

Connected Car

INFOTAINMENT / TELEMATICS / INTERNET OF EVERYTHING

Issue 2 / July 2015  Video Enabled



QNX

▶ MAKING INFOTAINMENT WORK

An interview with Andrew Poliak, Global Director of Business Development for QNX



▶ BMW - STILL BLAZING CONNECTED CAR TRAILS?

Connected Car talks to BMW's PM for Options & Technology



▶ AUTOMOTIVE BLUETOOTH ISSUES

A new series from NextGen: Pairing



▶ ERICSSON AND THE CONNECTED VEHICLE CLOUD

NextGen

INTRODUCTION FROM THE EDITOR

Hello and welcome to the second issue of Connected Car magazine. As we head to the mid-point of 2015 it is increasingly apparent that the connected car world is becoming more busy, more diverse, and more important.

As a regular reader of car magazines aimed at the consumer, such as the UK's primary weekly publication Autocar, it is clear to me that the car magazine writer's responsibilities are changing. No longer is it sufficient for a car journalist to be able to write knowledgeably about performance, styling, handling, ergonomics and NVH (noise, vibration and harshness – an industry acronym that leaked out into the consumer world). No. A car journalist now also needs to be an authority on smartphones, touchscreen, apps and GUIs. Every car test or review now includes an assessment of how well a car connects to the outside world.

This is quite an ask for the average journalist, who probably came to car journalism from a base point of loving cars – most car journos are petrolheads, there is no denying it. This meshing of the car and connected worlds does, of course, create an opportunity for crossover in the opposite direction, and I personally know two senior, experienced journalists who have spent most of their lives working as phone/mobile/computing writers who now write about cars. Some way down the line, we will see true hybrids – those journalists who know as much about mobile operating systems and short-range wireless connectivity as they do about adaptive dampers and handling characteristics. This is some way off.

In the meantime there will be lots of journalists – like me – who continue to operate based on a workable knowledge of both. We lean on the experts in our industry. I am fortunate that Connected Car's partner is NextGen Technology, which knows the connected car space like few others. The insight provided by NextGen is invaluable.

And I learn from real industry experts like the representatives of companies like QNX, BMW and Ericsson, all of whom I talked to in the preparation for publishing this issue that you are reading now.

No matter how big or small the company in the connected car space – be it Ford or GM, or a one-man-band app developer in his spare bedroom – we are all learning. Connected Car magazine intends to play a part in this process, and I intend that we will continue to bring in and share with our readers the thoughts and plans of the industry's most insightful people.

I would be delighted if you are able to continue on the journey with me.



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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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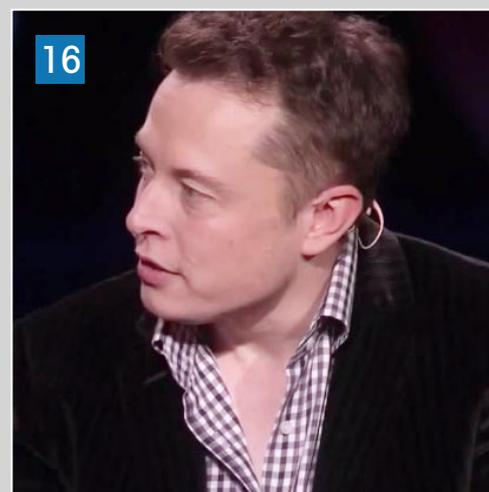
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NEWS

HUAWEI AND VOLKSWAGEN COOPERATE IN THE AREA OF CAR CONNECTIVITY

At the recent International Consumer Electronics Show Asia in Shanghai, Huawei and Volkswagen jointly demonstrated a series of apps that allow drivers to use GPS navigation systems, play music, send and receive messages, and make phone calls while behind the wheel. The apps support MirrorLink, the open technology standard designed to maximize interoperability between smartphones and vehicle-mounted systems and cover multiple services including phone calls, SMS, navigation, multimedia, and payment that are all centred on smartphones.

Sven Patuschka, Executive Vice President for Research and Development of Volkswagen Group China, said: "Our cooperation with Huawei will seamlessly blend the capabilities of users' smartphones with the systems in their cars. All content on the phone will be shown in real time on the car's infotainment touch screen. The result is smart and convenient interaction between phone and car."

Richard Yu, CEO of Huawei Consumer BG, observed that vehicles are turning out to be the largest mobile smart terminals. With rich experience in vehicle-mounted smart devices, data, and cloud platforms, Huawei believes its collaboration with Volkswagen will give drivers a seamless entertainment experience while driving comfortably and safely.

The first locally produced Volkswagen model equipped with MirrorLink is the Lamando, followed by the also locally produced Golf 7. More models will follow. All imported Volkswagen products from the model year 2016 will apparently be equipped with MirrorLink.

Today China is Volkswagen's biggest market worldwide. In 2014, Volkswagen Passenger Cars delivered 2.76 million cars to Chinese customers. In addition to the car connectivity field, Huawei is active in wearables and smart homes.

VISTEON AND CODETHINK COLLABORATE TO IMPROVE SOFTWARE DEVELOPMENT AND MAINTAINABILITY

Visteon and Linux software specialist Codethink are partnering to improve the long-term traceability and reproducibility of software used in in-vehicle infotainment products.

The two companies have apparently developed a unified approach to collect and integrate Linux ecosystem source code across a range of third-party and open source components used in Visteon's infotainment projects with global automakers. Both companies are members of the GENIVI alliance, which was set up to drive the broad adoption of specified, open source, In-Vehicle Infotainment (IVI) software.

The approach combines key elements of the Baserock and Yocto open source projects. Visteon believes it is the first organization to use Baserock's upstream source management functionality to support Yocto builds.

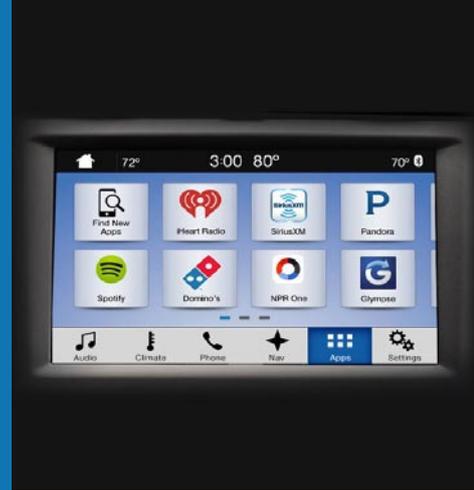
Christian Feltgen, vice president of Visteon's technology office told Connected Car, "As our software platforms are becoming increasingly global, we identified several benefits of combining the best elements of the Baserock and Yocto approaches. It provides us with local capture of the Yocto upstream build "recipe" and enables teams to either cross-compile using Yocto or build natively in Baserock – depending on the requirements for each project."

Codethink's CEO, Paul Sherwood added, "We are delighted to see Visteon contributing to the open source ecosystem and innovating this way. This new approach has the potential to minimize maintenance costs for long-term product support in Visteon's connected vehicle solutions."

U-BLOX JOINS CAR 2 CAR COMMUNICATION CONSORTIUM

u-blox, which develops wireless and positioning modules and chips, has become a member of the CAR 2 CAR Communication Consortium. The industry-driven consortium is dedicated to the development and deployment of Cooperative Intelligent Transport Systems (C-ITS). As their ultimate goal is to improve road traffic safety and efficiency, the Consortium is working to develop roadmaps for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications and to harmonize related standards. Lane accurate positioning and short range communication technology, both a focus of u-blox, play an important role for ITS applications.

u-blox CEO, Thomas Seiler, told Connected Car: "We see the work of the CAR 2 CAR Communication Consortium as pivotal to the success of C-ITS deployment, both in Europe and further afield. Its working groups and technical committee are undertaking very important work to ensure that vehicle communications technologies will contribute to saving lives and reduce injury by making our roads safer. We're delighted to be able to contribute to that effort."



DAIMLER AND QUALCOMM TO COLLABORATE ON CONNECTED CAR TECHNOLOGIES

Qualcomm Technologies and Daimler AG have announced a strategic collaboration focused on innovation in the connected car. In the first phase of the collaboration, the companies will focus on transforming future vehicles with mobile technologies that enhance in-car experiences and vehicle performance such as 3G/4G connectivity, wireless charging technology for in-vehicle use and implementation of the Qualcomm Halo Wireless Electric Vehicle Charging (WEVC) technology. In addition, the companies are jointly assessing the application of Qualcomm Technology's newly developed Automotive Solutions.

"It's important that we remain on the cutting edge of technology and continue to deliver unparalleled experiences to our customers," said Prof. Dr. Thomas Weber, Member of the Board of Management of Daimler AG responsible for Group Research and Mercedes-Benz Cars Development. "With this in mind, we are eager to jointly explore possible fields of future cooperation with an internationally leading tech firm like Qualcomm."

In the joint statement announcing the partnership Qualcomm said that it is helping the automotive industry create an entirely new landscape for communication, convenience, energy efficiency, infotainment and safety through its Qualcomm Snapdragon Automotive Solutions, and cited that Daimler has a history of producing vehicles that embody these concepts. As a mission statement, the two companies state that they intend to combine automotive expertise to advance the connected car industry by delivering intelligently connected vehicles of the future that drive emission-free.

INTEL PARTNERS WITH QNX TO BUILD CAR OF THE FUTURE

Intel is working with QNX Software Systems, the goal apparently being to accelerate the development of automotive technology for infotainment systems, digital instrument clusters and advanced driver assistance systems (ADAS). The effort will focus on new innovation for dashboard functionality within cars, including infotainment systems, digital instrument clusters and advanced driver assistance systems (ADAS).

Under this collaboration, the companies aim to help automakers optimize technology investments by designing and engineering development systems that simplify driving tasks, enhance driver awareness, and provide connectivity to online services and mobile devices.

Elliot Garbus, vice president and general manager, Intel Transportation Solutions Division told Connected Car, "As the automotive electronics industry continues to progress, innovative collaborations are critical to deliver on ever-increasing demands for a safer, more connected driver experience. Intel and QNX Software Systems have complementary technologies that work together to enhance consumer experiences and help make the promise of connected cars a reality."

This collaboration is apparently part of Intel's ongoing work with automakers and in-vehicle infotainment suppliers to help integrate advanced technologies into cars.

At the recent TU-Automotive Detroit, QNX Software Systems demonstrated the latest upgrades to its **QNX CAR Platform for Infotainment**, including a redesigned user interface running on Intel Atom processors. Designed to simplify the development of connected infotainment systems, the QNX told Connected Car that CAR Platform offers integrated support for advanced graphics, smartphone connectivity, voice recognition frameworks, fast booting, acoustic echo cancellation and noise reduction, and multiple app environments such as Qt and HTML5.

PANASONIC AUTOMOTIVE WORKS WITH FORD ON NEW SYNC 3

Panasonic Automotive Systems has announced its role as the Tier I supplier partner for SYNC 3 – Ford's next-generation communications and entertainment system. Panasonic Automotive worked with Ford to develop SYNC 3.

Tom Gebhardt, President, Panasonic Automotive told Connected Car, "Consumers have an expectation that the infotainment systems in their vehicles will be equally as responsive and elegant as their mobile devices. Clearly, vehicles are infinitely more complicated than tablets and smartphones. But with Panasonic's history in both consumer electronics and automotive, we have the expertise to marry the two worlds and create a vehicle experience that is engaging and satisfying."

Panasonic assisted with software and hardware design, development and implementation for the SYNC 3 business. Automotive grade QNX technologies were selected as the base operating system for Panasonic's software

Panasonic Automotive claims to be among the very few auto suppliers who have full end-to-end software and hardware development and integration capability. Panasonic apparently holds high JD Power rankings with other infotainment platforms they've produced, including many versions of Chevrolet's MyLink, Buick's IntelliLink and Chrysler's Uconnect.

"It's our breadth of experience across product and industries that sets Panasonic apart and gives us the capabilities to meet these increasing automotive challenges," said Gebhardt. "We may be the only supplier who can bring consumer communications and entertainment across the entire journey – home, car, airplane, mobile – connecting people in every aspect of their life."



CONNECTED CAR INTERVIEW



Andrew Poliak, QNX

QNX: PROVING THERE IS MORE TO MAKING CAR INFOTAINMENT WORK THAN APPLE CARPLAY AND ANDROID FOR AUTO

Vince Holton talks to Andrew Poliak, Global Director of Business Development for QNX

QNX SOFTWARE SYSTEMS LIMITED IS A SUBSIDIARY OF THE CANADIAN MOBILE COMMUNICATIONS COMPANY BLACKBERRY, AND DEVELOPS OPERATING SYSTEMS, MIDDLEWARE, DEVELOPMENT TOOLS, AND PROFESSIONAL SERVICES FOR CONNECTED EMBEDDED SYSTEMS. COMPANIES SUCH AS AUDI, SIEMENS, GENERAL ELECTRIC, AND CISCO USE QNX TECHNOLOGY FOR THEIR IN-CAR ELECTRONICS, MEDICAL DEVICES, INDUSTRIAL AUTOMATION SYSTEMS AND NETWORK ROUTERS, AND QNX SETS ITSELF OUT AS A COMPANY WITH A LOT OF EXPERIENCE OF HANDLING MISSION- OR LIFE-CRITICAL APPLICATIONS.

