

# Connected Car

INFOTAINMENT / TELEMATICS / INTERNET OF EVERYTHING

Issue 4 / February 2016  Video Enabled



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## ▶ 2016 CONSUMER ELECTRONICS SHOW REPORT

Watch the Connected Car video interviews with CES stars



## ▶ AUTOMOTIVE FUTUROLOGY WITH QUALCOMM

Vince Holton talks automotive futurology with Qualcomm



## ▶ WHAT'S ON THE E-HORIZON?

An interview with Brian Droessler of Continental Automotive



## ▶ TOYOTA ADOPTS FORD SMARTDEVICELINK SOFTWARE

Is Toyota first to help Ford establish an open-source connected car standard?



## ▶ HAS BMW CREATED THE MOST ELEGANTLY CONNECTED CAR?

Watch our video review of the BMW i8, and hear our assessment

NextGen

# INTRODUCTION FROM THE EDITOR

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## CONNECTED CAR IS PRODUCED BY:

Click I.T. Limited

Hampshire Gate, Langley, Rake

Hampshire GU33 7JR, England

## CONNECTED CAR IS DISTRIBUTED BY:

NextGen-Connect.com

8600 W. Bryn Mawr Avenue, Suite 500N

Chicago, USA

IL 60631

Connected Car is distributed on a quarterly basis to companies and individuals with an interest in connected car, infotainment and telematics technology.

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Hello, and welcome to the fourth issue of Connected Car magazine. This was created immediately after the Connected Car team returned from the 2016 Consumer Electronics Show (CES) in Las Vegas.

This event, one of the world's largest trade shows with 170,000+ visitors this year, was at one time purely about displaying the latest developments in – as the name makes obvious – consumer electronics devices. Expensive stuff like TVs, computers, games consoles, cellphones (for a while) plus endless smaller widgets and gadgets. But for about the last 5 years, there has been a creeping, but growing, influence from car companies. For the last 2-3 years, it has reached the stage where cars are everywhere at CES, and car companies, Tier 1 suppliers and semiconductor companies are now targeting CES as a major hub for automotive announcements and displays. As research company Frost & Sullivan observes, the show is regarded as "the holy grail for the automotive industry." Is the car a consumer electronic device, today? It would be a brave soul that argued that it wasn't at least heading in that direction.

This, then, justified Connected Car shipping a full production crew into Las Vegas, and in this issue we bring you video interviews with major players at CES. So, if you didn't manage to get to Las Vegas for this event, I suggest you grab a cup of coffee (or a beer if you must), sit back and watch what companies such as Ford, Audi, Hyundai, Qualcomm and others had to say.

This issue also sees us continue our series of interviews with executives from leading automotive companies. I had carried out one of this issue's interviews, with Qualcomm's Nakul Duggal, prior to heading out to Las Vegas. Coincidentally, it was Nakul that I met up with on the Qualcomm booth at CES, so he features twice. Then I spoke with Brian Droessler of Continental Automotive. His company contacted us to talk about Continental's automated driving technology and the company's eHorizon project, which helps the driver know much more about the unseen road ahead.

Need a bit of a supercar moment? Look no further than our video review of BMW's i8, a car which, unlike most, was designed from the start as a fully connected car. I was lucky enough to spend a little over a week with this car, and it was a special experience. We will film more connected car features through 2016. If you would like your car or your systems to be featured, just get in touch with me.



Vince Holton  
Editor  
**Connected Car**

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# NEWS

## VOLVO AND MICROSOFT GO ALL KNIGHT RIDER

More than 33 years after the popular American TV show Knight Rider showed David 'The Hoff' Hasselhoff talking to his car, KITT, Volvo and Microsoft are launching a wearable-enabled voice-control system.

Volvo owners will be able to talk to their car via their Microsoft Band 2, allowing them to instruct their vehicle to perform tasks including setting the navigation, starting the heater, locking the doors, flashing the lights or sounding the horn via Volvo's mobile app, Volvo on Call, and the connected wearable device.

In November 2015, Volvo and Microsoft announced their collaboration with the first automotive application of HoloLens technology. HoloLens is a fully untethered holographic computer, which could be used in future to redefine how customers first encounter, explore and even buy their car.

Thomas Müller, Vice President Electrics/Electronics and E-Propulsion at Volvo Car Group told Connected Car, "Volvo is intent on making the car experience as easy and convenient as possible by utilising the latest technology in the most relevant and inspiring ways. With voice control, we are only just beginning to scratch the surface of what is possible with digital assistant functionalities."

In recent times, Volvo says that it has begun to focus closely on innovations outside the traditional automotive arena, keen on opening up potential partnerships and new business models.

"Our ongoing partnership with Volvo continues to bring ground-breaking technology to enhance the automotive experience," said Peggy Johnson, Executive Vice President of business development at Microsoft. "Together with Volvo, we're just beginning to understand the potential that technology has to improve driver safety and productivity."

And when will you get your turn to play The Hoff? Well, the possibility to connect to a Volvo with voice control through Microsoft Band 2 will apparently be available for customers in Volvo on Call-enabled markets in spring 2016.

 *To watch Connected Car's video review of the Volvo XC90, click on the picture at the top left of this page*

## FORD EXPLORING SYNC INTEGRATION WITH AMAZON ECHO AND ALEXA, WINK

Ford is exploring linking smart devices like Amazon Echo and Wink to its vehicles to allow consumers to control lights, thermostats, security systems and other features of their homes from their car, and to stop, start, lock, unlock and check their vehicle's fuel range from the comforts of their couch.

Ford is working to link the home automation devices with its vehicles through Ford SYNC. This comes as half of consumers say they will buy at least one smart home product in the next year, according to Icontrol Networks.

Ford is looking to use new SYNC Connect technology to link vehicles with the Amazon cloud-based voice service Alexa, which would allow customers to access their vehicle from inside their home. Using Amazon Echo, a hands-free speaker and voice command device that interfaces with Alexa, Ford owners could request assistance with various functions of their car.

Alexa also provides a link to a variety of Internet-enabled smart devices, such as lights, home security systems, automatic garage doors and more.

From inside the vehicle, a driver would access Alexa through the steering wheel-mounted voice recognition button, allowing the driver to make requests of connected smart devices or functions of Alexa, including weather reports, music, shopping lists and more.

Ford also is working with Wink, the smart home platform that brings together smart home devices from many different companies. Compatibility with SYNC AppLink enables Wink users to control and automate their smart home device on the dashboard of their car or through voice control.

## AT&T RENEWS MULTI-YEAR CONNECTED CAR AGREEMENT WITH BMW

AT&T will continue to bring high speed internet to BMW vehicles in North America as a part of an extended multi-year exclusive agreement. Since 2008, AT&T has powered BMW's ConnectedDrive services and apps. Through a new agreement, the operator will also connect BMW "infotainment" features such as a Wi-Fi hot spot.

Beginning with the new BMW 7 Series, BMW's US customers now have the option of a Wi-Fi hot spot powered by AT&T's 4G LTE network. The Wi-Fi hot spot can be accessed through a device such as a smartphone or tablet, which is automatically directed to AT&T's new online Wi-Fi portal, powered by Ericsson. In the portal, users can activate a free Wi-Fi hot spot trial, buy a data session for their vehicle and manage their Wi-Fi account.

BMW customers can share data among phones, tablets and now their vehicles with AT&T Mobile Share Value. The cost for connecting these models to a Mobile Share Value plan is a \$10 access charge per month. This gives car owners ultimate flexibility – they can choose a stand-alone data plan or the Mobile Share option.

Chris Penrose, senior vice president, Internet of Things, AT&T Mobility told Connected Car, "We are thrilled to continue our long-standing relationship with BMW and to be a part of a brand that evokes a joy and passion for driving. The new Wi-Fi hot spot lets you connect up to 8 devices at a time and allows passengers to access their favourite apps, play games and surf the net at fast 4G LTE speeds."



## HERE UNVEILS HD LIVE MAP, ADDS FEATURES, REDUCES BANDWIDTH REQUIREMENT

At CES, HERE unveiled HERE HD Live Map, claiming this is the world's most advanced cloud-based map asset commercially available for vehicles today. Ready to be deployed in connected vehicles in North America and Western Europe, HERE says that HD Live Map creates a detailed and dynamic representation of the road environment, enabling a vehicle to effectively "see around corners" beyond the reach of its on-board sensors.

HD Live Map is an integrated offering, consisting of multiple layers of data delivered in a map-tile format. It is designed to enhance both Advanced Driver Assistance Systems (ADAS) and automated driving functionality, and therefore make driving more comfortable and enjoyable.

HERE suggests that with HD Live Map, automakers have the ability to enhance a vehicle's ADAS functionality - such as adaptive cruise control, adaptive headlights and curve speed warnings - by giving it access to more accurate and more reliable near real-time content and contextual information about its environment.

HERE explained to Connected Car that HD Live Map is the first ever map from HERE which is self-maintaining: through multiple modes of sensor aggregation and ingestion the vehicle's map is updated and delivered in near real-time. Similarly, if a new lane closure was reported, the map would update accordingly so that other vehicles approaching the area can already prepare to switch lanes or alternatively re-route if traffic is heavy.

HD Live Map is also data-efficient, requiring a small data footprint, with new events able to be layered on the map without the need to update the whole map itself. HERE says that the small file sizes within each live tile make the delivery of highly precise data much leaner, thus reducing bandwidth requirements.

HERE has already been providing either parts or full specifications of HD Live Map for automated driving testing purposes to more than ten automotive companies.

**▶ To watch the Connected Car video interview with HERE at CES, click on the picture at the top left of this page**

## JAGUAR LAND ROVER RESEARCH WILL HELP AUTONOMOUS VEHICLES DRIVE LIKE HUMANS, NOT ROBOTS

Jaguar Land Rover is investing in a £ multi-million research project that will help future autonomous vehicles drive naturally like human drivers, rather than like robots.

A fleet of Jaguar and Land Rover vehicles will be driven daily by employees of the London Borough of Greenwich, to establish how a range of different drivers react to real-world driving situations, including heavy traffic, busy junctions, road works and bad weather.

Data from sensors in these cars will reveal the natural driving behaviours and decision-making that drivers make whilst driving, including complex and stressful scenarios. These include giving way at roundabouts and intersections, how drivers ease forward at junctions to enter a flow of traffic, or how they react to an emergency vehicle coming up behind their car whilst in a traffic jam.

The three year £5.5m 'MOVE-UK' project, which is led by Bosch, will also use this data to help develop insurance policies for future autonomous cars. Insurance experts will provide their expertise on the liability of certain scenarios using the real-world driving data supplied by the fleet of test cars.

Drivers will need to completely trust the vehicle before they opt-in and engage automated systems. If an autonomous car can be programmed to have a very similar

reaction to a real driver, then the autonomous experience will be more natural, and the driver more likely to allow the car to take control.

The MOVE-UK consortium is led by Bosch and includes Jaguar Land Rover, Transport Research Laboratory (TRL), Direct Line, the London Borough of Greenwich and The Flow.

## FCA ANNOUNCES FOURTH-GENERATION UCONNECT SYSTEMS AT CES

Fiat Chrysler Automobiles headed to CES in Las Vegas with a display featuring the latest technology advancements in FCA vehicles and provided a glimpse of the new fourth-generation Uconnect system featuring Apple CarPlay and Android Auto.

