first/last-mile connectivity
Uber, Lyft & Grab (ride-hailing companies)	Putting ride-hailing AVs on the road

Transport Authority (LTA) and ST Kinetics in April will see the buses operate along designated AV bus lanes.

Clock ticking

There is strong urgency for governments to start moving in this direction given that carmakers have had a headstart in forming partnerships with these companies, such as the recent BMW's partnership with Intel, Mobileye and Delphi.

A possible place to start is with OSVehicle's EDIT, a heavily customisable self-driving vehicle that can be easily tailored to any market or country. Governments can easily adopt this model to customise into a self-driving public bus, for example.

Moving forward, a number of likely scenarios are set to manifest if the public sector takes action to ensure AV technology development is in sync with urban mobility evolution. However, the longer the AV technology development is left to be commercially driven, the more difficult it is to steer it back to align with public sector interests.

Among others, we would likely see disincentives to personal car ownership and usage via higher taxation and restrictions of entry into the city.

Going by the Singapore example of special lanes for AV buses come 2020, personal self-driving vehicles may also be barred from using public roads that still see non-AV cars on them to avoid potential incidents.

Instead, there may be specific lanes designated for AVs, but these would likely be limited to commercial or utilitytype (such as trucks) AVs due to space limitations.

Automakers may also face some challenges in terms of rolling out AVs that comply with the likely varying safety requirements from country to country, especially if the bar is set much higher than it is today. •••

SAE AUTONOMY LEVELS



Johan Sammy Principal Motion Digest Network

Connected cars and the role of telematics in the future of intelligent transport



ndoubtedly connected cars are transforming the driving experience across Australia and the world. From driverless cars to realtime traffic updates and on-demand infotainment, telematics has endless potential to vastly improve the efficiency and safety, as well as the enjoyment of drivers on the nation's roads. The benefits of telematics do not only apply to the driver. Car manufacturers, for example, are able to use telematics to build the brand experience and better understand customers. Whereas for auto insurance providers and fleet service managers, telematics can help make intelligent business decisions to ultimately improve products and services such as lower insurance premiums and faster delivery

of goods. Ernst & Young predicts that 88 percent of all new cars globally will have integrated telematics by 2025. Meanwhile, according to KPMG, half of all new cars sold today are connected and by 2030 all new cars on the road would have some element of connectivity, while a quarter would be fully autonomous.

The benefits that telematics will bring to drivers and businesses are limitless; however, here are four real examples on how telematics will transform the future of driving and intelligent transport systems:

Smoothing traffic congestion

Connected cars have the potential to

reduce the likelihood of traffic congestion on city roads and smooth traffic flow creating greater fuel efficiency and driver safety. Advances in connectivity such as in-vehicle diagnostics are steadily taking the guess work away from the driver. For example, Intelematics is currently building a solution for VicRoads that is expected to create smoother traffic flow by advising vehicles on the optimal travel speed needed to pass through a set of green traffic lights.

The technology works by using the data from the Victoria's centralised traffic system to identify and share the green light sequence with drivers via either a dashboard or smartphone alert so that road users can adjust their speed to align with the green light cycle. Moreover, KPMG predicts that automatic braking systems linked to connected vehicles could eliminate traffic jams by 2020. With the insight where technology is headed, we can expect road congestion to be thing of the past within the next decade or so.

Providing actionable insights for insurers

The use of telematics provides limitless opportunities to convert data into insights and action. For car insurance providers in particular, the behavioural, traffic, and locational data that telematics can collect enable them to generate more intelligent risk forecasting in order to determine more customised premiums. Insurers are also able to utilise this vehicle connectivity to identify accidents in real-time - capturing a higher percentage of the repair business as a result and meaning they will be able to reach out to customers immediately. Subsequently, this reduces the leakage of repair work to independent repairers.

According to consulting firm, Ptolemus, almost 100 million vehicles will be insured with telematics policies, which will grow to nearly 50 percent of world's vehicles by 2030. This is predicted to generate more than \$AU350 billion (equivalent) in premiums for insurers . If we are to believe the figures, within the next 20 years we'll be seeing car insurance policies that are based purely on driving behaviour rather than demographics such as age.

Steering the driverless car revolution

Global production of self-driving cars is forecast to reach 14.5 million over the next 10 years, with more than 22 million of the vehicles expected to be in use by consumers in 2025. As autonomous vehicles become more widely adopted, any accidents will most likely be treated as product liability claims. Whether the car is autonomous or not, telematics can pinpoint the causes of any incident or accident, so for manufacturers, telematics can provide the necessary information needed to develop better safety features. For instance, if a driverless car is involved in a crash with a pedestrian or another car, the data gathered will be able to conclude who is liable - whether caused by human error, manufacturing fault or system glitch. With in-vehicle diagnostics and automatic braking becoming a reality however, the number of road accidents occurring on Australian roads will likely diminish over the next half century as human driven cars will slowly be replaced by autonomous ones.

Improving fleet management services

Fleet services have traditionally been highly bespoke and expensive. However, widespread adoption of connected services in the consumer segment will disrupt the traditional model. While GPS technology can track an individual vehicle's location, status and speed, this doesn't enable the information to be



Adam Game Director of Strategy Intelematics

Adam has been a pioneer of connected motoring and navigation services since the early nineties, with achievements including introduction of car navigation and OEM telematics services in the AU/NZ region, and building out Intelematics as a global player in telematics with a footprint across Europe, North America, and Australasia. He has held a number of leadership positions during this time with Telstra, then Intelematics. As Director of Strategy Adam is now focused on creating new business opportunities for Intelematics and RACV in smart cities and the IoT.

detected across a fleet service. A fleet telematics solution is hence needed to enable vehicle tracking - providing a variety of benefits to businesses that rely on rapid delivery of products and/ or services. Moreover using information provided via telematics, fleet services can also better allocate resources; manage fuel and labour usage and costs.

More intelligent insurance pricing, more safety and streamlined driving on roads, better fleet management and autonomous driving are just the start – the potential for telematics to revolutionise transport systems are endless. The automotive industry and government must continue to collaborate to take advantage of telematics in order to provide both historical and real-time data to create more intelligent infrastructure and services.----



India is well-connected with Africa - can this lead to the development and export

As globalization increases where transporting companies are required to cross borders to deliver goods, it becomes pertinent to make use of cross border tracking solutions to increase the safety of shipments, drivers and trucks.

ndia's expanding automotive and telecommunications sector opens doors for the development and export of connected vehicles to Africa. This article will focus on two African countries that India already has good trade relations with; South Africa and Nigeria.

India's transporting industry and government are focusing on increasing the growth of the usage of automotive telematics. It is no doubt that the transporting industry in India will benefit greatly from the advantages vehicle and fleet telematics have in terms of monitoring driving behaviour, fuel consumption and from a safety perspective.

India is forecasted to be the fastest growing economy over the period of 2006 – 2020, this is according to Abdullah Verachia, CEO of The Strategist¹, "Verachia stressed that South Africa enjoyed a special relationship with India, which included the fact that the great Indian independence leader Mahatma Gandhi spent many years in South Africa and fought for civil rights in this country, developing many of his ideas here... Whereas African/India trade totaled \$1-billion in 2008...." (Campbell, 2013, Engineering News, Economic relations between South Africa and India blossoming)².

An article posted on Engineering News Online by Irma Venter, Senior Deputy Editor of Creamer Media on the 2nd of June 2017³ wrote about the Indian truck brand Eicher that recently entered the South African market, in partnership with Volvo Group. Volvo Group is a global truck manufacturer based in Gothenburg, Sweden and is the world's second largest heavy-duty truck brand. Volvo is a wellestablished and trusted brand in South Africa. This lays the ground work for India to manufacture and sell connected trucks in South Africa.

According to Matthew Conroy, trade manager of Maersk Line Southern Africa, India and South Africa are increasing the use of direct trade and the benefits of reduced transit times will continue to stimulate new trade and business opportunities. Matthew further adds that the most common commodities that Maersk Group transports to India is scrap metal, ore and timber. The South African Revenue Service (SARS) released a statistic not long ago about India being one of the top countries that South Africa imports from and exports to.

As globalization increases where transporting companies are required to cross borders to deliver goods, it becomes pertinent to make use of cross border tracking solutions to increase the safety of shipments, drivers and trucks.

Telematics are a crucial part of the fleeting industry as it can improve maintenance and repairs, fuel efficiency, road safety and security. According to an article written by Kim Alexander titled "Trucks Are Becoming More Interconnected"⁴ telematics are becoming more important in the trucking industry. Kim mentions in her article that a panelist from the Technology and Maintenance Council of American Trucking Association predicted that telematics could soon become a default standard for heavy trucks.

Non-profit organisations and cross border transporters operating in Africa are realising the importance of telematics to keep drivers and assets safe on the road as well as keeping operational cost low. This is made possible with telematics that allows fleet operators to view information of their whole fleet at a glance. With fuel probes and driver ID tags that is packaged into certain telematic products; the fleet operator can analyze the driving behaviour of the driver and at the same time the fuel consumption. Harsh braking and accelerating are two examples of bad driver behaviours, that lead to an increase in fuel consumption and vehicle deterioration.

Iridium satellites can alert fleet managers of the status of vehicles every movement. The safety analytics function on telematics can help fleet managers identify drivers that practice safe driving and identify drivers that require additional driver training.

In South Africa, various insurance companies include vehicle telematics into their product offering, for example Discovery car insurance rewards drivers in the form of cash back on drivers' fuel usage. If transporting companies have telematics to monitor their assets it can assist in bringing the cost down on fleet insurance; as it helps insurers price risk better. More companies, small and large, are choosing telematics to help with their fleet management every year. A lot of transporting companies operating in Africa are seeing the return of investment of fleet telematics help them in their day-to-day operations, measuring key performance indicators and to effectively make business decisions and increasing the profit margins by decreasing operational cost.

The fuel probes that come with some fleet telematics solutions are very useful for fleet operators to determine if fuel theft is a contributor to high fuel bills and to determine if the fuel has been contaminated. Some drivers sell high grade diesel for low grade diesel and pocket the profit from selling the highgrade diesel. Telematics make it possible to monitor fuel increases and decreases and to determine if fuel has been contaminated with paraffin, old diesel oil or low-grade diesel. Fuel contamination leads to great damage in the truck's engine.

Iridium satellites are a great cross border solution allowing fleet operators to consistently monitor the vehicles on the road especially in areas that do not have GPRS coverage.

Another way in which a fleet operator/ manager can benefit is through telematics preventative maintenance feature that allows users to keep an eye on vehicle mileage and maintenance procedures. Fleet manager can easily schedule maintenance tasks ahead of time to keep a close track on costs or create trend analyses of trucks that are becoming a liability rather than an asset. The system alerts fleet managers of upcoming maintenance procedures like oil and tyre changes based on kilometers travelled, or driver behaviour, such as harsh acceleration and braking.