When you start to dig into the background of the connected car industry, and to talk to both the car companies and the Tier 1 suppliers, QNX Software Systems' name crops up time and time again. I was less familiar with the company than I wanted to be, and so I set up an interview with Andrew Poliak, the company's Global

Director of Business Development, so that I could bring myself up to speed. Andrew holds patents for a framework that consolidates access to multimedia devices, and for in-vehicle navigation based on images encoded with location data. He also helped define and launch the QNX CAR Platform for Infotainment, which QNX believes significantly reduces the upfront engineering needed to develop connected in-vehicle systems.

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

AP: QNX has been in business since 1980 and in automotive since 1999 (to architectures beyond just x86). One of our first projects was with Motorola for an Audi telematics control unit and another was with Delphi for a GM program, and we grew from there. Incidentally, both GM and Audi are OEMs using QNX today. QNX software is now shipped in over 50 million vehicles, and we expect continuing growth ▶

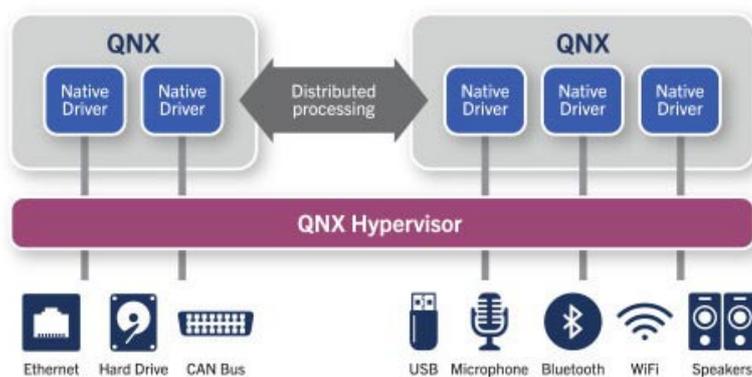
as the number of connected vehicles grows and the number of connectivity modules per vehicle also grows. We are focused on telematics, infotainment, digital instrument clusters, and advanced driver assistance systems.

QNX is a subsidiary of BlackBerry. We contribute to many open source and open standards technologies. As you can imagine, the BlackBerry connection helps us leverage mobile technologies such as Android and HTML5, which are making their way from the smartphone into the car. QNX has a strong legacy in mission- and life-critical applications; our OS is used in train-control systems, power plants, and medical devices, for example. This is a big advantage: our customers know that the same OS proven in safety-critical environments is also powering their in-car infotainment and telematics systems.

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

AP: Connectivity isn't just a pipe between the car and the cloud. We see three different areas of connectivity. The first involves vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications. Next is connectivity within the vehicle — sensor data displayed on the instrument panel, for example. Then there is connectivity between consumer devices brought into the car and the car itself — a smartphone projecting apps to the car's head unit, for example. All of these will continue, but more content will come to the car both from the cloud and from onboard cameras and sensors to complement existing services and to keep everything up to date. I personally believe that the reliance on portable consumer devices, such as smartphones, to provide in-car connectivity and infotainment will diminish as cars themselves become ubiquitously connected.

As for differentiation, we offer a production-proven automotive solution based on industry standards such as POSIX — the standard API used by UNIX and Linux. At the same time, our OS isn't susceptible to the viral licensing issues of open source OS solutions, which can open up OEMs' secret vehicle buses and make them vulnerable to security breaches. Our hard real-time safety-critical OS, coupled with our automotive ecosystem that provides the latest in consumer-oriented media and application solutions (including the ability to run Android and HTML5 applications) gives the automotive industry a reliable, proven solution for the connected car.



VH: What do you see as the major challenges for the connected car and what are your solutions?

AP: The automotive supply chain is evolving; OEMs are looking to get more involved in software, so they are engaging directly with the software suppliers. This can be perceived, erroneously, as "cutting out the middle man." The challenge we face is finding the right mix of value-adds and direct engagements with OEMs, while remaining supportive of our Tier 1 customers. At times, we will need to work

directly with OEMs, but those particular engagements will fill needs not being addressed by a supplier, or will provide integrated technologies that can span the OEM supply base. Things like over-the-air updates, security, and connectivity are common to all OEMs, and they require a consistent approach, across vehicle lineups and suppliers.

And then there is security. As part of BlackBerry QNX has a unique ability to leverage the technology and deep expertise that BlackBerry has built around security and data privacy. For instance, Certicom, one of our sister BlackBerry companies, is a specialist in elliptic curve cryptography, certificate management, and key management enabling end-to-end security for smart, connected devices. Using Certicom technology, our customers can provision air bags, brake control modules, and other safety-critical components with a secure key at the time of manufacture to prevent counterfeiting and to ensure that messages exchanged between components haven't been tampered with.

These technologies are exactly what car companies are looking for as cars become connected — encrypting data inside the vehicle and making sure that anything talking to the vehicle, or within the vehicle, is trusted. The latest version of the QNX Neutrino OS has Certicom's elliptic curve cryptology built into its file system.

VH: Where does the QNX operating system outperform the competition, and in what ways?

AP: We offer a microkernel-based OS, which allows customers to build self-healing systems that recover dynamically from failure. This architecture can make it much easier to identify root causes of software faults and to build modular systems that help speed up development time. Projects that used to take 2 to 4 years now happen much faster. For example, we kicked off a major project with Panasonic in May of 2010 and it shipped in June 2011. We get production programs up and running faster, performing well and more reliably than other solutions. This, and our modular platform, which helps customers reduce the hardware bill of materials (BOM), also make us cost-effective.

Finally, our legacy and pedigree in automotive means we have built up a huge ecosystem of third parties that offer technology on QNX.

VH: How does QNX co-exist with Apple CarPlay and Android for Auto?

AP: If you look at any projection mode solution, be it Apple CarPlay, Android Auto, or MirrorLink, it presents information from the mobile device to the head unit, enabling passengers and drivers to view and control applications without having to touch their handset. To support this, the car needs a system that can decode video streams and interact with the portable device and provide connectivity to car-specific functions. The OEMs have been announcing support for one mode or the other, and to be honest, these solutions have proven to be something of a benefit because they bring capabilities to vehicle lines that, in the past, would offer only rudimentary infotainment functions. For cars with limited connectivity — especially entry-level cars — bringing in smartphones to create a connected experience is great. In the past, entry-

level cars wouldn't have a full-blown OS in their entertainment systems; they would use a simple radio with a DSP to decode radio signals. Now, though, with the interest in connectivity, even entry-level cars need an infotainment OS like ours to support a CarPlay, Android, or MirrorLink solution.

To take it a step further, systems are getting more complex and have to work alongside each other. For example, how do you render video from a back-up camera, within two seconds of shifting into reverse, ▶

while also managing projected content from a smartphone? The system must arbitrate the video, arbitrate the audio feed, and overlay a warning over other layers of content being presented to the driver. All of these factors, plus many more, combine to help drive adoption of our operating system.

VH: Which part of the market is QNX aiming at – low tier systems or high, or both?

AP: It's all of the market! Not only will more vehicles need an operating system like QNX, but more modules within the vehicle will need one, too. And then there are developments that affect the Tier 1. For instance, we announced at CES that we are partnering with LG to work on multiple aspects of the car, including Advanced Driver Assistance Systems (ADAS), instrument clusters, telematics (such as OnStar) and infotainment systems. This multi-pronged approach signals a change in the supply chain. Traditionally, the Tier 1s operated within clear lines, where one company might make infotainment systems, another would make clusters, yet another would work on ADAS, and still another would do telematics. But those lines are now blurring, and the Tier 1s are starting to compete with each other, developing technology in the same areas. Again, this is good for QNX because we are one of the few companies that spans all of these sectors.

VH: And just what is QNX Software Systems' reach? How many vehicles on the road use QNX technology?

AP: We released a press release at CES in January that confirmed we are in over 50 million vehicles. At the same time, the research company IHS Automotive reported that we have more than 50% market share in the infotainment market.

VH: That's impressive! Extrapolating the discussion, which prominent systems developers or OEMs use QNX?

AP: We are in more than 40 automotive brands, including Acura, Audi, BMW, Chrysler, Ford, GM, Honda, Hyundai, Jaguar, Land Rover, Maserati, Mercedes-Benz, Porsche, Toyota, and Volkswagen. In fact, it might be easier to say who we are not in! That covers mainly North American and European OEMs. The Chinese OEM market is also growing fast for us — there are now about 70 OEMs in the region — and we are already in some of these. The reality is, if you've bought a new car in the last 5 years or so, our software is probably in it.

As far as the Tier 1s are concerned, I cannot think of one that doesn't use our technology in one form or another.



Mercedes QLA concept car.

VH: Is it an advantage being owned by a mobile company when working with the car OEMs, and if so, why?

AP: Yes, there is a clear advantage to being owned by BlackBerry, especially because of the security expertise that I already mentioned. Also, we can leverage BlackBerry's strong relationships with its silicon suppliers and integrate our software with their automotive-grade hardware. Moreover, we can take some of the same technologies BlackBerry originally developed for smartphones, including a browser

engine, an Android application environment, and a cellular data framework, and bring them into the car. It makes for a very comprehensive solution.

VH: How does QNX address the challenges of mobile device compatibility and interoperability?

AP: Product development cycles for consumer electronics are much shorter than those for cars. This is where QNX enjoys another advantage. We can assess what standards are likely to survive, for example, and make sure that a module or OS can be updated on the fly, to keep the car current and with new consumer technologies.

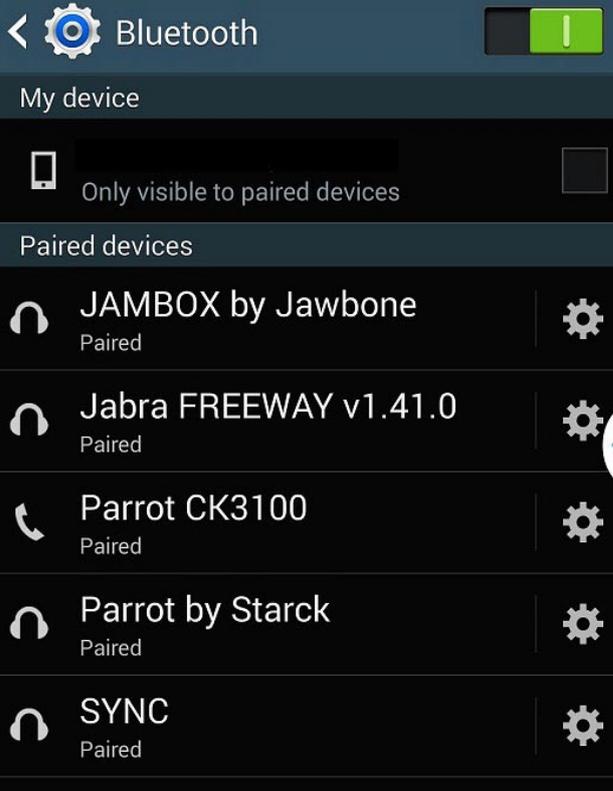
As for testing phone compatibility, we have partnered with the leading Bluetooth protocol stack companies and with a third party that has done rigorous Bluetooth testing. We pre-integrate their work into the QNX CAR Platform, which comprises a number of our technologies — including our OS, media player framework, user interface, and application environments — and is ready for a Tier 1 to add a branded UI and quickly get to regression testing. Tier 1s take testing and compatibility very seriously; they test across multiple phones, cars, and carriers. We do device-compatibility testing, but we are more about making an architecture that can simplify regression and compatibility testing. Our many years of dealing with legacy devices positions us very well to do this.

The problem is traditionally looked at from a Bluetooth perspective, but QNX has a team of wireless experts that have been working in 2G/3G/LTE radios as well as interoperability between spectrums, such as Wi-Fi and Bluetooth, and switching between those spectrums. That team's work, which has already been deployed in millions of BlackBerry devices and supported by hundreds of carriers worldwide, has resulted in the QNX Wireless Framework, giving us the ability to leverage a variety of different cellular modems and use them in a car. This allows cellular modem vendor flexibility to negotiate the best pricing, or a way to build a global platform, utilizing different cellular modems for regional differences in deployed technology and frequency bands. The ideas can be interchanged without needing to get involved with re-programming software in the system. We also have the systems level ability to gain some cost advantages with high manufacturing volumes. Many companies, we feel, will want to go straight into chipset level and integrate it onto the hardware, creating an integrated system with an embedded cellular modem. That group that we brought in has lots of experience of doing all of the cellular certification, testing – interoperability and carrier level – and we are making them available to our platform partners. I don't know of any other platform provider that can do this.

