Editorial

Köln Workshop, Part 2

DVN IMAGES

The DVN Interior workshop was a dense collection of technology—really a grand success, and it's incredible to see how much our interior community is growing year upon year.

This week, we report on the seating and cockpit sessions, after last week's coverage of keynotes, materials, sustainability, and interior lighting.

The seating session covered a broad perspective on seat benchmarking, regional evolution, and technology, with safer solutions, haptics, sensors, active comfort, and comparison of features between China and Europe. The cockpit session covered evolution of displays, with windshield displays including HUDs, and transparent displays with the objective to reduce distracting touchscreens.
Polestar and Renault provided automaker perspectives, with emphasis on user experience, including emotions.
Refraining from cognitively or visually overloading the driver is of pivotal importance for safe HMI. So are tactile buttons and switches within easy reach, on any surface—including smart surfaces and multifunction steering wheels.

If you missed a session, all speaker videos will soon be available on our website for participants to (re)watch and enjoy. PDF presentations released for publication will be posted as well. A dedicated report will be published soon to sum up all contributions.

Thanks again to all for your outstanding contributions and participation.
Sincerely yours,

Philippe Aumont
DVN-Interior General Editor

In Depth Interior Technology

In Depth #1 : Seating Session Overview

SEATING SESSION Q&A. L TO R: UWE WOLF · OLIVER KUERTEN · FADY YOUSSEF · FRANCESCO RUOCCO · ARNAUD GOY · GUANG YANG · SASCHA KLAPPER · PROF. DR. ANDREA UPMANN (SEATING SESSION CHAIRWOMAN)

The seating session covered a broad perspective on seat benchmarking, regional evolution, and technology. Technology highlights included haptics, seat sensors, gamification for more active posture, safe monitoring of child seats, carbon-reduced seat structure, and regional evolutionary forks—such as the Chinese-market importance of seats as a pillar of the mobile environment—which are influencing the global market

Seat Benchmarking Highlights Europe/Asia
(Arnaud Goy, A2Mac1 / LMI)

A2MAC1 provides full coverage and detailed analysis of best-in-class designs in the worldwide automotive market, and LMI—part of BSCA Group, as DVN is—provides unique market intelligence solutions. The two organizations together provided deep, reliable, up-to-date data and understanding of seating products and strategies.

Arnaud's presentation emphasized striking design examples such as the Tesla Model 3 rear seats, reflecting cost optimization with features like custom metal profile and special mounting devices, and BYD perceived quality via their flexible lid with i-Size Logo realized as 2K-component, instead of printed on the trim part.

These examples illustrate how to understand design strategies, trade-offs, and market-specific solutions.

<u>The Throne on Wheels</u>
(Guang Yang, Diconium, a VW company)

This first lecture of the seating session, which focused on the evolution of car seating in China, was already covered in [DVN-I Newsletter № 256](#), two weeks ago.

To recap, Guang Yang studies the differences between user needs and wants in western countries and China, driven by historical reasons and social environments.

While in Europe car history dates more than 100 years back, in China cars became a popular (and generally-attainable) item just 20 years ago. That means Chinese and western perceptions of the car aren't the same. Europeans like a comfortable and modern car, but it is mainly a tool to move, a transport appliance, becoming recently an extension of home features but still not as important as a home. For Chinese people, the car is more than a simple means of transport; it is a symbol of social status and lifestyle, and a space for rest and entertainment for the whole family. In Europe the typical family is parents and kids, but in China 13 per cent of population have families with 2 or 3 generations living together. So the car is a mobile office and a second living room: 3 generations, one family, a mix of work and life blended together.

