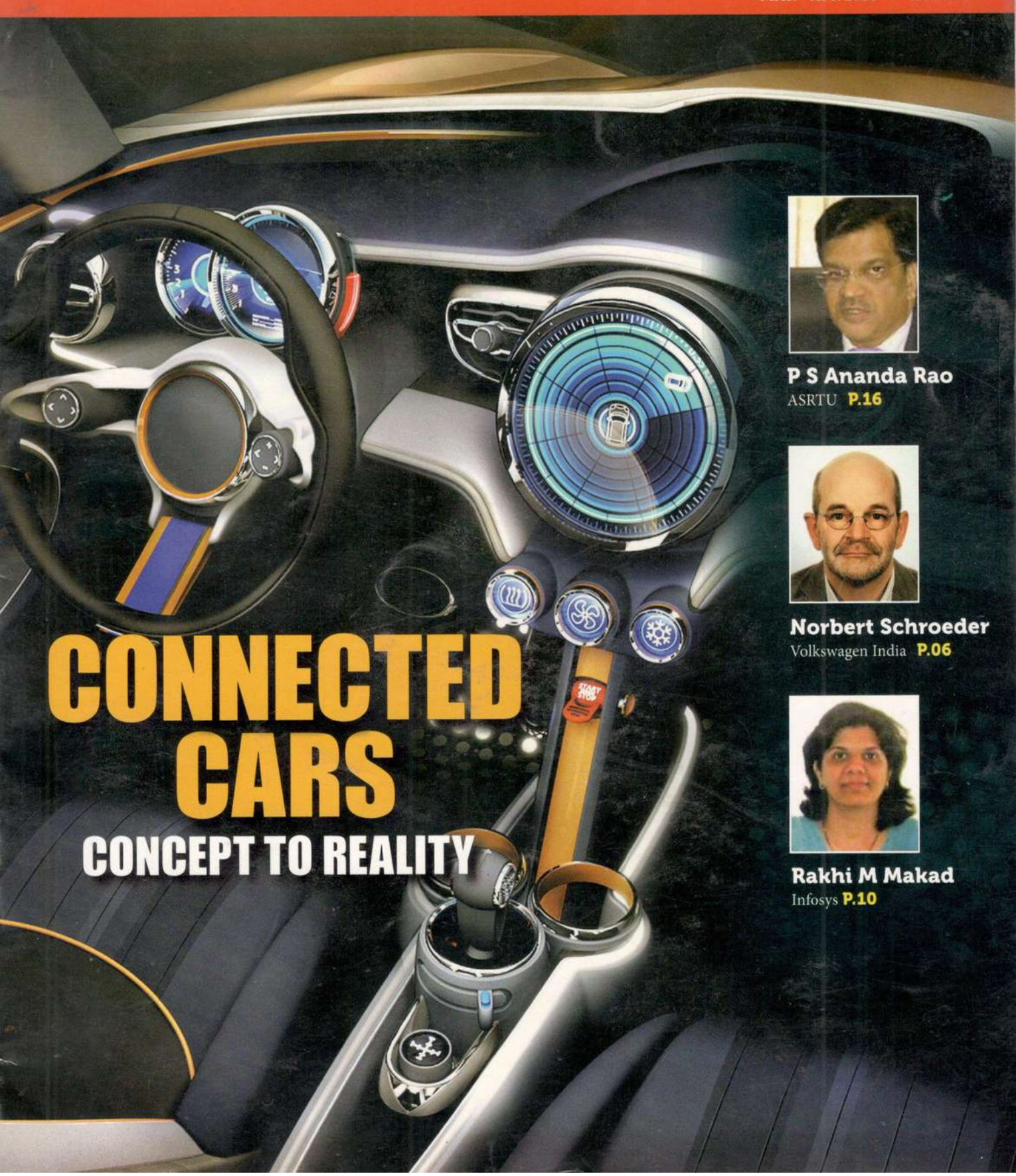# SMART AUTOMOTIVE

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CONNECTED CARS

CONCEPT TO REALITY

Editorial

Utility of Vehicle Telematics

Last few months have seen some activities in automotive telematics industry. The Telecommunication Engineering Centre (TEC) which has been mandated to develop standards for the M2M vertical application segments has initiated the process. It had couple of rounds of meetings including the one which was focused on vehicle telematics.

While the industry and government have put their heads together to work out the standards, the vehicle telematics industry is diving deep into the ocean of perceived services, to figure out what will be of 'actual use' for the commercial and private vehicles. Because, utility of vehicle telematics will overwhelm the excitement of technical possibilities which the connected car, etc presents today. We are all aware that vehicle telematics can provide us information on what is to be replaced or repaired, in a fair and transparent way. But, how many of us have actually used it before taking our vehicle for service. How many of the fleet operators are using this? Have the benefit accrued been quantified? Is there any awareness amongst general user about such feature coming in all the vehicles, manufactured after 1st April 2013 in India and even in many of vehicles manufactured prior to this date?

Hopefully soon we would habitually start using our smartphone to access the information about the vehicle's health, rather than listening service center supervisor say, 'Your vehicle has run 60,000km, so this, this and this needs to be replaced'. At times such statement leaves an unpleasant feeling and helplessness, even though the service center supervisor was correct with good intent.

The ability of the ecosystem in our country to facilitate the benefit of vehicle telematics to the industry and private user will play an important role. Some small steps can be seen here and there both by the industry and government. Telematics Association of India, in its last meeting in February, discussed about the need to have some standards for the devices which are being provided by the telematics industry service providers.

The government has intent, but somewhere there are dots which need to be connected. Many of the research and testing centers in automotive sector are yet to become a part of initiatives on standardization. While the driver of the initiative is under the Dept of Telecom, the industry which is going to implement this is with Dept of Heavy Industries. Also, the case studies from mining, petroleum, PDS, governance and many others, besides the transportation and logistics industry should provide for development of standard which should enable industry and private user.

Maneesh Prasad

Contents

Norbert Schroeder
Head-Electrical Dept.
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The chances and technological capabilities of connected cars for the car-industry

If you hear for the first time about the boundless capabilities that a "Connected Car" offers to the motorists, you will feel a little bit as if you are browsing through a science-fiction book.

And if you are an engineer, you will feel as if you've just arrived at the gate to the "technical paradise":

It's when you link cars with Internet and add smartphones on these. Suddenly arise so many thrilling and all new options, that will make the use of cars so much more attractive.

Access and starting the car by your smartphone, intelligent car-sharing, hands-free driving, up-to-the-minute-information about local traffic and weather situation, features like these and many, many more are suddenly possible. Not just in the future but they can be realized at the earliest!

But the questions are: Which of all the possible conveniences are really useful, which will be accepted by the commercial and private users – and which will really be established in the future?

Let us start with the describing of the highlights, that the connected car (CC) can offer.

Usually you need a key, to get into your car and start the engine. The key although disposes of information about your individual seat-positions, climatic-settings and others. Even if you can keep the key untouched in your pocket, why not using your smartphone for those tasks? Why dragging around two pieces in your pocket? The smartphone can get in contact with your car via internet and control all those functions as well. Forget the outdated car-key.

Once your sitting in your car, all functions are adjusted to your personal demands. You put your smartphone in a docking-station, listen to your favored music, follow the announcements of the navigation system and off you are without having touched any system of your car, because you've "brought your own device". And you've done all the fiddling at home. Not in the car or while driving. Wow, that's laid-back driving!

And when you are on the road, the 'connected car' technology offers you the opportunity of locally advertised road reconnaissance reports and weather forecasts. If the ABS-system of one car detects that the road is icy, it could inform with support of GPS the other cars in these area about the road condition. Or if there is a traffic jam, the accumulation of unmoved cars can be evaluated and a local jam report could be send to the cars some 100 meters behind. All these within minutes and related to the area, where you are just then driving.

People with a smartphone do not need a complete entertainment system in their car. They only need a docking station or a Bluetooth connection, an amplifier and loudspeakers. All the essentials likr music, e-books, telephone, Google, social networks etc are in their smartphones. Sounds promising, doesn't it?

But, will all kinds and especially all ages of motorists like these? Let me say it very simple. My children, whose life is matched to their smartphones, will like it. They even expect it. But I would prefer to have a voluminous entertainment system with dozens of knobs and buttons. Unfortunately I am a discontinued model, whereas my children are the future.

I am a glowing motor head, ever since I can remember. But they? They don't care about all my beautiful cars! They don't want a car but demand mobility. Hey, and that's THE chance for carmakers. Offer the young generation a 100% connectivity in our cars and if they are interruption free connected to their vital line, they will recover the accommodation of private transport in a car. And will buy our beautiful cars, especially, if they are electrically driven. Not only, because these kind of cars are eco-friendly. No, with cars of these kind the enjoyment with the Internet even can be still more intensive and above, useful. All information about the state of the battery's charge can be seen every time and everywhere on your smartphone's display.

For sure, all the well-established functions of petrol-cars you can have in an electric-car but even more. The connected electric car will match your calendar with your destinations and inform you how fast or slow you should drive to reach your meeting in time with the remaining battery power. And it will show you the best way to the next filling station including the information, if you have to wait because it is just occupied.

And even if all these should not be enough argument for the young generation to use cars, the connected car offers numerous functionalities to offer mobility. Suddenly car-sharing provides completely new experiences! Its technically possible that you rent a car from A to B. When you arrive at B, you place the car just where you want. The car rental company knows exactly, thanks to GPS, where the parked car is located.

The smartphone of the next client, who needs a car in this area, guides him to the car, opens the door, starts the engine and shows him at the end of his trip how much he has to pay. And the client listens in this unfamiliar car to his own favorite music and is during his complete trip connected to all his favored social networks. He feels homey in these car and will ask himself. Why should I own a car when sharing is so comfortable? Because this question is so obvious, it will be one of the major tasks for the future of the car-industry. As already well spotted by our youngsters, the future of automotive industry is not only by offering cars but by presenting mobility.