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?

AP: The thing we are most excited about is the Internet of Things (IoT) opportunity. The biggest change in the connected car market is going to be treating the car like a living thing once it is in the hands of the owner. I mean sending out over the air (OTA) updates, interacting with the car remotely, and having your data infrastructure interact with the carriers on a global basis. There will be challenges, such as sending out a software update to thousands of cars, all in one go. The carriers have rules about this sort thing: they don't want their networks to collapse. The BlackBerry IoT Platform, which is built on the secure, globally scalable BlackBerry network infrastructure, is extremely well positioned to address this challenge. When you then start to consider the new demands of advanced driver assistance systems and autonomous vehicles, which will also have connectivity, you can see how important this will be, and how well positioned we are.

www.qnx.com



AUTOMOTIVE BLUETOOTH ISSUES: PAIRING

By Jeff Clark
Engineering Manager,
NextGen Technology

NextGen

NextGen is a trusted partner to the global automotive industry. It's processes have changed the way interoperability testing is executed and presented, and have helped many of the world's automotive brands reach out to and better serve customers around the globe. Today, by combining knowledge systems, advanced communications, innovative in house software tools and consulting expertise, NextGen is uniquely positioned to help its customers meet the significant challenges in ensuring compatibility and customer satisfaction, both now and in the future.

NextGen services include Bluetooth, Wi-Fi and USB Interoperability Testing (IOT), customer support, custom application development and end user focused website help services and support.

www.nextgen-technology.com

BLUETOOTH PENETRATION IN THE AUTOMOTIVE INDUSTRY

We have seen phenomenal growth of BT technology in the automotive sector, and, as the following chart from ABI Research shows, Bluetooth is continuing to increase its market share. The growth is driven by wireless connectivity features and the emergence of the connected car and enhanced integration of the mobile device in the car. However, there is still scope to make Bluetooth easier to use every day and without the user having to memorise manuals and tricky, confusing procedures.

This growth means in car wireless Bluetooth connectivity is becoming more critical in consumer's purchase decisions and satisfaction.

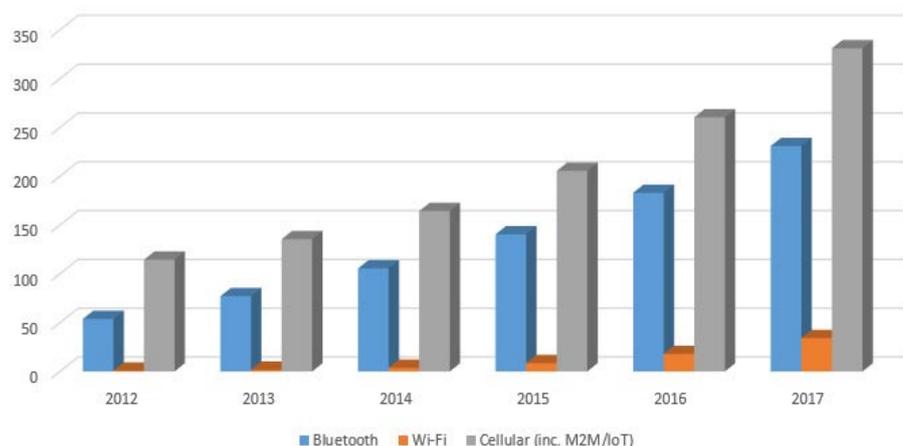
PROBLEM DESCRIPTION:

In the automotive sphere, Bluetooth-related issues are a high complaint area as shown in the following chart of the top automotive problems for the US domestic market. This is taken from J.D. Power's 2015 US Initial Quality Study and the scores represent problems per 100 vehicles (PP100). Recently Voice Recognition has taken over the top spot, but Bluetooth Pairing and Connectivity still stand out as major areas for improvement.

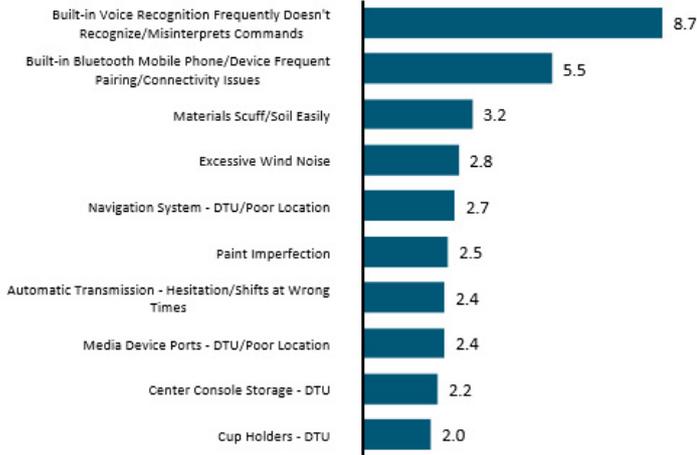


Jeff Clark, NextGen Technology

ABI RESEARCH INTERNET OF EVERYTHING MARKET TRACKER 2ND QTR 2015: INSTALLED BASE OF CONNECTED DEVICES IN CONNECTED CAR (MILLIONS OF UNITS)



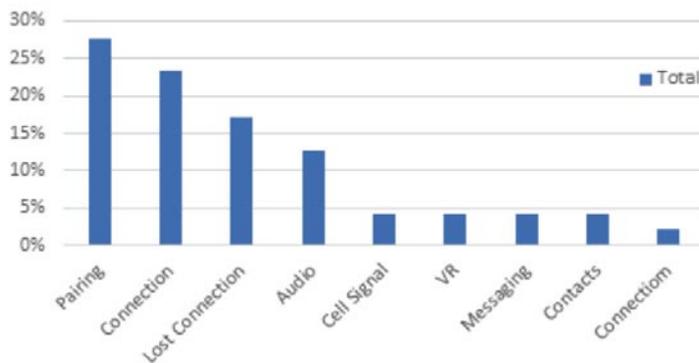
J.D. POWER 2015 - 'TOP 10 PROBLEMS IN THE INDUSTRY'



Analysis of the JD Powers list of most reported consumer problems for Bluetooth on initial consumer contact, still show Pairing followed by Connection as the top concerns.

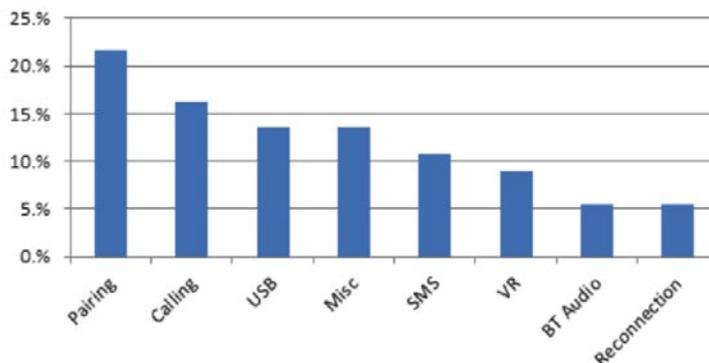
Connection issues are often handled on initial contact with support teams, with some connection issues being reclassified upon escalation.

TYPICAL REPORTED PROBLEMS PARETO - INITIAL CONTACT



Of the Bluetooth issues that are typically escalated, Pairing remains the most significant issue. We can see the initial contact resolves a substantial quantity of Pairing issues, but many remain. This article will discuss both the initial and escalated issues, to identify and reduce these causes.

TYPICAL REPORTED PROBLEMS PARETO - ISSUE ESCALATION



DISCUSSION OF PAIRING PROBLEMS

This section focuses on the most reported problem - "Pairing" - and possible solutions.

HISTORICAL ISSUES

Several Pairing type issues have been minimized through improvements in both the Bluetooth spec, mobiles and in-car systems. Most of these historical problems were resolved when Bluetooth Core Spec 2.1 with Secure Simple Pairing (SSP) was adopted by mobiles and in-car systems. These historical pairing issues have, then, been minimized, but older devices would still have these problems.

1. **Loss of Link Key Definition** - Although not exactly a pairing issue, this problem caused deletion of the pairing and then re-pairing attempts. Normally the re-pair works (at least for a while) but this is the main reason customer support personnel request re-pairing in the current environment.
2. **Pairing with different results depending on who performed the inquiry** - Some devices would have trouble connecting certain profiles, depending on which device initiated the pairing. To resolve, a re-pairing would be required with the other device performing the inquiry.
3. **Incomplete Pairing** - Some devices would go into discovery mode, but not allow pairing to complete, unless an exact sequence was followed. Like holding the pairing button for 3 seconds instead of the required 5 seconds.
4. **Trusted Device Overflow** - In car systems used to have a limited list of Trusted Devices and would remove the oldest without allowing the user to select which ones to remove. Some systems were limited to a couple of trusted devices, while other could take up to 12. Also, the priority was based on who was paired last - possibly causing slowness in connecting or connecting to the wrong trusted device. In one case a vehicle's trusted device list got locked up by not cycling to the beginning when the user exceeded twelve pairings. The vehicle had to go to the dealer and get a factory reset and new firmware to fix the problem.

CURRENT ISSUES

Further breaking down the customer complaints and adding some analysis, we can divide current Pairing issues into 10 distinct types:

1. **Misunderstanding**
This problem is the most obvious, but how can it be eliminated or at least significantly reduced? Simplification of the pairing process would be the best approach. The key is to

provide simplified pairing while maintaining security. Below are a couple of possibilities:

Out of Band Pairing - Use of NFC – this would be possible as it is used for Headset pairing. However, trusted device, contacts and SMS prompts issues would remain and would need to be resolved. Perhaps a warning message on the vehicle system would alert the user to accept these prompts.

Special Pairing App - A downloadable App that provides an easy, one step pairing from the mobile. This App would need to provide the Phone Book and SMS settings that are normally pop-ups on a mobile, or that need to be turned on in the Bluetooth settings.

For example NextGen has developed a Bluetooth Pairing App for automotive pairing that is tailored to the automotive brand and experience.

2. Multi-Mobile – connection not pairing

This is a high-runner complaint where a family gets into a car and the “wrong” mobile connects to the car. This problem is really a Connection problem, but is included here due to its severity.

Bluetooth for cars was developed when one mobile per household was the norm. Now the norm is several mobiles/tablets per household. However, most in car systems can only connect to one at a time - especially at the profile level, or at least make it very hard to connect multiple mobiles. With a few menu changes, in-car Bluetooth systems should be able to use multi-point to allow several mobiles to be simultaneously connected, however it is likely that only one at a time would be allowed as audio channel (SCO or A2DP) - at least in the first generation.

3. Enabling Trusted Device, Contacts downloads and SMS downloads

There are many contact and messaging failures that are actually problems stemming from the initial pairing, for the simple reason that the options to allow contacts and/or the messages to transfer to the in car system were not selected, or the “Do Not Ask Again” checkbox is not set. Ignoring or rejecting the requests may cause the car to disconnect and re-try to establish the connection. This can result in the user seeing a continuous yo-yoing of the connection.

Many of the customer complaints about contacts and messages are related to this pairing issue and hence we classify them as Pairing issues rather than contacts or message issues. NextGen can recommend some options to reduce and/or eliminate the pairing issues for contacts and messages:

Option 1 - A very prominent pop-up to make sure the user is aware of these last steps. Additionally a notification that the contact and message downloads may take several minutes to complete.

Option 2 - Add the Trusted, Contact and Message “check boxes” to the SSP verification or PIN pop-up so that the user can do both - pair and allow contact/messages to be transferred - in one pop-up menu, simultaneously and without delay. The mobile could use the Minor Device Class of “Car Audio” with the “Object Transfer” flag in the Bluetooth FHS Message to identify devices that will most likely use PBAP and/or MAP and setup the pop-up accordingly.

4. Apple MAP function

Apple hides the MAP capability from the in car system until the option is enabled in the Bluetooth settings of the phone. This can reduce compatibility issues in the field but, once MAP is enabled,

all devices are required to reconnect in order for MAP to function. This can generate issues for users.

A possible solution is to force a reconnect after the user opts for message transfer via the MAP profile.

5. Voice Recognition (VR) Issues

Some in car systems require the use of VR for pairing, and as you can see, the number one complaint - even higher than pairing - is VR. Noise reduction and microphone placement can help in these circumstances, though the regional variance in language dialect and accents is the biggest challenge to non-cloud based VR recognition systems.

6. In Car system Issues

Many Pairing issues actually stem from in car communication systems that fail to connect, connect only some profiles, fail to download the Contacts/Call Lists or fail to start a MAP session. And in some cases turning off the ignition doesn't solve the problem, so the prescribed “fix” is to remove the paired device and pair it again. In reality a hard reset of the in car connectivity system is the solution for this problem (hard reset is the total interruption of the system, usually by removing power to it for several seconds). However most cars don't have a method to enable a user to perform a hard reset without disconnecting the car battery cable, and so this issue becomes a pairing issue.