Joni Christensen, Head of Uconnect Marketing, FCA told Connected Car, "The Uconnect team is evolving Uconnect and making it even better. With the launch of the fourth generation of Uconnect systems, we are continuing to minimize the everyday stresses of busy lifestyles by providing drivers with a variety of ways to stay conveniently connected to their vehicles, while making every drive exceptionally informative, entertaining and unique."

FCA also offered CES attendees an opportunity to be fully immersed in advanced technology with hands-on demonstrations of the 2016 Dodge Charger Pursuit with an all-new Uconnect 12.1 system and an FCA technology concept display that explored the future of intelligent transportation.

In 2016, FCA said that it will introduce a portfolio of Uconnect systems that include capacitive touchscreens, performance improvements of faster startup time, enhanced processing power, heightened touchscreen responsiveness, vivid touchscreens with improved resolution and brightness, the Uconnect 8.4 NAV system, and select others within the global portfolio will include Apple CarPlay and Android Auto.

## CONNECTED CAR 2016 CES REVIEW

“ CES is bigger than most auto shows around the world with almost 500 companies showcasing automotive technology this time at the event. From OEMs like Kia announcing its 2020/2030 vision for automated driving, to BMW showcasing Air-touch revolutionary air gestures, to GM's investment in Lyft, the show is regarded as the holy grail for the automotive industry.”

Frost & Sullivan

### SO WHO SAID THE CONSUMER ELECTRONICS SHOW (CES) WAS JUST ABOUT TVS AND COMPUTERS?

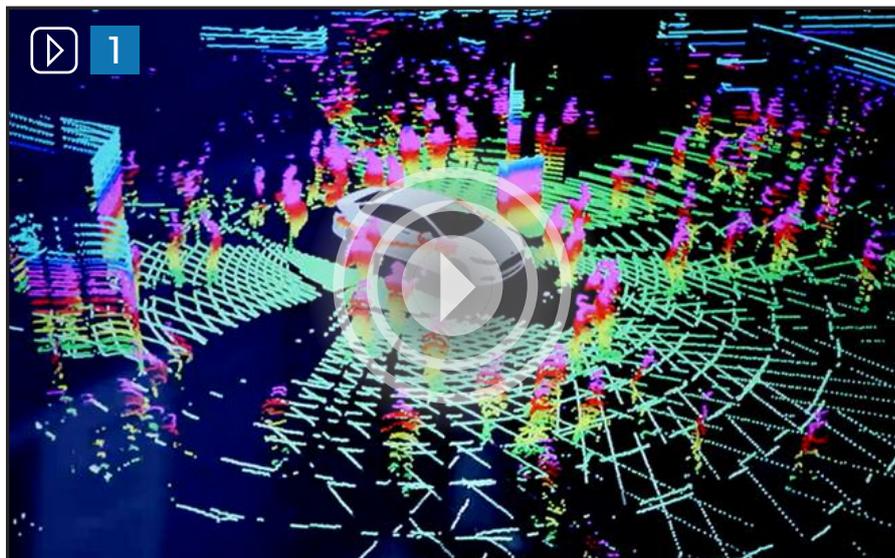
For many years now the amount of automotive content at CES has grown steadily. For the last couple of years, cars have been everywhere at CES, and major car companies, Tier One suppliers as well as tech companies with an interest in the auto sector have been using CES as a platform to launch new systems, as an axis around which to stage events and, well, just a really good place to network.

Connected Car sent a film crew to Las Vegas to create a review of automotive activity at this immense event, where more than 170,000 attendees from across the globe gathered amongst 2.47 million net square feet of exhibit space.

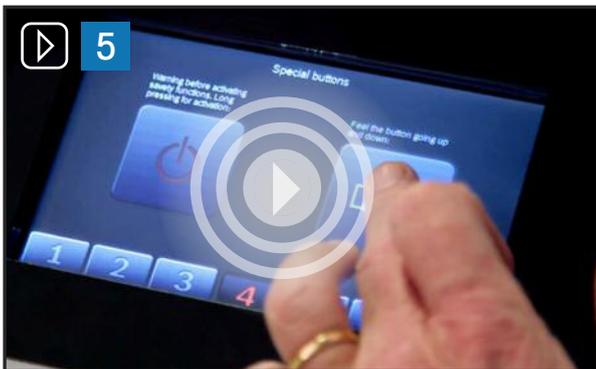
We invite you, then, to click on the movie screens opposite and enjoy Connected Car's face to face chats with eight of the automotive industry's leading companies.

#### VIDEO SYNOPSIS

1. **Ford** – James McBride – autonomous driving technology
2. **Qualcomm** – Nakul Duggal – Snapdragon and integrating CSR Bosch.

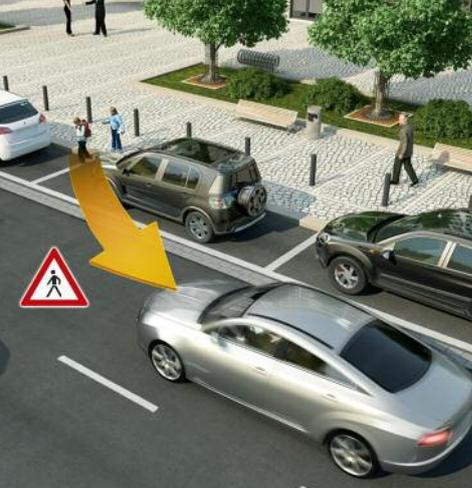


## CONNECTED CAR 2016 CES REVIEW CONT.



### VIDEO SYNOPSIS

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– Q7 system overview
- 4. Ford** – Stefan Bankowski  
– SYNC 3 and AppLink
- 5. Bosch** – Philip Ventimiglia  
– Haptic displays and autonomous driving
- 6. HERE** – Alex Mangan  
– HD Live Map
- 7. Kia** – Andrew Davis  
– autonomous driving demo
- 8. Hyundai Mobis** – Joseph Shin  
– automated driving systems.



# NEWS

## CONTINENTAL SUPPORTS TOYOTA WITH MULTI-FUNCTION CAMERA AND LIDAR

Continental has developed a new integrated sensor module, Multi Function Camera with Lidar (MFL), by integrating a camera and an infrared Lidar (Light Detection and Ranging Sensor) into a single compact unit. According to Continental's announcement, the module is now being supplied to Toyota for its new active safety package, "Toyota Safety Sense C" for compact cars.

The Multi Function Camera with Lidar integrates two sensor technologies. By combining the strengths of a camera with those of an infrared Lidar, the new sensor module is able to detect objects ahead of the vehicle and can warn the driver of a possible collision with an audio and visual alert. If the driver fails to brake in time, the system automatically applies the brakes. Up to approximately 50 mph, a crash can be completely avoided if the relative speed to the detected object is less than 30 mph. If the speed differences are greater, emergency braking will considerably reduce the force of impact.

CMOS (Complementary Metal-Oxide-Semiconductor) cameras are already used for identifying objects in front of a vehicle. However, Continental believes that a CMOS camera alone cannot always provide completely reliable information for initiating automatic emergency braking. Lutz Kuehnke, North American head of Continental's Advanced Driver Assistance Systems business unit explained, "The Lidar sensor transmits three pulsed infrared beams with a 905nm wavelength and measures the time-of-flight until the reflected beams reach the receiving optics." The sensor monitors a distance of more than 30 feet in front of the vehicle, which classifies it as a short-range Lidar system. From the speed of light and the time-of-flight, the Multi Function Camera with Lidar is able to calculate the distance to the object to an accuracy of about four inches. In

conjunction with the CMOS camera, the sensor module provides reliable means of object categorization.

## VISTEON ENABLES CONSUMER ELECTRONICS FEATURES IN VEHICLE

Visteon showcased a range of instrument clusters and information displays at CES. Included were high-end, fully reconfigurable clusters with 3-D graphics and large displays with touch sensors. Visteon was presenting larger, digital, high-resolution displays geared to premium vehicles ranging from curved lenses to thin, richly coloured organic light-emitting diode (OLED) displays.

Concepts on display at Visteon's exhibit incorporated the consumer appeal of design and touch capability with the latest in display technology. Visteon was presenting concepts such as curved lenses optically bonded to displays with formable touch sensors.

Visteon was also presenting next-generation graphics processing capabilities. These are accomplished through the use of a 2880-by-1080 pixel reconfigurable Lightscape digital instrument cluster. Lightscape units showcased graphics featuring complex 3-D shapes, textures and lighting.

Visteon and Rightware have worked together to create a particle animation system for enriching automotive cockpit graphics. The new system made its premiere at CES in the Visteon Lightscape D3.2 reconfigurable instrument cluster platform.

Jim Farrell, director, Visteon Technology Office told Connected Car, "Particles suspended in the air add realism and a stunning sparkle effect. These effects improve the already impressive graphics design in Visteon's Lightscape platform and highlight the future of visual effects in automotive use cases."

Visteon acknowledges that the move to all-digital displays can add cost to the overall system, and has developed a technology solution called SmartCore that provides a cost-of-ownership benefit as well as security and user experience advantages.

## BOSCH BRINGS THE CONNECTED VEHICLE TO INDIA

Bosch has developed a connectivity platform solution called iTraMS that is tailored to the Indian market and which Bosch claims can reduce a vehicle's fuel consumption, foresee when maintenance is needed and display everything on the car owner's smartphone. In India, Bosch has over 14,000 research and development engineers, and in 2015, the Bosch Group in India filed for more than 200 patents.

iTraMS features include tracking of vehicle location, condition monitoring, and performance analysis. The new Bosch solution works in passenger cars, commercial vehicles, and off-highway vehicles. iTraMS is not only available in newly produced cars, but also as a retrofit solution.

At a press conference in Delhi, Dr. Markus Heyn, member of the Bosch board of management, stressed the importance of local development: "Bosch's iTraMS platform is a connectivity solution tailored to the Indian market. It provides accurate vehicle-information on your smartphone and can immensely reduce everyday driving cost." The key benefits of this platform also include fleet management, essential and emergency services, off-road applications, and intelligent transport solutions as part of smart-city solutions.

Commenting on the possibilities of connected vehicles, Dr. Heyn said: "Currently, infotainment systems in India are mostly retrofit, with touch and display screens gaining popularity in the market. As smartphone integration picks up, personal vehicles are becoming an active part of the internet."



### QUALCOMM AUTOMOTIVE PROCESSOR WITH INTEGRATED LTE MODEM AND MACHINE INTELLIGENCE FOR CONNECTED CAR

Qualcomm Technologies has introduced its latest Snapdragon automotive processors, the Snapdragon 820 Automotive family, which the company says provide a next-generation infotainment, graphics and multimedia platform with machine intelligence and a version with integrated LTE-Advanced connectivity.

The Snapdragon 820A family is based on 14nm FinFET advanced process node running Qualcomm Technologies' custom 64-bit Kryo CPU, Adreno 530 GPU, Hexagon 680 DSP with Hexagon Vector eXtension (HVX), Zeroth machine intelligence platform, and the Snapdragon 820Am version with integrated X12 LTE modem capable of 600 Mbps download / 150 Mbps uplink.

The Zeroth initiative, a machine intelligence platform on Snapdragon 820A, is designed to enable automakers to develop deep learning-based solutions using neural networks for advanced driver assistance systems (ADAS) and in-vehicle infotainment scenarios, and run them efficiently on embedded platforms in the vehicle.

