DVN-I
Automotive Interior

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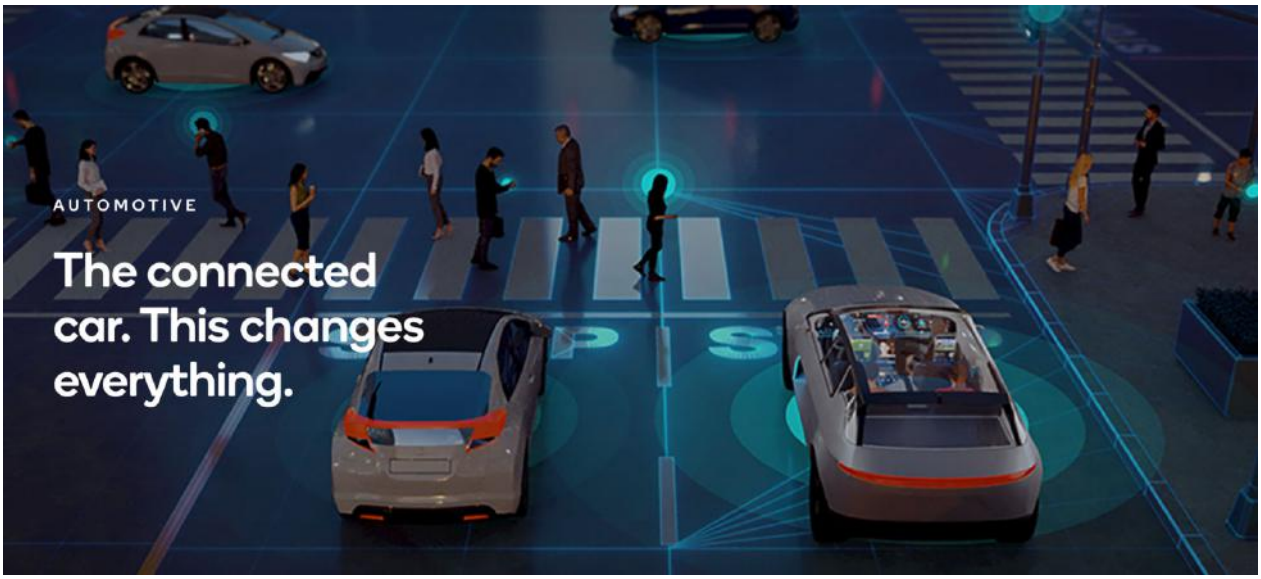
Editorial

New Digital Platforms Usher In A Connected Transport Era



QUALCOMM IMAGE

Qualcomm is one of the companies working with the automotive industry to create a connected future. Their solution comprises telematics, a digital cockpit, driver assistance systems, efficient chipsets, and cloud services—the basis for manufacturers to realise a digital chassis. That's a fine reason to take an in-depth look at Qualcomm, which you'll find in this week's in-depth article.

Elsewhere in this week's DVN-I Newsletter, we take a close look at the cooperation between Osram and Grupo Antolin for digital projection systems; a new kind of HUD from Volvo and Spectralics, and how BMW optimizes the acoustics in the vehicle. Also: the Kia EV6 wins a big award, and Rightware's new all-in-One HMI tool. We've got coverage of AI systems and legislative approvals for autonomous driving on higher levels, and information about the top 10 EV makers in China and the joint venture between BMW and Brilliance.

And you won't want to miss the upcoming **DVN-I Workshop** in Köln on 25-26 April—the best place to meet and be met; to exhibit your own innovations and see everyone else's, and to discuss the most important interior topics with a grand gathering of top experts. If you haven't already, **register here**.

We are glad you're here in the DVN-I community. Not a member yet? Come **join us**!