There are two solutions that come to mind – writing perfect code running on perfect hardware or providing a hard reset function on the face of the in-car system.

7. Co-existence

Wi-Fi and other active Bluetooth devices (e.g. A2DP, Phone Call, OPP) can inhibit or slow down the inquiry process, making discovery drawn out as the devices may not appear for a long time. Once discovered, the initial pairing messages may be lost due to the same co-existence issues. Temporarily turning off Wi-Fi and reducing the Bluetooth traffic will be the best way to reduce the pairing impact from this problem source.

8. Deletion of previous pairing on both devices

Sometimes previous mobile phone/in-car system pairing information was not fully deleted on both devices. The user may be unaware of this and/or doesn't know a full deletion is required. Bluetooth stacks have not been designed with the capability to re-do the pairing in these cases. There are three types of non-function:

1. When the Inquiry mode device has the “Zombie” pairing, the inquiry will not post the other device as a possible new device, frustrating the user as to what to do next. However the device, when selected, will fail to connect and will not attempt pairing. The cure may be worse than the disease for this problem.

2. When the discovery mode device is the one with the “Zombie” pairing, then the connection can be initiated, but is usually rejected, without providing the reason for the rejection. Some devices will attempt the pairing but fail, making the user experience even worse. A possible solution would be to ignore the older pairing and to repair the devices. If the pairing succeeds then delete the old pairing.

3. There also may be cases where users do not delete the trusted device on either device, but expect the new pairing to succeed. This may not be easy to overcome by technology. ▶

9. Placement of the mobile

Bluetooth can be surprisingly sensitive to both distance and Radio Frequency Interference (RFI). Some of the early messages sent during the pairing process may not make it error free and could then cause the pairing request to time-out. It is important for the user to make sure there is a solid connection before starting the pairing process and to minimise proximity of items – e.g. the hand or metallic items - to the mobile to reduce the chance of pairing failure.

10. Confusion of terms - Pairing vs Connection

Clearly the most confusing word in Bluetooth is "Pairing". Customers continuously report "pairing" problems, when in most cases they are Connection problems. Even experienced Bluetooth engineers say "pairing" instead of "connection". This confusion does cause problems when trying to analyse customer complaints.

TEST IMPLICATIONS:

REPETITION TESTING

There are three basic root causes of Pairing issues:

- Hard to understand pairing processes / user error
- RF issues
- Hardware/software issues.

Typically the first pairing of devices works, especially fresh out of the box. It is when the data gets dirty, perhaps through repeated pairing, that the problems will surface. The goal here is to eliminate the above group as a problem, and the best method is with automated tools to execute pairing (and connection) tests over and over again.

NextGen uses tools that can perform this function of repetitive testing, and which will emphasise the pairing and connection testing and exercise them through multiple iterations

User testing

Testing as various user profiles would also find the more vexing problems:

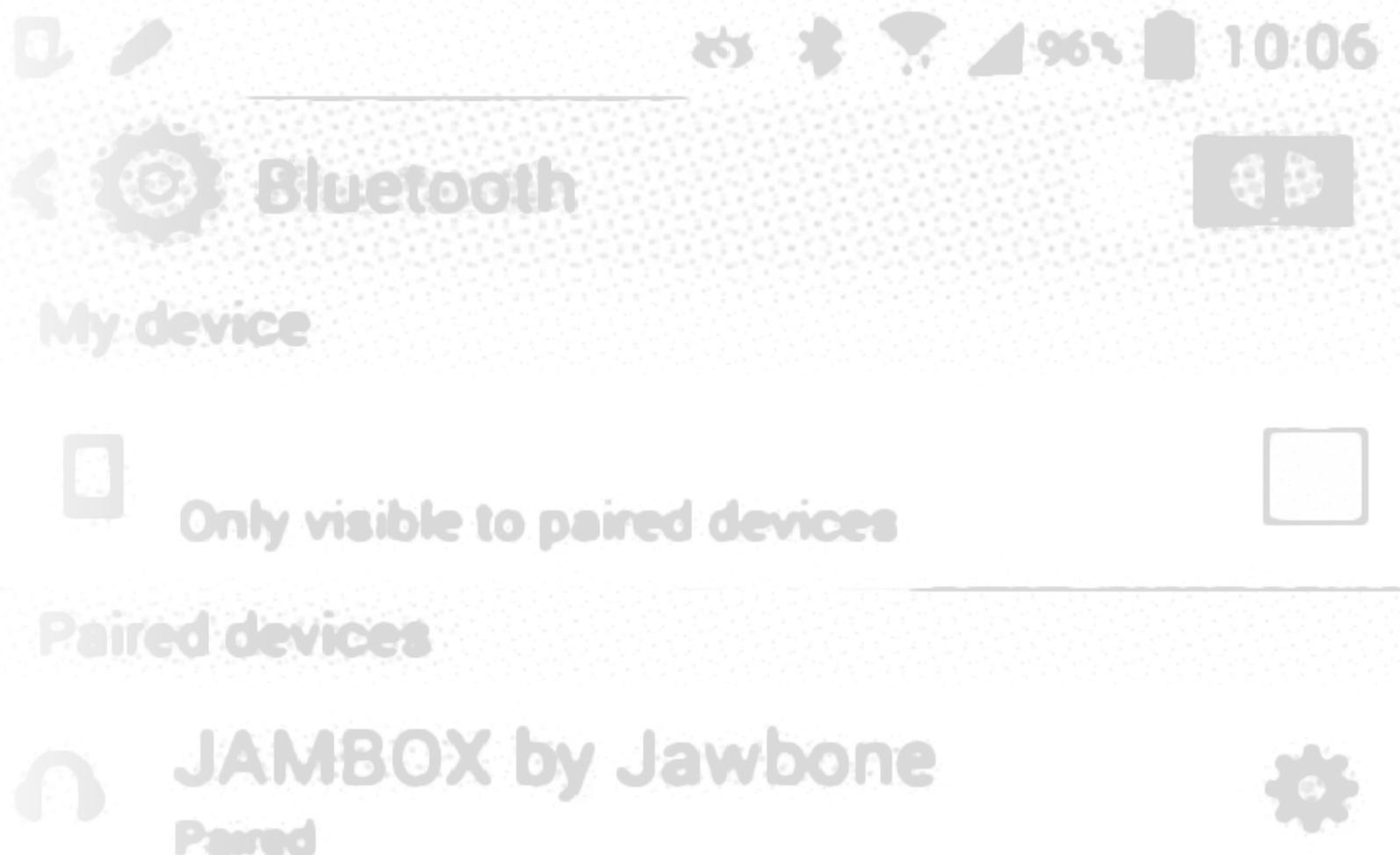
- Multiple paired mobiles in range when the ignition cycle is turned on
- Pairing with the mobile in a marginal signal strength environment.

www.nextgen-technology.com

About the author:

Jeff Clark has many years of experience in R&D, testing, customer support and with a significant focus on Bluetooth & Wi-Fi for the last 10 years. He has been responsible for Customer Support at a major mobile manufacturer for Bluetooth and Wi-Fi functions and for another company - notebook and chipset products. In this article, Jeff is passing on some of the knowledge he has gained in the Bluetooth automotive sector.

Besides working at NextGen, Jeff has also worked in the capacities of Management, Test, Certification, Customer Support., Project Management and Problem Analysis at Motorola and Intel and at Frontline Test Equipment before fully immersing in the challenges of automotive connectivity and interoperability at NextGen Technology.





NEWS

JAGUAR LAND ROVER USES BRAIN WAVE MONITORING

Jaguar Land Rover (JLR) has revealed a range of new road safety technology research projects that the company says are being developed to reduce the number of accidents caused by drivers who are stressed, distracted and not concentrating on the road ahead.

The JLR 'Sixth Sense' research projects utilises technology, from sports, medicine and aerospace, to monitor the driver's heart rate, respiration and levels of brain activity to identify driver stress, fatigue and lack of concentration. The UK-based team is also looking at innovations that would reduce the amount of time the driver's eyes are off the road whilst driving, and how to communicate with the driver via pulses and vibrations through the accelerator pedal.

The basis of JLR's Mind Sense research is to see if a car could effectively read the brainwaves that indicate a driver is beginning to daydream, or feeling sleepy, whilst driving.

The human brain continually generates four or more distinct brainwaves at different frequencies. By continually monitoring which type of brainwave is dominant, an on-board computer could potentially assess whether a driver is focused, daydreaming, sleepy, or distracted.

The most common method for monitoring brainwaves is close to the source using sensors attached to a headband, something that would be impractical in a vehicle. JLR is investigating a method already used by NASA to develop a pilot's concentration skills and also by the US bobsleigh team to enhance concentration and focus.

This detects brainwaves through the hands via sensors embedded in the steering wheel. Because the sensing is taking place further away from the driver's head, software is used to amplify the signal and filter out the pure brainwave from any background 'noise'. JLR is currently conducting user trials to collect more information on the different brainwaves

identified through the steering wheel sensors and will involve leading neuroscientists in the project to verify the results.

JLR is also assessing how a vehicle could monitor the well-being of the driver using a medical-grade sensor embedded in the seat of a Jaguar XJ. The sensor, which was originally developed for use in hospitals, has been adapted for in-car use and detects vibrations from the driver's heart beat and breathing.

Much of a driver's interaction with the car is via a screen, and JLR is apparently working on new technologies that increase the speed and efficiency of the interaction between the driver and the infotainment screen. The aim is to reduce driver distraction by minimising the amount of time the driver's eyes are on the screen.

Haptics are being investigated too, and could be used to communicate with the driver through the accelerator pedal to increase the speed of response and to ensure the correct action is taken.

To create these sensations in the accelerator pedal, an actuator sits at the top of the pedal arm and allows for vibrations or pulses to be passed through to the foot of the driver. The technology also uses a torque motor which can create resistance in the pedal feel.

MERCEDES UPS TECH CONTENT WITH GLC LAUNCH

Mercedes-Benz is making sure that buyers of its new GLC – an SUV-upé, if you like – are not left wanting for in-car tech. Novelties include a newly developed touchpad, which sits in the handrest over the rotary pushbutton in the centre console. Mercedes suggests that this adds smartphone-like ergonomics, with simple and intuitive operation of all the head-unit functions using finger gestures. The touchpad also permits letters, numbers and special characters to be entered in handwriting – in any language supported by Audio 20 or COMAND Online. A centrally positioned media display is partially integrated above the centre console.

Then there are a plethora of driver systems. As part of the Intelligent Drive concept, these systems combine data from various sensor technologies to enhance comfort and safety. Collision Prevention Assist Plus, Crosswind Assist, Headlamp Assist and Attention Assist are on board as standard.

Also new is the Head-up Display, (HUD). The HUD displays important information directly in the driver's field of vision on the front windscreen, providing clear legibility and less distraction from the road ahead. The system provides information on speed, posted speed limits, navigation instructions and messages from the DISTRONIC system.



Charging Station
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Information



BMW – A CONNECTED CAR TRAILBLAZER IN 2011, IS IT STILL TODAY?

Vince Holton talks to Andy Furse, Product manager for Options & Technology, BMW UK

I FIRST STARTED LOOKING SERIOUSLY AT CONNECTIVITY IN CARS IN 2011, AND DECIDED TO TALK DIRECTLY WITH ONE OF THE MAINSTREAM MANUFACTURERS TO SEE HOW MUCH AWARENESS THERE WAS OF THE TECHNOLOGY THAT WAS AVAILABLE AT THAT TIME, AND HOW SOON IT WOULD BE FITTED TO THE CARS WE DRIVE. I selected BMW, because, with its ConnectedDrive system and the standard fit embedded phone module and SIM that was being installed in all of its cars, the company seemed to have gone furthest to provide its customers with intelligent and connected systems.

Back in 2011, BMW ConnectedDrive comprised five services: BMW Assist, BMW Online, BMW Tracking, BMW TeleServices and in-vehicle internet access. These were integrated with the car's navigation and Bluetooth telephone system, and provided the driver and passengers access to online services from within the vehicle and the service network with telematics data. Every new BMW vehicle equipped with Bluetooth telephone preparation and a navigation system was entitled to a free of charge three year BMW Assist account.

While development cycles in the car sector are unquestionably slower than those of the mobile/consumer electronics sector, 4 years is a long time, and it seems that every day now we hear of new developments in connected car technology. And this is not just blue-skies

discussion of what may be about to happen. Pretty much every car company is today aware of the need to provide sophisticated infotainment and connected services in the car, from city cars up to luxury cars.

BMW seems to be keen to stay at the forefront. In the last month we have learned that from September 2015 BMW Navigation will be included as standard equipment across the range. When combined with some of the other standard features, such as BMW Emergency Call, DAB radio and Bluetooth with audio streaming, it is apparent that BMW plans to provide an extensive suite of advanced communication and entertainment features.