The version with integrated X12 LTE modem is designed to support continuous in-car and cellular connectivity, featuring the 4G LTE Advanced Pro that can support up to 600 Mbps download/150Mbps upload speeds, stream HD movies into the car, serve as a Wi-Fi hotspot supporting 802.11ac 2x2 MIMO, connect multiple mobile devices inside the car, and support 802.11p DSRC for V2X (Vehicle to Vehicle/Infrastructure/ Pedestrian) communications. Local connectivity inside the car is handled by Bluetooth.

The Snapdragon 820A's sensor integration provides cognitive awareness and vehicle self-diagnostics, supports ADAS features for improved vehicle safety systems, and provides location and navigation through GNSS and dead reckoning technologies.

### NEW FORD LAB INTEGRATES WEARABLES AND VEHICLES; FORD LOOKS AT LINKING HEALTH DATA TO DRIVER-ASSIST TECHNOLOGY

Ford suggests that the connection between what you wear and what you drive is getting stronger with help from its new wearables research laboratory. Here, scientists and engineers are working to integrate wearable devices and vehicles to enable driver-assist technologies to be more aware of the driver behind the wheel – particularly when that driver is stressed or sleepy.

Researchers at the new Automotive Wearables Experience laboratory housed in the Ford Research and Innovation Center in Dearborn, Michigan, are examining the potential to link vital health information to in-vehicle technologies, including lane-keeping assist and Blind Spot Information System.

Lane-keeping assist, for instance, could become more sensitive if a smart watch sends data to the vehicle that infers the driver didn't get enough sleep the previous night. Or, if a driver's heart rate increases as traffic intensifies, the vehicles adaptive cruise control or Blind Spot Information System could increase the distance between vehicles – giving the driver some breathing room.

The ability to measure wakefulness and health data including blood pressure, blood glucose and heart rate via wearable technology also could benefit semi-autonomous driving features.

The wearables lab is examining ways to signal a driver using semi-autonomous features of the potential need to take driving control back from the vehicle. If there were road construction or an accident ahead, a situation requiring a human at the wheel, the technology could send a wrist vibration or chimes, or even activate flashing lights on the dash.

Researchers are testing voice control for the [smart watch version of MyFord Mobile](#), which allows Ford drivers to remotely start, lock, unlock and locate their vehicle via their watch app.

### HARMAN SERVICE DELIVERY PLATFORM FOR CONNECTED CAR

Harman International has announced its cloud-based service delivery platform for the connected car, stating that the platform allows automakers and service providers to introduce and deploy new enterprise cloud services to connected vehicles.

Harman's Service Delivery Platform enables the launch of a variety of services including new software features for after vehicle sale, vehicle data to predict part failures, forecasting for preventative maintenance, and analysis of warranty claims. It is a framework with a collection of core services, third party services and management features, fully integrated with vehicle systems and updated over the air.

Harman Service Delivery Platform includes a collection of managed and SAAS services available to automakers, including OTA Campaign Management, Vehicle Diagnostics, Remote Control, Connected Infotainment and Connected Navigation.

Among the first new service providers for Harman Service Delivery Platform is HERE, which develops mapping and location technology to enables real-time location applications and experiences for consumers, vehicles, enterprises and cities. Automakers can apparently now deploy HERE Real Time Transport Protocol Experts Group (TPEG) Traffic through the Harman Platform.

Harman suggests that its service delivery platform will allow automakers to introduce their own customized services for drivers and passengers, including data analytics and OTA campaign management, billing and provisioning and content delivery.

Harman's Service Delivery Platform is available now.



**CONNECTED  
CAR  
INTERVIEW**

*Nakul Duggal,  
Qualcomm  
Technologies, Inc.*

# BUILDING MORE INTELLIGENT, MORE AUTONOMOUS, CLEANER AND SAFER CARS

Vince Holton talks automotive futurology with  
Qualcomm Technologies Inc.

**T**ECHNOLOGY INDUSTRY FOLLOWERS KNOW QUALCOMM AS A LARGE AND POWERFUL COMPANY THAT HAS A HUGE PRESENCE IN THE CELLULAR HANDSET INDUSTRY - ITS CHIPSETS ARE IN PRETTY MUCH EVERY HANDSET OUT THERE. HOWEVER, OVER THE LAST FEW YEARS QUALCOMM HAS BEEN BUILDING A PRESENCE IN THE AUTOMOTIVE SECTOR TOO, AND IT IS EMERGING AS ONE OF THE KEY PLATFORM PROVIDERS. QUALCOMM STATES THAT TO STAY CONNECTED, WE NEED TO FOCUS ON THE VEHICLES THAT TAKE US EVERYWHERE, AND SO IT IS TAKING NEXT-GENERATION CONNECTIVITY ON THE ROAD, RESULTING IN VEHICLES THAT ARE INTELLIGENT, MORE AUTONOMOUS, CLEANER AND SAFER.

With the recent acquisition of UK-based wireless semiconductor business CSR, Qualcomm has expanded the automotive presence of its subsidiary company Qualcomm Technologies inc. Prior to filming an interview with him at the 2016 Consumer Electronics Show (see CES report elsewhere in this issue), Vince Holton talked to Nakul Duggal, Vice President, Product Management, Qualcomm Technologies, Inc.

**VH:** Give us a little of the background to Qualcomm's position in the automotive sector.

**ND:** I've been managing the automotive business and, as you know,

we have recently completed the CSR acquisition – I know that you are familiar with their automotive portfolio. Let me give you more information about Qualcomm and the synergies between the two companies. Like CSR, our background has been within the connected car, but from the perspective of the modem, providing telematics, cloud connectivity and this dates back to 2002. That was when we engaged with General Motors, and they adopted our technology in the USA. As GM expanded globally, we followed them with our products and technology in their pursuit of providing the connected car platform. As of today, GM is probably one of the most mature in terms of the modem in the car and the services that they provide. What Qualcomm has been able to do as part of this partnership has been to jump-start our entire automotive telematics programme, which now extends across pretty much every car maker across the planet.

What we also announced – two years ago at CES 2014 – was an expansion into infotainment. For us, this expansion was very natural. Historically, most of Qualcomm's success was built on our work with the mobile platform, and we had a huge investment in application processors, wireless technology, software, graphics and media. We have a strong portfolio which we call Snapdragon. This is the basis of our application processor roadmap. This was expanded into infotainment in 2014, as part of a plan to become a single supplier to the automotive industry for all of their needs – application processors, ▶

graphics, multimedia, interfaces, the complex software – along with the LTE modems, allowing us to provide the complete platform for the connected car. That message has resonated really well with the automotive ecosystem.

As you know, the automotive industry moves very slowly, and when you are supplying something that is new, you are looked at very closely before the auto companies move or make commitments. Qualcomm has gone through that over the last two years. We have our first infotainment design win which will be implemented over the next year.

Qualcomm also acquired Atheros in 2011, which was a Wi-Fi company that also had a small automotive focus. This also supported Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) through 802.11d. We have through the wireless portfolio a Bluetooth/Wi-Fi combo solution that not only supports vehicle telematics within the vehicle, but that also supports V2V applications. So, taking the CSR portfolio, including the Bluetooth products, their location products, AM/FM tuner capability and their entry-level application processors focussing on the audio segment, and you combine them with Qualcomm's portfolio, and I think we have a rich and robust set of assets.

**VH: Does this mean that Qualcomm will also adopt CSR's apt-X audio codec technology?**

**ND:** Absolutely, that is very much part of our strategy. apt-X is something CSR has been developing for a long time, and we think that its value in the car is somewhat unique and an important part of our complete platform approach.

It's a very exciting time for us as seeds that we planted many years ago and plans that we made are all coming together.

**VH: What is the Qualcomm vision for the connected car domain and how would you differentiate yourselves from the competition?**

**ND:** One of the main differentiators for Qualcomm is that we do have a very large business built around mobile. We ship almost 800 million chipsets every year. This scale allows us to invest across all of the different technologies that we need to be in in order to be a complete connected car platform supplier. That is not only the obvious technologies such as the modem, but also the less obvious but still vital technologies such as security, and the ability to build the systems software and the platforms, and managing the over the air (OTA) upgrades that are required. We are a systems and systems platform company. This allows us to play at the platform level, which is very important in the automotive market, if you consider the number of ECU's that are going into vehicles, the complexity of the software that components in the car are being exposed to. These are skills that very few, if any, of our competitors are able to bring. They don't operate on the same scale in the mobile sphere, they don't have access to the same type of assets that we do. Finally, from a software point of view, as we do all of our software development in-house, we are able to stitch the software together in a way that our competitors are unable to do.

**VH: How do you see the connected car market evolving over the next few years?**

**ND:** Connected car is a buzz word, but I think we are already coming to the next stage. In the automotive industry the 'window of time' is



much larger than in the mobile sector, and therefore it will take longer for technology to make its way into the vehicle. I think what is pretty clear is that every car is going to need to have real-time access to the cloud. This is for a number of reasons, including the safety and security of the occupants, diagnostics and being able to remotely update the vehicle, as the vehicle is an extension of the auto makers network. Then there is the need to provide the high-speed bit pipe for the infotainment and other systems in the vehicle. Finally, we see the move to autonomous driving. Therefore the dependency on access to the cloud is very high. What is not really understood is the complexity of making this all happen. Outsiders have a relatively simple view of connected car. On the inside, people are trying to figure out how to tackle this next level of complexity. It's not like the mobile space where you are dealing with hundreds of millions of users and devices, in the automotive sector only about 100 million cars are built every year. These cars are delivered to every single part of the globe, and when it comes down to it, the complexity facing the auto companies as they look to roll out these services globally in a reliable, assured, guaranteed fashion is an enormous challenge.

The problem of enabling the hardware in the vehicle has, I think, been solved. I think there is a lot of work going on in the background with operators and service providers as people try to work out how to provide services.

Then the next phase is deciding how much of this technology is made a customer-facing option, how much is provided as a standard feature and how much does the customer pay for? Auto makers are very careful when it comes to adding cost to their vehicles

**VH: So do you think that the car could go the way of the smartphone, and become the hub of a mobile advertising network, serving the data-harvesting needs of companies such as Google, Amazon, Starbucks etc.?**

**ND:** Before I started to focus on automotive, I spent a lot of time working in the Internet of Things (IoT) space. I actually see the car as one of the ultimate use cases for IoT. The car has a huge societal impact, providing people with access, as it does, to this very large ecosystem. The other aspect is that the car has two personae, one being as a device to keep the manufacturer in touch in order to manage and service it once it has left the factory and then there is the consumer aspect, where the car is like a living room, where you have displays, audio, safety systems – there is a lot going on. To answer your question, I think there is still a lot more needs to be unearthed and unravelled to work out what these systems could look like. But it all comes down to the fact that a car is going to start to operate like a large, high-speed connectivity systems platform, centring on a security focus and a vehicle's ability to diagnose and implement software updates. A lot of the issues and challenges that we seeing today result from 'current' vehicle architecture that has been implemented, whereas we need the architecture of the future. Like a smartphone, the vehicle architecture of the future needs to be able to cope with the situation whereby if there is an issue, there can be an update and a patch and the problem is fixed. I think the auto industry has recognised this, and an architecture shift is happening, it just takes longer to make it happen.