A fleet telematics company needs to be able to offer fleet management solutions that save clients time and money whilst at the same time ensuring that the fleet and drivers are performing at their peak.

Nigeria is India's largest trading partner and according to an article written by Eromosele Abiodun from The Day Live⁵, India exports vehicles to Nigeria. With this long-term trading relationship and the economies of India and Africa being similar in nature, it provides an opportunity for India to invest in the research and development of automotive telematics for Africa. In Africa we at Globaltrack have started to research and develop motorbike tracking units. The infrastructure for a lot of African countries do not allow for easy access with a vehicle or truck on certain roads. Some NGO are using motorbikes to deliver emergency goods where trucks can simply not reach the people in need; motorbike telematics will ensure that the goods are delivered in a safe and



Pieter Smits CEO Globaltrack

timeous manner.

India and South Africa's consumers and transport companies are increasing their knowledge and exposure for connected vehicles via the internet of things and telematics companies advertising the advantages of vehicle telematics. India holds a long-term, special relationship with both South Africa and Nigeria and already has market entry into these countries through the exporting of vehicles to these countries. India's focus on the development of automotive telematics whilst receiving support from government and the transporting industry will accelerate consumers and public transporting companies to purchase connected cars.



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When you decide to monitor parameters such as vehicle speed and fuel level, a reliable and proven solution is to install a GPS tracker and a fuel sensor. If you need access to information such as engine speed, mileage, coolant temperature and other data from the onboard computer this task becomes very creative.

If a vehicle already has all the necessary sensors, then you don't need to install new ones, right? Almost all modern cars (especially when it comes to personal business class and expensive special machinery) are properly equipped with sensors, information from which is transmitted to the on-board computer. The question is only how to access this information. The problem remained unsolved for a long time. But there are more and more effective solutions now that solve a problem correctly obtaining such data as: engine speed and temperature, fuel level and consumption, information from tachograph and more. The solution, which we talk about in this



What CAN you do?

article, will help to read data from CAN bus of a vehicle.

What is CAN bus?

CAN (Controller Area Network) is a popular standard of the industrial network, focused on the integration into a single network of various actuators and sensors, widely used in automotive equipment. Almost all modern vehicles nowadays are equipped with so-called digital wiring - CAN bus.

Where did the task of reading data from CAN bus appear?

The task of reading data from CAN bus appeared as a consequence of the task of optimizing vehicles operation costs. In accordance with the typical requests of customers, vehicles and machinery are equipped with GPS monitoring and fuel monitoring systems (based on capacitive or ultrasonic fuel level sensors). But practice has shown that customers are increasingly interested in more economical ways of obtaining data, as well as those that do not require serious interference into design, as well as in electric cars.

That's how appeared such a decision to obtain information from CAN bus. It has a number of advantages after all:

1. Save money. Do not need to bear

significant costs for acquisition and installation of various sensors and devices.

- 2. Do not break warranty. Detection by the manufacturer of third-party interference in the construction or wiring scheme of the car leads to warranty losing. This is clearly not in the sphere of interests of vehicle owners.
- Access to information from standard installed electronic devices and sensors. A certain set of functions can be implemented in a vehicle, depending on the electronic system. Theoretically, we can access all these functions via CAN-bus. This can be mileage, fuel level, door open / close sensors, temperature overboard and inside, RPM, speed, etc.

What advantages and disadvantages does reading data from CAN bus lead to? Pluses:

- Ability to work in hard real-time mode.
- Easy to implement and lower costs of use.
- High stability to interference.
- Reliable control of transmission and reception errors.
- Wide speed range.
- Widespread technology, availability of

If a vehicle already has all the necessary sensors, then you don't need to install new ones, right? Almost all modern cars (especially when it comes to personal business class and expensive special machinery) are properly equipped with sensors, information from which is transmitted to the onboard computer. a wide range of products from various suppliers.

Disadvantages:

- The maximum network length is counter proportional to the transmission rate.
- Large amount of service data in the package (relative to useful data).
- Lack of a single generally accepted standard for a high-level protocol.

The network standard provides ample opportunities for almost error-free transfer of data between nodes, leaving to a developer an opportunity to put into this standard everything that can fit there. CAN bus is similar to a simple electrical wire. You can put any information flow that can withstand the bandwidth of the bus. There are examples of sound and image transmission on CAN bus. There is a known case of creating an emergency communication system along a road several dozen kilometers long. They needed a high transmission speed in the first case and a short line length in the second case. Manufacturers, as a rule, do not advertise how they apply useful bytes in the package. Therefore, FMS device can not always decrypt data that CAN bus gives away. In addition, not all vehicle brands have CAN bus. And not even all vehicles of the same brand and model can give the same information. There is a solution that is used to extract data from CAN bus. It is a contactless data reader CAN Crocodile.

Advantages of CAN Crocodile technology:

CAN Crocodile allows you to obtain



data about vehicle operation from CAN bus without interfering with the integrity of bus itself.

- Reading of data occurs without mechanical and electrical contact with wires.
- CAN Crocodile is used for connecting CAN bus to GPS / GLONASS monitoring systems, which receive information on engine operating modes, status of sensors, malfunctions, etc.
- CAN Crocodile does not break CAN wire insulation and "listens" to the bus exchange using a special wireless receiver.

Using of CAN Crocodile is absolutely safe for a vehicle, unnoticed by an on-board computer, diagnostic scanner and other electronic systems. Especially relevant is to use CAN Crocodile for warranty vehicles in which the connection of any electronic devices to CAN bus often serves as an excuse for cancelling the warranty. FMS and telematics messages contain important operation parameters of a vehicle: instant and trip fuel consumption, total fuel consumption, RPM, fuel level in a tank, engine operation hours, engine temperature

FMS and telematics messages contain important operation parameters of a vehicle: instant and trip fuel consumption, total fuel consumption, RPM, fuel level in a tank, engine operation hours, engine temperature, oil level, oil pressure and much more. It can be more than 100 parameters in total. CAN Crocodile extracts all available information through J1939 protocol.

If we speak about fuel monitoring, the fact is that the main purpose of standard fuel level sensors is to give an estimate with the degree of accuracy that seems to be correct for the vehicle manufacturer. This accuracy can not be shuttered with the accuracy of special sensors.

We recommend not fully rely on the readings of standard fuel level sensors, but consider each situation individually. As a rule, a suitable solution can only be found together with technical specialists. Different manufacturers have different accuracy of indications. Each customer also has different tasks. It makes sense to select a proper solution only for a specific task. Someone is quite fit to receive data from CAN bus, since it is several times cheaper and does not require any changes. ...



When Cars go beyond driving



Lakshmi Narayan Rao (Lux Rao) Director and Leader Digital Transformation Office, Cisco India and SAARC

midst concerns of safety and security, there is no question that technology can bring many benefits to transportation. Automated processes and intelligent controls can reduce delays and human error, preserve resources, improve connectivity, and enhance customer experience. As populations continue to grow and put pressure on the transportation sector to ensure operational efficiency, safety and security increases, technologies such as the Internet of Things (IoT) can build the next generation of transportation. The convergence of IoT and in-vehicle technologies, like remote diagnostics, onboard GPS, collision avoidance systems and 4G LTE Wi-Fi hotspots, can pave the way for new and exciting opportunities in the transport industry. Intelligent connections between datacenters and wheels are making sure that "Connected Transportation (read: Connected Cars)" as a concept, is no longer science fiction – it is real today and can provide people with a secure, safe, reliable and enriched driving experience.

Statistics indicate that the Connected Car market worldwide will likely reach \$155 billion by 2022, while 75 percent of the estimated 92 million cars shipped globally in 2020 will be built with internet connectivity. As the market grows, the biggest opportunity comes from the ongoing services that can be offered and the ongoing revenue that subscriptions to these services can create.

While there is evidence that the adoption rate for connected, services is growing (willingness to pay for connected services went from 21 percent in 2014 to 32 percent in 2015), many consumers still have concerns over the security of these vehicles. However, security is not solely a connected transport issue – it is an inherent concern with IoT, given the copious amount of data collected and shared between devices.

When it comes to IoT, people fear not knowing what devices are doing and what they are actually capable of doing. The reality is that today's networks were not built for the number of devices coming online. As networks evolve to better meet the needs of IoT and connected transport, automakers must take extra measures to ensure appropriate levels of connectivity at each step of the vehicle's lifecycle.

Security must be a top priority - from the design of the vehicle, to the time the driver takes the wheel, and beyond - to improve adoption rates and drive profits. The key to securing the Connected Car's vast, potential "attack surface" is enabling the right levels of connectivity at the right times. In addition to knowing when connectivity should be on or off, it's also critical to know what a vehicle should be allowed to do with that connectivity at different stages throughout its lifecycle. Automating this knowledge and ensuring proper connectivity to match each vehicle state is crucial to end-to-end security. It also eliminates the need to manually track and monitor connectivity. Automakers should partner with security experts and invest in IoT connectivity management platforms that are capable of automating how and when a vehicle connects, and what the vehicle is allowed

to do with that connection. Automated

connectivity management platforms enable manufacturers to identify what vehicles are allowed to do with their connectivity. If they do anything else, the platform can detect that anomalous behavior and automatically shut off the connectivity, preventing illicit activity that could compromise the vehicle's security and safety.

While IoT platforms and partnerships can help assuage security concerns and position automakers for success, there is an entire ecosystem of responsibility for the Connected Car. With new devices, connections and data points arising every day, no single party is 100-percent responsible for Connected Car security. Everyone – from the OEM, to the dealer, to the bank that enables automated payments, to the developers of aftermarket services – must do their part to keep cars safe, consumers happy and secure.

As the opportunities for new subscriptionbased services and connections with external networks continue to grow, security will remain top of mind. In the near future (5-7 years in India), we will see smart drive-through, in which fast food restaurants can connect with customers' vehicles and use GPS coordinates to predict ETAs for even faster, fresher service.

We will see gas pumps equipped with sensors that automate payments upon a vehicle's arrival, without the need to swipe a credit card. We already see cars connecting with social gaming platforms with in-app purchases to entertain passengers on long road trips. Everything from entertainment, to automated payments, to micro-transactions that take place between the vehicle and other infrastructures must be secured so that they are widely adopted, and in turn, drive profits for OEMs and aftermarket

providers alike.

Early adopters

Leading automotive OEMs worldwide are leveraging IoT solutions from Cisco Jasper to easily manage millions of connected vehicles on a global scale. Automate provisioning and operations, maximize up-time with real-time monitoring and diagnostics, and control costs with split billing and rapid roll out of new services.

Honda is leveraging IoT solutions from Cisco Jasper and Bright Box to deliver the MyHonda Connected Car platform, which provides a suite of powerful services that enhances the driving experience. MyHonda utilizes telematics solutions from Bright Box, powered by the Cisco Jasper Control Center automated IoT connectivity management platform, to deliver a variety of connected services that increase driver safety, simplify vehicle ownership, and enable new experiences for drivers. Honda has launched these Connected Car services across all European countries.