So, we have jumped forward to 2015, and I considered it was time to re-visit BMW ConnectedDrive, which seems to have become a much more comprehensive portfolio of systems and services, including:

BMW Emergency Call - More commonly referred to as 'eCall', in the event of an accident the vehicle can automatically make an emergency call to the emergency services via a BMW contact centre.

BMW Teleservices - the car automatically reports important technical information to the customer's assigned dealer e.g. service requirements or technical faults.



BMW's visual interpretation of 'infotainment'.

BMW Online services and apps - provides access to web-based information to ensure that the driver has all the information needed along your journey.

News: World, Business, Entertainment and Sports. With the text-to-speech function articles can be read aloud to the driver.

Weather - Five day weather forecast for current location or any destination.

Google Local Search - Online POI search from live Google data to ensure the information is up to date.

Send-to-car - Addresses and POIs can be sent to car via Google Maps ahead of journey.

App interface - supports BMW Connected applications via compatible mobile device: including Spotify, Life360, Facebook, Twitter and more. BMW Online also offers support for selected email services directly into the car, including Gmail, Yahoo, Hotmail, Live and Outlook.

Real Time Traffic Information (RTTI) - RTTI provides up-to-the-minute details on the flow of traffic and potential delays along a journey.

Concierge service - provides additional convenience and support should the driver require location-based information e.g. addresses or phone numbers.

Remote Services - allows the customer to contact and control certain features of the car remotely. Services can be performed by calling the Customer

4G connectivity and other over the air map updates - BMW provides free of charge 4G over-the-air map updates up to 4 times per year.

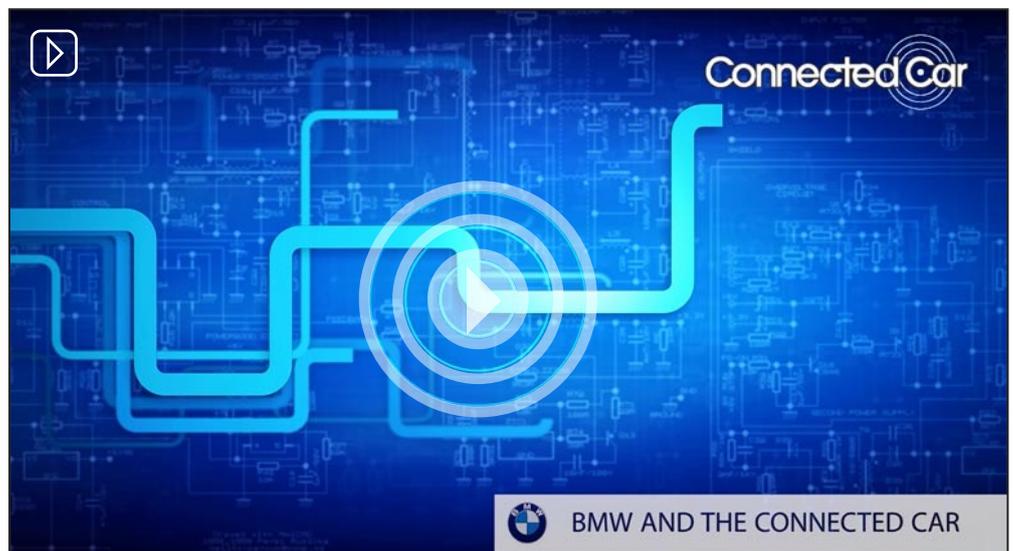
Online entertainment for cars - BMW claims it is providing the first direct to car music streaming service in Europe.



That does seem one of the most sophisticated and ambitious packages on offer, and so I decided to interview Andy Furse, BMW UK's Product Manager for Options & Technology. My goal was to learn not only BMW's philosophy, but also its goals for connected car, and the challenges that a manufacturer faces when re-engineering the car to

become part of the online/connected world.

[Click on the movie screen here to watch the Connected Car interview.](#)





CONNECTED CAR VIDEO REVIEW

We review web video presentations on the subject of connected car technology on an ongoing basis, and each issue will include a selection that we have reviewed.

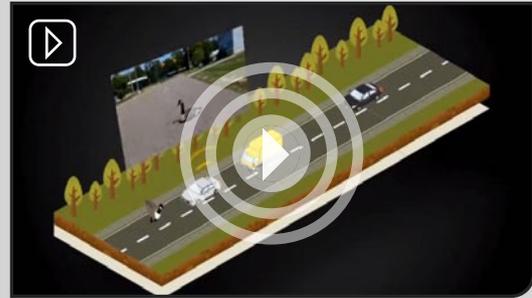
If you spot great videos, or would like to put forward your own company's video for inclusion in a future issue of Connected Car, contact us.



Click the movie screens to watch the videos



CNN: AT&T Drive Studio and the connected car.



Honda showcases new connected car and automated driving technologies.



NextGen – Interoperability for the connected car.



A ride in the Google self-driving car.



Mercedes-Benz: F 015 Luxury in Motion research vehicle.



Elon Musk talks Tesla and smart cars.



Ford at CES Asia 2015: Connectivity.



NEWS

HARMAN AND HORTONWORKS DELIVER CONNECTED CAR PROGNOSTICS SOLUTIONS TO AUTO MANUFACTURERS

Hortonworks, which is the contributor to and provider of enterprise Apache Hadoop via the Hortonworks Data Platform (HDP), and Harman, the infotainment, audio and software services company, have announced a collaboration to enable the connected car ecosystem with real-time, Internet of Things (IoT) data, insights and prognostics solutions.

HDP processes the sensor data from the connected car – collecting it, storing it and analysing it – from real-time alerts on driver behaviour, road safety or the need for maintenance and repairs. According to Hortonworks, HDP can also provide a single view of this data to inform automotive engineers about driving behaviour, safety risk and car performance across all vehicles. Connected car data can be stored in any format for processing, and integrated with existing data architectures through a full range of deployment options.

The two companies will apparently collaborate to integrate HDP functionality into Harman's cloud-based offerings, giving automotive OEMs an enterprise platform to support value-added user experiences. Incorporating offerings from Harman's Symphony Teleca and Redbend companies, Harman is claiming to be the first tier 1 automotive supplier to enable the full range of IoT and V2X applications for the connected car, including deployment of software through over-the-air (OTA) updates, diagnostics and telematics to big data, service management and analytics.

...and Harman completes acquisition of Bang & Olufsen's automotive audio business

Harman has also successfully completed its acquisition of the Bang & Olufsen Automotive car audio business. Bang & Olufsen branded audio products are available in a range of Audi, Aston Martin, BMW and Mercedes-Benz car models.

Bang & Olufsen Automotive is established as an exclusive brand delivering sound quality through its capabilities within acoustics, design and craftsmanship. In addition to the company's signature design excellence, its systems incorporate the what Harman calls the 'synthesis of emotional appeal and technological performance that represent the hallmark of Bang & Olufsen'.

INTEGRATED MULTIMODAL IN-CAR OEM NAVIGATION SYSTEM SHIPMENTS TO EXCEED 18 MILLION BY 2020

With mounting traffic congestion and increasing concerns about environmental issues, the focus of both public and private companies in the automotive and transportation industries is shifting to multimodal / intermodal transportation solutions, according to analysts at ABI Research. Traveller information systems providing real-time public transport timetable information, multimodal journey planners, and smartphone-based pedestrian guidance applications are, they suggest, geared at facilitating knowledge of and seamless access to a wide range of mobility solutions. "This is prompting car OEMs such as BMW, Jaguar Land Rover, and Ford to offer solutions beyond the narrow context of the vehicle itself, realizing their products will become part of an integrated intermodal system, offering a range of mobility modes," said VP and Practice Director Dominique Bonte.

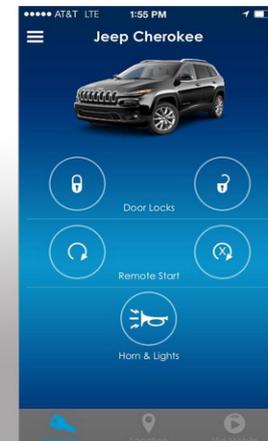
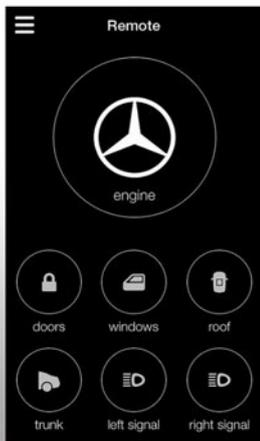
Key suppliers of multimodal in-car navigation solutions and journey planners include HERE (Jaguar Land Rover), Google (Android Auto), and INRIX (BMW i brand). ABI believes that real-time parking space availability content providers, some of which rely on crowd-sourced data, are also important actors, playing a critical role in removing the friction points between different modes of transportation. Parking Spotter, one of Ford's 25 smart mobility projects (co-developed with Georgia Tech) is based on ADAS sensors, allowing information about open street-side parking spaces identified by roaming vehicles to be shared with other drivers via the cloud.

OVER 342 MILLION CONNECTED AUTOMOTIVE INFOTAINMENT SYSTEMS TO SHIP BETWEEN 2015 AND 2020

According to a new ABI Research report, connected automotive infotainment systems will exhibit a Compound Annual Growth Rate (CAGR) of 33.8% over the next 5 years, with a rapid expansion in connected navigation and in-car Wi-Fi driving growth. Developed regions, which accounted for over 60% of shipments in 2014, will account for only 37.4% of shipments in 2020. Indeed, ABI forecasts that just over half of all systems shipping in 2020 will do so in the Asia-Pacific region.

James Hodgson, Research Analyst at ABI commented, "This growth in connected infotainment is largely consumer driven, with OEMs and Tier One suppliers both recognizing the need to provide an integrated digital experience which is consistent and compatible with the remainder of the end-user's consumer electronics."

Many OEMs have made commitments to equip the majority of their consumer vehicles shipping in 2020 with embedded connectivity. Nevertheless, a significant number of vehicles are still expected to rely on smartphone integration for their connectivity, and ABI predicts that shipments of telematics systems supporting such integration on average are expected to exhibit a CAGR of 60.6% between 2015 and 2020.



NEWS

QNX AND CERTICOM UNITE SECURITY EXPERTISE IN AUTOMOTIVE

QNX Software Systems and Certicom Corp., both subsidiaries of BlackBerry Limited, are partnering to bring cryptography and entity authentication to the automotive industry. QNX will be well-known to most readers as a developer of automotive infotainment and telematics OS and middleware systems (Ed: see [QNX interview](#) elsewhere in this issue), while Certicom is an applied cryptography and key management specialist enabling end-to-end security for smart, connected devices. The two divisions intend to provide a security framework for automakers and automotive tier one suppliers, with pre-integrations that simplify the manufacture and deployment of secure, connected vehicles.

It is no secret that in-vehicle electronics are becoming increasingly vulnerable to cyber-attack, and attack surfaces continue to grow with the use of telematics systems, Wi-Fi hotspots, apps, and brought-in devices. Certicom tells us that cryptography protects not only vehicle software, but also electronic components, by ensuring that messages between components come from authentic devices and have not been tampered with.

Certicom explained that its security solutions for vehicles include portable cryptography toolkits, a managed certificate service to manage device identity, and the Certicom Asset Management System (AMS), which provides secure key distribution during the manufacturing process. Customers can use Certicom technology to provision a component with a secure key at the time of manufacture, then manage electronic subsystem keys throughout the vehicle's lifespan to secure module communications and to ensure that air bags, brake control modules, and other safety-critical components are not counterfeited, but manufactured by trusted OEM suppliers.

Jim Alfred, vice president, BlackBerry Technology Solutions, Certicom told Connected Car, "Connected cars require faster development cycles, with security that is designed in from the start — not added as an

afterthought. Our products offer a proven platform for achieving this."

DAIMLER TRUCKS OF NORTH AMERICA BEGIN AUTONOMOUS TRUCK TESTING ON PUBLIC ROADS

According to news from ABI Research, during May, the state of Nevada, USA granted Daimler Trucks of North America (DTNA), through its Freightliner Trucks brands, a license to operate autonomous commercial vehicles on public highways. The Freightliner Inspiration Truck is apparently the first autonomous commercial vehicle in the United States to operate on highways in "real-life" traffic situations, with all of the complex and unpredictable scenarios that that entails. Outside of the United States, the Mercedes-Benz Future Truck 2025 (another Daimler brand) has been tested on closed infrastructure for some months, but ABI asks what will the significance of public road tests be for Daimler, for the United States, and for the emerging autonomous commercial vehicle market as a whole?