However, connected cars offer a lot of chances for the future of the car industry. When you connect the car's diagnostic system directly to the dealer, these offers many customer-friendly proposals. The dealer can check, if and when the customers car needs a new service. He even can call the customer for an unscheduled check, if any part of the car shows alarm signals, so that it could break probably within the next time. And when the customer arrives at the dealer, his repair is already scheduled. He will be very satisfied, if he and his car does not have to spend unneeded time at the dealers shop.

And the car manufacturer can smoothly analyzes these data and gets very early the information, if there could be the risk of a recall.

Till now we only enjoyed some of the benefits of connected cars. But for us engineers the questions of "how to realize all these goodies" are crucial.

Here are some of these questions.

What is more useful and demanding the users claims, 'built-in' systems or "bring your own device", that is docking-station? This is not only a question of likes and dislikes. There are although some crucial technical points that have to be attended. A built-in system will always show a better performance, because of built-in antennas, safe power-supply, better sound etc. For example, the connectors for docking-stations do not include any antenna-connection. So docked-in smartphones can only use their build-in antenna which always will show a restricted performance. Therefore the built-in system is fairly inflexible. Because smartphones are renewed every second year and cars inclusive their built-in components need roughly 5 years for a complete renewal, the built-in will always be a little bit old-fashioned.

Another very important point is the data safety. Suddenly many very interesting data of the cars and their owners or users are flying around in the Internet. And to protect these data and the cars and their owners will be an even bigger challenge than to develop all the explained functions.

Why? All electric and electronic components of today's cars are communicating with each other. So if someone cracks the code, he will not only have free admission into the car, he although might be able to start the engine. He even might get access to all other systems of the car. So the "hare and hedgehog-game" between car-manufacturers and car-thieves will reach a new generation

The connected car technology offers the car industry an extraordinary opportunity, to offer new comfort- and safety technologies. As a result of these groups of buyers can be interested for cars, that have lost or never had an interest in cars.

Connected cars, regardless of electrical or petrol-drive can be used more effectively. And they can protect our environment. ●

Norbert Schroeder

He is qualified as electrician in 1975 and is currently heading the electrical department at Volkswagen India. He has over 6 years of experience in development of purpose-built machines 23 years experience in development of mechanical, electrical and electronics components for Volkswagen Germany. He also has several patents registered under his name.

The Connected Car

Kaustuv Ghosh
Business Evangelist & Development
Simply Tapp

The Connected Car Industry - An overview

It may be difficult to establish the exact starting point. However, as early as the mid 1980s and early 1990s, applications centred around drivers were being created or commissioned by automotive majors. One could go back to the car phone, visible today largely in films. Car radios allowed FM access, making the daily commute bearable. Hands-free call facilities began coming into upscale models after bans on cellphone usage while driving. The Carminat Navigation System, developed by Renault, evolved into the better known Renault R-Link[1-2]. Ford Sync, which allows in-car entertainment and communications, had its first release in 2007. While there have surely been significant developments in laboratories around the world, the emphasis appears to have been mostly around communications and entertainment. After all, more and more people were spending more and more time in cars and needed to stay connected and entertained. The development of on-board diagnostics and the evolution from the early stage in-car computer of the 1960s to the OBDII today, have added considerable weight to the overall connected car proposition.

The Utility of Connectivity

Perhaps we have taken it for granted. But it is surely useful to back to the fundamental question-why connect the car? I argue this has less to do with the value added features which can help create differentiation between manufacturers and more to do with the underlying evolution of the place of the vehicle in society. Replacing the word car with vehicle is deliberate-though we will continue to use the two terms interchangeably. It would be erroneous to consider only private passenger cars-though it seems we tend to think of these first- and overlook commercial vehicles as well public transit buses. However, cars alone are likely to cross 1.7 Bn by 2035[3]. Phil LeBeau quoting the International Energy Agency in "Whoa! 1.7 Billion Cars on the Road by 2035"[4] published on 12 December, 2012). As the number of vehicles grows, their physical domination of available space is real and the impact considerable. So too are the resources consumed, which at this stage refers largely to petroleum based fuels but will soon increasingly include electricity. The mobile environment(not to be confused with the telecommunication device) is becoming as significant to us as the built environment. Therefore, on one hand there is the growing need to optimize the consumption of fuel and emission of greenhouse gases. Then, there is the urgency-articulated in various metropolitan environments, especially, to ensure that these vehicles do not overwhelm available land. Thirdly, we need to be able to "speak" to the cars, trucks and buses on our roads to ensure these utilized efficiently, relative to the other players who share the given space. All this requires a real-time, multimodal network that provides for drivers to communicate with one another as well as with on-road and off-road infrastructure. Further, such networks must allow cars to "talk" to one another or to service establishments such as garage centres, emergency responders, monitoring agencies and so on. While using the term network, it must be kept in mind that the connected-ness of the cars is not just about connectivity. It is as much about the applications or services used within specific contexts. A specific example could be around the issue of emissions monitoring. Ambient air quality monitoring in cities is very much possible today. Yet there seems to be little available by way of live emissions monitoring from individual vehicles. The richness of data that can come out of a running car via a network can be analysed and put to use to achieve the kind of micro and macro optimization referred to earlier. In the same manner, the ability of highway authorities to respond to a vehicle breakdown or accident by obtaining mission critical, near real-time updates, can help save lives as well as prevent extensive traffic chaos. City road authorities can tweak road pricing to account for shifts in peak traffic and administer customized, multi-variate tariffs in different zones. Transit authorities can be alerted about the relative loads of passengers waiting at different stops and divert additional resources, if needed, to help move people along during rush-hour. In addition to the more mundane needs of finding ones' way on the road, looking for the nearest service station and ordering tickets to the next game, it should be possible for the car to send a status "ping" to its' service station. Quoting a report by SBD, the GSMA estimates that the revenues from connectivity will increase from Euros 814 milion in 2012 to Euros 4.1 Bn in 2018; the revenues from services are expected to grow from Euros 9.3 Bn to Euros 24.5 Bn in the same period.

The Key to Success

Within this larger, highly lucrative picture, I would like to focus on one specific area. Just as in case of the mobile phone, the interaction

diagnostics, transmitted in near real-time or real time to the service centre, will become popular. But beyond that, the key to success lies in creating an end to end ecosystem of services, a flexible and readily available catalogue, a service delivery platform and the interface between man and machine. It is in the last aspect that a lot of attention needs to be paid and hopefully, resources will be made available to that end. ●

between the human being and the device is of great importance. Of course, the car is a far more complex device and one that cannot be easily shrunk. Its primary function, in case we forget, is not communication-it is transport. That makes the interaction between man and machine somewhat different. There is also the fact that a car is much more expensive and hence a different set of requirements and safeguards arise out of that. The path to making a car truly connected from a behavioural standpoint, beyond

the given equipment and software, lies in bringing about intensive contact and regular usage of the applications. It is inevitable that some of the applications available today will continue to be used extensively. For instance, telematics based cargo monitoring and GPS based route search. It is also very likely that functions like eCall, mandated by regulators, will operate on their own as and when needed-and will become fairly pervasive.
One might take a step further and state that real-time engine

[1] http://www.renault-multimedia.com/en_UK/carminat-gps-navigation/,
[2] http://connectedcarsworld.com/interview-with-thierry-viadieu/
[3] http://www.cnbc.com/id/49796736
[4] http://www.cnbc.com

Kaustuv Ghosh

An alumnus of National University of Singapore (NUS), he is experienced in setting up country, regional and global operations. He takes care of sales and business development activities in a Singapore-based firm, Simply Tapp. His sectoral specialization includes Mobile banking, payments and digital commerce. Machine to Machine and the Internet of Things.

Industry Perspective about
Vehicle Telematics

Rakhi M Makad
Industry Principal
Infosys

Can you share your views on telematics ecosystem?

The telematics ecosystem is complex and fast evolving. As against 5.4 Mn cars fitted with any kind of embedded telematics in 2012 globally, more than 36 Mn connected cars are expected to be shipped in 2018. This makes it one of the core focus areas for any integrator. However, there are many stakeholders involved - hardware, on-board software, connectivity, infrastructure, content providers, service providers, OEMs & component manufacturers and of course the end consumer - across the value chain. Technologies around telematics are also evolving and bringing in a shift in the way the whole ecosystem works, these are in the space of cloud, big data, analytics, security, HMI (Human Machine Interface) and ADAS or Advanced Driver Assistance System. It, in fact, now touches so many adjacent industry domains beyond the automotive sector, be it insurance, utilities, media & entertainment, telecom, healthcare, transport and so on. In our experience, clients are very much tuned into telematics as the future of connected vehicles and are ready to invest in the program provided the domain expertise along with innovative approaches and solutions are provided to them not only on the consumer side but also on the enterprise side of the connected story.

What is the status of telematics in India and what are the initiatives at Infosys in this regard?

I can definitely say that telematics is getting very good traction in India given the faith instilled by the world's best auto OEMs by setting up manufacturing hubs here. Due to client confidentiality, however, I will be unable to share information on specific projects and their outcomes where Infosys is involved. The ecosystem in India is growing with local manufacturers of telematics units as well as global players strengthening their services. While in most countries, telematics has perhaps found adoption first with the consumers and then moved on to enterprise use, in India it has been the other way around, for e.g. for fleet management. But, I would expect auto OEMs to introduce telematics capabilities to passenger vehicles very soon, maybe initially to start with as a differentiator and then as a must-have feature. Also, given the value-for-money mindset of the Indian consumer, I expect this technology to fast transcend from the D-class luxury segment to the hot selling C & B class car segments.

How relevant are platform like NGTP or GENIVI for India?

One of the challenges for the overall industry would be in moving towards a common telematics platform. This is similar to the battle between Blu-ray and HD DVD for establishing the standard for high definition video and audio. Currently, there are different alliances that have started work on different platforms globally and I believe that these auto OEMs will

continue to bring the same platforms in India. However, platforms like GENIVI and NGTP are very relevant for India. They allow us to leverage the learnings from so many implementations already and we can reduce development time and cost and also be able to go to market with potential uses cases quickly.

Which segment under automotive telematics like insurance, remote diagnostics, navigation, etc. will lead the industry?