**VH: How does Qualcomm see the consumer device integrating into the car in the future – beyond Bluetooth and Wi-Fi? As the car becomes more of a connected device in its own right with its LTE modem, will the role of the consumer mobile device and these wireless technologies be reduced?**



**ND:** Well, starting with the role of Bluetooth and Wi-Fi, they have become pretty much standard in all cars. We don't see any requests from manufacturers for Bluetooth only – it's all about Bluetooth and Wi-Fi combo solutions. For sure this has been partly driven by bring your own device (BYOD) solutions like Android for Auto and Apple CarPlay. The remaining change in that area is for the connections to gravitate to wireless, using the Bluetooth/Wi-Fi combo, rather than wired connections. To the main question, well, most of the car companies see their car, and their car's interior, as a key differentiator for the client. They want to develop their personality and their identity via the on-board electronics, the fascia, the HMI and the interactions that they create with the customer. So, while Android Auto and CarPlay currently provide the convenience of being able to have more than just Bluetooth, you are able to use your mobile device and project it onto the vehicle displays, if you think about it, even for the handset companies, their ultimate goal is to get their own software embedded in the vehicle. This is about how you use the car as a sensor on wheels. How do you get access to what is happening in the vehicle, what is happening around the vehicle, what the surrounding environment is? There is so much information that the car can become a hub for, that I think that the smartphone is just a convenience feature. I think the auto makers will focus on building their own identity.



The challenge is that this has not been the conventional approach for car companies. But they are learning. Companies like Audi and Tesla have shown that they are able to offer quite a bit of differentiation and features that are beyond industry norm. I think a lot of auto makers are now following suit.

I think that we need Bluetooth and smartphones, and for them to be working properly, but I think that auto makers will be looking to offer a wider class of experiences, and that can only happen if the technology is embedded in the vehicles.

**VH: How many vehicles on the road today use Qualcomm technology?**

**ND:** Publicly we state that we have over 20 million vehicles on the road using our technology and our modems. This is growing rapidly because pretty much every auto maker today has some sort of connected car programme, and these are moving towards LTE and other new technologies.

**VH: What challenges face connected car, and what could slow down the evolution of the technology?**

**ND:** I am not seeing too many challenges. You have to consider pricing, but then this is a very competitive space. As one of the component suppliers, this of course affects Qualcomm, but I think that it is proportionate to the increased volumes that we are offering. The potential size of the connected car market is attracting new suppliers

who have not traditionally been part of the connected car market to make investments and to enter. They feel that it is vital to be part of this developing market and this new direction in which the auto industry will head in the next few years.

One big challenge we used to face was that the operators were charging a lot for new services and the business models outside of handsets were not ready to support new services, but I think that is all a thing of the past. Not only are the volumes attractive but there is a lot of competition. All of the auto makers are looking to partner with the operators and develop long term relationships.

I think the other thing supporting role out of connected car is the availability of LTE. We are not talking about a few kbps of bandwidth. We will soon be rolling out cars in 2018 that can support over 600MBps. That is a gamechanger.

So, no, I can't really think of anything that is going to stand in the way of connected car. It's just a matter of how much time it takes to get this new technology into the vehicle.

**VH: OK, and to finish off in traditional fashion, how do you see the connected car market changing in the next 3-5 years and beyond?**

**ND:** I think a few different things will happen. I think that North America, Europe, China, Japan and Korea will all bring in standard, connected car options from all the auto makers. This will be the differentiator that all car companies seek.

Then, and this may not be visible to the consumers, I think that all of the car companies will become very aware and very capable of understanding the value of their particular 'Thing' in the IoT. And this will play out into the wide world. I think there will be a very strong interest, for example, from the insurance companies, in gaining access to information.



There are so many more examples, but it all comes down to data – or big data. If you have access to more data, you can make so much more of an informed decision. This can bring savings as well as improvements in productivity.

Then, security will be a major focus. When you connect a car to the cloud, you have to consider how it can be misused and abused, so security will be an area that requires a lot of attention.

And finally, as we see more and more of a focus on autonomous driving, connected car will be very much part of the process as you need to be able to have continual access to the vehicle. I think that the auto makers are going to start to look at their car as a network of processors that manage a set of assets. I think the challenge will be in the context of how quickly the auto makers can get themselves up to speed in terms of all of these new changes that are happening. From one car company to another there are varying degrees of sophistication and complexity, and different levels of ability to understand the challenge. The ones that understand best today are the ones that are heading the market.

# TOYOTA ADOPTS FORD SMARTDEVICELINK SOFTWARE

Other automakers, suppliers join to support development of a new industry standard

**FORD HAS ANNOUNCED THAT A FIRST WAVE OF AUTOMAKERS AND INDUSTRY SUPPLIERS – LED BY TOYOTA MOTOR CORPORATION – IS ADOPTING ITS SMARTDEVICELINK SOFTWARE – WHICH FORD DESCRIBES AS A HUGE STEP TOWARD GIVING CONSUMERS MORE CHOICE IN HOW THEY CONNECT AND CONTROL THEIR SMARTPHONE APPS ON THE ROAD.**

SmartDeviceLink is the open-source software on which the Ford SYNC AppLink platform is built. Ford's stated goal is to provide consumers with an easy way to access their favourite smartphone apps using voice commands. PSA Peugeot Citroën plus automotive suppliers QNX Software Systems and UIEvolution are also adopting the technology, with plans to integrate it into their products.

Ford believes that by adopting this technology, automakers and suppliers are helping accelerate an industry standard that will increase the number of apps available for in-vehicle use. With common industry software, it believes that developers can focus on creating the best experience on one platform – SmartDeviceLink – which will be available to customers of many brands.

Surprisingly, as this sort of information is often suppressed until a full-on public announcement has been agreed, Ford was able to tell us that PSA Peugeot Citroën is investigating adding SmartDeviceLink to its vehicles, while Honda, Mazda and Subaru also are considering adding the software.

Don Butler, Ford executive director, Connected Vehicle and Services explained, "The true benefit of a common smartphone app communications interface is that it creates an industry standard – enabling great experiences for customers while allowing different companies the freedom to differentiate their individual brands. Ford is making the software available as open-source, because customers throughout the industry benefit if everybody speaks one language."

SmartDeviceLink software, including AppLink, is part of Ford Smart Mobility – the plan to take Ford to the next level in connectivity, mobility, autonomous vehicles, the customer experience, and data and analytics. SmartDeviceLink-equipped vehicles enable drivers to manage popular smartphone apps using display screens, buttons and/or voice recognition commands. Popular music apps such as Spotify and iHeartRadio, information apps including AccuWeather and MLB, retail apps such as Domino's, and a growing list of apps from around the world are already available for Ford AppLink users.

Butler suggested that those apps become more readily available in vehicles equipped with SmartDeviceLink because developers have access to higher volumes of vehicles and new capabilities. For automakers and suppliers, Ford says that SmartDeviceLink adoption broadens the choice for customers in how they connect and control their smartphones while on the move, and also supports increased quality and security of the software as multiple parties can collaborate on improvements.

As part of Ford SYNC, AppLink is available on more than 5 million Ford vehicles globally. The technology is expected to reach 28 million more vehicles by 2020. Industry-wide adoption of SmartDeviceLink will help the technology spread to new markets, such as China, Taiwan, New Zealand and Thailand.

Later this year, Ford will apparently introduce the next version of AppLink based on SmartDeviceLink software, allowing customers to access their favourite compatible navigation app – much as they do on a smartphone – on in-vehicle touch screens. The upgrade brings smartphone navigation to the car, an important feature for customers worldwide.

## FORD GROWS THE CONNECTED CAR COMMUNITY

There's no question that open-source is a business model that is finding favour around the world – ask the Linux Foundation, for example. By making SmartDeviceLink software available to the open-source community, Ford says that it is providing the industry a way to maintain differentiated, brand-specific entertainment and connectivity systems that deliver on customer expectations for smartphone app integration – regardless of smartphone.

Livio, a wholly owned Ford subsidiary, continues to manage the open-source project by working with SmartDeviceLink adopters to build the appropriate interfaces into each unique vehicle environment.

Ford's announcement with Toyota – the world's largest car manufacturer – is, without question, highly significant. Shigeki Terashi, executive vice president, Toyota Motor Corporation observed, "Developing a safer and more secure in-car smartphone connectivity service – which better matches individual vehicle features – is exactly the value and advantage an automaker can offer customers. We expect that many companies share our view and will participate in the industry SmartDeviceLink collaboration."

QNX Software Systems, a BlackBerry subsidiary, offers a portfolio of infotainment, telematics, safety and acoustics solutions deployed in more than 60 million vehicles worldwide. More than 40 automotive manufacturers use QNX Software Systems, including Ford, which employs the operating system for SYNC 3. So, it is also very significant to learn that QNX plans to integrate SmartDeviceLink into its QNX CAR platform for infotainment, which supports a wide variety of OEM systems. This could help to rapidly migrate the interface to millions of vehicles around the world.

The genesis of a new automotive standard? We shall see.

Watch Ford's SmartDeviceLink video overview by clicking on the screen here.





# NEWS

## AT&T 4G LTE TO POWER FORD SYNC CONNECT

Ford and AT&T plan to connect more than 10 million customers to Ford SYNC Connect within the next five years. SYNC Connect, Ford's new high-speed connectivity technology, adds levels of convenience to SYNC, Ford's in-car entertainment and communications system. Ford is introducing SYNC Connect in the United States and Canada this spring in the new Escape.

With Ford SYNC Connect, Ford vehicle owners can remotely lock and unlock doors from anywhere, use the built-in GPS system to locate their parked vehicle on a map, remotely start the vehicle or schedule a start time and view vehicle information, including fuel and battery level and tire pressure readings

Launched in 2007, Ford claims that SYNC was the industry's first system to widely and affordably offer voice-activated technology to control smartphones. New-generation SYNC 3 features faster performance, more conversational voice recognition, a smartphone-like touch screen and easier-to-understand graphical interface.

On the network side, Ford says that it was the first U.S.-based automaker to build AT&T network service into its cars in 2011 with the introduction of MyFord Mobile – a smartphone and Web-based connected experience that enabled electric vehicle owners to remotely connect their smartphone with the car to manage charging.

For AT&T's part, in 2014, the operator launched two major initiatives in the connected car space. The first was a connected car innovation centre in Atlanta, called AT&T Drive Studio. It also launched a new global automotive solution and development platform, AT&T Drive.

SYNC Connect, then, debuts this spring on the new Ford Escape. After the initial rollout in North America, SYNC Connect

is launching in global markets, adding another 10 million connected vehicles by 2020.

## ENHANCED IN-CAR CONNECTIVITY FOR VOLVO XC90 WITH LAUNCH OF APPLE CARPLAY

Connected Car magazine recently tested and featured Volvo's new XC90, and now Volvo Car UK has enhanced its in-car connectivity by announcing the roll out of Apple CarPlay.

CarPlay enables owners to directly connect their iPhone to the XC90's Sensus Connect information and entertainment system. They can then make and receive calls, send and receive messages, get directions and choose what music to listen to by using their phone's Siri voice control personal assistant – which allows them to keep their eyes on the road at all times. Alternatively, the Sensus Connect's touch screen interface can be used to mirror their iPhone's functionality by replicating the phone's icons on the infotainment display.

Apple CarPlay also provides access to Apple Music, and apps such as Spotify, Beats Music, iHeartRadio and Stitcher. Volvo-designed apps are also supported, including Volvo On Call, which allows customers to remotely control and check various functions of their car.

The introduction of Apple CarPlay coincides with a complimentary software update for the Sensus Connect system. This brings improved speech functionality and enhanced satellite-navigation features, including a map update. Existing XC90 owners will be contacted by their dealer to have the Sensus Connect update carried out.