Sincerely yours,

Carsten Befelein
DVN-Interior Consultant

In Depth Interior Technology

Qualcomm Technologies' Snapdragon Digital Chassis

QUALCOMM IMAGE

Cars are evolving rapidly, driven by immense consumer demand for new smart services and greater comfort and safety. New digital platforms are bringing on an era of connected transport wherein cars will connect to the cloud and to mobile services, to other vehicles and pedestrians, and to surrounding infrastructure. And mobile connectivity will keep onboard computers up to date (to patch inevitable security flaws and software bugs; to upgrade features, etc) without intervention by the driver or dealer.

Qualcomm has positioned itself for a leadership role in this sector of the automotive industry, they work with 23 of the 25 leading automotive brands. Their offerings include telematics, digital cockpit, ADAS, efficient SoC (systems on chip), and cloud services. These form the basis on which manufacturers can realise a digital chassis.

The Qualcomm Snapdragon Digital Chassis comprises a portfolio of open, scalable and cloud-enabled automotive platforms. It helps automakers and tier-1 suppliers develop connected, intelligent vehicles that are customisable and upgradable. This portfolio of technology components is integrated into the car to support a safer and more immersive in-car experience that can be continuously upgraded with new features and services.

QUALCOMM IMAGE

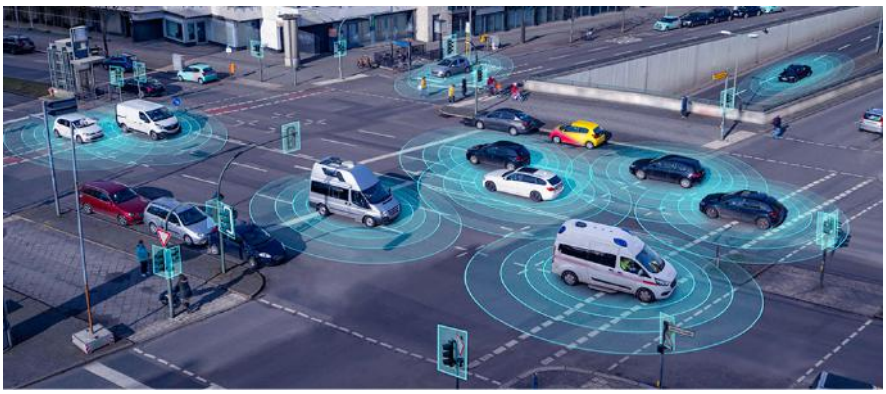
To support the rapid pace of change in the automotive industry and enable a digital chassis, Qualcomm has divided their automotive segment offerings into four key areas:

• Telematics for 4G; 5G; WiFi; Bluetooth; C-V2X, and low-latency cloud connectivity;

• Advanced digital cockpit platforms for 4K displays; premium audio; streaming entertainment, and contextual safety features;

• Scalable ADAS/AD solutions, such as the Snapdragon Ride platform for robust, high-performance safety systems and autonomous driving, and

• Cloud connectivity with the Snapdragon Car-to-Cloud Platform to deliver new in-car experiences and services to drivers and open up new business models and revenue opportunities for car manufacturers; content providers, and application developers.



QUALCOMM IMAGE

Manufacturers and tier-1 suppliers can use Snapdragon 4G and 5G modems to meet the demands for personalized, high-quality customer driving experiences. Technologies such as C-V2X; WLAN; Bluetooth, and precise location tracking are integrated.

The Digital Cockpit combines the infotainment and control elements of a vehicle. The new Gen-4 Snapdragon Cockpit Platform enables manufacturers to create high-value experiences in the car.

For automated driving, cars need—among other things—strong onboard computing power. Qualcomm offers scalable SoCs for automated driving that are based on a 5-nm manufacturing process for high energy efficiency. Manufacturers can access an expanded software ecosystem with industry-proven stacks for image processing, parking and driver monitoring.

With cloud connectivity, vehicles get new digital features and personalized services. The Snapdragon Car-to-Cloud Platform connects vehicles to the cloud and helps automakers offer new services to generate new revenue. For example, drivers receive personalized in-vehicle services through over-the-air updates or on-demand optimizations of existing features. This

works over the entire lifetime of a connected vehicle (or until its maker decides to stop supporting it, whichever comes first).