The Freightliner Inspiration Truck is a modified Cascadia Evolution, augmented by the same Highway Pilot system employed on the Future Truck 2025. This system enables highly automated driving by a fusion of ADAS sensors, including mid- and long-range radar and the increasingly popular stereoscopic camera. This forward-looking camera uses stereopsis to determine distances, in much the same way a human driver would, whilst the radar sensors monitor the vehicle's surroundings to allow autonomous driving with reference to vehicles at the rear and in adjacent lanes. The vehicle is also equipped with V2V and V2I communication, though this is not essential for piloted driving because the vehicle can navigate highways based on data from ADAS sensors alone. Unlike autonomous consumer vehicle trials on public roads from the likes of Google, which focus on full automation in urban environments, DTNA's prototype investigates the application of conditional automation in highway scenarios.

UCONNECT RECEIVES 'INFOTAINMENT OF THE YEAR' AWARD FROM DIGITAL TRENDS

Uconnect — the system found inside the Fiat Chrysler Automobiles (FCA) US vehicle line-up — has earned the "Infotainment of the Year" award from Digital Trends.

FCA's mission statement says that ease of access is a top priority for the Uconnect system, and that offering a variety of ways to control the systems allows drivers of all ages and skills to make the best use of Uconnect.

Commenting on the award, Nick Jaynes, Automotive Editor at Digital Trends said "No automaker has eased the learning curve for all the digital features of a new car better than FCA with its Uconnect system. With Uconnect, FCA avoided the pitfalls of option overload and distilled the essentials of infotainment into one handsome, accessible package. We love Uconnect not only for its big, 8.4-inch touch screen, few hardwired buttons and responsiveness, but also for its clean, but not overly sterile, interface."

FCA US Uconnect systems provide access to a range of features and services, including, hands-free communication options, entertainment and audio options, navigation options and Uconnect Access, Uconnect Access via Mobile, SiriusXM Satellite Radio, SiriusXM Travel Link and Traffic services that use wireless or satellite technology to deliver real-time information to drivers, e.g. Wi-Fi to check e-mail or social networks and Yelp to find popular locations, nearby gas stations and prices, movie times etc.



SHORT cuts

HARMAN ANDROID SDK FOCUSES ON SUPPORTING DEVELOPER INNOVATION

Harman International Industries has released the Android Software Development Kit (SDK) for the Harman Kardon Omni Wireless HD home audio system. This SDK enables third-party developers to create home audio and IoT (Internet of Things) experiences for Android users with high-fidelity sound.

With its SDK, Harman suggests that developers will find it more manageable to explore and participate in the new network of connected audio and IoT experiences by accessing tools, downloads and community forums. Harman says that its Developer Community will leverage the company's expertise and technology portfolio to contribute to the next generation of apps.

CONNECTED CARS TO REPRESENT 20% OF THE GLOBAL CAR MARKET BY 2019

Hi-tech analysts at Juniper Research are forecasting that the telematics sector will continue to outperform all other M2M markets over the next five years, in revenue terms, with one in five passenger vehicles connected globally by 2019.

Smartphone-based models have become the key disruptor for M2M, says Jupiter, as sectors such as healthcare, consumer electronics and retail continue to evolve. Juniper Research forecasts that the M2M sector will generate service revenues of over \$40 billion globally by 2019 - doubling the size of today's market.

JOHNSON CONTROLS TO SEPARATE AUTOMOTIVE BUSINESS

Johnson Controls is exploring strategic options for the separation of its automotive business. "This announcement continues our strategy of proactive portfolio management to drive focus on strategic product-oriented businesses where we can be a global market leader, drive more profitable growth and deliver maximum long-term value for our customers and shareholders," said Alex Molinaroli, chairman and chief executive officer, Johnson Controls.

Johnson Controls said it had no specific timetable for the completion of the strategic review, which includes a full range of strategic options for the automotive business. The company is also continuing to actively evaluate growth platforms that are aligned with the operational capabilities and specific attributes of its multi-industrial portfolio.

Connected Car MEETS ERICSSON



Preceding a full feature, Vince Holton grabbed the thoughts of Magnus Lundgren, Head of Connected Vehicle Cloud at Ericsson.

VH: Can you position Ericsson for us in the connected car sector?

ML: In the industry, Ericsson is providing the back-end for connected car with its Connected Vehicle Cloud.

VH: And what are your thoughts on autonomous driving vehicles?

ML: They provide a huge opportunity for new services in the car and will transform a lot of things once vehicles become autonomous. For example, if you have to travel very far to get to work each day, with the right services, you could maybe have a video conference inside the car, so living further away from work doesn't have to be a problem in the future.

VH: JD powers reported that the number one issue is connection in the car – what are your strategies to avoid or address this issue?

ML: The number one priority is to use a Wi-Fi hotspot in the car that is provided by the external car antenna. Using a device inside the car reduces reception drastically.

Moving forward with self-driving cars, we will see how connectivity is improved along the network.

VH: How does Ericsson see the consumer device integrating into the car in the future – beyond Bluetooth and Wi-Fi?

ML: Eventually, all cars will more than likely be a connective device, and the integration to services will be done through the cloud.

VH: How can manufacturers ensure vehicle security with greater connectivity?

ML: It is key to have a secure back-end for the connected car that makes the car available in the cloud. This way, services that are interacting with the car are accessing the cloud rather than the car itself.

VH: Data ownership is in the spotlight following requests from 3rd party marketing companies to manufacturers to sell them client data. What is Ericsson's position?

ML: Data ownership is a very vital issue and is always on the agenda of OEMs. It is important to be careful about the ownership of the data and how it is shared with partners. In general, customers are willing to share data if they receive a benefit from sharing. For example, if customers want to be able to receive information on things such as icy road conditions or road closures, they also have to agree to send out similar information.

More information:
<http://www.ericsson.com/ourportfolio/transpart/connected-vehicle-cloud>

BEYOND THE HOOD: HOW BOSCH NOW SEES ITSELF AS A SYSTEMS SUPPLIER

By Dr. Rolf Bulander,
chairman of the Mobility
Solutions business sector of
Robert Bosch GmbH



IT DOESN'T ALWAYS HAVE TO BE THE ENGINE THAT GETS THE MOST ATTENTION AT BOSCH. AND INDEED, WE'RE GIVING OUR ATTENTION NOT JUST TO THE TECHNOLOGY UNDER THE HOOD, BUT ALSO TO ROAD TRAFFIC.

Traffic that is regimented according to odd and even days, as in both Paris and Beijing. Traffic that moves at 19 kilometers per hour, as it does in London, or at a staggering five kilometers per hour, as in Mumbai. This suggests that we need to rethink personal mobility, at least in big cities, and move toward a multimodal concept encompassing bikes, trains, and buses. That's exactly why Bosch as a company is looking beyond the hood. We can summarize how the way we see ourselves has changed in two sentences:

- We are a systems supplier – and that already encompasses much more than braking and injection systems.
- And we supply systems for mobility as a whole – including solutions for connecting cars, other modes of transport, and infrastructure.



Dr. Rolf Bulander, chairman of the Mobility Solutions business sector of Robert Bosch GmbH.

Against this backdrop, Bosch decided to rename its Automotive Technology business sector Mobility Solutions. The new name says it all. That's the point I'd like to pursue. I'll sketch out our view of the future of mobility and then show how our technologies are the logical answer to that. We are already making good progress on the necessary solutions. True to our strategic imperative "Invented for life," we want to improve the efficiency not just of engines but

also of traffic in general. Only then can we truly see ourselves as a supplier of solutions for the mobility of the future.

Our Mobility Solutions business sector brings together a worldwide network of 126 manufacturing sites and 59 engineering centres. It has a total workforce of some 205,000 associates. Of these, more than 39,500 work in research and development. That's the team that is working on the mobility of tomorrow.

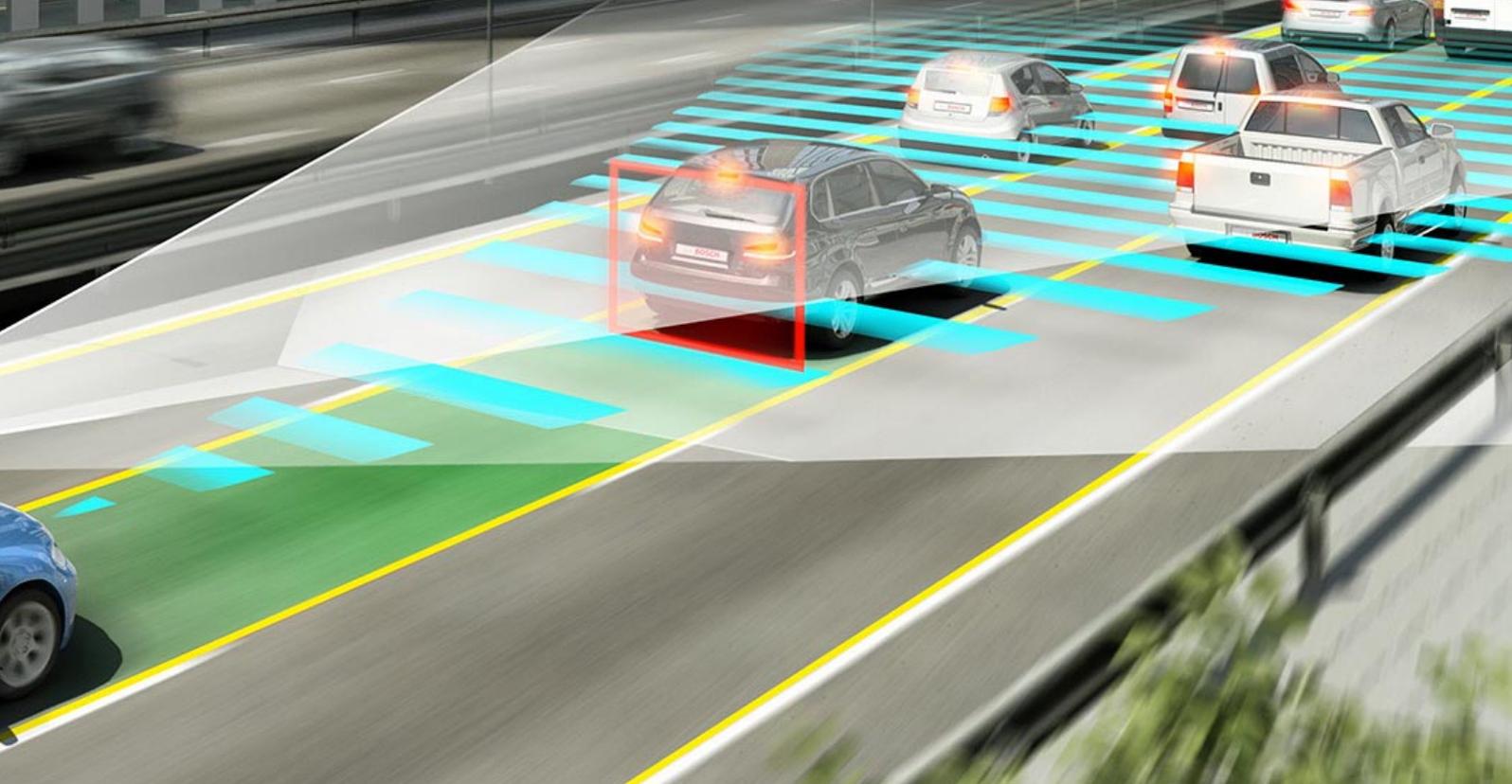
FUTURE MOBILITY: IT DOESN'T ALWAYS HAVE TO BE THE CAR

But where are cars and traffic heading in the coming years? At first glance, everything looks positive and the direction clearly set. When it comes to car driving, we see a congruence between societal and technological trends. For example, fuel efficiency is in the interest of climate protection. But forecasts can be quite uncertain – a truth that the economic and financial crisis clearly demonstrated once again a few years ago. It would be negligent to believe that market developments will be linear.

To predict the basic outline of long-term change is only one half of the story. The other half is to prepare for volatility in our markets. How can we do both?

Only by thinking in terms of scenarios. That's why at Bosch we've drawn up a series of pictures of the future. I'll compare two of them here:

- On the one hand, there's the globalization of driving enjoyment. Never mind all the rules and regulations, having your own car is still a lot of fun. So personal mobility will spread further, while the internet will further enhance the driving experience, for instance with music from the cloud. This means that in advanced economies, vehicle demand will be driven by innovations, while in emerging markets it will be driven by the adoption of Western standards of consumerism. In China, there are currently just 50 cars per 1,000 inhabitants, while in the European Union it's a good 500. Under the "fun for everyone" scenario, these numbers would converge.
- On the other hand, there's ecological globalization. This sees the world going green – either because climate protection policies are adopted right around the planet, or because megacities all over the world place limits on personal transport. The result is a further tightening of emissions and efficiency regulations for cars in both advanced economies and emerging markets. We are already seeing countries such as China and India following the European model and tightening their



emissions limits. Under the “green world” scenario, personal mobility will not only be regulated more strictly, it will increasingly be complemented by other modes of transport. This is reflected in real planning: for instance, China wants to build 170 new local public transportation systems such as subways and light rail by 2030.