Apple CarPlay is available on all new XC90s, priced at £300 on D5 and T6 versions, and £250 on the new T8 Twin Engine. Existing XC90 owners can also have Apple CarPlay retro-fitted to their car. It works on all iPhone models from

the iPhone 5 onwards running iOS 8 (iOS 9 is recommended, however).

 To see *Connected Car* magazine's video report on the XC90, click on the middle picture above.

## RANGE ROVER EVOQUE CONVERTIBLE DEBUTS 10.2-INCH TOUCHSCREEN AND INCONTROL TOUCH PRO

Land Rover has unveiled what it calls 'the world's first luxury compact SUV convertible'. The Range Rover Evoque Convertible combines the design of the Evoque with a folding roof to create an all-season, four-seat convertible. This fifth member of the Range Rover family is the company's first ever convertible – as long as you discount various iterations of the original Land Rover, which, up to the current Defender, had often featured a soft-top for farmers who like to get a tan.

Gerry McGovern, Land Rover Design Director and Chief Creative Officer, commented: "Range Rover Evoque Convertible is a vehicle for all seasons. Its uniquely distinctive design and world-class engineering adds another dimension to the Range Rover family, further enhancing its desirability and appeal."

But Connected Car is, of course, mainly interested in the tech inside the car, and at the heart of the cabin is an all-new, high-resolution 10.2-inch touchscreen with Jaguar Land Rover's next-generation infotainment system, InControl Touch Pro, which debuts in a Land Rover. Described as 'highly-responsive and super-fast', InControl Touch Pro offers seamless smartphone integration, door-to-door navigation, 3G connectivity and a premium sound system.

The new Range Rover Evoque Convertible will be produced at Land Rover's Halewood plant in the UK, alongside the five door and Coupé bodystyles, and goes on sale across from Spring 2016. Pricing in the UK will start from £47,500 OTR based on a TD4 HSE Dynamic derivative.



## BMW i8 Connected Drive overview

# COULD THIS BE THE MOST ELEGANTLY CONNECTED CAR?

**THERE IS NO DOUBT THAT THE NEED TO CONNECT THEIR CARS TO THE INTERNET AND PROVIDE A PLETHORA OF DRIVER AIDS AND ADVANCED INFOTAINMENT WEIGHS HEAVILY ON THE MINDS OF PRETTY MUCH EVERY CAR MANUFACTURER. WELL, EXCEPT FOR COMPANIES LIKE CATERHAM, AERIAL AND MAYBE EVEN LOTUS. THEY, QUITE UNDERSTANDABLY, FOCUS ON LIGHT WEIGHT (THOUGH HAVE YOU SEEN THE WEIGHT OF A LOTUS EXIGE THESE DAYS?!?), HANDLING AND PERFORMANCE.**

Everyone else is working flat out to stuff their vehicles with levels of never seen before technology. It started with Bluetooth connectivity, allowing drivers to bring their mobile devices into the car. Then we started to see Wi-Fi, combining with embedded modems to connect the car with the outside world. Initially this was to help the manufacturers with telematics and, generally, to suit their own purposes. Today, though, the sky is the limit (see what we did there?) and car companies need to plan ways for their customers to regard their cars in the same way they do their phones, their computers, their Nest thermostats and their EnOcean-based wireless energy-harvesting light switches – fundamental components of the Internet of Things ecosystem.

But all of this IoT technology is based on platforms architected by non-car people in tremendously fast-moving industries. The fundamentals of how a car is constructed have not really changed for decades. Therefore, it has been a case of bolting connected car technology onto and into vehicles wherever it could be fitted, and mating leading-edge mobile technology with automotive electronic systems that, while advanced by car industry standards, were perhaps never originally intended to co-exist and cooperate with devices, operating systems, applications and cloud-based back-office systems that reach or exist outside of the car.

The result has been that connected car as a concept has been realised with greater and lesser degrees of success by the world's car companies. Some things have worked successfully, some haven't. Our own experience of testing connected car systems leaves us feeling that there has perhaps been a bit of an unseemly rush to implement connected car. Many of the systems we have tried are very unintuitive even to people like ourselves who have a lengthy history in connectivity, mobile devices and the Internet. Many systems fall over continually. There is much too much distraction, as the driver struggles with a touchscreen, or a voice control system. Some systems – and we won't name names here – have even left us feeling that they were interfering with basic safe driving, creating dangerous situations that were the direct result of so-called 'driver assistance' systems.

And this is discounting for now the huge issues of privacy and security, vehicle hacking etc., as discussed in the previous issue of Connected Car.

There is no doubt that this situation will continue for some time. Car companies recognise that they need to do things properly, but, sadly, they also get distracted by the need to at least keep up with the competition – if not to maintain a competitive advantage. Connected car has become a key way for car companies to demonstrate brand differentiation.

But there is at least one exception to the 'bolt-it-on' rule. And this exception comes about as a result of one company re-writing the rule book and creating a car for which connected systems were part of the philosophy from Day One. That company is BMW, and the car is, of course, the BMW i8, the subject of this Connected Car video feature. BMW's 'i' series cars stand out from the crowd, and not just because they are electric or petrol/electric hybrids. We've yet to try the i3, and we understand that there is a mid-range (think 5 Series size) 'i' car coming before too long. But how do these cars compare with other connected vehicles? Well, we lived with the i8 for a little over a week, so watch the movie here and we give you our opinion.

*[Click on the movie screen to watch the Connected Car BMW i8 movie feature.](#)*



And if you would like to look at BMW's i App, then just [click this link](#).



CONNECTED  
CAR  
INTERVIEW



Brian Droessler,  
Continental.

# WHAT'S ON THE EHORIZON?

Vince Holton talks connected car technology with Continental Automotive

**C**ONTINENTAL HAS A LONG AND VERY STRONG BACKGROUND IN THE AUTOMOTIVE MARKET, AND RECENTLY CONTACTED CONNECTED CAR TO PROVIDE AN OVERVIEW OF THE WORK THE COMPANY IS DOING WITH AUTOMATED DRIVING AND EHORIZON, AND HOW IT IS BRINGING ALL ASPECTS OF THE CONNECTED CAR TOGETHER TO LET THE DRIVER KNOW MUCH MORE ABOUT THE UNSEEN ROAD AHEAD. CONTINENTAL IS COMBINING CLOUD DATA COLLECTION, ACCURATE MAPS, DRIVER ATTENTION CAMERAS, LIDAR AND SENSORS. THIS SOUNDED LIKE A GOOD OPPORTUNITY TO GET TO KNOW MORE ABOUT THE GERMAN COMPANY, AND SO VINCE HOLTON TALKED TO BRIAN DROESSLER, VP, CONTINENTAL AUTOMOTIVE.

**VH:** Can you give us an overview of Continental's background, and how connected car fits into your organisation's structure today.

**BD:** From a Continental perspective, we are all about bringing the connected car forward. We have a **Vision Zero** initiative, where we see that cars should have no accidents. Part of the way that will be achieved is through the car being always 'on', always connected, and that connectivity is better informing the car of its surroundings, in order to make the car safer, more efficient and more comfortable to drive. Connectivity really is the cornerstone of that.

We have a specific business unit, based in Chicago and dedicated to infotainment and connectivity technologies. Not only do we create our own line of products based around radios with various wireless

communication technologies but also devoted and dedicated telematics modules that use many flavours of 802.11, plus 2G, 3G, 4G, LTE embedded automotive-grade modems. All of that technology is not only used in our own product line but we also supply it throughout the corporation. We see a melding of connected car technology with all of the other technologies running through Continental, whether it be chassis, safety and all the way to Advanced Driver Assistance Systems (ADAS) and other driver assistance systems.

So, we think connected car is absolutely vital, and a key enabler of Vision Zero. But we also have a major focus on self-driving cars, and connected car is certainly helping accelerate the reality of the self-driving car as the car becomes an element of the Internet of Things (IoT).

**VH:** You recently contacted us suggesting we talk about Continental's developments in automated driving and eHorizon. Can you bring us up to date?

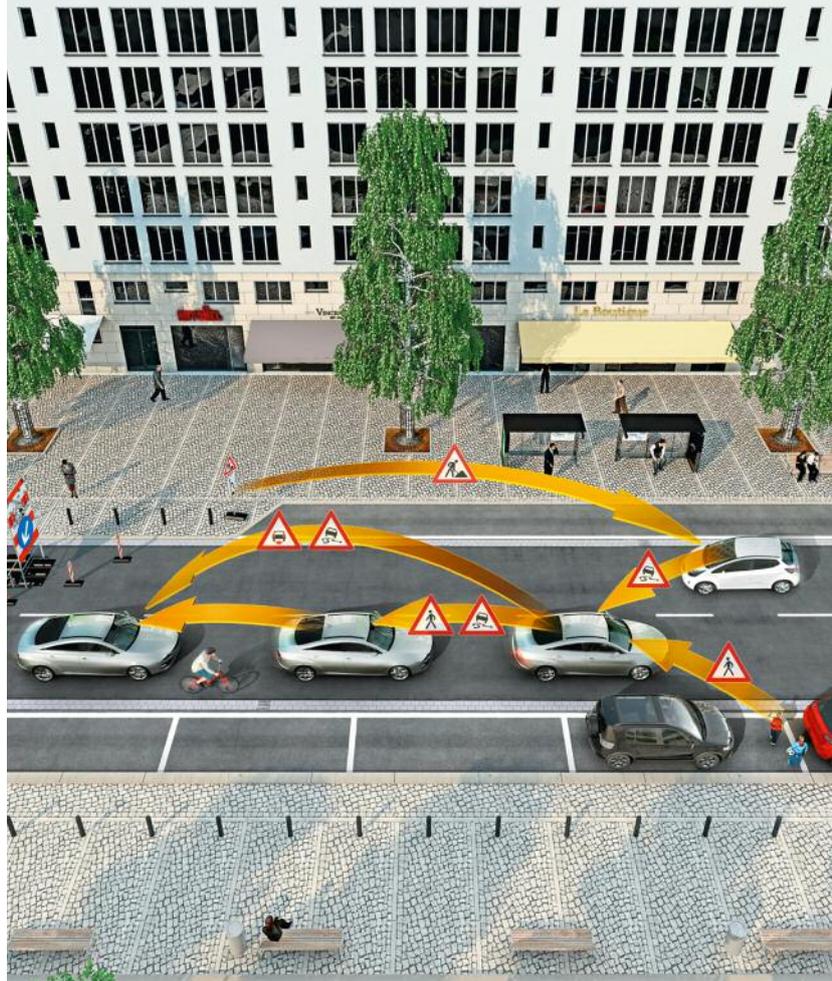
**BD:** Certainly. eHorizon has been incubated in our business unit and has been distributed throughout our organisation to help implement automated driving. eHorizon started out as a software product – it still is a software product – that we would embed or license for use in commercial vehicles controllers. The concept is to create an electronic horizon for the vehicle systems to help know what is coming up on the road ahead. It's quite simple. We took some basic map information such as topology – the slope and curvature of the road ahead – then making some assessment of which road segment the vehicle is going to take, and then we can send that information out to the power train system or the braking system. Those systems can then listen to that information and take action. For example, we found we could achieve 3% fuel savings by informing the power train and braking systems about slopes ahead and allowing for better gear shifting and driving decisions, all done automatically by those modules – adjusting speed, speeding up before a hill or slowing down as you are cresting a hill. Fuel saving is of course a big deal for commercial vehicles, but now in passenger vehicles we are seeing its application in self-driving vehicles will be really valuable. Cars will need to make decisions about likely path, conditions of the road up ahead, and we are in discussions with several OEMs to use the technology in advanced cruise control and their first steps into automated driving.