Over the world, I think it has so far been consumer focused use cases and segments like infotainment, navigation, point of interest recommendations etc while the enterprise focused use cases, especially in the areas of insurance, vehicle health & diagnostics have been catching up lately.

I would expect focus to move to segments like warranty optimization, recall optimization, spare part management as well – these will help enterprises become more cost efficient and create more value for money for consumers. I also expect new business models like car sharing to gain more prominence as telematics matures and usage could widely shift across discrete and process manufacturing and services industries. However, this will be more of a developed country phenomenon before it finds relevance in India.

Can you share with our readers some of the successful implementations of your telematics solutions?

Again, it will not be possible to share client specific details. At a broad level, these have been of a variety of types including – engineering services for on-board sensors and software, new hardware, firmware modifications, integration with cloud based data center and enterprise applications, analytics and insights, mobile and web applications, content delivery platform for vehicles etc. From a business perspective these have been in the space of remote vehicle

services, usage based insurance, car sharing, fleet management, vehicle prognostics, recommendation engine based on LBS and several others. Infosys is uniquely positioned to cater to the end-to-end solution needs in the connected vehicle technology and is already partnering with large auto OEMs for the same.

One example that I can very proudly share is of our vehicle tracking system implemented for our buses that run across the cities for our employees, it is be based on our own LBS IP and currently under pilot, to be soon implemented across all buses. The vehicle tracking system tracks divergence from the existing route and triggers alerts to the administrators and users of that bus.

The system provides an option for Infoscions to opt for an automated alert if the bus is one or two stops away from the place where they typically board the bus. Infoscions can also see the real-time status of the bus on their Android phones.

Will Infosys provide solutions for vehicle tracking to Govt/ PSUs or industry in India?

Infosys has an India unit which is actively working with Indian clients and PSUs. Telematics, internet of things, machine-to-machine communication, big data & analytics etc are all key focus areas in the emerging technologies space for us and we look at providing business solutions leveraging the same across all geographies. ●

Rakhi M Makad

She is an Industry Principal with Infosys and currently heads Innovation Initiatives for the manufacturing vertical. Prior to this, she was heading consulting for Information Transformation, which included Business Intelligence & Analytics, Enterprise Performance Management, Enterprise Data Warehousing, Information Management and Big Data where she leveraged her extensive BI experience in giving strategic and directional guidance across multiple clients.
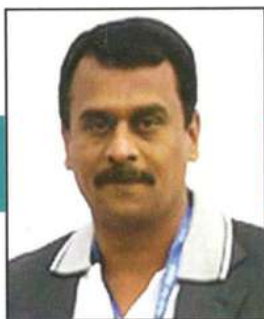
Muthu Swamy S
CEO
DeepBiz Technologies

Role of Telematics in
Transport Management

Can you share with Telematics Wire readers about your offerings for vehicle tracking and intelligent transport system industry?

Transportation is the backbone of economic development, and likewise, reliable mobility solutions encourage national economic growth, which creates a valuable inter-dependent lifecycle. Innovation in transportation systems has become a lifestyle characterized by extra-ordinary freedom of movement, immense trade in manufactured goods and services, and social mobility. Enlarged vehicle population on roads has increased congestion, accidents, air pollution and many others factors of concern. Economic activity depends on transportation to operate, so it's important we rely on enhanced and efficient transportation solutions to lead the way by introducing efficient driving behavior, effective route management, economic fuel utilization, increased road safety, avoiding accident by effective control over the vehicle and reduced congestion while increasing efficiencies and safety. All this brings an immediate impact on productivity and health of both the economy and the environment.

Which industry segments do you cater to?

DeepBiz is the largest manufacturer and solution provider of innovative GPS devices and cloud based Enterprise GPS Solutions to governments and private sectors worldwide. Our range of GPS devices are Vehicle Tracking, Personal Tracking, Pet Animal tracking and Livestock Tracking and its solutions to government and the private sectors. DeepBiz's unique position of owning all aspects of the device design, manufacture, firmware, back-end and front-end of the enterprise solution allows flexibility in meeting all our client needs. Bespoke integration work facilitates increased value in the data generated within the solution.

What has been your industry approach?

A partnership approach with the clients has delivered cost savings and improved efficiencies for our customers that are quantifiable and have realized a return on the investment in typically, 6-8 months. Sustained investment in our range of products suite, adding functionality that benefits our customers and users the most recent advancements in technology, demonstrates continuous innovation with our higher quality cloud based service to all sectors with a 100% commitments to our quality service, 24/7 customer support and trainings.

Can you share your success stories in vehicle tracking?

iGateway associated with The Federation of Motor Sports Clubs of India and Karnataka Motor Sports club to provide live tracking their motor cars during their rally championship. 39th K1000 – 2013, Round 4 of FMSCI Indian National Rally Championship event was the first championship program in India to provide GPS Tracking system to all their competitors' motor vehicles in association with our cloud based Enterprise vehicle tracking system. Ashok Leyland uses our GPS tracking system to track their educational fleets effectively to ensure their students, staffs safety and many other educational institutions uses our VTS to track their fleets and students. Friends Track Call Taxi goes online with our GPS Tracking System. Daily News Paper (Dinakaran) uses our tracking system to manage their effective distribution and delivery of their daily newspaper. One of the most popular TV network channel uses our GPS Service to track their vehicle and their media person online to ensure their safety and security. Coastal Security Guard have been secured by our GPS tracking system to their boats to monitor the boats movement and control their border crossing issues.

Do you think there are any impediments in the growth of telematics industry in India?

Yes. Telcos are not equipped with their offering and services to many of the rural places in India. With their current infrastructure and services, providing effective online tracking system is a big challenge in rural places.

What are the future plans of iGateway System for India?

iGateway contributes Nation's Economy and Pollution Control by providing cost effective and quality services to all type of vehicles and improving their driver's driving efficiency. To achieve this goal, our telematics research lab is working towards integrating GPS, RFID, Camera solutions together to provide more innovative secured solutions to our clients.

What according to you is the future of automotive telematics in India?

A radical innovation needs patience, long term committed finance in this automotive telematics industry. Integrating blue tooth, Wi-Fi, GPS is one of the innovative future solution that we are doing in our telematics research lab currently. ●

Muthu Swamy S

He is the CEO of DeepBiz Technologies Pvt Ltd. In December 2012 they ventured into the telematics industry with the launch of iGateway System. He takes active interest in software project management for the automotive and transport sector.

Shyam Ananthnarayan
VP-Marketing
Product Engineering Business
Tata Elxsi

M2M IN VEHICLE TELEMATICS

Can you share with our readers your offerings for the M2M/ IoT industry?

Tata Elxsi today is in a strategic position to collaborate with IoT vendors. Our Embedded Product Engineering business cuts across the key segments like Telecom, Healthcare, Automotive, Home automation and Consumer Electronics where the adoption of M2M/ IoT promises to make a difference in human life. Some of our recent projects in these segments include Intelligent Signage systems, Wearable Technology devices for health monitoring, modems/ gateways for industrial communications, connected camera to drive pattern monitoring etc. Being part of an ecosystem of partners and customers, which includes not only OEMs or ODMs but also silicon vendors and service providers gives us access to the aspects of service and experience design, latest platforms from silicon vendors and the service delivery platform for analytics and billing applications.

How do you see the present market scenario for the M2M/ IoT industry in India?

In a developing country like India, where even a small increase in mobile data traffic enhances the country's GDP significantly, Mobile Network Operators will have to drive the M2M / IoT adoption. The MNOs, under constant pressure to increase ARPU, are expected to take the M2M route to innovate, design innovative services, and unearth newer revenue streams, while solving some of the basic problems that India is facing today.
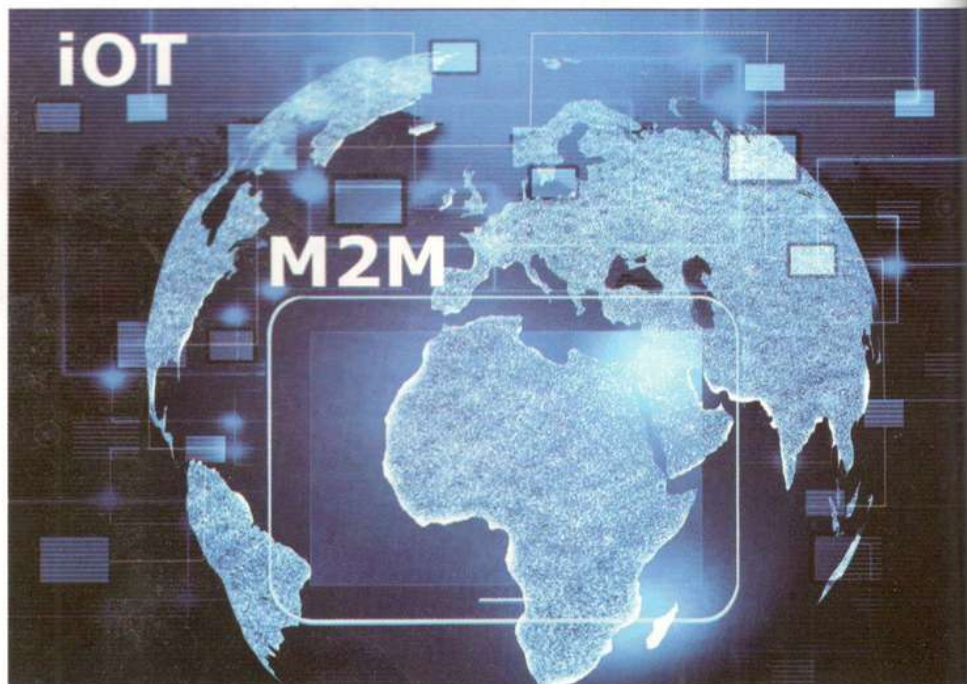
The possibilities with M2M/ IoT in India is endless with improved remote health diagnostics, energy conservation, traffic congestion management, improved ticketing or tax collection facility etc. just to name a few. While the adoption has not happened on a mass scale yet, there are several examples where mobile MNOs are already working towards addressing some of the challenges mentioned above.