Honda drivers will benefit from the following IoT-connected services through the MyHonda Connected Car platform:

- Vehicle information and diagnostics — Drivers have easy access to critical vehicle information via the MyHonda app, and diagnostic information is sent in real time to track the health of their vehicle.
- Simple scheduling of maintenance

 Drivers are alerted when maintenance is needed, and can easily schedule appointments with the push of a button.
- GPS tracking for location-based services – Drivers are provided with information on their trips, push notifications to alert them when speeding, the ability to locate open parking spaces, and more.

Cisco Jasper Control Center is the global

The concept of Connected Cars is reality today in many European countries, thanks to the Internet of Things. An enhanced driving experience and increased safety are some of the key benefits of these services. IoT platform of choice for 23 of the world's largest auto manufacturers. These OEMs utilize Control Center to transform vehicles into dynamic hubs capable of delivering a variety of services that provide new, ongoing revenue channels for both them and their ecosystem partners.

Bright Box uses Control Center to decrease operational costs and guarantee the connectivity and responsiveness needed for Honda's always-on IoT services.

Honda experiences the following benefits of the Bright Box and Cisco Jasper IoT solution:

- Best possible customer experience

 Honda uses Cisco Jasper Control Center's automated rules and APIs to continuously monitor and proactively service connected vehicles for pan-European drivers.
- Optimized telematics Bright Box is a market leading telematics service provider that is already using Control Center on four other continents with six OEMs. Bright Box has partnered with Post Luxembourg, who provides the connectivity for Honda's pan-European project on Control Center.
- Global scale Control Center enabled Bright Box to easily extend the automated connectivity management for Honda's vehicles across six European countries today. And Cisco Jasper's partnerships with more than 50 service providers, which manage IoT devices across more than 550 mobile networks worldwide, will enable Honda to expand their services globally as needed.

By using Cisco Jasper Control Center in Connected Car projects players like Honda and other automotive OEMs have managed to reduce operating costs and increases service quality for customers. Today's most innovative auto makers are leveraging IoT to provide new services that enhance the driving experience for their customers. The MyHonda connected services, Honda is a demonstration of building a better driving future where drivers will continue to benefit from new levels of safety and convenience.

From cars to connected and intelligent cars



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He has been involved in testing and certification for over 17 years in a variety of roles and has played a vital role in establishing TUV Rheinland's testing and certification services in India.

While travelling on the Indian roads, one often comes across the persistent problems of incessant traffic jams, long queues at the toll booths, mixing of traffic on roads by different vehicles, i.e. same roads used by high speed cars, trucks, 2 wheelers, cyclists and even animals. Safety & security needs to be ensured while people are on the move. As per Ministry of Statistics, Govt. of India, 1, 69,107 lives were lost on the Indian roads due to road accidents alone in 2014. Security of girls in the public vehicles has become a national issue. Pollution on the roads is bound to adversely affect the health of citizens if correct measures are not taken on time. How and when are we going to address these issues?

Intelligent transportation Systems (ITS) seems to provide a solution for many

of these problems. ITS technologies are being deployed at all levels & by all concerned stakeholders in the transportation ecosystem. MoRTH, the apex body of transportation has already published a policy document on vehicle tracking systems (VTS) & CCTV systems for being deployed across all public vehicles in the country. Some state governments have already implemented the mandate of equipping all public vehicles with these tracking systems. These VTS systems are capable of relaying live videos to the backend along with location coordinates. The system comes with a SOS button to alarm the command center regarding safety & security of the passengers. The live data of all these public vehicles are being monitored at the central command servers. These VTS systems are also being used to ensure the entry of only authorized vehicles in the mining fields of Orissa. This is a classic example of ITS technologies contributing towards safety, security. With the visible advantages it

has, the VTS systems might be included as an OEM fitment in the coming years.

The government has announced an ambitious plan, "all electric vehicles by 2030". This means no gasoline vehicles on the road 2030 onwards. Most of the OEMs are already working on their electric vehicles. However, a lot of work would go into creating the charging infrastructure. The petrol pumps would need to be replaced by charging stations. The cost implication of such transformation would be significant. Also what would happen to the existing gasoline vehicles is another question? But there are innovative ways in which we could build up on our existing infrastructure & save on the costs, e.g. converting the existing electric poles to double up as the charging points. In this way, we could also save on the wiring and installation activities & overheads. The retrofit hybrid module may convert the existing gasoline vehicles into the electric vehicles directly.





The other technologies such as V2X communication, advanced driver assisted systems (ADAS), driver drowsiness systems (DDS), interoperable RFID cards & transceivers at all tolls across the country are some of the other technologies which are being developed & deployed by the industry. A lot of these systems communicate over the RF or internet and hence we need to also build a protocol regarding data exchange. Since every coin has two sides, cyber security would need to be properly ensured before deploying such systems on a mass scale.

But the question arises! Are we ready for this change? Is our infrastructure robust enough to handle & safeguard the amount of data that would be on the web when these systems are deployed on a country level? Is a protocol standard set for the communication flow & information exchange between these devices? These questions must be discussed & proper framework needs to be prepared before we take a giant leap into the world of connected cars.

"The dream of connected & intelligent cars built on a safe, secure & reliable platform is gradually becoming a reality with the joint initiative of the industry and the government. The car would essentially become a connected device which would communicate with everything around (man, machine and infrastructure). Hence, a protocol standard would need to be developed to ensure proper protocols for communication flow and information exchange between the different stakeholders to ensure safety & security of sensitive data."

To play our part in this complete ecosystem, we at TUV Rheinland (India) Pvt. Ltd. have equipped ourselves with the state-of-the-art facilities to test and validate all of these new systems & technologies from the reliability, EMC and wireless perspectives to ensure that a safe, reliable and secure product enters the market. We also provide trainings and services in the field of conformity of production (COP) for automotive components and vehicles.----





Shaun Brashaw Executive Technology Altech Netstar, South Africa Harman Connected Services

He is a competent executive with over 20 years' experience in operational and technical roles in the fleet management and telematics arena, spanning South Africa, Africa, and beyond. Shaun has delivered on a multitude of large corporate transactions, and has developed global strategies and complex solutions with global reach.

egislation in India makes it compulsory for public transport vehicles to have vehicle telematics devices installed. Once the law comes into full effect, millions (if not billions) of data packets will be collected from vehicles every day. But to what end? Collecting data is only the beginning. If it is not analysed and used, there is no point in collecting it.

More than dots on maps

Increasingly, vehicles are fitted with telematics devices during the manufacturing process, enabling vehicle manufacturers to collect data on the performance of their products. They use this information to design better vehicles.

But there is another side to the telematics coin: fleet management. In the case of India's legislation, it is in the public interest to run busses and taxis as effectively and efficiently as possible. Similarly, private fleet managers have much to gain from data that gives them visibility on all aspects of their businesses at all times.

Telematics is only the first step

The dot on the screen that shows where a vehicle is; and the alarm in the cab that warns a driver to slow down; are not fleet management. Intelligence that enables real-time business decision-making is.

This is where telematics can and should come into its own.

Fleet management is about an entire ecosystem that is networked through the internet of things (IoT) and pulled together through big data analytics. Enormous benefits can be derived from drawing in data from different sources – not only vehicles – to provide a single view of the business through a user-friendly online portal. For us the purpose of telematics is fleet management in the most comprehensive sense of the word, namely a second-by-second view of the business that gives executives the context they need to make businesses decisions in real time.

The ecosystem includes regulatory requirements and legislation, safety and compliance (eg, axel mass, up-todate licences), fuel management, risk management, health and safety matters, scheduling and dispatch, and gate management.

Currently, fleet telematics concentrates largely on driver behaviour. Tracking devices locate vehicles on an electronic map, while monitoring driving actions such as speed control, braking and acceleration.

However, this information exists in isolation, as do the other ecosystem elements. The company's fuel account, for instance, is managed through a fleet card system that resides in the Finance Department, while issues such as rewards and recognition, career planning and

disciplinary action are the domain of Human Resources. Depot managers often work in silos, failing to coordinate vehicle utilisation and route optimisation. And nobody comes even close to an immediate understanding of the total cost of ownership of each individual vehicle and the fleet as a whole.

Fleet management entails far more than the harvesting of information from a truck and its driver; it has to be a holistic process. We see fleet management as the ability to manage all your transport risks and opportunities from one portal. IoT broadens our horizons like never before. In addition to vehicle utilisation, driver behaviour, fuel and salary bills, and the legislative boundaries within which operators have to function, we can now develop unique solutions for each of the verticals served by the transport sector by monitoring and reporting on the quality of goods in a shipment.



Over and above general quality parameters, such as whether or not a load had been dropped or was tampered with and host of others are available. Pharmaceutical distribution, for instance, requires careful temperature control, which can be monitored by inserting wireless temperature probes in the load. Electronics, on the other hand, are sensitive to vibrations, while coal deliveries are particularly susceptible to shrinkage.

Fleet managers are increasingly demanding industry-specific, custommade solutions. It is an exciting challenge for all of us in the telematics industry.

Delivery through collaboration

Delivering on these customer expectations is best done collaboratively through the leveraging the power of IoT.

Thanks to the Fourth Revolution, which is putting technology in people's hands in useful and accessible ways, fleet managers are increasingly tech savvy. We don't have to sell the advantages of technology because people are already used to not waiting until next week to receive today's data. Our task is to pull the available technologies together and collate the data they generate into a single, seamless view that is easy to understand and that customers can manipulate according to their needs and preferences.

In meeting this challenge, industry players have to stop behaving as telematics providers and become fleet system providers.

Our job is to write the specification that will deliver the fleet manager's ecosystem to his or her fingertips. Armed with that understanding, the fleet system provider incorporates other service providers into its network and links all their systems into a delivery portal. This entails collaboration with non-traditional partners, such as banks, and exploiting the cloud as delivery platform.

Delivery via the cloud has become a given, largely because of the flexibility it offers. Fleet system providers can effortlessly scale their services to accommodate the usage peaks and valleys that characterise telematics loads and, importantly, bill accordingly. Pay-per-use is a feature no industry player can afford to be without.

Another cloud advantage is that providers can duplicate their infrastructure globally. As a result, customers can connect from anywhere on any device, making it possible for a company like Altech Netstar to operate in markets as diverse and geographically dispersed as South Africa, Australia and India.

The future of fleets

Transporters know they have to digitise their businesses to remain relevant. They have already evolved from 2PL transporters to 3PL logistics providers, and are dipping their toes into 4PL and even 5PL waters. An Uber-type model for loads will become a reality as soon as the regulatory issues around risk management have been resolved.

Sadly, in most instances, fleet management companies remain stuck in the past. They keep on developing solutions with traditional transporters in mind. At most, an element of logistics is thrown in the form of route optimisation.