Where we go next with eHorizon is to change the situation whereby we are using static data, which could be 'stale', we want to bring in dynamic information. Such as knowing whether a certain lane is closed – perhaps just for a few hours – by the Department of Transport (DoT) due to road works. If we can take our software and link it to a wireless connection that can talk to a cloud server at the DoT, take that information about the lane closure, bring it back down to the car, we can know to avoid that particular lane.

It was always the intention that these systems would migrate from commercial to passenger vehicles.

**VH:** What communications technologies do you see entering the V2X sector?

**BD:** Technologies in this space are ever-changing, and the progress in standardisation is a long and rocky one! Within Continental we cover Bluetooth and Wi-Fi, and all of the wireless modem technologies. We make our own 3G and 4G automotive modems. Sometimes there is a philosophical discussion about which technologies could or should be used for V2V, V2I, V2X, V2I2V etc, but what we most often concluded and implemented is whatever is easiest to adopt, doesn't require a lot of infrastructure and investment and which will be quickest to market and to make happen. We already see this with vehicle to infrastructure connectivity using embedded cellular modems. This is available now and growing in penetration – we believe that every car will ultimately



have an embedded modem. This has outpaced the implementation of 802.11p, for example.

It's not fair to compare Bluetooth in these types of application, but we believe that Bluetooth can play a part in the future in some of our access products. When we are talking device to car, Bluetooth – and NFC – come into play.

We find there are two aspects. Firstly, each individual use case might demand a certain wireless technology that is viable from a cost and performance perspective. And then we see that the long range wireless connectivity is currently dominated by cellular modem technology.

I do think that V2X has struggled with mandate and legislative aspects and therefore government investment for some of what was envisioned. This continues to be an issue, but the advent of 5G or LTE Advanced technologies which will allow for ad hoc networks to be made from device to device, that could create a situation (now that cellular technology is on a path to being widely implemented in vehicles) whereby 5G/LTE Advance could be used to create peer to peer, V2V communications.

**VH:** In addition to vehicle to vehicle and vehicle to infrastructure communication, Continental has been talking publicly about vehicle to pedestrian communication, based around adaptations to Wi-Fi. How will this work, and how quickly could this be rolled out?

**BD:** This is something that is getting a lot of attention. It's based on the concept of a pedestrian providing information about his location. This could be done via Wi-Fi in his phone, by the phone working with a piece of wearable tech, or via a standalone wearable device – a bracelet, for example. I believe that an OEM has already been demonstrating such technology, connecting the vehicle with cyclists (Ed: this was **Volvo**). This is certainly an interesting concept, and one that we are definitely planning to support and to add to our **M2XPro** communications module.

But you asked how quickly it could be rolled out. Technically it's not an issue – we can do it. The question is whether consumers will want

to wear a special bracelet? Will the consumer electronics industry adopt the concept of communicating with that protocol, with 802.11p being another tech they have to incorporate to generate more sales for a phone or other device? These are some of the non-automotive industry questions that will plague a quick roll out.

**VH: Is this not a situation where both safety critical and also security and privacy issues become enormously important, and is there a realistic likelihood of this being manageable?**

**BD:** You are absolutely right. Privacy and security do become extremely important. Security in particular has had a lot of attention recently with the Jeep hack (Ed: see 'FCA responds to Jeep hack' in previous issue) among many others – this is not a new issue. Privacy has not received so much coverage in the press so far but private data can be just as vulnerable. What we see with respect to both privacy and security is a really high focus in the industry, especially as we move towards automated driving, but even before that. We are seeing a new focus on improving the security of connected systems – where threats can surface, implementations of trust centres, encryption and decryption technologies – much of what has been learned in the IT industry is coming into the automotive space.

Is it realistic to manage all of this? I believe it is, but I believe that some people think it is as simple as 'oh, I just need to go find a security supplier like a Citrix or Cisco, license their security product and insert it into my engine controller or my telematics module and I will be safe and secure and the consumer's privacy will be maintained'.

The problem is that for security it really starts all the way back at the architectural level. You have to go from the bottom up – from the hardware, through the operating system, going into hypervisor or virtualisation techniques, hardware security, keys, encryption, over the air (OTA) security, data security - making sure that not only is the connection secure but also being able to trust the data that came into the car over a connection. It creates a problem for the OEM in that bottom to top security has to be at a total system level, and at this time the OEMs are still 'silo'-based businesses. It will be necessary to change that mentality, and some OEMs are doing better than others. The chassis people need to talk to the wireless people need to talk to the telematics people need to talk to the vehicle bus folks, and all must work together to architect the vehicle differently in the future.

**VH: In the emerging Internet of Everything ecosystem, how important is connected car?**

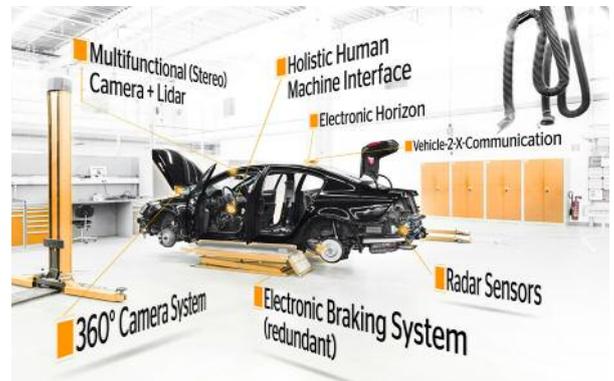
**BD:** It's no surprise, I'm sure, that I would propose that the connected car is absolutely and very highly important to the Internet of Everything ecosystem. Not just because it is a high-value product that consumers take into their homes and that they want to be part of their connected life. No, it is becoming more apparent that the time that people spend in their cars is, effectively, wasted time. Companies like Google and Apple recognise that, and know that if you can capture that time and devote it to surfing on Google, or purchasing Apple products, or that you can advertise to them, then there is money to be made. This is part of why there is such a big push for automated driving from the consumer electronics giants.

Package delivery, transportation and shipping (connected trucks), ride-sharing and Uber are other very important drivers for connected car. A lot of completely new business models are emerging.

**VH: Will the lengthy development schedules of the automotive industry make it very difficult for car companies and Tier 1 suppliers to keep up with other developments in IoT/IoE? Won't it be a constant game of catch-up?**

**BD:** This is a difficult one. In the foreseeable future cars won't be replaced every two years and therefore have to span a number of years of technological and best-practice changes. What is coming to

the industry is the concept of the updateable car. Continental has been showing for probably 15 years that you can do OTA updates to cars. Now that consumers expect it and are not surprised by it happening routinely with their personal devices, it is entirely likely that cars will follow that same process. That will be ok for software. Hardware will continue to be a difficulty.



**VH: Recent experience of the latest connected cars makes it clear that at the moment a lot of technology is being crammed into cars that a) may not be fully developed and b) definitely distracts the driver away from the basic task of driving safely. Is this a good idea?**

**BD:** Arguably there is today a lot more technology in new cars than consumers use or spend the time going through the menus to understand. I am not sure that I would agree that it distracts the driver away. I do know that there are things that consumers are doing while driving their cars – using their phones, for example, that do distract them. I would say that amongst OEMs and Tier 1s there is a very high focus on distraction in the vehicle, and we summarise this in the concept of holistic Human Machine Interface (HMI). It is critically important that as the car takes over more and more of the driving tasks, or offers more and more of these features, that a holistic HMI should be achieved such that it is not distracting, that it is creating more safety, more comfort and more efficiency. We have done a lot of studies that focus on what works well with the consumer. Multi-modal alerts, for example, and trying to use multiple types of alerts or indications or interactions to see what works best for the consumer. We have found that audio alerts, for example, work better than some forms of visual alert. We found that having the vehicle very lightly apply the brakes, creating a very slight jerk, was very highly effective and accepted by the test group that we worked with.

Another concept for managing distraction is spacial reference. How do you guide the consumer's attention to left or right, to look straight ahead or backwards? We did some early tests with audio, visual, animation and here also we found that audio was less distracting than any form of a visual or animation.

And then last is cascading warnings. Now that we have talked about multi-mode and spacial reference, there is how you do those and at what points in time? When you need to bring the driver back to driving, how many seconds do you give them before they really have to come back into that task? Five seconds? Is one minute enough? Those propositions are really infinite, and my prophesy is that you will start to see many of the car companies looking at combining and testing all of those different combinations of HMI in a way that will differentiate their brand. Consumers may end up having discussions about the way one car company's HMI compares to another's, in the same way they might have discussed performance and handling in the past.

There is a lot to be done, but safety and distraction are both in very high focus. You can't go backwards!

[www.continental-automotive.com](http://www.continental-automotive.com)



# NEWS

## BOSCH IS TEACHING THINGS TO FEEL

Although they are only as small as a pin head, they are changing everyday life in many fields: tiny micromechanical sensors. In cars, sensors identify dangerous situations and instantly alert the control electronics to keep the vehicle on the road. Because sensors detect the earth's gravity, smartphones can change their screen orientation to suit users' needs. Dr. Franz Lärmer, a Bosch sensor expert told Connected Car, "The key challenge in the ongoing development of our MEMS sensors is their energy consumption. For example, more intelligence in sensors makes it possible for us to reduce energy consumption. It is hard to put a number on the many potential applications of sensors. They are a key technology for the internet of things (IoT).

With the aim of reducing sensors' energy consumption, Lärmer and his team in Renningen, Germany have joined forces with Bosch researchers in Palo Alto, California. "In the future, nearly all everyday objects are likely to be equipped with sensors. This is a revolutionary development that will allow almost every object to gather information about itself and its environment. As a result, the potential applications of these objects will increase tremendously," Lärmer said. "But other things are also playing an increasingly important role, such as the combination of several sensors and the integration of software intelligence."

Microscopically fine structures are etched into silicon during MEMS production. On the sensor, the teeth of tiny comb-like silicon structures intermesh. Less than one-quarter the thickness of a human hair, these comb-like structures are pushed up against each other during movement. The distance between the teeth changes, leading to a change in the electric current in the structures. This current can be measured and calculated as an electric signal that the sensor then transmits.

MEMS sensors are extremely sensitive thanks to this technology, Lärmer explained. "In a laboratory, you can use them relatively easily to measure the earth's rotation." What is more, the fine silicon structures are already capable of measuring movements of just one femtometer. This is the unimaginably small distance of 0.000000000000001 meters (10-15 meters), the same magnitude as the diameter of atomic nuclei.

## FORD, PIVOTAL COLLABORATE ON SOFTWARE PLATFORM FOR FORDPASS

Ford is working with cloud-based software technology developer Pivotal to build a software platform supporting FordPass that will enable the company to build new applications and mobility solutions for consumers.

FordPass – a free digital, physical and personal platform – features four benefits for members: Marketplace includes mobility services such as parking and sharing; FordGuides help consumers move more efficiently; Appreciation, where members are recognized for their loyalty; and FordHubs, where consumers can experience Ford's latest innovations.

FordPass also will allow Ford owners with SYNC Connect technology to remotely start, lock and unlock, and locate their vehicle – capabilities that will, Ford predicts, play a key role in future mobility services.