RENAULT IMAGE

The Snapdragon Cockpit Platform is used, for example, in the i-Cockpit communication and infotainment system in the new Peugeot 308—delivering connected experiences and offering responsive interfaces; high-resolution 4K graphics, and media streaming and immersive sound to create a premium in-car experience.

OPEL IMAGE

The new Opel Astra will also use Snapdragon cockpit platforms to power the all-digital Pure Panel cockpit. This features wide, high-resolution touchscreen displays as well as a new HMI that offers vehicle occupants a simple, connected, intuitive driving experience. And BMW Group recently announced that their next generation of automated driving and ADAS solutions will use the Qualcomm Snapdragon Ride Platform to deliver a safety-focused, intelligent, sophisticated driving experience.

The convergence of connectivity; efficient computing power; artificial intelligence, and cloud access is creating new opportunities int he automotive field, starting with 5G and connectivity. Computing power is available in the connected vehicle, while virtually unlimited computing power is available from the cloud. A connected, intelligent, autonomous automotive future is already arriving, brought forth by the likes of Qualcomm's Snapdragon technology.

Interior News

Antolin + AMS Osram = Digital Projection for Car Interior

INTERIOR NEWS

AMS OSRAM IMAGE

Compact digital projection modules from AMS Osram and Grupo Antolin enable the flexible display of individual content on a wide variety of surfaces, which can be used for ambient lighting, enhanced entertainment, and passenger safety.

AMS Osram have partnered with Grupo Antolin, combining their expertise in lighting, electronics and integration, to further develop and integrate their digital projection solutions. The aim is to unlock new functionalities for digital projection systems and their application on various surfaces, such as the roof liner; dashboard; side panels, and panoramic roof.

Digital projection technology opens up a wide range of options for displaying customised content such as exterior environments; videos; visual patterns; logos, and other images like warning signals or supporting information for drivers. Another focus of the application is on greeting scenarios.

The digital projectors are based on the DMD (digital micromirror device) approach, and can be seamlessly integrated into the vehicle interior to display projections on different surfaces. The modules can be synchronised with the functional and ambient lighting and individually adapted to different driving scenarios and the mood of the passengers.

Volvo Buys Into Spectralics for New AR-HUD Tech

INTERIOR NEWS

VOLVO IMAGE

Volvo has invested in Israeli startup Spectralics, who are developing a new whole-windshield AR-HUD display.

Spectralics is a deep-tech company developing optical engines and advanced materials. Their HDK (Hardware Development Kit) for imaging systems functions as a technological infrastructure to support advanced displays, interfaces, cameras, sensors, medical devices, and more. They use metamaterials and nanotechnology to create a new breed of smart dynamic optics based on switchable elements controlled by software and voltage.

Volvo's present windshield-display HUDs show detailed driving information like turn-by-turn navigation and the estimated time of arrival. But, like all conventional windshield HUDs, they have some shortcomings: the HUD's projected image can be distorted or made difficult to see by sunlight hitting the dashboard, or from the angle of the viewer in comparison to where the HUD is being projected.

The innovative new AR-HUD solution is directly layered into the windshield using a thin film Spectralics produces, which they call a 'multilayered thin combiner'. It ensures the driver clearly sees the HUD at all times, in all conditions, while turning the windshield into an augmented-reality display. Volvo's implementation will reportedly display information or graphics on any portion of the windshield, and use cameras to pinpoint and outline street signs, obstacles, and roads.

As is typical of startup's advanced development, product and industrial feasibility have so far not been achieved, so no start of sales is on the calendar…yet!

Acoustics Are Central in Electric BMW i7

INTERIOR NEWS

A CAMOUFLAGED NEW I7 IN DEVELOPMENT ON AN ACOUSTIC TEST BENCH (BMW IMAGE)

At BMW's Research and Innovation Centre (FIZ), they're working on the acoustics of the forthcoming new 7-Series, and now have provided some detail about the development of the battery-electric i7 with the analysis of drive and rolling noise, aeroacoustics, and vibration comfort; their guiding principle is that wellbeing in the interior is largely determined by keeping disturbing noises away from the occupants. This aspect of R&D is taking place on new acoustic test benches specially designed to meet the requirements of electromobility, in the new FIZ Project House in Munich.