We are yet to build a 4PL solution in fleet management terms. The time has come to integrate data from different sources into real-time views of the logistics business as a whole. For example, business owners want to know how each depot is performing against its KPIs today. This should include revenue generated and total costs, from salaries, overtime and sick leave, to vehicle repairs and maintenance. The more traditional services, such as route optimisation, vehicle tracking and sign-on-glass PODs, become the givens, not the selling points.

In this scenario, maintenance becomes predictive because it is based on each vehicle's actual performance and needs, not on the manufacturer's standard.

Pressure points and bottlenecks in an operation become evident; an inefficiency in the wash bay, for instance, stops costing the business money in the form of late delivery penalties.

A different approach to insurance becomes possible: instead of a flat monthly premium, pay-per-trip is an option. An executive can see immediately how his or her business tracks against global best practices. He or she can drill down in the data to identify opportunities for improvement because the data can be exported, manipulated and compiled into customised dashboard.

None of this is actually futuristic. We have the technology to drive such business models. The telematics is a given, and has been for the last 15 years. The question we have to answer for our customers is how the technology enables fleet management. The future is about the value we add and the problems we solve.



Sumit Dey Director Harman Connected Services

n his famous book, "Surely You're Joking, Mr. Feynman", Richard Feynman has documented experiments and outcomes with ants and their trails. It is perhaps counterintuitive to analyze these outcomes in a journal for Connected Cars. However it may excite the reader if certain parallels can be drawn between the navigation systems of modern cars compared to navigation of ants in search for food.

Ant trails are characterized by the following key tenets –

- » Ants mark their path with trails on a common ground
- » Trails get reinforced when ants successively use the same path
- » On successful return (characterized by success in food search) by a different path, ants leave different and stronger trails to differentiate and indicate success to other ants starting to look for food

- Initial trails get superseded by successful return trails (when these are different)

 Trails are chemical-based and generally evaporate in around 30 mins

Navigation systems of connected cars have the following characteristics –

» Cars "mark" their routes with invisible

Smart Trails and Connected Cars

trails on a common map

- » Trails get "reinforced" when multiple cars use the same route
- A "successful sojourn" (characterized by less time, distance, fatigue etc) on a different route is more recent data and indicates to other cars of an alternate viable route at the start of a journey

- Initial sojourns get superseded by successful sojourns (when these are different)

 Trails can be stored on cloud and can be analyzed over several months to fine-tune

Connectivity enables smartness in systems. For example, an ant considers a simple but smart logic to choose a path that maximizes its chance of successfully finding food (refer Figure 1). If its predecessor 1 went on this path, it will choose the same. However, if its predecessor(s) returned on a different path successfully with food, it will prioritize this path over the former and which will then get reinforced with newer trails. Similarly for a "smart, connected" car in Figure 2, the mantra is that it will follow its predecessor 1 who went on a given route, unless a predecessor 2 has been able to use a better alternate route (that is longer but with less congestion resulting in overall saving in time) in which case the car will prioritize the latter route over the former and reinforce this route by choosing it. Since the route selection criteria between ants and cars are different, the preferred route choice in itself could be completely opposite (as shown by thicker trails in the Figures 1 and 2).

Smart Navigation

Modern city traffic administrators can utilize the smart trails for better traffic





Figure 3: Connected Car Applications

management. Let us consider that a city traffic administration gets a live map of its routes characterized by experiences of the Connected Cars. For example, routes have pre-fixed capacities but different vehicle densities at different times of the day. A live map updated minute-byminute helps the traffic administrators to direct the traffic from a central monitoring and command center. Armed with the live maps, government agencies such as traffic coordinators can work on the traffic data and recommend route preferences to individual drivers.

How will this work in a day to day scenario? Let us analyze the city traffic (shown in Figure 4) between points A and B via 2 different routes at different times of the day. For simplicity each of the blocks are considered as 2 by 2 kilometers. Distance via routes 1 and 2 both are 10 kilometers. However, traffic patterns vary during different times of the day. A part of the city is depicted below.



Figure 4: Time taken from point A to B at 7am



At different times of the day, observed times via Route 1 are:

6:00 am - Time (AB) = 4 + 4 + 4 + 4 + 4 = 20 mins

7:00 am - Time (AB) = 4 + 4 + 6 + 4 + 4 = 22 mins

8:00 am - Time (AB) = 4 + 6 + 6 + 4 + 4 = 24 mins

9:00 am - Time (AB) = 4 + 6 + 8 + 6 + 4 = 28 mins

Route 1 being a preferred route starts getting a higher vehicle density during the peak hours. Route 2 too gets a higher vehicle density by around 9 am. Journey duration without the involvement of the traffic coordinators are shown below.

Start Time	Route 1	Route 2
6 am	20	20
7 am	22	20
8 am	24	21
9 am	28	22

Traffic coordinators can route vehicles via Route 2 to reduce the vehicle density on Route 1. With optimal traffic flow, traffic coordinators can improve travel times on Route 1.

Start Time	Route 1	Route 2
6 am	20	20
7 am	21	21
8 am	22	22
9 am	24	23

As depicted in the above chart, traffic coordinators are able to improve the travel times on Route 1 without significantly compromising the travel times on Route 2.

There is an urgent need to research traffic flow and travel times by each of the city traffic administrators as every city may have different needs and peculiarities. As an example, a small industrial town may have peak hours only during a 30-60 minutes window twice a day, whereas in a metro there may be several peak hours during the day. Further, in an industrial town the traffic hotspot may be confined to a few pockets in the city – typically the entry and exit points into the factory. However, in a metro the traffic hotspots are spread out in several parts of the city. Moreover, travel time on a route may change over time in a day, week, month and year. Cyclical trends can emerge in daily, weekly, monthly and annual frequencies that needs to be understood over a significant period of time and large volumes of data. For example weekend traffic patterns would be quite different than weekday traffic and summer traffic pattern could be guite different from the winter traffic pattern. Further, traffic data must be viewed with a "window". More recent travel data (for e.g. time taken by a car) could have higher weightage compared to other travel data (for e.g. average times in the previous day or over last week). Besides, traffic data may need to be modulated for sudden events with no previous inkling for example a street protest.

In Emergency

We now consider other benefits of the Smart Trails in developing nations that often do not have sufficient width of roads to accommodate emergency vehicles on a dedicated lane. With burgeoning traffic in these countries, it is close to impossible to provide any prioritization to emergency vehicles. This often causes delays sometimes fatal - in making an emergency services available. In certain other cases, entire stretches of roads are required to be closed to common traffic to enable emergency services such as for example organ transport. With connected cars, traffic coordinators can easily manipulate traffic on Route 1 in a way such that the journey duration is around 20 minutes and allows an emergency vehicle such as an ambulance to use Route 1 above even during peak hours and without delaying daily commuters on the route.

In other emergency situations when a "connected" car is directly involved, it would fare better compared to another vehicle as it can automatically "summon" help from Roadside Assistance for vehicle breakdown and Police or Ambulance for more severe situations e.g. an accident. In emergency situations on the road for e.g. a collision and pile-up, connected cars can (besides rerouting without dropping a sweat) provide vital information to traffic monitors even before people actually call for help. For example vehicles standing still in locations where they are unlikely to

be standstill can surely trigger an action on traffic monitors to send in a patrol to evaluate the situation from up close.

City Parking

City parking is another concept that can be significantly improved by using Connected Car technologies. Many of the city roads allow parking on the weekends. For e.g. a street with multiple offices will most likely wear a deserted look on the weekends and can allow parking of hundreds of vehicles from the neighboring downtown shopping district. A connected car will have an advantage over traditional cars since it will possibly get notified for additional parking space available on the office street adjacent to the shopping district. Further, city traffic administrators can find out the parking needs of a particular area by analyzing the smart trails and can proactively direct traffic towards the new parking plaza. While a connected car with a suitable parking database service will find the new plaza quite easily it may not be intuitive for other vehicles to look for this parking plaza. This is precisely where the traffic administrators will have a significant role to direct traffic to the new parking plaza until it is common knowledge and the parking plaza achieves the desired capacity. Similarly, traffic administrators can have better predictability of vehicle movement at entrances and exits of large malls.

Stolen Vehicle Tracking and Driver Behavior

These same trails that are used for

betterment of traffic experience in a city are equally handy in tracing stolen vehicles. Law enforcers can utilize "connected car" trails to track the movement of stolen vehicles and nab the culprits before they cause much damage. In fact a Connected Car would be very unlikely to be stolen in the first place as an intrusion will possibly trigger an alarm and may force the thieves to abandon the plan and run for cover. Even if they do manage to take off with one such vehicle, they would soon be on the radar of the police and find themselves behind bars in no time

Analysis of the same trails can also throw light on driver behavior. Imagine handing over your connected car to your young relative – either your teenage child or a sibling for an overnight trip by road. You can sleep easy if you get periodic updates from the car directly that it is safely driving within the speed limit and confirms on arrival at the destination. Moreover, after the trip one can analyze any risky driving pattern and eliminate the same with conscious intent. Safe driving habits are ultimately what will make roads safe.

Fuel/Energy Saving and Smart Home Connectivity

Connected cars can also enable energy and fuel saving in the city. Smart street lighting must be setup based on the traffic patterns to save cost and energy. For example, during the normal evening hours there would likely be a continuous stream of vehicles on the Route 2. However, later during the night, many parts of the street

Traffic data must be viewed with a "window". More recent travel data (for e.g. time taken by a car) could have higher weightage compared to other travel data (for e.g. average times in the previous day or over last week). Besides, traffic data may need to be modulated for sudden events with no previous inkling for example a street protest. lighting can be switched off. Instead, only portions of the street - where there is active traffic or pedestrian movement can be kept in on state while switching off portions where there is no traffic activity. Significant saving in fuel is also an outcome of "Smart" cars as they will spend far less time and distance to explore better routes or to explore availability of parking. Now, consider another situation. You have setup an alarm to wake up at 7 am to wake up and get ready for the daily the commute to office for a schedule meeting at 9 am. You have planned to hit the road at 8 am. At 7:45 am, you get a message that the traffic has peaked early today and as a result if you hit the road at 8am the commute time is 15 minutes higher than other days. Instead you get a recommendation to start around 8:30 when it is predicted based on previous traffic patterns that the commute time is likely to be within 1 minute of the average commute time. What would you do? You would more than likely postpone that meeting at 9 am to 9:30 am and then start for office at 8:30 am rather than at 8 am. A connected car can thus improve the driving experience even before you hit the road.

Once you hit the road, and are almost halfway down to office, you remember the Air Conditioning at home has not been switched off! Again your connected car comes to your rescue. The connected car connects to the Smart Home hub over internet and seamlessly switches off the Air Conditioning. On your way back from office, you could switch on the Air Conditioner for optimal temperature when you reach home.