Elena Ford, vice president, Global Dealer and Consumer Experience told Connected Car, "With FordPass, we are making it easier for consumers, whether they own a Ford vehicle or not, to get where they need to go. Working with Pivotal, Ford will be able to rapidly add new features and adapt mobility solutions and services that benefit FordPass members in the ways that fit them best."

By collaborating with Pivotal, Ford says that it gains a wealth of cutting-edge modern software development methodologies, next-generation cloud platform and analytics capabilities and knowledge. Claiming to be operating 'at the pace of a startup', Pivotal and Ford IT engineers are working side-by-side to develop and design new consumer experiences for FordPass members.

Pivotal CEO Rob Mee added, "More than 100 years ago, Ford transformed how the world moved. Now, Ford is using Pivotal's cloud platform and technologies to do it again by bringing the Silicon Valley state of mind to the company. By collaborating with Pivotal on FordPass, Ford is proving they can innovate and move as quickly as any venture-backed startup."

FordPass launches in April; membership is free for Ford vehicle owners and non-owners by registering online. In the future, customers will be able to access both car-sharing and ride-sharing services via FordPass. Experimental work with Pivotal is now under way and teams are apparently building future applications and consumer experiences.

CONNECTED CAR INTERVIEW



Peter Virk, Jaguar Land Rover

# JAGUAR LAND ROVER DEVELOPS INCONTROL, ENHANCES HMI

*In an industry where adding vehicle connectivity has become something of a gold rush-style, claim-staking frenzy, Jaguar Land Rover has done more than many to blaze trails. Connected Car interviewed Peter Virk, who has been on the front line during his company's campaign.*

**O**VER THE LAST 24 MONTHS, JAGUAR LAND ROVER (JLR) RE-LAUNCHED AND RE-VAMPED ALL OF THE CONNECTIVITY SYSTEMS ACROSS ITS ENTIRE RANGE OF VEHICLES.

Connected Car travelled to Jaguar Land Rover early in 2015 to meet up with Peter Virk, global head of Connected Technologies and Apps, Connected Car, and then visited again in December. During this latest two-part interview, Vince Holton eased out of Peter all of the information about JLR's tech updates.

In the first part, Peter talks us through the updates to JLR's connected services and remote access to the vehicle, plus the latest iteration of InControl, now known as InControl Touch.

In the second part, Peter exchanges his comfortable seat indoors and takes us outside. Here, in JLR's recently launched – and now award-winning – Discovery Sport, he provides a complete walk-through of the vehicle systems.

Click on either screen to watch the movies.





# FORD CONDUCTS FIRST SNOW TESTS OF AUTONOMOUS VEHICLES

**F**ORD IS CONDUCTING AUTONOMOUS VEHICLE TESTS IN SNOW-COVERED ENVIRONMENTS, SAYING THAT IT KNOWS THAT THE FUTURE OF AUTONOMOUS DRIVING CANNOT RELY ON IDEAL CONDITIONS.

Jim McBride, Ford's technical leader for autonomous vehicles (see video interview link below) told Connected Car, "It's one thing for a car to drive itself in perfect weather. It's quite another to do so when the car's sensors can't see the road because it's covered in snow. Weather isn't perfect, and that's why we're testing autonomous vehicles in wintry conditions." McBride noted that roughly 70 percent of U.S. residents, for example, live in snowy regions.

Ford's winter weather testing takes place in Michigan, including at [Mcity](#) – a 32-acre, full-scale simulated real-world urban environment at the University of Michigan.

McBride pointed out that fully autonomous driving can't rely on GPS, which is accurate only to several yards – not enough to localize or identify the position of the vehicle. And it's key that an autonomous vehicle knows its precise location, not just within a city or on a road, but in its actual driving lane – a variation of a few inches makes a big difference.

LIDAR, on the other hand, is much more accurate than GPS – identifying Ford's Fusion Hybrid's lane location right down to the centimetre. LIDAR emits short pulses of laser light to precisely allow the vehicle to create a real-time, high-definition 3D image of what's around it.

In ideal weather, LIDAR is the most efficient means of gathering important information and metadata – underlying information about the data itself – from the surrounding environment, sensing nearby objects and using cues to determine the best driving path. But on snow-covered roads or in high-density traffic, LIDAR and other sensors such as cameras can't see the road. This is also the case when the sensor lens is covered by snow, grime or debris.

Undaunted by this challenge, Ford and University of Michigan technologists began collaborating toward a solution that would allow an autonomous vehicle to see on a snow-covered road. To navigate in these conditions, Ford autonomous vehicles are equipped with high-resolution 3D maps – complete with information about the road and what's above it, including road markings, signs, geography, landmarks and topography.

"Maps developed by other companies don't always work in snow-covered landscapes," said Ryan Eustice, associate professor at University of Michigan college of engineering. "The maps we created with Ford contain useful information about the 3D environment around the car, allowing the vehicle to localize even with a blanket of snow covering the ground."

An autonomous vehicle creates the maps while driving the test environment in favourable weather, with technologies automatically

annotating features like traffic signs, trees and buildings. When the vehicle can't see the ground, it detects above-ground landmarks to pinpoint itself on the map, and then subsequently uses the map to drive successfully in inclement conditions.

"The vehicle's normal safety systems, like electronic stability control and traction control, which often are used on slippery winter roads, work in unison with the autonomous driving software," said McBride. "We eventually want our autonomous vehicles to detect deteriorating conditions, decide whether it's safe to keep driving, and if so, for how long."

Winter driving still presents a host of challenges, but Ford believes that its testing marks an important achievement on the road to autonomous driving. That road goes back roughly a decade, to the first-generation autonomous vehicle from Ford – a LiDAR-equipped F-250 Super Duty.

In 2013, Ford launched its second-generation autonomous vehicle platform, a Fusion Hybrid sedan using more advanced LIDAR sensors. This past summer, Ford transitioned its fully autonomous vehicle development program from the research to advanced engineering phase, the second of three phases before entering production.

Earlier this year, Ford announced it is taking the next step – tripling its fully autonomous development fleet to 30 vehicles being tested on roads and test tracks in California, Arizona and Michigan. This makes the company's fully autonomous vehicle fleet the largest of all automakers. These third-generation autonomous vehicles continue to be based on a Fusion Hybrid sedan now featuring the first auto-specific LIDAR sensor capable of handling different driving scenarios – thanks in part to its longer range of around 200 meters.

 To see Connected Car's video interview with Ford's Jim McBride, as he talks LiDAR and autonomous driving, click on this movie screen here.





# NEWS

## TELIASONERA UNWRAPS SMART SOLUTION FOR CONNECTING YOUR CAR

TeliaSonera has introduced a cloud based solution enabling high end car features. Together with partners from the automotive and insurance industries, a combination of car control functionalities, high performance connectivity and value added services will be made available in the Nordic and Baltic countries starting with Sweden during 2016.

The connected car solution – Telia Sense - was announced at TeliaSonera's annual Internet of Things symposium. By using an app together with the installed hardware in the car, car owners get access to existing and future smart features and upgrades.

Hans Dahlberg, Head of TeliaSonera Global M2M Services told Connected Car, "Our cloud based solution can as easily be installed in older as well as newer cars enabling our customers to be in control and feel at home both on and off the road. We don't make cars but we want to make cars awesome for our customers."

TeliaSonera has partnered with companies from the automotive and insurance industries, and the initial functionalities will enable smart features running from car diagnostics, pro-active car maintenance, tailored car insurance – all available over 4G Wi-Fi hotspot connectivity. Telia Sense will be launched in Sweden during 2016 followed by successive roll out in other countries in the Nordic and Baltic region.

The cloud based connected car solution will consist of three parts; a monthly subscription, hardware consisting of a car telematics unit with an included SIM-card for installation in the OBD2-port of the car which is available on all cars from 2001, and an app for smartphones.

The end user interface and the technical platform for Telia Sense are provided by Springworks, which builds smart human interfaces for Internet of Things applications. Earlier this year TeliaSonera

invested in Springworks in order to leverage the development of innovative services.

## APPLE CARPLAY AND ANDROID AUTO TO DRIVE CONNECTED CAR MARKET TO \$600M BY 2020

A new study from Juniper Research has estimated that the adoption of connected in-vehicle infotainment systems will produce revenues exceeding \$600 million in 2020, representing a 10-fold increase on this year.

The new research forecasts that consumer adoption of connected car entertainment will grow rapidly as Apple CarPlay and Android Auto gather traction. As these systems become firmly established, Juniper expects a wave of new applications to become available, specifically designed for in-vehicle use such as advanced traffic solutions, route optimisation, and in-vehicle gaming.

According to the research, on-board systems with integrated wireless functionality will eventually push ahead of systems requiring the presence of a smartphone. OEMs will seize the opportunity of greater independence, better integration with other in-vehicle systems by including directly integrated units such as Apple CarPlay, Android Auto and BlackBerry's QNX.

Furthermore, the research also argued that OTT (Over the Top) players such as Apple, Amazon and Google would play an ever more central role in the development of the connected car space as end users demand more technology in their vehicles. It pinpointed Apple and Google's activities in the autonomous driving systems space as key developments in this regard.

Juniper observes that Amazon's recent announcement that their voice controlled smart home service, Echo, will now be able to interact with Ford's SYNC in-vehicle system signals the merging of the connected car and the smart home space.

Juniper argued that the swathe of new OTT services will bring with it the challenge of high consumer expectations. Apple and Google are set to deliver a new application ecosystem for the vehicle environment where consumers are able to download new services and functionalities directly through the head unit.

## AUDI 2017 VEHICLES TO INTEGRATE QUALCOMM SNAPDRAGON 602A INFOTAINMENT PROCESSOR

Qualcomm Technologies and AUDI announced at CES that Qualcomm's Snapdragon 602A processors have been selected for Audi's 2017 vehicles. Announced at CES in January 2014, the Snapdragon 602A was Qualcomm Technologies' first automotive grade infotainment chipset and is designed to meet automotive industry standards while delivering smartphone-quality connectivity, infotainment, navigation, voice quality and control features in cars.

Ricky Hudi, executive vice president, electronic development, Audi AG told Connected Car, "Audi has always been on the forefront of connected vehicle technologies, first highlighting the potential for LTE connectivity in vehicles at CES 2012 and being the first automaker to announce a commercial model with embedded 4G LTE connectivity. Now, with Qualcomm's Snapdragon 602A, we are well positioned to provide today's most cutting-edge connected vehicle technologies."

At CES 2016, Qualcomm demonstrated the Snapdragon 602A integrated in an Audi Q7. The 602A contains a quad-core Qualcomm Krait CPU, Adreno 320 GPU, Hexagon DSP, integrated GNSS baseband processing and additional audio, video and communication cores. The processor pairs with the Snapdragon MDM modem roadmap.

 **To see the Connected Car video interview with Qualcomm at CES 2016, click this link.**



### VW LOOKS TO THE FUTURE WITH BUDD-E

Innovative and avant-garde – this was the impression VW hoped would be created by the BUDD-e at CES in Las Vegas.

With the world premiere of the BUDD-e at CES, Volkswagen said that it was presenting the next step into the mobile world of the future. A new electric drive system facilitates a range of up to 533 kilometres (NEDC). The all-wheel drive vehicle's total system output is 235 kW / 317 PS, and by arranging the battery in the vehicle floor, a totally new interior configuration has been achieved.