With funding from the Indian Government in projects such as UIDAI (Unique Identification Authority of India), Micro-Banking, Jawaharlal Nehru National Urban Renewal Mission (JnNURM) and enhanced PPP (Public-Private Partnership) there will be increased value for corporate and entrepreneurs to focus on M2M/IoT goes forward.

Can you share your views on applicability of telematics solutions in India?

The Infotainment/Telematics market in India is still in a growing stage but the flourishing automobile sector is seeing a large number of organized players entering this segment with technology oriented products and accessories. These players have been bringing together a blend of entertainment, interactivity and information that help customers with the right access to infotainment on the move. Moreover, the growing urban population in the country is providing huge opportunities for players to launch customized and more innovative products. Having said this Indians are price sensitive and hence they would prefer solutions which are cheap but at the same time cost effective.

Currently, the penetration of

Infotainment & vehicle telematics applications in areas like safety, commerce, communication and entertainment are mostly focussed on high-end models but gradually this is expected to pick up in the medium/low price points. We are already witnessing improved HMI, integrated navigation systems, voice recognition, emergency assist etc. on Indian cars so the applicability of many other advanced features will happen in the future.

Do you think there are any impediments in the growth of telematics industry in India?

Robust connectivity is a prime factor to improve the telematics market in India. As we see today more vehicles are equipped with GPS based connectivity which helps in vehicle tracking, fleet management, emergency assist, fuel conservation etc. but lack of connectivity which is comparable to the developed nations can hinder the growth of telematics in India. Due to this, advanced features like car-to-car communication, car-to-infrastructure communication and cloud based navigation etc could take a back seat. We feel that it's the joint responsibility of network service provider, telematics system manufacturer/OEM and the government machinery to streamline the telematics ecosystem in the country.

Do you think there is a need for regularization or standardization of telematics solutions in India?

As mentioned earlier the growth is directly proportional to the effectiveness of the telematics ecosystem and if that has to happen, standardization plays a major role. Improving the wireless connectivity part is very important and for that network service providers need to strengthen the existing infrastructure. It's also very important from the government side to come out with roadmaps to strengthen the telematics industry in the country. Features like Emergency Assist or ecall could be made compulsory inside vehicles within a stringent timeline which will enable other players in the ecosystem to come out with their innovative products and solutions. This will also

enable the telematics players to team up with OEMs to come out with cost effective solutions offering better features to the Indian customers.

What are the future plans of Tata Elxsi in M2M/ IoT space?

On one hand we are working with our customers in various segments such Automotive, Healthcare & Telecom, to develop various M2M solutions. On the other hand, we are also developing our ecosystem further with partnerships. Keeping the larger Tata Group's objective of giving back to the society in mind, while enhancing our business, we see the Service & Experience Design playing a key role going forward. Be it any segment, starting from the smart cities or solving basic infra issues of connected healthcare services, we intend to mix service design and consumer preference into newer solutions we develop to help address the real challenges faced by consumers.

How do you see the telematics industry in India shaping up in the coming years?

We at Tata Elxsi foresee the future of telematics industry to be very promising and exciting. Though there are few roadblocks, the Indian automotive industry will witness a further surge in demand and we will definitely see custom made solutions applicable to the Indian scenario. Indian customers are already aware about the different

features available in European and US markets and their expectations are quite high. The challenge for telematics industry in India will be to provide the same solutions at a lesser cost. for example, The software that gets developed should be configurable and scalable as it should support multiple languages.

Mobile phones have influenced the automotive industry across several levels and will offer great opportunity for car manufacturers to improve the customer's driving experience. OEM's are closely working with mobile phone manufacturers to develop interfaces that allow drivers to use new features in the car. Smart phones will soon be replacing expensive navigation systems with numerous applications such as locating parked vehicles, tracking traffic conditions and fuel costs, offering breakdown assistance, reading emails aloud while driving are some of the trends in store. This will be an advantage in India, as we have a large penetration in the Smartphone segment that could very well drive the growth of in-car entertainment. In addition to this the three main areas that can directly contribute to the growth of in-car infotainment's eco-system are safety, security and comfort with services such as remote diagnostics, vehicle relationship management, insurance management and fleet management. ●

> ## Keeping the larger Tata Group's objective of giving back to the society in mind, while enhancing our business, we see the Service & Experience Design playing a key role going forward.

Shyam Ananthnarayan

He is the head of marketing for the product engineering division, the largest division of Tata Elxsi. He has been with the company for the last 4 years. He has held various general management positions at Tata Elxsi including marketing, key account management and business unit management. Currently his responsibilities include steering all marketing activity for the product engineering business. Prior to Tata Elxsi, he has held various senior management positions globally at HP, Ness including product management, marketing and operations management. He has over 10 year's senior management experience and 17 years overall experience. Shyam holds B.E from Bangalore University, an MS from Syracuse and an Executive Management Diploma from IIM-Bangalore.

P S Ananda Rao
Executive Director
Association of State Road Transport
Undertakings (ASRTU)

"The future vehicle whether it is a bus or a truck or a car; it has to be intelligent on road"

Vehicle Telematics in State Transport Corporations

Q. What is your vision for ASRTU?

On behalf of ASRTU, we have the vision of advocacy, co-ordination among STCs through innovative best practices in line with national policy goals in order to achieve the status of best public transport service provider in all the states of the country. We intend to achieve sustainable urban, sub-urban, inter-city and inter-state services and seamless movement of the commuters through IT intervention.

Q. Various STCs have started deploying vehicle tracking systems in their buses. What has been the role of ASRTU in helping realize these initiatives as a governing body?

Yes, there have been initiatives by various state transport organizations to deploy vehicle tracking systems. Karnataka is the first state to start the initiative in Mysore city which has combined Global Positioning System (GPS) and Passenger Information System (PIS) and is operational in 400 buses as of now. From ASRTU, we have been taking delegation to

Mysore city to demonstrate the use of Intelligent Transportation System (ITS), GPS, vehicle monitoring systems and PIS system to show how this can be adopted in their systems as of today. As a governing body we also coordinate with different state transport corporations (STCs) in implementing ITS through financial support of Ministry of Road Transport & Highways in all the states of the country.

Q. Do you think there should be some regulation regarding implementation of vehicle tracking system in state transport vehicles to have its uniform adoption across India?

Yes, in fact the JNNURM-II which has come out with Urban Bus Specification-II for the second phase of funding under the JNNURM, has mandated that all the 10,000 vehicles funded under JNNURM-II will be ITS-enabled with vehicle tracking options. This is a beginning to make transport vehicles with uniform adoption of these systems in urban cities. This will also continue in other cities of various states in the country.

Q. Are there any initiatives to retrofit the already existing fleets with OBD-II in compliance to OBD becoming a mandate w.e.f April 1st, 2013?

Yes, OBD II has been mandated in all Euro-4 vehicles registered from April 1, 2013. Most of these vehicles with OBD II have been deployed in 12 cities which has been mandated with Euro-4 regulation. However some of the vehicles in present fleet

are more than eight years old when there was no Electronic Control Units (ECU) hence retrofitting them with OBD II is difficult. As far as the existing fleets are concerned, although the maintenance aspects are easier yet, it is difficult to make OBD-II retrofitted in these vehicles. However, efforts will be made to install OBD II in the vehicles which are less than two years old.

Q. Do you think the use of vehicle telematics for driver behavior management and in-cab coaching will be effective or useful for state transport corporations?

In our opinion, the future vehicle whether it is a bus or a truck or a car; it has to be intelligent on road. The driver behavior management, and driving habits have to be monitored through the use of vehicle telematics. It will be useful tool for STCs in monitoring driving habits and vehicle movements. It can further indicate some corrective actions, taking into account parameters like speed, harsh braking/acceleration etc.

Q. What has been the response from public transport authorities in the states implementing vehicle tracking system?

In India, there are only two major public transport undertakings who have implemented vehicle tracking

system. First one, as I mentioned, is Mysore city in Karnataka and other in Punjab (PUNBUS). These two have effectively managed to implement this system in atleast 400 of their buses. There is no such problem that has been seen and the response is very encouraging when it comes to depot management. Depot managers, drivers and conductors have shown no resistance in adopting the tracking system that is being implemented in these two organizations.

Q. What has been the experience of authorities managing these two transport corporations?

The managing authorities of Mysore and Punjab had no problem. There were queries regarding the understanding of these systems. They required training of the drivers and maintainance staff. The training was imparted to make them understand how these systems should be maintained and looked after giving special attention to electrical maintainance and daily maintainance. Having understood the maintainance practices, the authorities haven't had any problem and tracking systems are working very effectively in these organizations.

Q. In your opinion what is the future of vehicle telematics in state transport corporations?

The future of vehicle telematics is very bright in my personal opinion and also as a feedback from STCs. We had an interaction with all the STCs on ITS and ITS-Enterprise (ITS-E), wherein we discussed about various aspects like planning, scheduling and management of vehicles which has been done using vehicle tracking system. As all of us know, the major costs incurred are vehicle, fuel and staff. We can improve the productivity and can control the cost of the staff by implementing vehicle telematics. To some extent we can also improve the fuel efficiency of buses through sensors by proper accounting and monitoring driving habits and their behavior. STUs can perform better through the implementation of vehicle telematics in their operating systems. ●

P S Ananda Rao

He holds a Bachelor in Mechanical Engineering and Masters Degree in Traffic Environment and Safety Management from Sweden. He has served in various positions in Karnataka State Road Transport Corporation (KSRTC) handling important responsibilities, particularly in the fields of engineering & environment conservation in transport sector. Presently, he is the Executive Director at Association of State Road Transport Undertakings (ASRTU) which is an apex body of all the state road transport corporations across the country. He has presented many papers related to important issues of transport on various national and international platforms. He has been instrumental in formulating several transport related programs and policies at National level related to IT in Transport.

SMARTPHONE ON WHEELS

"Eyes on road, hands on wheels yet omni-connected."

Today, in-car connectivity is no longer a matter of science fiction or a part of some Men-in-Black sort of sci-fi movie. For a user, it brings an unprecedented in-car experience by giving access to his favorite apps, music, news updates, traffic updates directly from the in-dash panel. For automotive and smartphone industry, it creates new and effective business models and paves the way for multi-billion dollar road map. However, irrespective of its future, which is already envisioned as 'rewarding', there is a lot more to think over before 'connected cars' can be considered as THE technology for car of tomorrow.