Self-Learning and Autonomous Cars

In several countries – especially developed ones – we see a trend of Autonomous Driving and Self-Learning Cars. Some of the Autonomous cars can navigate on their own on specific traffic situations for example bumper to bumper traffic. The self-learning car can predict the route its driver will want to take based on past driving history. Most of these cars will also have Software Update capability with improved algorithms and bug fixes for its navigation or learning modules. As highlighted earlier, significant research



Figure 5: Connected Car Architecture -

is required in each of the areas noted above before a well-rounded experience is achieved with a combination of a fleet of Smart Connected vehicles as well as Analytics.

Convenience

As the infotainment system in a connected Car has progressively become the fifth screen after TV, Computer, Tablet and Mobile, it also encompasses a payment gateway and convenient shopping hub. On your way to office you could pre-order and pre-pay for your coffee and pick it up on the way. On a return trip from office, you could pre-order your vehicle part and book an appointment with your service dealer. On a weekend trip you could delight your spouse by booking tickets to the concert and by locating a quaint little restaurant snuggled by the roadside off the highway. Connected cars can delight the consumers with their "smartness" and enabling previously unthinkable use cases in addition to providing unmatched convenience and safety for the car and driver. We now consider an architecture (in Figure 5) of a connected car ecosystem that would enable this kind of "smartness". As indicated, connectivity is a key recipe of "smartness". Connectivity could be either "built-in" or "brought-in" through a smartphone. Besides, analytics is also an equally important ingredient as is personalization. The entire ecosystem needs to be hosted on the cloud and must

have software update capability – similar to what we today have for Smartphones. Besides, applications and content approved by vehicle manufacturers must be available in the vehicle without compromising on safety and security.

In conclusion, while ant trails have been successful in explaining the communication traits among social ants, Connected Cars are essentially a manifestation of mankind's social traits. Several aspects of how Connected Cars have a positive influence on friends and family members, other vehicle users and city administrators in the social chain is explained with Navigation, Traffic, Parking and Emergency use cases in cities. Connected Cars technology will continue to further evolve with a plethora of convenience and safety features. The ability of the "Connected Car" technology to delight the consumers shall spur its growth and adoption in vehicles. Both auto manufacturers and consumers are keen to explore the benefits that come with the Connected Cars. Further, Connected Cars is becoming an important link in the smart life of end users who have access to a variety of smart devices from smartphones to smart home hubs and demand similar or higher "smartness" from their vehicles. Auto manufacturers are game!

TELEMATICS The Way Forward in Insurance



Vijay Sinha Managing Director & Chief Executive Officer DHFL General Insurance Ltd.

The advent of technology has enabled the possibility of hyper-localization and hyper-targeting of specific audiences in terms of messaging, segmentation, and serviceability. Telematics is an enabler which provides the same opportunity in Motor Insurance ecosystem.

It's a potent tool that helps insurance companies track, assess and modulate offerings and hyper-target underwriting. It brings about laser-sharp focus, fair pricing, and truly offers what the customer requires. Each car owner and driver therefore becomes an ecosystem, a market and customer segment onto themselves.

Across the globe, several insurance companies have brought forth differing levels of maturity in terms of offering true customization with reference to motor insurance. However, as is the case with each early-stage technology, telematics implementation in India is no exception. There could be couple of challenges in its implementation, but the advantages offered by this technology are far more.

To analyse the advantages we will have to evaluate the current scenario of motor insurance in India.

Motor Insurance in India has always been an enforced requirement and motor insurance premium has been a function of the make, model and location of the vehicle. Various other parameters , which may be responsible for the upkeep and maintenance of the car and its condition. has been seldom considered, such as how frequently the car is driven, what distance is it driven at a stretch/during a day, what terrain is it driven on – within city or intercity, is it driven by night or by day, how safely is it driven and maybe more. These factors can directly result in a more meaningful risk assessment and pricing mechanism.

In the current scheme of things in India, people who are driving less and/or driving safer in their self-owned car are also paying the same premium as those people who are driving more and may be in riskier situations/fashion/timings.

As a starting point, it can be safely assumed that people who drive fewer number of kilometres are in a way cross-subsidizing the insurance premium for those people who drive higher number of kilometres. Also, people who have safe driving behaviour are subsidizing the insurance premium for the people with bad driving behaviour. Telematics in insurance can help eradicate this anomaly. Telematics based insurance helps in the real-time monitoring of the vehicle and the driver data along with focused analyses and reports.

To successfully function—the current technologies that are usually in the offering involve

- A black box wired to the car's electronics and hidden somewhere in the vehicle
- A self-installed device which is generally plugged into the vehicles on-board diagnostic port (OBD)
- 3. Application installed in the Smart phone

Once the device is installed in the vehicle, the data from the device are then analysed and key attributes are then derived such as

- Location
- Speed
- Distance travelled
- Length of time driven for
- Time of the day journey took place
- Accelerations & Decelerations both longitudinally and laterally
- Harsh accelerations, braking or swerving events
- Crashes

These set of data can be used to evaluate the insurance policy premium amount, as well as give timely and accurate information when an accident occur. This can help the insurer to record quality 'First Notification of Loss' information (FNOL) and understand liability as well as challenge potentially fraudulent claims.

Telematics can serve as the platform for usage based insurance Pay as You Drive (PAYD) insurance, as also Pay How You Drive (PHYD) insurance.

Pay as You Drive (PAYD) product is a usage based product in which premium depends on how much vehicle is driven



over a specified period. This is considered for calculation of insurance premium. Pay-As-You-Drive pricing requires verified mileage data.

PAYD insurance can enable drivers to experience substantial savings on their car insurance by paying premiums solely based on how much they drive.

Pay How You Drive (PHYD) product is a user behaviour based product in which premium depends on how safely a vehicle is driven. It uses GPS technology to measure how a vehicle is being driven insurers then use this information to make judgments about driving performance. Driving performance is quantified as 'Driving Score' which is defined in terms of speed, road used, time of driving, braking, cornering etc. Driving Score influences final premium charged which may be revised regularly at predetermined intervals. 'Safe' drivers will usually benefit from lower premiums than 'less safe' drivers.

opportunity for users to improve their driving safety and reduce the cost of their cover by proving themselves to be responsible drivers.

PHYD insurance can enable drivers to experience substantial savings on their car insurance by paying premiums solely based on how well they drive.

Telematics based Insurance will be a lucrative service offering for the consumers and would be instrumental in increasing the renewal rate, since customers will benefit from this value proposition. It promises to bring about not only an economic benefit, but also in that of the mindset. Culturally it makes insurance viable to purchase beyond the compliance norms. It becomes a valued, pull-based service that customers are likely to bring into their budgets themselves.

If telematics success factors are activated, there would be an immense value generation that will allow lower premiums to co-exist with profitability. The advent of Telematics allows the insurance industry to take its first steps into Insurance 2.0.

A world where real time intelligence through tracking and unbridled data rapidly adjust themselves to attune to risk as it happens.

Apple-Hertz



In another development Apple has partnered Hertz. Hertz, will lease a small fleet of cars to Apple to test self-driving technology. At present, Apple is testing Lexus RX450h SUV models which are reportedly leased from a Hertz owned company, Donlen. The details of the partnership are yet to be known and it remains to be seen whether Apple will be launching a fleet of self-driving taxis with Hertz or it will just remain confined to testing of self-driving technology. It should be noted that recently Tim Cook had admitted that his company is working on self-driving technology. Its not clear whether Apple will build its own self-driving car or will be focused on developing technology for the same. Whatever be the strategy of the company, but Apple increasing its activities in the automotive industry is big news and indicates that the future of this industry is promising.

Strategic partnerships amongst mobility & technology companies

Technology companies and traditional automakers are trying to foray into mobility services. For this they are entering into partnerships with the companies already working in this field. The reason behind this is the prediction by various research firms about the future concept of car ownership. It is predicted that in future the car ownership will cease to exist and we will have people sharing the cars. This will have a significant impact on the car manufacturing business and thus automakers are protecting themselves against this change. Even the technology companies are exploring different business models and are trying to find their role in this emerging ecosystem.

Waymo-AVIS-Lyft

Recently Waymo, signed an agreement with AVIS, wherein Avis will provide fleet support and maintenance services for Waymo's self-driving car program at Avis Car Rental and Budget Car Rental locations. The collaboration is designed to support Waymo's growing autonomous vehicle (AV) fleet and Waymo's early rider program, a public trial of its self-driving cars in Phoenix, Arizona. Waymo recently announced that it is adding hundreds of Chrysler Pacifica minivans to build a 600-vehicle fleet. This partnership will allow Avis Budget Group to service Waymo's growing number of cars on the road, ensuring Waymo's self-driving vehicles are ready for riders around the clock. Waymo has also entered into a partnership with Lyft, according to which Waymo will



provide a fleet of cars for Lyft to operate through its ride-hailing ecosystem. Lyft lack the infrastructure to service a fleet of cars while Avis' Zipcar service lacked the technology to deploy cars like a taxi service. Waymo so has aligned itself with both the companies, thus all the three companies are complementing each other. It is also being speculated that the three companies can enter into an agreement to operate as one autonomous transportation system. In future Waymo may enter into a partnership with any insurance firm, further consolidating its presence in the ecosystem.

Nvidia partners with companies for its DRIVE PX AI Platform

Nvidia has entered into partnership with ZF, Hella and Volvo, Autoliv in two different partnerships. But both these partnerships revolve around the usage of Nvidia Drive PX AI platform. ZF and HELLA have partnered to provide customers with a complete self-driving system that integrates front camera units, as well as supporting software functions and radar systems. Using the NVIDIA DRIVE PX AI platform, the partnership aims to produce the highest NCAP safety ratings for passenger cars, while also addressing commercial vehicle and off-highway applications. This partnership will also enable ZF and HELLA to develop software for scalable systems starting from modern driver assistance systems that connect their advanced imaging and radar sensor technologies for autonomous driving functionality. In another partnership Nvidia will be working with Volvo Cars and Autoliv to develop advanced systems and software for AI self-driving cars. The



three companies will work together along with Zenuity to develop next-generation self-driving car technologies and will create systems that can utilize deep learning, a form of artificial intelligence, to recognize objects in their environment, anticipate potential threats and navigate safely. Zenuity is an automotive software development joint venture equally owned by Volvo Cars and Autoliv. Like the other partnership production vehicles will be built on the NVIDIA DRIVE PX car computing platform are planned for sale by 2021.

US federal government working towards legislation of self-driving cars

The US federal government is looking into framing the legislation for self-driving cars. A group of senators is working on it and it might be introduced soon. According to reports, the bill being

drafted would represent the first changes to the federal law aimed at self-driving cars. So far, the government has issued autonomous car guidelines, but they are not mandatory and several states have enacted their own self-driving car regulations. But if this federal legislation is passed and comes into effect it would surpass all the laws made on the subject by the states.