ELECTRIFIED, AUTOMATED, CONNECTED: COMPLEMENTARY DEVELOPMENTS

These two pictures of the future stand at the two extreme ends of the scale: one an emotive perspective on car driving, the other ecological. And yet the technological answers to both are identical. No matter whether personal mobility continues to grow worldwide or becomes more tightly regulated – either way, powertrains will be electrified and driving will become automated and connected. The reasons for all three developments are easy to summarize:

- First, electromobility will be promoted with the same legislation that has led to advancements for the combustion engine, namely stricter efficiency and emissions regulations. But this is more than an obligatory piece of green policy, because it also enhances driving enjoyment. For instance, electromobility delivers excellent torque for acceleration even at low engine speeds.
- Second, automated driving makes road traffic more efficient and above all safer. It avoids human mistakes, which are the root cause of nine out of ten accidents today. Yet driver assistance can already relieve the burden on drivers in stop-and-go traffic, in other words, when driving is no fun. And a car with an autopilot provides a whole new driving experience – it becomes your home on the move.
- Third, connected driving, too, can help to find savings. At first glance, we might think the Internet’s greatest impact would be felt in improving mobile infotainment. But it is also capable of delivering real-time information with which to avoid traffic jams or adjust hybrid vehicles’ charging strategy depending on the current state of traffic.

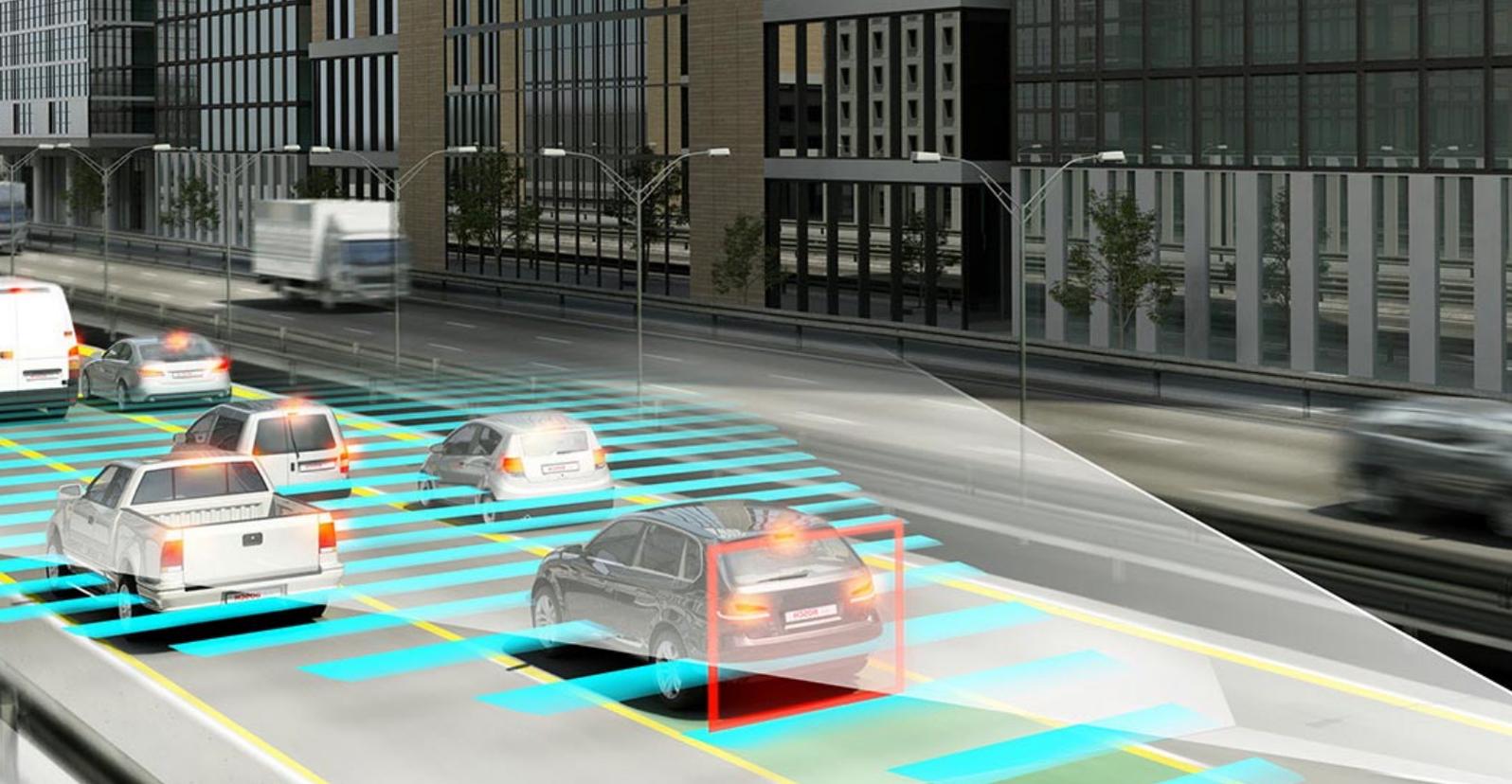
Whether electrification, automation, or connectivity – all three development paths make personal mobility both sustainable and

appealing. That means they are also compatible with contrasting pictures of the future – with both the “green world” and “fun for everyone.” But more than that: the three paths complement each other. Drivers will be more at ease if they know they can use the internet to find and reserve not only the nearest parking space, but also the nearest charge spot. Driving becomes even safer once automation allows vehicles to warn each other of intersections with limited visibility or congestion ahead. Our developments do more than fit the future, they interconnect with each other in a coherent way.

THE ROAD TO THE FUTURE LEADS TO COMMERCIAL SUCCESS

But how can we make headway on these roads to the future? Bosch is already achieving success, not just technologically but also commercially. This, too, is something I can point out for you on all three development paths:

- First, electromobility is coming – whatever reservations people may have. This is reflected in the spread of infrastructure as much as by progress in the technology. By 2020 we want to halve battery costs; by then, some three million charge spots will have been installed around the world – ten times as many as in 2013. This gives the market ample room for growth in the next decade. By 2025, 15 percent of all new vehicles will feature an electrified powertrain. But it also means that well into the next decade, the combustion engine will remain the basis for efficient mobility. Particularly where this hybridization of the powertrain is concerned, Bosch has broad-based expertise, and this is giving rise to a host of solutions. We have already completed 30 production orders for electrifying driving, ten of them for premium plug-in hybrid vehicles. In the mid-sized segment, we’re working on an affordable entry-level hybrid; here we have an order for large-scale volume production.
- Second, automated driving is coming via a market that is already expanding rapidly: the market for driver assistance systems. Bosch’s sales in this market are currently growing by a third each year. Our sales of radar and video sensors will once again double in 2015, as they did in 2014. We are the world leader in radar sensors. Last year was the first time that we sold ▶



more than 50 million sensors all told for driver assistance systems. But development doesn't stop there: this year, we're starting production of a range of new assistance systems covering remote parking, traffic jams, evasive action, and turning against oncoming traffic. By 2020, we want to produce a highway pilot for automated driving on freeways. Some 2,000 developers are working on functions such as these at Bosch – a good 700 more than two years ago. Our acquisition of ZF Lenksysteme has once again improved our prospects. Bosch technology will enable the cars of the future not only to autonomously accelerate and brake, but also steer.

- Third, connected driving has already progressed beyond the pilot-project stage. Collecting and transmitting ECU data and driving profiles and then using these to generate appointments for preventive maintenance or tips for how to use less fuel – by the end of this year, Bosch will have connected some 200,000 vehicles for these functions alone. In this way, we are helping leasing and insurance companies to manage vehicle fleets – as well as supporting services for drivers on our own mobility portal, Drivelog. In addition, we're developing completely new solutions for urban transport. One starting point is the micromechanical sensors that we employ in systems such as ESP. We are web-enabling them and fitting them unobtrusively into parking spaces. There they can detect whether a space is in use – resulting in a real-time online parking map. This will considerably reduce the time spent on looking for parking spaces, which accounts for at least 30 percent of urban driving. At the same time, we're connecting the various modes of transport. Stuttgart Services is a pilot project offering a single chip card that can be used to access car and bike sharing services, trains, and buses, but that also serves as an entry pass for swimming pools or libraries – and we developed the software solution for it. It's a sneak peek at the transportation services of tomorrow.

NEW CUSTOMERS, NEW SERVICES: BOSCH IS EXPANDING ITS BUSINESS

I would like to close for now by looking at these examples. It is precisely the topic of connectivity that shows how broad a reach our mobility solutions now have.

- On the one hand, new products that go beyond the car, such as urban transportation services.
- On the other, new customers that go beyond the automotive industry; in the future, it could be all road users.

But even within the automotive industry, our customer base has broadened to include the new entrants in California. However cars and transportation are changing, Bosch is playing an agile part in shaping those changes. And we're not going to leave it at that. It is common knowledge that Bosch's versatility goes beyond cars and transportation. That means we can connect vehicles with smart homes – so our car's navigation system can instruct our home's heating system to warm up the living room before our arrival. In short, whether for houses or for cars, Bosch creates technology that is "Invented for life". We can connect them all, and this gives rise to a better quality of life. With the versatility of our expertise, our prospects for the mobility of the future are excellent



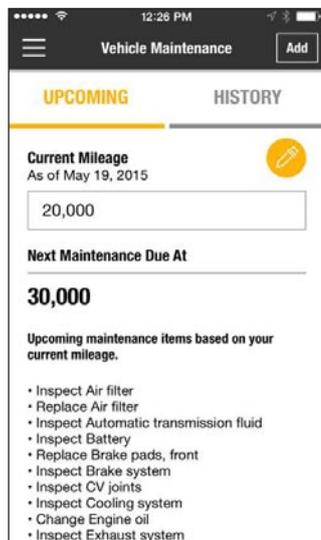
MOPAR ENHANCES FCA OWNER APPS

The Mopar brand has redesigned and enhanced its suite of FCA Owner apps, and says that it is putting more resources than ever at owners' fingertips with easier access to vehicle and lifestyle information.

Beginning with model-year 2011 vehicles, Mopar introduced smartphone vehicle-information apps for customers. The latest enhancement to FCA Owner apps, available free for download for both iOS and Android mobile devices, provides access to an archive of vehicle-specific information, including maintenance schedules, service history, recall notices and more.

Pietro Gorlier, President and CEO – Mopar Brand Service, Parts and Customer Care, FCA told Connected Car, "Mopar was first with smartphone vehicle apps for customers, and the redesigned FCA Owner apps provide another important extension of the vehicle ownership experience. From augmented reality to a wide variety of vehicle-specific information, FCA Owner apps are a comprehensive mobile tool for owners on-the-go in their customer journey every day."

Gorlier explained that owners can tap into an "augmented reality" function through the app, using the camera feature on mobile devices to scan and identify certain instrument panel icons. How-to information and videos are also available, and owners can log and track vehicle mileage or monitor a purchased Mopar Vehicle Protection plan.



Push notifications allow the customer to regularly receive important information updates about their vehicle, including maintenance offers, open recall alerts and tricks and tips.

And here is one feature that most of us would benefit from at one time or another - an enhanced Parking Reminder feature that enables owners to set a pin at their parking location and a timer for the meter, and even provides walking directions back to the vehicle. Users can also connect with dealerships to find a nearby location and

view coupons, or for those looking to purchase a new car, schedule a test drive and receive a quote.



An OEM industry-first Accident Assistant feature helps owners create accident records, upload insurance information and capture accident scene photos. Owners can search a Shop Locator by city or ZIP code to find a certified FCA collision repair facility and schedule an appointment to ensure their vehicle is repaired using original equipment parts. Owners can also access Roadside Assistance.

Personalisation is a keyword for today's car buyers, and Mopar has thought of that too. Owners can customize the app to highlight their favourite FCA US vehicle brand, choosing from Chrysler for Owners, Drive Dodge, Jeep Vehicle Owners, Ram Toolbox, My FIAT and Mopar Owner's Companion versions of the app. Each brand version also supports other 2011-2015 FCA brand models — for instance, owners can download the Ram Toolbox version of the app but still access vehicle information on Jeep or Chrysler vehicles parked in their garage.

All brand versions of the app are available for download in both English and Spanish on mobile devices, including phones and tablets.



mobile  comply



NEWS

ELEKTROBIT CORPORATION SELLS ITS AUTOMOTIVE BUSINESS TO CONTINENTAL

Elektrobit Corporation (EB) and Continental AG have done a deal which sees EB sell its automotive business to Continental. The transaction comprises the sale of Elektrobit Automotive GmbH and its subsidiaries, including EB's 51 per cent ownership in e.solutions GmbH, a jointly owned company between Elektrobit Automotive GmbH and Audi Electronics Venture GmbH. In addition, the rights to the name Elektrobit will transfer to Continental. The purchase price is apparently EUR 600 million.