There is an on-going debate between the 'built-in' and 'brought-in' connectivity which is prevalent amongst tech pundits from various industry segments like automotive, consumer electronics, content providers and hardware manufacturers. 'Built-in' solutions are those where the cars have an embedded telematics unit with a dedicated SIM card to provide connectivity.

This on-board unit comes as a factory-fit OEM solution, much like the one provided by General Motors' OnStar. In the second case better known as 'brought-in' or 'bring-your-own-device', all the features of your smartphone are replicated onto the in-dash panel, while the connectivity is provided by your smartphone. This is also sometimes known as 'smartphone integration'. In this case the smartphone will have to be connected to the in-dash panel via a Bluetooth link or an USB cable. In a nutshell, our smart phone is acting like a MODEM so as to provide connectivity, without the need to employ another SIM card. Apple's CarPlay is one of the examples to this.

This article explores the potential of smartphone integration and the ways it can be leveraged by the automotive industry and other players in the value chain (smartphone makers, app developers). Although, at various instances it will take into consideration some points related to the 'embedded telematics' as well. However a detailed comparison between the two approaches needs more in-depth analysis and is beyond the scope of this article. Let's see how 'smartphone integration' is seen by different stakeholders.

From automotive perspective

Soon you will not be able to make money anymore with cars that don't integrate customers' smartphones.

Dieter Zetsche, CEO&MD, Daimler

Developments in the smartphone community and the ability of automakers to integrate it in the car are revolutionizing consumers' in-car expectations. Besides Internet connectivity itself, the ability to enjoy their favorite apps, live music, navigation assistance are probably some the IVI features that a user values the most.

In-vehicle Infotainment (IVI) systems are high on the agenda of all the automotive companies where in they are trying to meet customers' demands for a better in-car experience in order to differentiate their offerings from their rivals. The major automakers across the globe are already making the most of it and many of them are using 'smartphone on wheels' as their sales pitch as well[1].

Juniper Research forecasts that 92 million vehicles will feature technology to integrate the smartphone into the head-unit by 2016[2]. And this is something which even a user would be happy with, after all who would like another computer in the car when one can easily mount his iPhone or Galaxy Note on the dashboard. So how does smartphone integration benefit the automakers? And what is preventing them to adopt 'built-in' infotainment systems?

The answer is simple yet interesting. Imagine a company like Volkswagen that designs every detail of its car 3-4 years in advance but is now trying to incorporate features that tend to update every month, or may be in a week or so. This is because the cycles in consumer electronics and app development are quicker than in automotive industry[3]. In order to prevent the inevitable 'obsolescence', automakers must opt for something which has the capability of being updated as and when required. If this condition is not fulfilled, sooner or later we'll have cars with too many features and buttons but none of them to have fun with.

Consider a situation where a car has an emergency SoS button (a part of embedded telematics) which comes as a factory-fit OEM solution. It is supposed to send an alert in form of a ping or SMS to the nearby hospital or roadside

assistance team on course of an accident. Now, in couple of years, suppose the SoS feature becomes outmoded due to some other technological innovations like eCall from some other automaker. Soon we'll be left with a not-so-useful and ugly SoS button that does no good to us but is supposed to be there forever.

From a smartphone maker's perspective

For a company like Samsung, Apple or Nokia, integrating with the car offers an unprecedented opportunity to capitalize on the millions of en route hours whereeven a little interaction with the phone, or its apps or any of its features has occurred. It also enables the smartphone's developer community to create vehicle-centricapps. These apps can benefit the smartphone maker through increased developer revenues and thus promoting a greater brand allegiance among consumers. This would also allow the users to remain productive while driving in a safe and secure manner.

From users' perspective

There is a sociological reason as to why a user will be more comfortable with smartphone integration than to have a 'built-in' telematics solution. That is, today a user is more emotionally attached to his smartphone than anything else[4] and that he expects this attachment to persist even while travelling. Of course we all would like to update our Facebook status while driving as 'Hey there! I am driving.

Let's take another situation for those who are conscious about their pockets. By integrating our smartphone into car, the additional tariff may add to the existing data plan that a user might be using for voice telephony[5]. However, in case of embedded telematics, the built-in SIM card may be proprietary to one organization and managed by a telecom operator other than the one already serving the user. Clearly, the former approach is appreciable and nevertheless practical for a user perspective. After all, it is better to have more particulars on one bill rather than having multiple bills.

It's a dicey situation for automakers.

At present the situation for automakers is a bit uncertain and this uncertainty holds them back[4]. They are trying to match their offerings with the agendas of both customers and smartphone makers. There is no universally adopted standard platform for infotainment which can integrate any smartphone into the in-dash system. However, there have been some efforts like MirrorLink, Genivi Alliance, Connected Car Consortium, GSMA mAutomotive where automotive and electronics experts spend their mid-day sweat in a hope to develop a global standard. But in reality, this is not supported by smartphone makers due to obvious reasons of creating their own proprietary platforms, Apple's CarPlay being the tangible example. So how can automakers capitalize on what is known to be 'the future of connected cars'?

Car OEMs face the difficult challenges of not only how best to integrate smartphones into their vehicles, but also how to ensure that the integration strategy remains viable throughout the life of the vehicle and multiple generations of smartphones5. Hence, first, they must develop an open platform which is smartphone independent. It should not be the case that a BMW having integrated an iPhone 4S is not working when the user has switched to Samsung Galaxy Note.

Secondly, they must incorporate some core features into the infotainment units and should be able to upgrade them through remote provisioning as and when required.

Third, they must develop an open-source application framework, the one like HTML5 which has caught the attention of app developers. HTML5 supports all the major smartphone platforms, making it a sophisticated cross-platform app development environment, and ultimately a useful tool for in-car apps.[6]

Last but definitely not the least, the government legislations are on the way. There is stewing on-going debate between infotainment and security between industry and

government. In-car apps and smartphone integration is generally not backed by government support as it is felt that these could increase the road fatalities. US Transportation Secretary Roy LaHood expressed his wish to eliminate all mobile devices in vehicles. In one of his media interaction he opined[7], "New technologies do not fit with my high standard of zero distractions in vehicles." Government authorities are happy with the 'embedded' option because they find the idea at least reliable, if not more.

Hence, if at present automakers decide to go for the full-monty, and start developing cars with the 'smartphone-only' option. In future, they'll have to add the embedded module when it becomes compulsory which again would be a nightmare for them. Does this mean that car makers must wait and watch for the mandates to creep in?

Certainly not! We can consider smartphone as an interim solution to bring infotainment features as of now, before something better comes into play. Infotainment panels must be designed with a 'hybrid' approach[3-8] with suitable interfaces for future retrofits.

Even if the government mandates to use a 'built-in' SIM, the in-dash systems must have the capability to use the smartphone connection as well, thus making everyone happy. This is possibly the way which can realize the dream of 'smartphone on wheels' and can make smartphone integration a worthy investment for the automotive giants. ●

Shamik Ghosh
Editorial Team, Smart Automotive

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How do they accelerate M2M adoption?

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For the last few years, Machine to Machine (M2M) and Internet of Things (IoT) has been tipped to be the next big opportunity. However, the M2M industry has grown at a rather slow growth rate than the predictions made by market research firms time and again. Only few solutions have registered reasonable growth towards maturity in the area of fleet and connected car solutions, remaining of the many have been in trials for a long period of time or have seen very limited growth. What could be the potential challenges that are hindering the growth of an excellent technology? Even the Indian IT industry, while it has had a remarkable success in selling software globally, they have struggled with M2M. Let's analyze what are the ingredients that go in to making an M2M solution.

What have been the reasons for this slow growth?

A typical M2M solution at a very basic level requires sensors or devices, connectivity and software. Each of the components requires a different set of skills. Unlike a conventional business software application project, the success of an M2M project is predicated on the smooth interplay of hardware, field services, connectivity, software and a centralized managed service. Each of these components have inherent challenges: Investments- Hardware capital expenditure costs (until a critical scale is reached) are quite prohibitive.

Field Services: The hardware installation and commissioning need skill in deployment. Additionally these have to be maintained in the field and that requires geography specific field capability and capacity.

Connectivity: Network costs could be quite high in certain geographies and especially for data hungry applications that require video streaming and this requirement could make the entire project less attractive. In emerging geographies, while the connectivity costs could be low, the quality and availability of the connectivity pipe is, often, far from satisfactory.

Software Application: The software piece requires a very strong domain understanding and appreciation of the challenges and requirements of the end customer. Also handling the variety and the customization requirements of each customer or theconsumer, could prove to be expensive.

How does an M2M platform help in M2M value chain?

To enable the successful delivery of M2M projects, a platform can play a major role, especially, in the device management side and rapid development of software application.

Most of the M2M projects require a basic software application that processes data in a specific way and generates valuable information for users. A lot of functionality required for software development is found to be common irrespective of the industry. The platform functional features can be categorised into three main layers:

Device Management layer includes the ability to manage large amount data from multiple kinds of device protocols. The gateways in the field interact with this layer of software to establish two way communication for controlling end devices, over-the-air (OTA) firmware updates, security and authentication.

Business Logic layer provides all functionality required to organize the data from the Device Management layer, apply business specific rules and help report and take action. Typical functional components in this layer are a Configurable Rule Engine, Event Engine, APIs for integration to other enterprise applications etc,

Application enablement layer provides collection of functionality for developers that enriches and enables software developers to develop new

software application faster, better and more cost effective manner. The main components include business work flows, rule engines and domain specific real time processing algorithms. The correlation of different information from sensors/ devices is also enabled by third functionality.

It is also worth mentioning that as the M2M industry approaches a point of inflection, there are new performance specific M2M platform features that are going to required for large scale deployments. The following are some of the key differentiating features that an M2M platform should support:

Cloud based: Cloud based deployments can reduce the Total cost of ownership and simultaneously offer scalability, flexibility and modularity. The platform support multi-tenancy and integrated business intelligence engines to help customer take advantage of big data analytics opportunities. Having said this, with many customers, cloud is still a taboo and for a platform to be successful it should also support an 'On-premise' deployment.