The reports are stating that the regulations will be so framed that it will balance between encouraging the development of self-driving cars and issues like safety and cybersecurity. It might also fix separate roles of state and the federal government so that there is no encroachment of

rights among the two. Working in this direction the US Congress this week held latest of a series of hearings to accumulate

more information about self-driving cars. There is an increasing pressure from the side of automakers who are eager to launch their self-driving cars and as they say, the ambiguity around

the regulation of self-driving cars is the only hurdle they are facing. A significant bipartisan effort that urges manufacturers to make cyber security a "top priority" in self-driving vehicles took place over the last two days through the release of principles for bipartisan legislation on self-driving vehicles and a subsequent hearing, "Paving the Way for Self-Driving Vehicles."

But it is not an easy task for the legislators as they need to address several issues like safety, security and deal with scenarios like accident or crash involving self-driving cars and the also liability in those cases. There are also chances that the Trump administration may change the guidelines issued

during Obama administration which is also a concern and the lawmakers will have to keep this in mind while framing the legislation.

Bosch announces \$1.1 billion facility that will produce semiconductors used in self-driving cars

Tier one auto industry supplier Bosch has announced a \$1.1 billion facility that will produce semiconductors used in self-driving cars, smart homes, and smart city infrastructure. The new plant will be based in Dresden and is reported to start producing silicon chips commercially by 2021.

This move by the company to expand its chip manufacturing capacity by a huge scale is seen as an effort to consolidate its position as a key automotive supplier. In future semiconductors is seen to be the key ingredient in cars as they get more and more connected. The company has also said that it is investing in the wafer 'fab' in order to manufacture chips based on 12-inch wafers, in response to growing demand for IoT and mobility applications.

Although Bosch is not new in this field of



chipmaking and it has been supplying chips for cars as well as smartphones for around 40 years but with giants like Intel, Qualcomm trying to create a space for themselves in automotive sector this move is significant.

Of late, there has been a lot of activity in automotive semiconductor market with Intel acquiring Mobileye, Qualcomm taking over NXP and Samsung Electronics acquiring Harman. It was forecasted by Research and Markets that the global automotive semiconductor market is expected to reach an estimated \$45.9 billion by 2022 and to grow at a CAGR of 6.4% from 2017 to 2022. With dwindling share in the smartphone market with the advent of cheap semiconductor manufacturers, the giants have shifted their focus towards automotive.

GM's Cruise automation to foray into HD mapping for driverless cars



GM's Cruise Automation has decided to foray into HD mapping. The company has decided to eventually increase the mapping efforts to cover 100 cities. It is trying to gain an edge over would-be rivals in the autonomous car tech field, including Waymo, Tesla etc. Notably, Cruise Automation had started out as an independent company but was acquired by GM last year.

HD maps are indispensable for the self-driving cars and all the companies that are developing self-driving cars are directly or indirectly involved in HD mapping technology too. Some are building it in-house while some are depending on some partners or third parties. For example, Ford is backing Civil Maps and HERE, the mapping service co-owned by Daimler,

BMW, and Audi following its acquisition from Nokia. Similarly, Mobileye is working on real-time mapping solutions for autonomous vehicles and has got into partnership with BMW, Nissan, and Volkswagen. There are number of startups as well working on the mapping technology like Deepmap, Noxomo, Mapper.ai etc.

GM has a large number of active vehicles on the road equipped with the advanced sensors needed for HD mapping, so this can provide the company an edge over its competitors. Also, GM is growing a fleet of Cruise test Chevy Bolt EV cars, which could help with the efforts in those cities where they operate. Sensor data is sort of building blocks for digital maps and different companies are approaching it differently to capture and use it. •••

Nissan files patents related to autonomous car technology in India



Nissan Motors has filed a series of patents between the months February and May in India. The patents are related to autonomous car technology in India. It is for "electronic subsystems" that will help a car sense road conditions and assist the driver by providing advanced navigation advice and helping the car to get through the obstructions. It also includes sensing vehicles ahead. These patent applications seem to describe the combined functionality of the first stage of Nissan's ProPilot autonomous driving system that is capable of autonomous driving on single-lane highways. It is being observed that the number of patent applications towards autonomous vehicle technology has been growing rapidly across the globe The number of patent publications at present is around 60 in 2017 which was around 20 in 2013. A number of companies like Toyota, Ford, Amazon and Alphabet are also been filing patents on driverless technology. The traditional automakers ,Technology giants to startups all are filing patents in order to get an edge over the other companies........

Waymo testing its own autonomous truck technology

According to some reports, Waymo is testing its own autonomous truck technology. The company is exploring how technology developed by it in the span of eight years works on integrating it into a truck.

As per reports, so far the company is testing only one truck and the testing is taking place at its private track in California. The road test will follow later this year in Arizona. The reports further say that a test driver will be at the wheel at all times during the testing.

Looking at the bigger picture it can be seen that Waymo and Uber are emerging as fierce rivals. Uber through the acquisition of Otto last year, had forayed into this sector, so the Google spinoff too has decided to enter this segment trying to deny any kind of edge to Uber.

All are aware of the rift between the companies as Waymo sued Uber and Otto in February, claiming that the companies were benefiting from the secrets stolen by Levandowski, who at the time the suit was filed was heading Uber's self-driving vehicle R&D. Moreover, Waymo is also collaborating with Lyft, rideshare rival of Uber for bringing autonomous car technology to the market.

News

Tata Elxsi signs licensing & integration support deal with a top OEM

Tata Elxsi has announced the licensing of its advanced autonomous vehicle middleware platform 'AUTONOMAI' to one of the world's top 5 automotive OEMs for their driverless car R&D. Although the company has not named the OEM with which it has signed the agreement but it is known that the top 5 OEMs today are Volkswagen, General Motors, Ford, Toyota, and Daimler. So it can be any of these 5 OEMs.

The AUTONOMAI platform is a middleware and acts as an interface between hardware like radars, lidars, cameras, AI and machine learning algorithm. It will provide carmakers and Tier 1 automotive suppliers with a comprehensive and modular solution covering Perception, GNC and Drive-by-wire systems, to quickly build, test and deploy autonomous vehicles. As autonomous cars are now being envisaged outside the



test tracks to the public roads also, it needs to be noted that AUTONOMAI allows rapid region-specific adaptation through its preintegrated validation datasets and AI and deep learning capabilities.

In course of fine tuning and simulating its middleware AUTONOMAI, the company has developed two self-driving cars. It was also in news a few months back that it might be testing them on the Bangalore roads. As per some news reports Tata Elxsi is currently not focussing on competing with giants like Google, Uber, Intel etc rather wants to work with them for developing their own self-driving cars. Reports also say that the company is also in talks with Tier-1 suppliers to co-develop sensors that will work with its underlying software.

Autonomous driving will spur new 'Passenger Economy' worth \$7 Trillion: Intel

According to a new Intel study, self-driving vehicle services, including ride-hailing, cargo delivery and in-car entertainment, will be worth \$7 trillion by the year 2050. Intel has coined this the "passenger economy." The report has been prepared by analyst firm Strategy Analytics. The research firm further points out that autonomously operated vehicle commercialization will gain steam by 2040, generating an increasingly large share of the projected value and heralding the emergence of instantaneously personalized

services. Intel predicts a new "Passenger Economy" will emerge to support the idle time when drivers become riders The economic opportunity will grow from \$800 billion to \$7 trillion as autonomous vehicles become mainstream Mobilityas-a-Service will disrupt long-held patterns of car ownership, maintenance, operations and usage

Key report highlights include:

- Business use of Mobility-as-a-Service (MaaS) is expected to generate \$3 trillion in revenues or 43 percent of the total passenger economy.
- Consumer use of Mobility-as-a-Service offerings is expected to account for \$3.7 trillion in revenue or nearly 55

for \$3.7 trillion in revenue or nearly 55 percent of the total passenger economy.

- \$200 billion of revenue is expected to be generated from rising consumer use of new innovative applications and services that will emerge as pilotless vehicle services expand and evolve.
- Conservatively, 585,000 lives can be saved due to self-driving vehicles in the era of the Passenger Economy from 2035 to 2045.

- <section-header>
- Self-driving vehicles are expected to free more than 250 million hours of consumers' commuting time per year in the most congested cities in the world.
- Reductions in public safety costs related to traffic accidents could amount to more than \$234 billion over the Passenger Economy era from 2035-2045.
- Highlights of future scenarios explored in the study include:
- Car-venience: From onboard beauty salons to touch-screen tables

for remote collaboration, fast-casual dining, remote vending, mobile health care clinics and treatment pods, and even platooning pod hotels, vehicles will become transportation experience pods. Movable movies: Media and content producers will develop custom content formats to match short and long travel times

Location-based advertising: Locationbased advertising will become more keenly relevant, and advertisers and agencies will be presented with a new realm of possibilities for presenting content brands and location.

 Mobility-as-a-perk: Employers, office buildings, apartment complexes, university campuses and housing estates will offer MaaS to add value to and distinguish their offer from competitors or as part of their compensation package.

With Intel's entrance into the autonomous automobile market earlier this year with its introduction of its Autonomous Driving Garage in San Jose and acquisition of Mobileye, has put it into direct competition with other tech giants, like Google and Nvidia, and other auto companies. •••

News

BMW CarData platform

IBM recently announced that it is a pilot partner of BMW CarData. BMW CarData will allow up to 8.5 million BMW customers globally to make use of third party services in a secure and transparent way.

BMW is the first OEM to release an open data platform with the introduction of BMW CarData. BMW CarData gives BMW ConnectedDrive customers the ability to share telematics data from their BMW vehicles with third parties of their choice. As a pilot partner, IBM has integrated Bluemix with the BMW CarData platform. Vehicle data will be enhanced by IBM Watson IoT, using cognitive and data analytics services to enable third parties, such as automotive repair shops or insurance companies, to develop entirely new customer experiences. IBM's cloud platform Bluemix* also gives developers access to the entire service catalogue from IBM and its ecosystem partners to build and run innovative new service offerings. Customers will have to actively agree to share their encrypted telematics data when they want to use a specific service from a service provider.



In addition, IBM will also act as a neutral server for extended vehicle access. This allows for the gathering of data from BMW vehicles but also vehicles from additional automotive manufacturers. In this role, IBM will help to realize the vision of a secure and open vehicle data platform as demanded by many players in the mobility ecosystem. The first use cases and client services are expected to launch in the fall of 2017.

The concept of a neutral server fosters innovation by establishing a single point of contact for multiple parties to access vehicle data from various manufacturers, thereby reducing integration cost whilst ensuring fair competition. Bluemix has rapidly grown to become one of the largest open, public cloud deployments in the world. Based in open standards, it features more than 150 tools and services spanning categories of cognitive intelligence, blockchain, security, Internet of Things, DevOps and more....