EB's automotive business offers a range of software products and R&D services for in-car embedded software, as well as professional tools that support the process of the in-car software development. Its customers are carmakers, car electronics suppliers and other suppliers to the automotive industry. EB's automotive business has been organized under Elektrobit Automotive GmbH and employed 1,431 people worldwide, mainly in Germany. In addition, the jointly owned company e.solutions GmbH employed 459 persons.

Continental is a supplier of brake systems, systems and components for powertrains and chassis, instrumentation, infotainment solutions, vehicle electronics, tires and technical elastomers. Continental is also active in networked automobile communication.

Commenting on the deal, EB's CEO Mr. Jukka Harju said, "The automotive market, including software is in a very dynamic phase. Cars are becoming increasingly connected and automated driving is another megatrend in the car industry. The carmakers continue to invest in automotive software for new car models and the market for software products and services is estimated to continue to grow. As a result, the carmakers, suppliers of various parts and systems for cars and well-known consumer and IT products companies are increasing their focus on these markets. After this divestiture, we will focus on growing the Wireless Business Segment under a new name, Bittium Corporation."

MOBILE COMPLY UNVEILS CONNECTED VEHICLE PROFESSIONAL CREDENTIALING

Mobile Comply, The Connected Vehicle Trade Association (CVTA) and The Society of Automotive Engineers (SAE) International unveiled their jointly developed, vendor-neutral training and credentialing program in connected vehicle technology, The Connected Vehicle Professional (CVP) Credentialing Program at SAE World Congress, which took place in Detroit during April. The program is apparently aimed at helping professionals build a skill set and increase credibility by signifying that the individual has the requisite understanding necessary to perform tasks involving connected vehicle and intelligent transportation best practices, in-vehicle safety, infrastructure, communication protocols, security and more.

The consortium stated that there is an unfilled need for skilled workers across the country. Currently, more than 80,000 skilled and technical jobs are unfilled in Michigan. Additionally, an estimated 500,000 new jobs are forecast to be created within the connected vehicle industry by 2020, with an almost sevenfold increase in the number of new vehicles equipped with factory-fitted mobile connectivity over the next five years.

The series consists of three courses:

- CVP I – Function, Protocols, and Architecture
- CVP II – Standards, Organizations, Programs, V2X
- CVP III – Data, Markets, Policy and Regulations

The CVP Credentialing Program's learning approach incorporates instructor led lectures, online activities, videos, and other interactive elements to provide the professional with the necessary understanding of Vehicle-to-Vehicle, Vehicle-to-Infrastructure, and Vehicle-to-X connectivity inclusive to the rapidly advancing field of connected vehicles. Those who successfully complete the end-of-course learning assessments are awarded the SAE International/CVTA Certificate of Competency.

7.7 MILLION TRUCK PLATOON SYSTEMS TO SHIP BY 2025

ABI Research suggests that truck platoons are the most imminently anticipated application of highly automated driving in commercial vehicles. A fusion of forward-looking radar and V2V communication enable fleets of trucks to safely manoeuvre with a short distance between vehicles. The reduction in aerodynamic drag for following vehicles, and build-up of pressure behind the lead vehicle yields impressive fuel efficiencies, with various tests reporting convoy savings of between 5% and 10%. "With most fleet operators attributing some 30 to 40% of their operating costs to fuel expenditure, the savings presented by platooning are significant," James Hodgson, research analyst, ABI Research told Connected Car.

As technology progresses and regulations adapt to accommodate greater vehicle automation, ABI predicts that further benefits to fleet operators will come in the shape of labour productivity gains and better asset utilization. Currently, solutions from pioneers such as Peloton Technology require active intervention from the following driver to keep the vehicle within the lane of travel, but in the future the driver of the lead vehicle could be in sole control of all vehicles in the convoy; allowing following drivers to rest, or eliminating the need for them altogether.

TESLAS ADDED TO BOSCH AUTONOMOUS DRIVING TEST FLEET



S POTTING A TEST VEHICLE, EQUIPPED AS THEY ARE WITH MEASUREMENT DEVICES, SENSORS, AND INSTRUMENTS, IS USUALLY PRETTY EASY. BUT THAT'S NOT THE CASE FOR THE NEW MODEL S TESLAS THAT RECENTLY JOINED THE BOSCH FLEET. Bosch told Connected Car that both these test vehicles are helping engineers further refine automated driving. But at first glance, it's hard to tell them apart from production models. "Bosch is developing automated driving for production vehicles of all kinds," said Dr. Dirk Hoheisel, member of the Bosch board of management, adding that the new test vehicles are evidence of the progress Bosch has already made in integrating the necessary systems and components.

To make the test vehicles ready for automated driving, they first had to be retrofitted. Fifty new Bosch components were installed in each car. They included a stereo video camera (SVC), which the car uses to recognize lanes, traffic signs, and clear spaces. The Bosch SVC is claimed to be the smallest stereo camera system for automotive applications currently available in the market. In addition to the camera, 1,300 meters of cable were laid in each car and fixed in place with 400 cable ties. The company says that the two Teslas can now autonomously drive from a highway on-ramp to off-ramp without the driver needing to constantly monitor them.

This transfer of responsibility from the driver to the vehicle explains why so much time and effort is necessary for the retrofit. Highly automated vehicles have to be capable of operating safely even if a component fails. The only way to achieve such operational reliability is by a design strategy that includes redundancy in safety-critical systems such as braking and steering. For example, both test vehicles feature both Bosch's iBooster electromechanical brake booster and the ESP braking control system. These can brake the car independently of each other, without any need for driver intervention. Back-up systems are also available for the two test vehicles' power supply and vital ECUs.

Since 2011, Bosch has had two teams – on two continents –

working on automated driving. At the Abstatt location in Germany, Bosch engineers are working on system integration. Their colleagues at Palo Alto in California's Silicon Valley are driving forward work on function development. The two teams receive support from roughly 2,000 driver-assistance engineers who work for Bosch around the world. To make it as easy as possible for the two teams to share their results, Bosch uses identical test vehicles. Hoheisel explained why Bosch opted for two all-electric Model S vehicles made by the U.S. automaker Tesla: "They combine two automotive industry trends: electrification and automation." This presents a particular challenge, he said, but one that Bosch apparently relishes.



Bosch started testing automated driving on public roads at the beginning of 2013. So far, it has been using test vehicles based on the BMW 325d Touring. Engineers have successfully driven them for several thousand kilometers on freeways – both the A81 near Stuttgart and the I280 in California. Before the first test drives, the German certification authority TÜV Süd reviewed the safety concept that Bosch had prepared specially for the purpose.

CONTINENTAL REVEALS FIRST COMPLETE TOUCH SCREEN WITH HAPTIC FEEDBACK FOR USE IN VEHICLES

With its new active haptic feedback display, the automotive supplier Continental says it is offering an intelligent solution to the problem of drivers taking their eyes off the road to use infotainment systems.



The technology provides feedback by means of a movement impulse that can be felt through one's fingers, indicating that the desired operation has been triggered and understood by the system. The display has to fulfil several additional requirements to be certified for use in vehicles. For example, finely tuned force recognition (or "force sensing") ensures that accidental touches can be distinguished from intentional operational commands.

Continental is currently showing a demonstrator with haptic feedback across the entire touch display, showcasing technology currently ready for production. It is a touch-sensitive, car-appropriate 8-inch screen with a built-in haptic actuator system. The company claims this as a 'first'.

The actuators are made up of an electromagnetic spool with two windings. In certain operating situations, they trigger mechanical feedback that can be clearly felt by the user and, at the same time, measure the force exerted. The actuators are located behind the construction elements of the touch display, under the screen's bonded layers (protective glass, capacitive sensor and display). The conditions for use in vehicles and the basic principle of active haptic feedback require an especially rigid structure for the individual construction elements. Continental suggests that its solution can be scaled to larger display sizes depending on vehicle manufacturers' requirements. An application of the haptic feedback for display sizes of up to 12.3 inches is technically possible at this time.



Jennifer Wahnschaff, head of instrumentation and driver HMI, Continental North America told Connected Car, "The active haptic feedback enables us to close the loop between driver, vehicle, and environment. The clear advantage is that the driver does not have to change focus or take their eyes off the road, but instead receives direct tactile feedback from the touch screen."

The tactile feedback from the display is not visible to the naked eye as a mechanical movement because the "deflection" is apparently only around a tenth of a millimeter. However, as this takes place with very high acceleration, the mechanical impulse generated can be clearly felt by a finger. The feedback always takes place on the entire display area. The characteristics and intensity of the haptic feedback can be freely configured, so that it can be adapted to the brand-specific haptic standards of automotive manufacturers. The feedback can also be tailored to a particular driving or operating situation.

Continental said that the operating concept developed by for its haptic feedback display was specifically designed to allow for tactile feedback. It includes haptic search, an aspect that is important for the reduction of driver distraction. When the driver runs a finger over the display, the haptic feedback provides information about the boundaries or functional use area. Among other things, this kind of touch support allows the user to distinguish between several virtual buttons without having to look at the display.

The haptic feedback display enhances operating safety and user-friendliness by allowing largely "blind" operation of the touch screen controls while driving. Users receive active haptic feedback in precisely those operating situations in which they expect it.

Operating elements with haptic feedback developed and produced by Continental, are already in widespread use. For example, the Mercedes C-Class has this technology integrated into an optional touchpad that controls the infotainment system. Continental is anticipating the haptic feedback display to be in series production by 2017.

Connected Car

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NextGen

TOP HANDSET RELEASES BY REGION – Q3 2015



EUROPE Q3

MANUFACTURER	MODEL
HTC	One M8s
Huawei	P8
Huawei	P8 Lite
LG	G4 H815
LG	G4c H525
LG	Leon H340
Microsoft	Lumia 640
Samsung	Galaxy A7 A700F
Sony	Xperia M4 Aqua E2303
Sony	Xperia Z3+ E6553



NORTH AMERICA Q3

MANUFACTURER	MODEL	CARRIER
LG	Escape 2 H443	AT&T
LG	G Stylo H631	T-Mobile
LG	G4 VS986	Verizon
LG	G4 H810	AT&T
LG	Lancelot VW820	Verizon
LG	Leon H345	T-Mobile
Microsoft	Lumia 640	T-Mobile
Microsoft	Lumia 640 XL	AT&T
Samsung	Galaxy J1 J100V	Verizon
Samsung	Galaxy S6 Active G890A	AT&T



CHINA Q3

MANUFACTURER	MODEL
Gionee	Elife E8
HTC	One E9+
HTC	One ME
LG	G4 H818
Meizu	M2 Note
Meizu	MX5*
Nubia	Z9
Oppo	R7
Vivo	X5Pro
Xiaomi	RedMi 2A

* Device details are subject to confirmation



JAPAN Q3

MANUFACTURER	MODEL	CARRIER
HTC	J Butterfly HTV31	au
LG	Isai Vivid LGV32	au
Sharp	Aquos Serie SHV32	au
Sony	Xperia Z4 SOV31	au
Fujitsu	Arrows NX F-04G	docomo
Fujitsu	Disney Mobile DM-01G	docomo
Sharp	Aquos Ever SH-04G	docomo
Sharp	Aquos Zeta SH-03G	docomo
Sony	Xperia Z4 SO-03G	docomo
Kyocera	Digno U	Softbank



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.

2015

1-2 July 2015

AutomotiveIT International Congress

Paris, France

<http://congress.automotiveit.com/>

18-20 August 2015

Bluetooth SIG 2015 Automotive Test Event

Auburn Hills, MI, USA

<https://www.bluetooth.org/en-us/news-events/upcoming-events/testing-events/automotive-test-events>

15-16 September 2015

Bluetooth World Europe

London, United Kingdom

<http://bluetootheuropeevent.com/>

12-15 October 2015

Bluetooth SIG UnPlugFest 52

Berlin, Germany

<https://www.bluetooth.org/en-us/news-events/upcoming-events/testing-events/unplugfest>

14 October 2015

OpenAutomotive

Seoul, Korea

2-3 November 2015

TU Automotive Europe

ICS International Congress Centre, Stuttgart, Germany

<http://www.tu-auto.com/europe/>

17-19 November 2015

Connected Car Expo/ LA Auto Show

Los Angeles, California, USA

<http://connectedcarexpo.com/>

18-19 November 2015

Internet of Things World Forum 2015

London, UK

<http://iointernetofthingsconference.com/connected-car/>

2016

6-9 January 2016

Consumer Electronics Show

Las Vegas, Nevada, USA

<http://www.cesweb.org/>

3-13 March 2016

Geneva Motor Show

Geneva, Switzerland

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

8-9 June 2016

TU Automotive USA

Detroit, Michigan, USA

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



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