BUDD-e is the first Volkswagen concept vehicle based on the new modular electric drive kit (MEB). The b-bus is equipped with VW's next generation infotainment, which is intended to make travelling an interactive experience. Everything happens more intuitively than ever, says VW, with touch and gesture control merging into each other seamlessly. Individual displays fuse together to form large-format infotainment panels and even the internal rear-view and external wing mirrors become digital screens.

Budd-e certainly captured a lot of attention at CES. Sadly, when Connected Car arrived to film an interview with the BUDD-e design team, they had all left the VW booth to go to collect an award that the vehicle had won.

And so, we bring you the next best thing - watch VW's BUDD-e product video by clicking on the screen here:



### RENAULT-NISSAN TO LAUNCH MORE THAN 10 VEHICLES WITH AUTONOMOUS DRIVE, ADDS VPA FOR IOT

The Renault-Nissan Alliance has stated that it will launch more than 10 vehicles with autonomous drive technology in the next four years. The car group confirmed that it will launch a range of vehicles with autonomous capabilities in the United States, Europe, Japan and China through 2020, and said that the technology will be installed on mainstream, mass-market cars at affordable prices.

In addition, Renault-Nissan will apparently launch a suite of new connectivity applications that will make it easier for people to stay connected to work, entertainment and social networks.

Renault-Nissan claims that it is already the industry's zero-emission leader. The Alliance has sold nearly 300,000 all-electric vehicles since the first Nissan LEAF was sold in the San Francisco Bay Area in December 2010.

2016 will mark the debut of vehicles with "single-lane control," a feature that allows cars to drive autonomously on highways, including in heavy, stop-and-go traffic. In 2018, Renault-Nissan says that it will launch vehicles with "multiple-lane control," which can autonomously negotiate hazards and change lanes during highway driving. And 2020 will see the launch of "intersection autonomy," which can navigate city intersections and heavy urban traffic without driver intervention.

Later this year the Alliance will launch a new automotive app for mobile devices, which allows remote interaction with your car. Next year, it will launch the first "Alliance Multimedia System," providing new multimedia and navigation features, as well as improved smartphone integration and wireless map updates. In 2018, the Alliance Connectivity & Internet of Things platform will support the new Virtual Personal Assistant feature for individual and business customers.

### TELEMATICS TO POWER MORE THAN 73 MILLION COMMERCIAL VEHICLES BY 2020

Research company ABI believes that the commercial telematics industry is set for very strong growth in the next five years, especially in the enterprise and SMB segments, with players such as Telogis and Fleetmatics leading the way in these respective verticals in the United States. ABI suggests that it is just a matter of time before the first vendor exceeds 1 million vehicles under management, with Fleetmatics having set a target of 1.2 million subscriptions by 2020.

VP and GM Dominique Bonte told Connected Car, "We are witnessing the emergence of a very dynamic ecosystem characterized by cut-throat competition, aggressive marketing, mergers and acquisitions galore, and high levels of equity investment with high expectations about quick returns. This results in accelerating awareness about the many benefits of telematics far beyond the traditional asset tracking, diagnostics and fuel saving paradigms."

ABI believes that technologies such as onboard diagnostics (OBD) dongles and Cloud/SaaS solutions linked to hardware agnostic approaches leveraging third party application developer ecosystems on smartphones and ruggedized tablets are critical growth drivers. They allow vendors such as Telogis, PeopleNet (Trimble), Astrata, Zonar, CalAmp and Geotab to cost-efficiently address wide ranging requirements across a large number of segments, including the growing commercial vehicle OEM opportunity.



# NEW E CLASS MERCEDES-BENZ A VERITABLE TECH FEST

**T**HE AVERAGE CAR COMPANY PRESS RELEASE RUNS TO ABOUT 500-700 WORDS. IMAGINE HOW OUR JAWS DROPPED WHEN WE SAW MERCEDES-BENZ' PRESS RELEASE FOR THE NEW E-CLASS, WHICH RUNS TO 3,786 WORDS! NEEDLESS TO SAY, WE CAN'T ALLOCATE THAT MUCH SPACE, AND SO LET US FOCUS HERE ON THE MAIN ELEMENTS PERTAINING TO CONNECTED CAR MAGAZINE, EVEN IF THAT DOES MEAN LOSING ABOUT 2,000 WORDS OF INFORMATION ON DRIVER ASSIST SYSTEMS. OH, AND PARDON US IF SOME OF THE LANGUAGE IS A BIT FLOWERY, BUT MERCEDES PUT A LOT OF EFFORT INTO THIS RELEASE!

So, where do we start? Well, how about the main displays. Options include two next-generation high-resolution displays, each with a wide screen diagonal of 12.3 inches – which Mercedes claims is a first in this segment. Beneath their shared glass cover, the two displays 'visually conflate into a wide-screen cockpit that seems to be hovering in thin air', creating a central element that emphasises the horizontal orientation of the interior design. As the instrument cluster, this wide-screen cockpit contains a large display with virtual instruments in the direct field of vision of the driver as well as a central display above the centre console. The driver can choose between three different styles to select their preferred design for the wide-screen instrument cluster: "Classic", "Sport" and "Progressive".



In addition, touch-sensitive control buttons ("Touch Controls") on the steering wheel make their first appearance in a car. Like a smartphone interface, they apparently respond precisely to horizontal and vertical swiping movements, allowing the driver to control the entire infotainment system using finger swipes without having to take their hands off the steering wheel. Further controls for the infotainment system are provided in the shape of a touchpad with controller in the centre console, which can even recognise

handwriting, and the LINGUATRONIC voice control system.

A new, intelligent graphic design with high-resolution visualisations and animations, together with a simplified logic, further enhances the operating experience.

#### **OTHER HIGHLIGHTS INCLUDE:**

**Car-to-X communication** - Mercedes states that in 2013 it was the first manufacturer to introduce widespread car-to-car networking in the form of a retrofit solution, and says it is now following up with the world's first fully integral Car-to-X solution in series production. The mobile phone-supported exchange of information with other vehicles further ahead on the road, for example, can effectively allow the driver to "see around corners" or "through obstacles" well in advance. This means that the driver receives an earlier warning than previously in the event of imminent danger, such as a broken down vehicle at the edge of the road or also in the event of heavy rain or black ice on the road ahead. In this case the new E-Class simultaneously acts as a receiver and a transmitter, since warning messages are conveyed automatically by evaluating vehicle statuses or manually by the driver to the backend.

**Digital Vehicle Key** - This drive authorisation system uses Near Field Communication technology and allows the driver's smartphone to be used as a vehicle key.

**Multifunction Telephony** - An all-new infotainment generation is making its debut in the E-Class equipped with COMAND Online. Its highlights include the touch-sensitive Touch Control Buttons on the steering wheel and the new, intelligent graphic design of the Multifunction Telephony. It allows mobile phones to be charged and connected to the vehicle's exterior aerial – with no need for cables or a telephone holder. The wireless, inductive charging system works with all mobile devices that either support the Qi standard or can be upgraded to this standard. The charging pad, built into the stowage facility at the front of the centre console, is compatible with mobile phones with a screen diagonal of up to 15.2 cm (6 inches). When the "NFC" logo is touched, the system connects the mobile phone to the head unit and the exterior aeriels via Near Field Communication (NFC). Telephone calls are then routed via the Bluetooth hands-free system automatically.

Comprehensive, eh? Remember too that this is an E-Class, not the range-topping S-Class. And, as we said, the kit covered here is just the part of the press release that covered the stuff that we are most interested in.



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## AUTOMOTIVE INDUSTRY EVENTS

Connected cars feature at events all over the world, and not just at traditional car shows. Connected Car maintains a list of significant shows. If you are aware of events we have missed, please feel free to let us know.

### 2016

3-13 March 2016

#### Geneva Motor Show

Geneva, Switzerland

<http://www.salon-auto.ch/en/>

28-29 April 2016

#### Automotive Steering Technology 2016

Steigenberger Hotel, Berlin, Germany

<http://www.steering-technology.com/en/>

8-9 June 2016

#### TU Automotive USA

Detroit, Michigan, USA

<http://www.tu-auto.com/detroit/register.php>

28 June - 1 July 2016

#### Connected Cars conference

Olympia Grand, London, UK

<http://connectedcarsworld.com/about/>

28-30 June 2016

#### Connected Car '16 (Informa)

London, England

<https://connectedcarsworld.com/>

18-21 October 2016

#### Genivi 15th All Member Meeting

Burlingham, California, USA

### 2017

5-8 January 2017

#### 2017 Consumer Electronics Show

Las Vegas, Nevada, USA

<https://www.cesweb.org/about-us>

18-21 April 2017

#### Genivi All Member Meeting

Paris, France

<https://www.eiseverywhere.com/ehome/index.php?eventid=158479&>



In Connected Car magazine each quarter readers are able to access market-specific phone/smartphone data and detailed regional summaries from our sponsor NextGen Technology's global market research (see pages 26-27).

# NextGen

# NextGen

## TOP HANDSET RELEASES BY REGION – Q1 2016



### EUROPE

MANUFACTURER	MODEL
BlackBerry	Priv
HTC	One A9
Huawei	Google Nexus 6P H1512
Huawei	Mate S CRR-L09
LG	Google Nexus 5X H791
Microsoft	Lumia 950
Microsoft	Lumia 950 XL
Motorola	Moto X Force XT1580
Sony	Xperia Z5 Premium E6853
LG	V10 H960



### NORTH AMERICA

MANUFACTURER	MODEL	CARRIER
BlackBerry	Priv	AT&T
HTC	One A9	Sprint
Huawei	Google Nexus 6P H5111	AT&T
LG	G Vista 2 H740	AT&T
LG	Google Nexus 5X H790	AT&T
LG	V10 VS990	Verizon
Microsoft	Lumia 950	AT&T
Microsoft	Lumia 950 XL	AT&T
Motorola	Droid Maxx 2	Verizon
Motorola	Droid Turbo 2	Verizon



Huawei Mate 8



Lenovo 乐檬 X3



LeTV 1 Pro



LG V10 H968



Meizu 魅蓝 Metal



Oppo R7s



Vivo X6 D



Vivo X6 Plus 远航版



Xiaomi Redmi Note 3



ZTE Axon 天机 Mini



## CHINA

MANUFACTURER	MODEL
Huawei	Mate 8
Lenovo	乐檬 X3
LeTV	乐1 Pro
LG	V10 H968
Meizu	魅蓝 Metal
Oppo	R7s
Vivo	X6 D
Vivo	X6 Plus 远航版
Xiaomi	RedMi Note 3
ZTE	Axon 天机 Mini

au Digno Rafre KYV36



au Xperia Z5 SOV32



docomo Arrows Fit F-01H



docomo Nexus 5X



docomo Galaxy Active Neo SC-01H



docomo Aquos Zeta SH-01H



docomo Xperia Z5 Compact SO-02H



docomo Xperia Z5 SO-01H



Softbank Nexus 6P



Softbank Xperia Z5 501SO



## JAPAN

MANUFACTURER	MODEL	CARRIER
au	Kyocera	Digno Rafre KYV36
au	Sony	Xperia Z5 SOV32
docomo	Fujitsu	Arrows Fit F-01H
docomo	LG	Nexus 5X
docomo	Samsung	Galaxy Active Neo SC-01H
docomo	Sharp	Aquos Zeta SH-01H
docomo	Sony	Xperia Z5 Compact SO-02H
docomo	Sony	Xperia Z5 SO-01H
Softbank	Huawei	Nexus 6P
Softbank	Sony	Xperia Z5 501SO

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