Bosch & Sony to jointly develop camera technology

Robert Bosch and Sony Semiconductor Solutions are coming together to develop camera technology. Video camera along with radar, lidar and ultrasonic sensors are also critical for proper functioning of driver assistance systems and automated driving.



For proper functioning of ADAS features like traffic sign recognition pedestrian detection and lane keeping there is high dependability on video cameras as they can provide a higher signal density and object recognition.

Bosch has been producing video sensors in mono and stereo technology to provide a 360 degree all-round view, and is one of the leading suppliers in this sector of the automotive industry. It had earliar too launched multi purpose camera (MPC2) that allowed vehicle manufacturers to integrate a wide range of driver assistance functions into their vehicles using only a single sensor — thereby enabling manufacturers to effectively and efficiently address the ever-increasing safety standards set by legislators and consumer protection organizations. Bosch is also credited with making the smallest stereo video camera for automotive applications.

Lyft partners with nuTonomy bring first self-driving service to Boston

Lyft is partnering with nuTonomy to provide self-driving service in Boston. nuTonomy a MIT spin-off, based in Boston, is also credited with launching its autonomous taxi service in Singapore.

nuTonomy will power the first autonomous vehicles on Lyft's network with its software system and algorithm for urban driving. The first stage of the partnership will be focused on research and development (R&D)



around the understanding and optimisation of the passenger experience. Future stages of the collaboration could lead to thousands of nuTonomy cars on the Lyft platform, as both the companies work together. However, it must be noted that no money is changing hands and it is based completely on mutual benefit. nuTonomy has a partnership with PSA for autonomous vehicle testing in Singapore which ultimately may help integrate nuTonomy's tech in a range of PSA vehicles that can eventually be run on ride-hailing platforms like Lyft. But the company will be employing Renault Zoe EVs for the initial phase now....

South Korea's first autonomous car tested on roads

Intelligent Vehicle IT Research Center at Seoul National University, has developed autonomous car named "SNUver". It recently conducted the first test drive on the actual



roads in Yeouido, Seoul, on June 22.

SNUver has been test running at the Seoul National University's Gwanak Campus with no accidents for almost two years after it was first developed in November 2015. It has run more than 20,000 kilometers in the campus. The reports say that the car has capabilities in recognition and reasoning for vehicles, pedestrians, lanes, traffic lights and signs. It also has a high-precision 3D map, moving subject detection and tracing technology and collision risk avoidance technology. SNUver is collecting data while driving to study whether the existing infrastructure is right for the automated driving. Citizens too can also board this car during test drives.

Lyft to provide a billion rides per year by 2025

According to some reports, Lyft has set itself an ambitious goal of having all of the electric and autonomous vehicles on its platform to be powered by 100% renewable energy.

The company has said that it will provide 1 billion rides per year using these electric and autonomous vehicles by 2025. In the year 2016 Lyft provided 160 million rides so 1 billion rides in 2025, solely from autonomous electric vehicles, showing the ambition of the company to grow multiple folds. The company will also be launching self-driving electric vehicles in Boston later this year as per its partnership with nuTonomy.

To offset any emissions from fueling of autonomous electric vehicles, the company has said it will purchase renewable energy certificates. But Lyft has clarified that all of its self-driving cars will be not electric and initially it will be testing a variety of prototype vehicles, but eventually as this technology develops the company will ensure that most of its vehicles are electric vehicles. Co-founders of Lyft, Logan Green and John Zimmer, writing on a blog have opined that in future, ridesharing, combined with autonomous vehicles, will be the driving force and will bring electric vehicles from a tiny portion (~0.1%) of all cars on the road today to a significant majority within 20 years. Lyft is one of the companies that has pledged to continue to abide by the Paris agreement despite President Trump announcing the US pull out of the agreement.

Autonomous Driving Platform: Continental joins the alliance of BMW, Intel and Mobileye

Continental has joined the Autonomous Driving Platform formed by BMW Group, Intel and Mobileye as System Integrator. The alliance aims to establish a new cooperation model for automated driving that would provide scalable solutions for automotive industry worldwide. As a system integrator, Continental aspires to play a key role in the industrialization of the platform for other automotive manufacturers and bring the joint solutions to the market more quickly. In July 2016 BMW Group, Intel, and Mobileye came together as cooperation partner to bring solutions for automated driving into series production by 2021. Goals of the BMW Group, Intel and Mobileye development partnership:

- Industrialization of technologies for highly and fully automated driving for various vehicle manufacturers worldwide
- System integration, function development, motion control, simulation, and validation; Continental contributes a broad range of know-how along the entire process chain of automated driving
- Worldwide development and production for locally adapted technology

The Cooperation Partners have since developed a scalable architecture that can be adopted by other automotive developers and carmakers to pursue State-of-the-Art designs and create differentiated brands. In January 2017 the alliance had announced that a fleet of approximately 40 autonomous BMW vehicles will be on the roads by the second half of 2017, demonstrating the significant advancements made by the three companies towards fully autonomous driving.

The range and complexity of the technical systems required for automated driving are enormous. The competence of Continental includes necessary range of products and services: surrounding sensors, environment model, driving functions, system architecture, functional safety, control units, brake systems, tires, complete powertrain systems as well as systems for human-machine-dialogue and system validations. The company joining the alliance would help both the company as well as the alliance ----



News

Delphi and Transdev to develop on-demand shuttle service in Europe

Delphi Automotive has entered into a commercial patnership with Transdev Group to develop an automated on-demand shuttle service in Europe. Transdev is a public transport service controlled by the French government.

The fully Automated, Mobility-on-Demand (AMoD) transport system will utilize Transdev Universal Routing Engine (URE) and Delphi's previously announced automated driving platform – the Centralized Sensing, Localization and Planning (CSLP) platform which Delphi is developing in partnership with Mobileye. Transdev and Delphi will start collaborating on pilot programs in Paris-Saclay and Rouen (Normandy) France, as the first EU driverless, on-demand mobility service on an open road.

Delphi and Transdev will share knowledge of AMoD systems to develop fully autonomous vehicles, a driverless vehicle infrastructure solution (DVIS) and cloud infrastructure to support a commercial AMoD system that can operate globally.

To accomplish this, Delphi will integrate its turnkey CSLP platform into Transdev's mobility service vehicles, including a centralized computer running Delphi's Ottomatika vehicle control software, a comprehensive sensor suite, and all the required connectivity and data devices based on Control-Tec real-time analytics, Movimento's secure, over-the-air (OTA) technologies and Mobileye's REM technology. Transdev will integrate its Universal Routing Engine and remote control command software, including intelligent infrastructure and additional software modules dedicated to public transportation and leverage its deep knowledge in client use-cases, safety and quality of service specifications for shared mobility services.

Transdev has initiated an Autonomous on-demand Mobility service program in Normandy this year. The collaboration with Delphi will allow the two groups to jointly test the entire system: dispatch, remote control-command and vehicles, and test the sensor architecture and intelligence for driverless last-mile and door-to-door transportation service with the next phase including a commercial service.

In Paris-Saclay, Transdev and Delphi and will collaborate on the development of a first mile, last-mile on-demand solution between a conventional railway station and the Paris-Saclay plateau and campus.

GM rolls out self-driving test vehicles in a mass-production facility

General Motors has announced that it completed production of 130 Chevrolet Bolt EV test vehicles equipped with its next generation of self-driving technology at its Orion Assembly Plant located in Michigan. The vehicles will join the more than 50 current-generation self-driving Bolt EVs already deployed in testing fleets in San Francisco; Scottsdale, Arizona; and metro Detroit.

The self-driving Chevrolet Bolt EVs feature GM's latest array of equipment, including LIDAR, cameras, sensors and other hardware designed to accelerate development of a safe and reliable fully autonomous vehicle.

GM and Cruise Automation engineers have been testing Chevrolet Bolt EVs equipped with self-driving technology on public roads in San Francisco and Scottsdale, Arizona, since June 2016 and on public roads in Warren, Michigan, since January 2017.

Waymo retires its fleet of Fireflies

Waymo has decided to retire its fleet of Fireflies, the self driving cars. It will now focus on putting its autonomous driving software in vehicles mass produced by the big car makers. In a blog on Medium the company officials have mentioned that Firefly was designed by Google in 2013 and from the beginning, Firefly was intended as a platform to experiment and learn, not for mass production. The car helped the company to crack some of the earliest self-driving puzzles — where to place the sensors, how to integrate the computer, what controls passengers need in a car that drives itself.

Along the way, the Firefly scored some impressive achievements for the development of autonomous vehicles, that includes million of miles driven and the first completely autonomous trip. Reports say that some of the prototype cars might be put on display in museums including the Computer History Museum in California.....



Toyota CSRC Next launched



Toyota's Collaborative Safety Research Center (CSRC) has formally launched the next phase of its research mission. The new research effort, named CSRC Next, will focus on the challenges and opportunities of autonomous and connected vehicle technologies over the next decade.

First announced in 2014, CSRC Next will direct \$35 million through 2021 towards research designed to support a safe transition to the future of mobility.

Projects will follow four research tracks:

- The potential integration of active and passive safety systems, using advanced pre-crash sensors to improve and personalise crash protection
- Building advanced technology vehicle user experience models for individuals and society in order to improve usability and strengthen the driver-vehicle relationship;
- 3. Studying driver state detection, working to improve mobility using metrics for physiology and health; and,
- Applying big data and safety analytics techniques to develop algorithms and tools to study naturalistic driving data.

At launch, CSRC Next's research portfolio includes eight projects in partnership with six schools. Examples include work with the Massachusetts Institute of Technology (MIT) AgeLab to develop new systems for autonomous vehicles to perceive and identify objects in their environment and to understand social interactions in traffic; and a research study with Virginia Tech to estimate issues that may arise after Integrated Safety Systems (ISS) are deployed in the future, including all active and passive safety systems. CSRC is working with the Toyota Research Institute (TRI) and Toyota Connected (TC). CSRC research is helping to accelerate autonomous driving technology development as well as contributing to the exploration of the complex relationship between future mobility and broader social trends. The beginning of CSRC Next also marks the conclusion of the center's first five years of automotive safety research; In that period, CSRC has launched and completed 44 research projects with 23 partner universities, publishing more than 200 papers and presenting at multiple industry conferences. While CSRC research has helped improve the safety of Toyota vehicles, results have contributed to standards development at international bodies like the Society of Automotive Engineers (SAE). •••

Audi to demonstrate its autonomous cars in New York

The first application for an autonomous vehicle demonstration on New York public roads has been approved. Audi of America Inc. has been given green signal to begin demonstrations this summer on roads near the state capital, Albany. It will be the first ever such tests on the streets of New York.

Governor of NewYork, Cuomo acknowledges the potential of this technology to reduce the accidents and recognises the autonomous vehicles as a major part of the future of the automotive industry and so is committed to developing New York as the hub of innovation and cutting edge technology. The state had begun accepting applications for testing or demonstrating the autonomous technology in New York earlier last month as part of a year-long pilot program funded by the state's 2018 budget.