There are sound absorbers in the pillar trim, the seats, the headliner, and the rear shelf. Beyond that, the acoustic optimization of the electric drive units, the model-specific mounting concept, and newly-developed noise encapsulation for the electric motors should contribute to a correspondingly low noise level. Increased frontal body stiffness and tires with a foam absorber inside for integrated noise insulation are also intended to reduce NVH. In addition to the wind tunnel, an acoustic climate test rig simulates globally relevant climate conditions and, especially at temperature extremes, analyzes and optimizes noise sources such as the HVAC system.

BMW IMAGE

Kia EV6 is Geneva Auto Show Car of the Year

INTERIOR NEWS

KIA IMAGE

Kia picked up a first-time Car of the Year award at the Geneva motor show, beating out six other (mostly) electric vehicles. The seven finalists' voting point totals were:

- Kia EV6: 279 points
- Renault Mégane E-Tech: 265 points
- Hyundai Ioniq 5: 261 points
- Peugeot 308: 191 points (not a full EV, but available as plug-in hybrid)
- Škoda Enyaq iV: 185 points
- Ford Mustang Mach-E: 150 points
- Cupra Born: 144 points

It is interesting to notice that 18 out of the 39 candidates for this year's award are EVs. The EV6 is Kia’s first BEV. We looked at it in DVN Interior previously (21 March 2021). Rather than Hyundai's flat floor (E-GMP platform) and moveable center console, it has a static center section with a great deal of storage built in, and a much more intimate feel.

KIA IMAGE

Recapping our report from last March: the EV6 employs a retro-futuristic and simple design, while the Kia's styling takes a more dramatic and sporting approach with a seamless, curved, driver-oriented infotainment display and center console. Extending from the steering wheel across to the center of the car, it displays an instrument cluster in front of the driver, with infotainment and navigation above the center console. The width of the screen is said to create an immersive experience for the driver, with a minimal number of physical buttons to offer an uncluttered and soothing driving experience.

Underneath the central nav screen, HVAC settings are controlled with haptic simulated buttons. Below this panel, the dashboard slopes away toward the front of the car, creating a sense of space and openness for the driver and front passenger. A handsome mix of light and dark materials adds an upscale feel.

Rightware's Kanzi One is Do-All Automotive HMI Tool

INTERIOR NEWS

RIGHTWARE IMAGE

Rightware, a ThunderSoft company, recently released Kanzi One, which they say lets automakers deliver future-looking user experiences for advanced HMIs in less than half the time with teams half the size and with significantly less coding compared with traditional methods.

Rightware is headquartered in Finland. They have presence in China, Germany, Italy, Japan, South Korea, the UK, and the USA. The guiding philosophy for their renowned Kanzi tool suite is a designer empowerment, with priority on rapid prototyping; workflow efficiency, and high performance. This first automotive HMI toolchain to be fully compatible with Android, Kanzi One delivers industry-leading 3D graphics and a new UI workflow, empowering automakers to create compelling new user experiences with visual excellence and high productivity.

Rightware says their goal with Kanzi One is to inspire automakers and tier-1 suppliers with impressive rendering capabilities and a powerful 3D graphics engine, the deepest Android integration for next generation infotainment systems, and a straightforward workflow that unleashes HMI possibilities.

News Mobility

AI System to Optimize Object Recognition From Radar Sensors

NEWS MOBILITY

INFINEON IMAGE

In the REPAIR project—Robust and Explainable AI for Radar sensors—a team at the Institute for Signal Processing and Speech Communication at TU Graz is working together with Infineon to optimize an AI system to improve object recgonition by attenuating mutual interference in radar signals. Model architectures for automatic noise reduction were developed based on CNNs: convolutional neural networks. These filter visual information; recognize correlations, and complete the image based on familiar patterns.