Data driven approach: An approach that will collate data from various enterprise softwares, enabling the developer community to design and develop solutions that are focused on enriching customer value and experience. Enterprises are looking to extend the reach of their enterprise systems to external world to provide extended functionalities. This will help enterprises create new revenue streams based on triggers and thresholds.

Inter-operability: An M2M platform has to be able to seamless connect to different enterprise applications. These could be traditional ERP, CRM and financial applications or more recent enterprise mobility applications. Only with this integration can an enterprise fully harness the power of an M2M infrastructure and realize returns on their investments. In many consumer driven M2M applications which could be driven by a connectivity operator integration to a Telco OSS/BSS

> ## Only few solutions of M2M have registered reasonable growth towards maturity in the area of fleet and connected car solutions, remaining of the many have been in trials for a long period of time or have seen very limited growth.

platform becomes crucial. The M2M platform should support open API for application development, payload data analytics and data storage. The platform should enable enterprise customers with a vision of connected devices. Additionally customer should be able to provide above mentioned features to their customer in B2B-to-consumer (B2B2C).

Business Intelligence Enablement: Data generated from the devices is stored after transformation and made available to enterprise customers. The availability of historical data along with real time stream of data on the same dashboard enables data driven and faster decision making. This operable business data will make future enterprises highly productive, efficient and better integrated. The M2M platform should also enable data to be shared by customers securely with third parties.

Generic Features: The platform has other essential capabilities required for the delivering new solutions. The customers should be able to leverage role bases access for various levels relating to site, device, individual settings and configurations and ability to develop custom dashboards by the user on the fly. The rule engine should be configurable and should be able to generate logical what-if scenarios and trigger action.

How to make device integration easy for M2M gateway manufacturers?
There are two ways of integrating the gateways to an M2M platform. One way is for the M2M platform to accept the data from device 'as is' and having protocol translators on the platform side. Alternatively, one could enforce a certification program on the hardware manufacturers to follow a particular protocol for integrating their gateway to the platform. The first approach is an inclusive approach and could attract a lot of devices to be connected and give a fillip to the proliferation of connected devices. The second approach is an exclusive approach. This approach means less effort for the platform provider, but could significantly impediment the proliferation of connected devices.

In summary, success of an M2M project depends on the tight collaboration of device manufacturers, M2M platform players and system integration companies. An intelligently architected M2M platform goes a long way in making this collaboration between the stakeholders smooth and effective. ●

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Home: The Next Convergence Frontier

Not very long ago most of us were the proud owners of several personal electronic gadgets. The list included discmans, personal organizers, digital watches, voice recorders etc. Depending on how connected we needed to be, there was a cellular phone as part of the stash. Boring as it was, the primary purpose of the cell phone was to make and receive calls while on the move. The next wave in the adoption of digital devices came with RIM's Blackberry range of products that enabled secure access to corporate e-mail on handheld devices. RIM had its run for a while, but it was Apple that revolutionized the smartphone market almost overnight with its iPhones. Apple's model was simple. The iPhone was a converged platform that could easily perform the operations of all the previously listed gadgets, and more. It also introduced the concept of an AppStore, which created an ecosystem of sorts where independent developers could build applications and deliver new functionalities through the iPhone. Since the introduction of the iPhone by Apple, the commodification of the smartphone market has been so rapid that "voice quality" does not even make it to the footnote of a new phone launch. Instead,the USP has shifted towards hardware specifications of the smartphone; specifications that are geared towards delivering powerful graphics and multimedia content to the customer.

Like in the telecommunications industry, there is a subtle convergence of technology happening at our very homes and we are gravitating towards smarter domestic living experiences. The vision of a smart home is to embed intelligence into regular devices, and also be able to interact with them in cohesive natural language. Smart home should really be smart enough to resolve ambiguities in the interaction by understanding the location and context of the interaction. Emergent realities of these intelligent devices can already be witnessed in our smart TVs, smart plugs, smart air conditioners etc. While some of these devices are shipped with pre-installed software, others are logging on to the Internet automatically. They are becoming part of a global phenomenon called the "Internet of Things" where powerful new apps are delivering content or providing decision making capabilities to these connected things.

The Internet of Things (IoT) is fundamentally changing the way we interact with household devices. In the process we have significantly improved upon areas like home healthcare, home security, resource efficiency and remote tracking. If we take the example of home healthcare companies like AnDare already producing devices like Bluetooth enabled weight scales and blood pressure monitors. Sensaris, an Italian company, provides an Android/iPhone application that connects to its sensors called SensPods and ZaoPods. These devices can not only stream readings from the devices to a smart phone but the data can also be remotely shared with care providers or loved ones. Companies like Adhere Tech and Vitality are venturing into hard to monitor areas of healthcare like patient drug adherence and are manufacturing smart pill bottles that track and report the quantity of medication in them. These smart pill bottles also let us know when our loved ones have taken their prescription medications. What is more important is that it lets us know when they have missed a dose so that we can take immediate corrective action. In the growing market of smartphone connected devices, French company Kolibree recently demonstrated the world's first connected electric toothbrush that can provide statistics about a brushing session.

On the home security front Nest Protect and Nest Thermostat, from the yet to be renamed Nest Labs, have enjoyed tremendous success with its range of connected home monitoring products. The MiFi range from Ubiquity Networks and NinjaBlocks from Ninja Blocks Inc offer a comprehensive set of Internet connected motion sensors, temperature and humidity sensors, door locks and smart switches for home use. These sensors allow us to build powerful applications that

> **The Internet of Things (IoT) is fundamentally changing the way we interact with household devices. In the process we have significantly improved upon areas like home healthcare, home security, resource efficiency and remote tracking.**

can provide us peace of mind when we are away from our homes. To complement these sensors there are solutions like RemoteLock that allows a user to remotely unlock the door for an unexpected visitor with by swiping on a cellphone. Similarly, Garageio by Allotazs Labs and NiOGarage by iOTOS, allow a garage door to be controlled remotely from a cellphone, just in case you wanted to open the garage door as you were taking the last bend towards home. UK based AlertMe helps British Gas' customers gain home energy consumption insights on their cellphones so that they can be more judicious about their heating requirements. Greebox and GreenIQ, two Israeli companies, have launched smartphone controlled lawn watering systems to reduce wastage associated with pre-timed installations.

Some IoT applications are just for fun. For those of us in a perpetual holiday mood, Holiday by Australian company Moorscloud, offers the world's smartest Christmas lights, which can be configured remotely. Nokia's Treasure Tag and US based SquareTag offers the possibility to create a personal cloud space for various things at home by tagging them with a smart tag. If we extend the home ecosystem to include the family car, then applications like Fuse by JoinFuse and TeenSafer by Aegis Mobility can help tracking driving behavior of our loved ones. All the applications that we have described so far represent only a tiny fraction of the numerous applications that are out there, but they do illustrate the breadth of current generation smart home technologies. For example, the typical value chain of an IoT service can be quite long and involves the device manufacturers/distributors, content creators/ distributors, service providers, data center providers and connectivity providers. At its simplest, an individual service provider deploys services on the cloud and the consumer subscribes to a subset of these services. However, even to cater to this model, it is necessary for the service provider to invest in a IoT service delivery platform that can help with service provisioning,

revenue sharing, manageability and maintenance of devices.

The essence of IoT applications are that they are connected to the Internet. As such these applications connect to the Internet using one of three available topologies. The first method leverages a cellular connection for the connectivity. It includes standalone applications like Garageio and NiOGarage. The second method uses broadband connectivity to connect to the Internet and deliver streaming content to appliances like smart TVs or connected printers. The third form of connectivity uses an intermediate gateway device that supports a high-speed wide area network on the northbound side and potentially multiple constrained local/personal area networks on the southbound side.

This gateway device offers tremendous potential for convergence of IoT, voice and media services for the home i.e. the gateway device becomes an abstraction for all the smart objects associated with a home. It acts as the digital broker, representing the home on the Internet. By design it is expected that multiple devices would connect to their respective service providers through the gateway. Additionally the gateway device can also provide standalone

services. For example, by attaching a WiFi module it could become a local hotspot. Similarly by adding digital TV capabilities it could also act as a set top box, with the primary TV doubling up as a monitor and the unit remote control doubling as an input device. However, as of today, there exists an interoperability issue because different appliance OEMs have proprietary implementations of existing standards and service providers (e.g. for digital TV) use different coding techniques. This could adversely affect the process of convergence. In theory it is possible to resolve such interoperability issues by allowing virtualization at the gateway level, such that individual service providers can configure their service on a virtual machine, thus eliminating the need for multiple gateway devices.

It would be worthwhile to believe that the capabilities of the connected home today are only a precursor of awe-inspiring things to come. Soon our home would be an extension of ourselves and can act on our behalf. For example, if we were to throw a party our homes could send invitations to our friends or family, place the food orders and when the guests arrive it could turn into a virtual DJ playing music pulled from the favorites list of the attending visitors. ●

Atanu Roy Chowdhury

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M2M for Real-time Pollution
MONITORING & ENFORCEMENT

Pollution is a serious issue affecting our planet today. Pollution in the air we breathe, the water we drink, the soil we grow our food in all leading to numerous health issues. We face hazards from pollution every day, be it a visit to our favorite beach or our daily trip to the office. However, the real question is how we can address this menace. The National Environment Policy tries to address environmental concerns in all development activities. However, the challenge is enforcing it. Weak enforcement of environmental

compliance is due to inadequate technical capacities, monitoring infrastructure, and trained enforcement staff. The legacy telemetry systems and manual data collection have failed to address the issue of enforcement. So what can we do to make enforcement better?