Audi was the first company to apply and to get the approval, the state is still open to application from other parties who might be interested in testing their vehicle on its public roads. Audi was to begin testing its cars from



13th of this June. The model chosen is already said to have covered several thousand miles in U.S. and as per reports, it is level 3 in autonomous vehicle operations by SAE standards. It is capable of safely allowing hands-free driving at posted highway speeds, but there will be a person present behind the wheel at all the times. It has also been reported that there will also be two engineers present in the car while testing. Also, each car has been issued a \$5 million insurance policy, Audi has to submit the testing reports by March next year....

JLR invests \$25 million in Lyft

Lyft announced that Jaguar Land Rover is making a \$25 million investment through its mobility services arm, InMotion Ventures. The company has said that it will use the cash influx to support further expansion in the U.S. as well as fund development of self-driving technology. Moreover, Lyft will also get a fleet of Jaguar and Land Rover vehicles.

Lyft has entered into strategic partnerships with many significant players in the automotive ecosystem, consolidating its position against its competitors like Uber. In the recent past Lyft has announced collaborations with Waymo, Nutonomy and before that it had a partnership with GM.

InMotion Ventures has stated that the investment will give JLR the opportunity to develop and test its mobility services, including autonomous vehicles.

Lyft has total valuation of about \$7 billion while Uber stands at \$69 billion, Uber also has partnerships with GM which has \$500 million investment in Lyft, Mercedes-Benz and Toyota. So this shows that the gap between the two companies is huge but Lyft is making the right moves to get even with its main rival....

The secret life of connected car Industry in India

r. Sundar Pichai and Mr. Travistwo very renowned names in the industry- recently summarized the future of the connected cars and driverless cars in India very subtly. History speaks for itself and in this case, Mr. Pichai and Mr. Travis based their comments on the fact that India has always been a cash cow for multinationals; giving business rather than proven innovation and scalable acceptance of the technology. Let's look at an interesting comparison between two popular automotive companies-Mahindra & Mahindra and Tesla motors.

It's hard to believe at first but it was an Indian company to actually put an electric car on such a commercial scale before Tesla or even Nissan. But even after the early mover advantage Reva couldn't create a global impact like Tesla when it comes to the 'Green energy revolution' in the automotive industry and the reasons are pretty obvious:

- 1. Lack of conducive ecosystem for electric vehicles,
- 2. Due to which customer acceptance was low,
- And that was because of the product which didn't stand out as the best product like Tesla

India faces challenges because of lack of adoption to the global phase shift in the automotive industry. The technology development is radically being improved at lower prices, there are new high-tech companies providing solutions which are driving the shift faster than predicted by analysts, the business model around new age mobility and the increasing demand of low cost of ownership is driving new services and revenue models and a few governments have already drafted policies around the connected car industry bringing out clear constraints and bottlenecks for the connected vehicle industry. While India is still in the transformation stage from BS IV to BS VI, there aren't many tech-companies

building solutions around the connected vehicle industry. The 2015 startup bubble is a proof that most companies who raised billions in funding were mostly e-commerce service based companies generating billions in revenues. In 2017. however a few companies have started to pivot themselves in this direction. This state of affair is coincided by an inevitable Ironical situation. All the multinationals who are building solutions for global automotive companies are doing this by investing in the 'human resource' of India. Most of the R&D work by these techcompanies is being done in India. But we don't have a solution yet. It is evidently clear that the connected vehicle evolution will take its sweet time because of an unavoidable cycle of socio-economic & political effects in India.

There are the three most important factors ruling a smooth integration of connected Vehicle industry (V2X) in to any geography; these are:

- 1. Infrastructure
- 2. Revenue model & Monetization
- 3. Growth & Acceptance by the community

4. Regulatory and compliance changes The graph shows that since the term 'Autonomous Cars' has become a trend, the growth rate of these factors has been rather slow. As fast as the technology is progressing the integration factors are growing at a much slower rate. It was only in 2016 when Driverless Car became the center of attraction in the connected car Industry. The answer is not necessarily to pump in more investment into connected car or autonomous driving technologies, but to invest more thoughtfully. As quoted by a lot of reports today's car has the computing power of 20 personal computers, features about 100 million lines of programming code, and processes up to 25 gigabytes of data an hour.

Today it's about the survival of these automotive companies too. If they are not progressive, in adapting to the new age software and electronic solutions they will eventually die. And that is the reason that today all the global automotive companies have partnered with famous software firms to develop the technology and infrastructure for the connected car industry. Tech-giants like Google and Apple have invested billions to improve the technology while companies like Ernst & Young, PwC, Morgan Stanley are working towards drafting business strategies for these companies and enforcing the compliances with the governments of various countries. So where do these automotive companies come in picture? Companies have realized that consumers are more software driven today. Hence there have been consortiums formed globally to collaborate with software companies and come up with a new business model and revenue streams. One of the reports by PwC concluded that 70 percent of global connected service sales come from premium brands. By 2022, that number will fall to 50 percent, at the expense of falling margins. Although connected services will generate sales of US\$155

Company	Mahindra Reva	Tesla
Founded in	1994	2003
Nationality	Indian	American
Founder	Chetan Maini	Martin Eberhard & Marc Tarpenning
First car	Revai	Roadster
Market entry	2001	2008
First sales milestone	2011 (4000 units)	2016 (150,000 units)
Price start	11,000 \$	35,000 \$



AUTONOMOUS TECHNOLOGY

billion, most of this value will be offset by falling sales from legacy features such as navigation, entertainment, and safety systems. These trends will contribute to a squeeze in profits for OEMs and suppliers. Higher R&D expenses will not convert into higher overall sales. On the supply side, by 2030, profits available to traditional automakers and suppliers may drop from 70 percent to less than 50 percent of the industry total.

The balance may be captured by new entrants, including suppliers of new technology, mobility services, or digital services. From the inception of first commercially scalable car Ford Model T. the automotive industry has evolved from all mechanical to software and electronics integrated industry. There is a lot of debate on the business model around the connected car industry but the results are not concrete. In my current company, I am heading the Artificial Intelligence department where we are building the modern age Autonomous car and ADAS systems. And I have identified following few points which might help other automotive companies to monetize their

products and services:

- Consumers love to buy products which are easy to install and maintain. Hence the companies should offer connected IOT solutions with hardware as a packaged DIY kit.
- Vendor development for the hardware and software for the connected vehicles. Many of today's manufacturers and suppliers lack the skill, agility, and boldness to turn their companies' digital quickly enough to take advantage of this change.
- Aftermarket services for the connected vehicles should become the revenue source for these companies. A product never develops a relationship, services do!
- Active data acquisition from the customer of the product and service to enhance the quality of the product as well as the services and gain customer loyalty.
- 5. Use of big data to analyze the patterns of usage of the vehicle to reduce the cost of maintenance for the consumer and improve the lifecycle of the vehicle which thus will help in controlling emission.
- 6. Offer vehicle as a service. Urban residents in today's markets appear to be losing interest in owning their own cars, where cars simply aren't a requirement, and where public transport and ride-sharing apps can easily fulfil their needs. Success of Ola and Uber is a direct result of the consumer's thought process.





Kumar Ranjan Director, Artificial Intelligence Mean Metal Motors

 It will be useful to put it all in context, and look at the market shifts and structural changes that are underpinning the current and future development of the connected car and autonomous vehicle.

Their current rate of innovation in India is too slow to keep up with all the new players entering the field. "The top five OEMs spent \$46 billion on R&D in 2015, an 8 percent increase yearover-year", quotes a report by PwC. Globally, however, the success has been elusive in the field of connected car and autonomous car industry and there is very little noticeable differentiation between players. Take example of a driverless car. 80% of the hardware and codes are same for every company. India needs to up its game if it wants a piece of one of the biggest phase shifts in the automotive industry. The Indian automotive companies should start to differentiate the options and opportunities based on the capabilities that automakers/vendors already have in generating profits and customer loyalty.

To be sure, the connected car, and especially the autonomous car, will eventually emerge as the "fifth screen" in people's lives: the next media consumption nexus point after movies, televisions, personal computers, and mobile phones- the focus should be on innovating the driving experience and creating frictionless access to the car's many features and seamless interfaces to technological partners....

Startup perspective



Urmil Shah Founder Carnot

ndia has seen a rise in the number of startups in the field of OBD port devices, fleet management and cloudbased analytics.

Honestly we wish there were more companies in the connected cars space. That would help increase the awareness in the market and improve the adoption of connected cars among consumers and enterprises. Having said that, our product is unique in that every stack has been developed by us indigenously right from the hardware to the firmware, backend cloud infra and mobile apps. This gives us agility and adaptability, critical to servicing the range of applications in automotive IOT. Further, we've have developed proprietary and low cost technology that enables our product to give rich performance insights for not only cars, but also bikes, trucks, tractors and buses. We have also filed patents for the same.

Automotive Cyber Security

Automotive cyber security has been a concern for a long time. To keep all our data secure, we are using SSL encryption for data transmission, that is bank grade security. From an end consumer point of view, data security is critical as no one wants their data to be shared with third parties without consent. Building consumer confidence will help widespread adoption of connected car solutions.

Data Ownership

Data ownership has been an ongoing debate with the entire app and mobile ecosystem. The same rules will apply to the connected cars space. Data ownership will and should rest with the consumer and if auto ecosystem players find strong ways to help improve customer experience, much like mobile apps have, customers will willingly share the data.

NGTP

To realise the full benefits of connected cars, it will be important to create an open ecosystem on which all auto players can interact with a customer regardless of the make or model of the car or telecom service provider they use. While car manufacturers build their own telematics platform, it will be important to maintain standards to ensure interoperability.

Government Role

I think the Startup India program is a great move. Part of executing a successful movement is to brand it as one and I think the Modi government has done that well. The government has been successful in bringing about a mindset change by making start ups a household conversation. We now have a lot more youngsters eager to start their own ventures or join an up and coming startup. When you have hundreds of thousands of young minds thinking of ways in which they can build disruptive products, innovation is bound to occur. On the question of policy, yes various measures have been announced - SIDBI Fund of Funds, abolition of angel tax, innovative startups being relieved of the tax burden etc. But the true impact of these policies will only be realised over the next few years. One has to be patient for the impact of policy to percolate through to the grassroots.



Implementing a successful waste management policy and action plan includes,

	77	10
	ć	á

Saving money on what you buy Using raw materials, packaging and equipments more efficiently means you won't have

ments more efficiently means you won't have to buy that much



regulations

Meeting your environmental obligations Having effective policies and procedures in place should make it cheaper and easier for

your business to comply with waste



Cutting your waste disposal costs

Efficient waste management will reduce the amount of waste your business produces



Finding new sources of revenue

You may find that some of your waste products can even be sold to other businesses for them to reuse or recycle

We can save our environment by effective use of cleanCity "









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