Over the next three years, the project, funded by the Austrian Research Promotion Agency FFG, will further optimize this development and make the radar sensors even more robust against interfering signals. TU Graz's Franz Pernkopf says "For our successful tests, we used similar data that we had used for training. We now want to improve the model in such a way that it still works when the input signal deviates significantly from learned patterns". The system should eventually be able to recognize uncertain predictions and react to them with a secured emergency routine, for example.

Germany Approves L4 AD Law

NEWS MOBILITY

BMW IMAGE

On 23 February, the German Federal Cabinet decided on a further step towards L^4 autonomous driving. As the Ministry of Transport in Berlin announced, one core of the legal ordinance is a regulation on the procedure for the admission of motor vehicles with autonomous driving functions to road traffic by the Federal Motor Transport Authority. The Bundesrat still has to approve the ordinance.

The ordinance states that the development dynamics for automated, autonomous and connected driving remain high. In order to be able to exploit the potential of this technology, it is necessary to implement further steps for the introduction of corresponding systems into regular operation. It is a matter of going beyond the testing already possible in road traffic and introducing their regular operation. Initially, autonomous vehicles should be able to be used in defined operational areas.

German Automotive Industry Association president Hildegard Müller says "The fact that the Federal Cabinet has finally passed the missing ordinance on the law on autonomous driving today is an important step. Now the Bundesrat must also pass this ordinance as soon as possible, because the automotive industry wants to put vehicles with autonomous driving functions on the road this year".

General News

China's Top Ten EV Makers

GENERAL NEWS

A RED BYD TANG (BYD IMAGE)

Domestic automakers dominate the Chinese market for new energy vehicles. Evidence: Volkswagen, who have long held a giant chunk of the Chinese market, did not make it into China's ten most successful NEV manufacturers with their ID series.

Due in part to its strong popularity in China, Tesla's Model 3 was the best-selling e-car on earth for the fourth year in a row. Although sales of Volkswagen's ID series are steadily increasing, in 2021 VW sold only around 70,000 of them in China's highly competitive car market—that's how many cars Tesla sold in China last December alone!

According to the latest figures, the biggest competition for Tesla comes from China. In 2021, BYD was the biggest winner in the new energy vehicle market. In China, New Energy Vehicles or NEVs include all vehicles with alternative, "green" drives, i.e. not only purely electric vehicles, but also hybrids and vehicles with fuel cells.

BYD sold 580,000 NEVs in China last year, 220 per cent more than in the previous year and more than any other car manufacturer. Because of this impressive catchup, Chinese media are now speculating that BYD could possibly dethrone Tesla as the global market leader in e-cars in 2022.

BMW Buys Majority in Brilliance JV

GENERAL NEWS

BMW IMAGE

BMW has bought the majority shareholding in their Chinese joint venture BMW Brilliance Automotive, and extended the JV agreement out to 2040.

The increase in BMW's stake of BMW Brilliance Automotive (BBA) from 50 to 75 per cent took place on 11 February, from which date BBA will be fully consolidated in BMW AG's consolidated financial statements. The Chinese partner, Brilliance China Automotive Holdings (CBA), holds the remaining 25 per cent. This is the first time a foreign carmaker has taken a majority stake in a joint venture in China. Previously, foreign carmakers in China were only allowed to hold 50 per cent in joint ventures with Chinese partners, but since 2022 this limit has been relaxed.

The joint venture, founded in 2003, produces BMW vehicles with combustion engines and electric drives at two locations in Shenyang, Liaoning province, for the Chinese market and for export.

BMW also announced that BBA is again increasing production capacity in Shenyang due to high demand. To this end, the BBA plant in the Dadong district is being comprehensively expanded. In addition, a completely new plant will be built in the Tiexi district. Nicolas Peter, BMW's management board member responsible for finance, says "Our extended joint venture agreement lays the foundation for further joint growth and progressive development in the future. It paves the way for us to continue to develop in a balanced way in the three major regions of the world".