M2M (Machine to Machine) or IoT (Internet of Things) can help us make enforcement better and cost effective. M2M technology can improve pollution monitoring and enforcement in two ways:

- Create community lead sensor networks
- Enforce compliance via automated data gathering

M2M can allow sensors and devices, which measure pollution level, to communicate with the society and enforcement bodies without manual intervention. The system can alert people in case of extreme situations or identify non-compliance. Community and government lead sensor networks that monitor pollution levels are today taking enforcement to

How does it work?
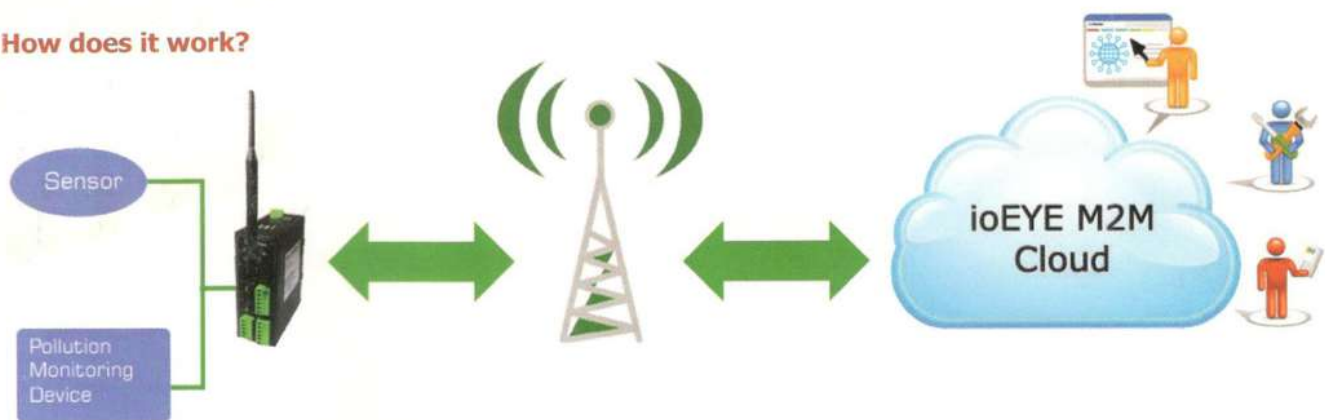
a new level. And this is not a distant future, this is all happening now.

M2M system for real-time pollution monitoring gained a lot of attention in 2011, following the nuclear disaster in Japan. Pachube public M2M platform displayed thousands of real-time radiation feeds generated by community members around the planet concerned about the lack of official information.

Air Quality Egg, a community led and M2M powered sensor network helps communities set up their own air quality monitors at an affordable cost. This is a project aiming to give citizens a way to participate in the conversation about air quality. It is composed of a sensing device that measures the air quality in the immediate environment and an on-line community that is sharing this information in real-time. It is a community developed, open source project that is driven by people who care about the air they breathe. Community led environmental monitoring can help local farmers, government and people benefit from this information. The device costs around USD 200 and measures air temperature, humidity, Nitrogen Di-oxide and Carbon Monoxide. The sensors send data to a public M2M cloud; you can then view this data on an interactive community site integrated with the M2M platform.

iKair, a Chinese company provides M2M bases pollution monitoring system. The USD 40 device provides dust level, radon, noise, light, temperature, humidity, carbon monoxide, nitrogen dioxide etc. Communities can use this M2M device to monitor

pollution levels around them at an affordable cost. The device sends data to the proprietary M2M platform of the company.

A state pollutions control board in India is also using M2M platform for remotely monitoring and managing effluent levels. The platform helps them in enforcing compliance at their common effluent treatment plants. The effluent monitoring system is comprised of a M2M device, sensors and ioEYE M2M platform. At fixed intervals, 24x7, the system sends water quality reading to the ioEYE platform.

The system also alerts the engineer via SMS if the effluent levels exceed permissible limits. No more is the need for someone to monitor the data continuously. The real time monitoring system keeps watch over the effluent levels and saves time and money. The pollution control board previously employed field technicians. These technicians manually monitored effluent water quality by visiting the remote site, collecting the data, and reporting their findings. With the switch to a M2M solution, the pollution board has realized an immediate and significant improvement in compliance.

How can M2M engage communities?

Communities can install low cost M2M monitoring devices in their locality to monitor air quality, water quality or ground water levels. An air quality monitoring M2M device can cost as low USD 100 today. These devices in real time send pollution data to M2M device platforms. You can then easily integrate these platforms with community portals.

How can M2M help make enforcement better?

M2M devices along with sensors that monitor key pollution parameters can regularly send data to a M2M platform. On detecting issues, like high pollutant levels or sensor not working, the platform generates real time alerts. The data is continuously stored, if required, by the M2M platform. A third party application, a public site or government bodies can request or subscribe to this data via the application interface of the M2M platform. You can use an M2M platform for:

- Air quality monitoring
- Common effluent treatment plant monitoring
- Stack and flue gas monitoring
- Community incinerator plant monitoring
- Ground water monitoring
- Water pollution monitoring

Advantages of using M2M over legacy telemetry systems

- Low cost and reliable
- Uses public networks like GPRS, Broadband (Satellite in extreme cases)
- Open protocols
- More reliable due to device push instead of server polling
- M2M or IoT platform reduce IT infra and maintenance costs ●

Atindra Chandel

He is the CEO & Co-founder of SenseGrow which has been a pioneer for implementing M2M in India for Ambient Air Quality(AAQ) monitoring. He has over a decade of vast experience in M2M software business with specialization general management, software product development and marketing of large web based platforms. Prior to joining the M2M industry, he was an executive in the shipping industry handling operations.

Automotive Electronics in India
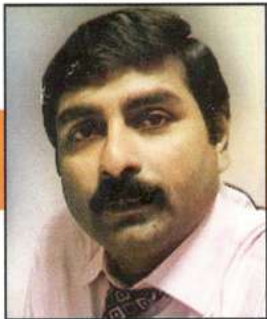
Chandrasekhar Konakalla

General Manager
Product Development Engg. Electronics
Pricol Limited

Can you share with Telematics Wire readers about your offerings for automotive telematics?

Pricol is one of the leading automotive parts suppliers, serving several OEMs across different market segments, both in India and abroad. In telematics space, Pricol offers various products such as Vehicle Tracking Systems, Road Speed Limiters, Fare Meters, etc, under the product grouping "Asset Management Systems". These products are offered separately or as a basket along with company's products like instrument clusters, round gauges, driver information display, sensors and actuators.

Can you share your success stories in vehicle tracking system in India?

We have been successfully providing various Asset Management Solutions over last decade. Our rich experience in handling aftermarket challenges and various four wheeler & off-road vehicle segments is enabling us to deploy highly qualified telematics solutions today. Pricol's broad portfolio of products is our advantage in providing wide range of integrated solutions for various market scenarios.

Do you think there are any impediments in the growth of VTS industry in India?

Yes, there are many of them. The major impediment is the lack of established standards / certifications in India. In the case of developed world, specifically the European and North American countries have established good forums for setting the standards / certifications / regulations, and for helping their respective governments to come up with comprehensive legal regulations for effective deployment of telematics systems. This helps the end user to have apple to apple comparison of available services / opportunities in the market. In India, we are yet to get started on these aspects. This is one of the reasons why fleet owners in India are perplexed in choosing the right product.

Though we have reasonably good telematics systems infrastructure in India, I believe there is a strong need of effective deployment of these services in Intelligent Transport Systems to address prevailing issues of transport sector in India. This is a good opportunity as well as challenge for transport system organizations and solution providers.

Do you see the market pull for various sensors fitted in the In-Vehicle Infotainment panel?

Globally many organizations are still working out the possibilities to diversify the telematics applications/solutions. Today, design teams of OEMs are deliberating on how to tap & utilize the vehicle sub-systems data to have effective customer service. This is creating a scenario where telematics integrated with other vehicle electronics/sensors to provide integrated vehicle data for further analysis and customer service. This is also providing an opportunity to provide much more 'reliable driver information' posted either in the instrument cluster or in an Infotainment system.

What are your views on Insurance Telematics in India?

While U.S and some European countries have made lot of progress, we believe it has just started taking shape in India. In these countries, driver history is managed based on various inputs from several agencies. That means, this requirement is there for long time and now with telematics the job is addressed easily. Whereas in India, this requirement is emerging well now and it is good sign for Indian telematics industry.

What are the future plans of Pricol Limited for India?

We are focusing on delivering embedded solutions for various OEMs and Intelligent Transport Systems. Leveraging Pricol's vast automotive experience and wide range product portfolio is substantially enabling us to frame new integrated telematics solutions for the industry. In short, we want to be one-stop embedded shop for various telematics electronics needs.

What according to you is the future of automotive telematics in India?

Though Indian telematics Industry has captured the pulse of the existing market demands over last decade, I am not sure if we are really tapping the enormous benefits of various integrated telematics solutions that can address the various business needs. For example, we are still in the primary phase of deploying good Intelligent Transport Systems. There are still several challenges in content management, setting up standards for equipment reliability, protocols, standardization of vehicle data analysis/representation, etc. This is important, because many diversified solutions require rich experience in various sub-systems of overall deployment and require alliances of organizations with appropriate skills set. ●

Chandrasekhar Konakalla

He is M.S. in Instrumentation and has over 20 years of working experience in embedded product development space. He has work experience/interactions with Continental, TRW to name a few. In conversation with Telematics Wire, he shares his views on the automotive telematics scenario in India.

Qualcomm launches world's first commercial 20 nm LTE advanced chipset for automotive

Qualcomm Technologies, Inc., has added the Qualcomm Gobi 9x30 platform with extended lifecycle support to Snapdragon Automotive Solutions, enabling advanced telematics and infotainment features. The Gobi is based on the 20 nm technology node with support for global carrier aggregation deployments up to 40 MHz in both LTE FDD and TDD modes.•

Smartphone apps to drive penetration of telematics in taxis to 21%, globally by 2019

According to a recent research report from ABI research, an increasing number of taxis equipped with embedded telematics units is being overshadowed by the rapid rise in popularity of smartphone-based taxi apps, which enable passengers to order a taxi via an app, with the driver similarly receiving pick-up requests directly via smartphone. In a number of countries, the regulatory authorities plan to issue guidelines on the use of taxi apps, particularly in relation to driver distraction issues, as well as dealing with problems concerning fare payments via smartphones. However in China, where telematics is mandatory in all taxis, the authorities have banned the use of taxi apps in some cities.•

Tata Motors and Samsung join hands for in-car infotainment systems

Tata Motors and Samsung have collaborated under which the passenger vehicles from Tata Motors will be equipped with Samsung's 'Drive Link Application' based on MirrorLink technology intended to help driver to navigate, answer calls and access Internet and music. Having been working jointly for last six months on this project,

Quectel launches UC15 UMTS/HSDPA module

Quectel announced UC15 - UMTS/HSDPA module featuring a maximum data rate of 3.6 Mbps downlink and 384 Kbps uplink in the LCC castellation packaging. It provides a flexible and scalable platform for migrating from GSM/GPRS/EDGE to UMTS/HSDPA. This enables integrators and developers to design their applications once and take advantage of true worldwide coverage and service flexibility afforded by the combination of the two most prevalent cellular technologies worldwide.•

u-blox launches CAM-M8Q GPS /GNSS antenna module supports all satellites

u-blox has introduced the CAM-M8Q GPS/GLONASS/BeiDou/QZSS antenna module. The module integrates a u-blox M8 satellite receiver IC plus SAW filter, LNA, TCXO, RTC, passives and a pre-tuned GNSS chip antenna in a tiny 9.6 x 14.0 x 1.95 mm package. CAM-M8Q is ideal for a wide range of applications such as personal locators, handheld navigators, wearable electronics as well as vehicle telematics systems used for emergency call, anti-theft, insurance and road pricing. It also has a feature whereby the internal chip antenna can be used as a backup antenna if the design makes use of an external antenna.•

Tata Motors is looking at making the system available to its volume segment cars and not necessarily restrict it only to more expensive vehicles like Safari or Aria.•

Harman International sets up production facility in Pune

Harman sets up a production plant in Pune to cater to the Indian automotive market. The facility is expected to go live latest by June. This wholly-owned venture would employ around 100 people, out of which 30 of them were already undergoing training. Mr. Lakshminarayan, Managing Director of Harman expressed the hope that Harman would notch up revenue of

$250 million in three years in India.•

PSA Peugeot Citroen and EPFL team up to make car with emotion detection

PSA Peugeot Citroen has teamed up with Ecole Polytechnique Federal de Lausanne (EPFL) to develop an emotion detection system designed to recognize signs of irritation and
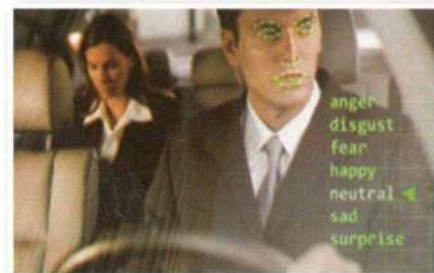
fatigue in a driver's facial expressions. Scientists in EPFL's Signal Processing 5 Laboratory (LTS5) adapted a facial detection device for use in a car, using an infrared camera placed behind the steering wheel. Future plans for the project also include using voice recognition or lip reading technology, and reading other driver states, such as distraction.•

Mercedes-Benz to make use of Nokia HERE mapping services

Mercedes-Benz has chosen HERE Maps to power the emergency call eCall system in its cars. HERE has been supplying map data across 19 European countries to Mercedes-Benz. While Merc's eCall system was already using this data from start, now it will leverage the HERE Location Platform. This does look like a very important initiative and may prove to be lifesaver for thousands, especially, when drivers and passengers lose their consciousness due to crash. •

Continental LTE Telematics module provides high-speed data access worldwide

Continental unveils its telematics module offers up to 100 Mbps

bandwidth where the 4G Long Term Evolution (LTE) mobile network standards are available. By integrating configurable frequency variants, interchangeable options for air interface solutions, GPS/GLONASS, and WLAN into one scalable and highly compact hardware unit, it facilitates worldwide use of the national frequency variants in the US, Europe, Russia, China, Brazil and many other countries.•

GVMC to install vehicle tracking systems for transportation of drinking water and garbage

Greater Visakhapatnam Municipal Corporation (GVMC) will install tracking systems in vehicles transporting drinking water and garbage in the city. By implementing the vehicle tracking system, the GVMC can keep track of the

expenditure related to fuel in addition to the areas to which water is being supplied, said MV Satyanarayana, Commissioner, GVMC. On vehicles involved in lifting garbage, he said the tracking system has to be installed in 274 vehicles.•

Buick advances Connected-Car convenience with OnStar 4G LTE

Buick announced that the 2015 LaCrosse, Regal, Verano and Encore would come standard with OnStar 4G LTE hardware, with data packages available for an additional charge. With OnStar's 4G LTE connection, the vehicle provides a mobile hub, giving customers easier access to apps and services that require a high-speed cellular or data connection. All drivers can pay for data through OnStar, independently from their other mobile data accounts. Pricing and data packages for OnStar 4G LTE will be announced later this year.•

## Audi and AT&T announce pricing for in-vehicle 4G LTE connectivity

Audi and AT&T announced new data plans for the all-new 2015 A3 sedan, which will enable the first-ever in-vehicle 4G LTE data connection in North America. The data plans will be competitively priced, starting at $99 for a 6-month plan and $499 for a 30-month plan. The plans are customized for typical usage in a vehicle. Customers can be sent e-mail alerts if they near the data plan limit. Audi also plans to roll out 4G LTE capability across its entire lineup as new or refreshed models come to market.•

Asset Protection Unit (APU) prevents fraudulent insurance claim worth £20,000 using telematics

Asset Protection Unit (APU) has prevented a false personal injury claim worth £20,000 using a telematics system and other

MapmyIndia partners with iBall for navigation technology

MapmyIndia and iBall have entered into a strategic partnership for innovative telematics products. The first offering to come out of this relationship is the iBall Andi Uddaan, India's first women safety mobile phone's deep integration with MapmyIndia's people safety app, Locate. The device has a dedicated and exclusive SOS feature in the phone, which is powered by MapmyIndia Locate app. The emergency message reaches the right person instantly and with clear details about how to reach the incident spot. A person can add five emergency contacts, who will receive the distress signal.•
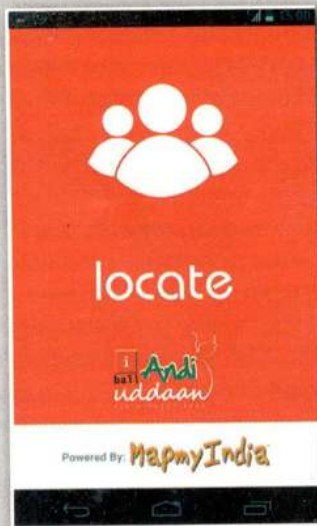
techniques used by motor fraud investigators. The personal injury claim was filed with APU-assisted Aviva after three claimants reported that two vehicles had been in collision. One of the vehicles was fitted with a telematics system; it was determined by APU that the vehicle was over two miles away from where the alleged accident was said to have occurred. The three claimants have since ceased to seek compensation for the incident and have been added to APU's fraud database.•

Lamborghini selects HARMAN for in-car infotainment system for its Huracan

Lamborghini teams up with Harman to integrate its infotainment system in its new car Huracan. It includes a 60 GB hard disk-based GPS navigation system which generates highly realistic 3D views of cityscapes and landscapes and retrieves data from Google Earth and Google Street View. Landmark destinations are shown in photorealistic style for an even more dynamic navigation experience. A 7-inch 16:9 TFT color display delivers vehicle and infotainment details to the driver, as well as providing excellent navigational views. •

NNG and ANS launch personal navigation device (PND) for Indian roads

NNG and Ayana Navigation Solutions (ANS) have introduced the ANS Navigator A-501 device, a 5-inch model, runs on the renowned iGO primo software by NNG, a global leader in the GPS navigation industry. The new PND is pre-loaded with the latest India maps and over 7 million points of interest (POIs). To guarantee continued reliable guidance, the unit comes with a 1-year map update guarantee from NNG's update portal Naviextras.com.•

Volvo and Norwegian Public Roads Administration team up for cloud-based V2V ice warning

Volvo Car Group the Norwegian Public Roads Administration (Statens Vegvesen) are initiating a pilot project that will send road condition information from individual vehicles to a cloud-based system to improve public safety. The system works by sending real-time data about road friction to the cloud-based platform so that it can automatically alert other nearby vehicles about slippery patches and poor road conditions. When a car detects an icy or slippery road patch, the information is transmitted to Volvo Cars' database via the mobile network.•

USPTO issues patent to Apple for using iPhone as an eCall unit

The US Patent and Trademark Office (PTO) has awarded a patent to Apple for a system concept using an iPhone to detect and respond to emergencies. The patent covers medical and crime emergencies and also automotive crashes. If the system detects abrupt deceleration from a specified velocity it transmits the vehicle location to emergency assistance services. The patent mentions the iPhone could be given access to in-car data such as GPS location and airbag deployment sensors.•

Tata Motors partners with Harman for its in-car infotainment systems

Tata Motors' brand new cars Zest and Bolt will feature the infotainment system designed and built by HARMAN. The infotainment system boasts of a wide range of features such as 5-inch touch screen, Bluetooth technology, Smart voice recognition, social media integration and touch phone controlled interface and will be part of Tata's ConnectNext package. Moving forward with the recent launches from Tata Motors, HARMAN infotainment systems will provide entertainment, navigation, and connectivity for the company's entire range of passenger cars.•

Apple reveals CarPlay infotainment system at the Geneva Motor Show 2014

Apple announced CarPlay, a proprietary standard for integrating a range of iPhone like 4S, 4C and 5S in vehicles. It comes with a wide range of applications such as live music streaming, Siri enabled voice controlled texting, Internet radio, turn-by-turn navigation etc. Top auto manufacturers are leveraging CarPlay to enhance their infotainment portfolio including BMW Group, Ford, General Motors, Honda, Hyundai Motor Company, Jaguar Land Rover, Kia Motors, Mitsubishi Motors, Nissan Motor Company, PSA Peugeot Citroën, Subaru, Suzuki and Toyota Motor Corp.•