In that context, seating is a very important part of the car: a seat should welcome you, and offer you comfort during your trips. It should allow you to relax and to work without stress, and to take a nap during long rides. The rear seat is more important than front seat, because the boss sits in the back (the 'boss seat', so to speak).
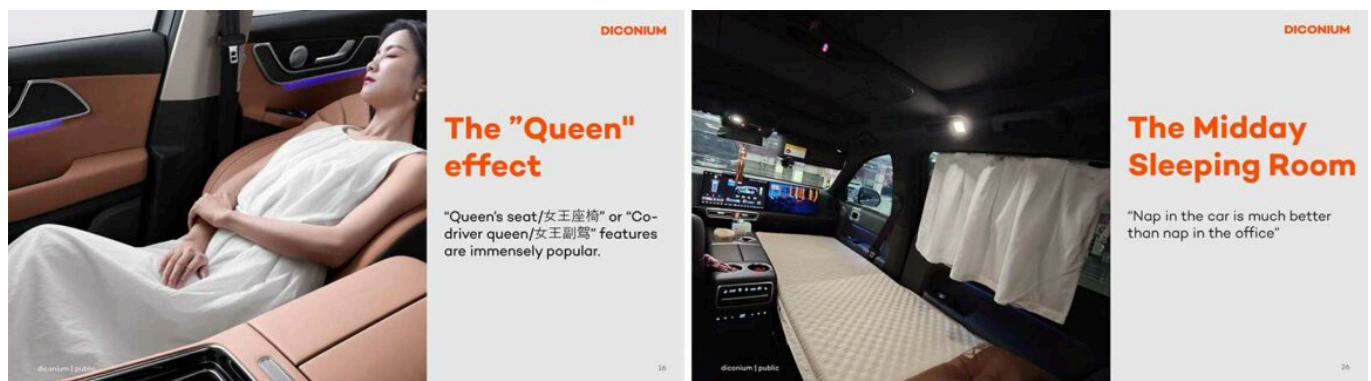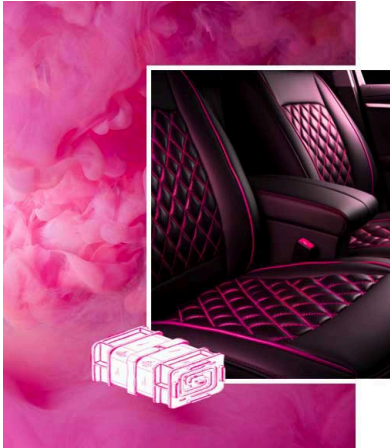

So, four key takeaways for developing a car seat for China are:

- Design for the rear first
- Flexibility is essential
- Lifestyle integration matters
- Culture shape expectations

These are great insights for western OEMs wanting to compete with Chinese ones.

Seat Haptics
(Fady Youssef, Grewus)

Grewus is a company specializing in haptics and acoustics. They've been developing haptics for smart surfaces, as an alternative to physical buttons.

Haptics spurs fast, intuitive response from users. It is non-visual and has different degrees of sensitivities. It is applied today to diverse areas like entertainment gamification, multimodal user interfaces, and seating.

Haptics integration in seats is now easily done thanks to new modular actuators designed to allow flexible integration. They enable a broader frequency range and a higher definition haptic response, and haptic patterns can be customized.

As EuroNCAP is now demanding buttons for safety features, a smart seating haptics application could become an alternative to warn the driver with vibrations about dangerous driving situations, like drifting from lane or exhibiting signs of fatigue.
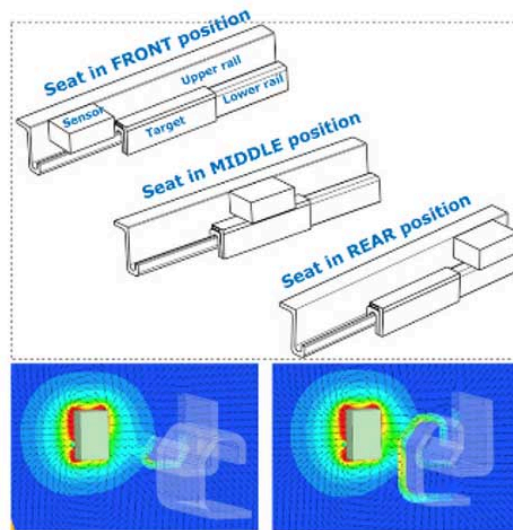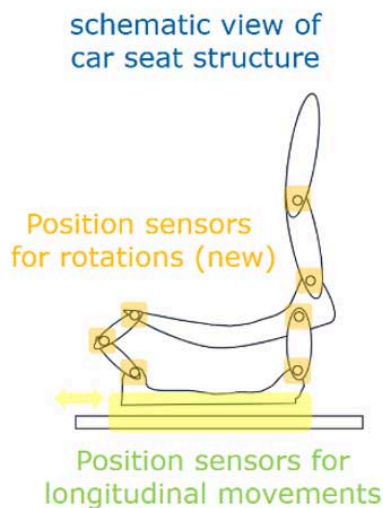
Haptic seating is now a trend!

Seating Position Sensors
(Oliver Kuerten, Polycontact)

Polycontact is a company of experts in seat position sensing, providing different types of solutions, from seat tracking sensing to position sensing, together with electronics and lighting-seating integration.

Seat position sensing is attached to the seat structure and connected to the airbag control units. Seat track position sensors, called for by NCAP, are positioned in front rear and middle position of tracks.

Linear position sensors are the best from safety perspective, detecting the seating positions to tune the airbag deployment parameters.

With autonomous driving, the seat position sensing is going to be much more variable, and it could be integrated with lighting to provide additional functions like:

- Dynamic light adaptation, with illumination changing to seating and driving status
- Safety signalling, to indicate incorrect seating configurations
- Visual comfort and safety, with real-time feedback on ergonomic adjustments

- Personalization, with driver and passenger lighting setting preferences

Sensor-Based In-Seat Gaming
(René Wegner, Headis)
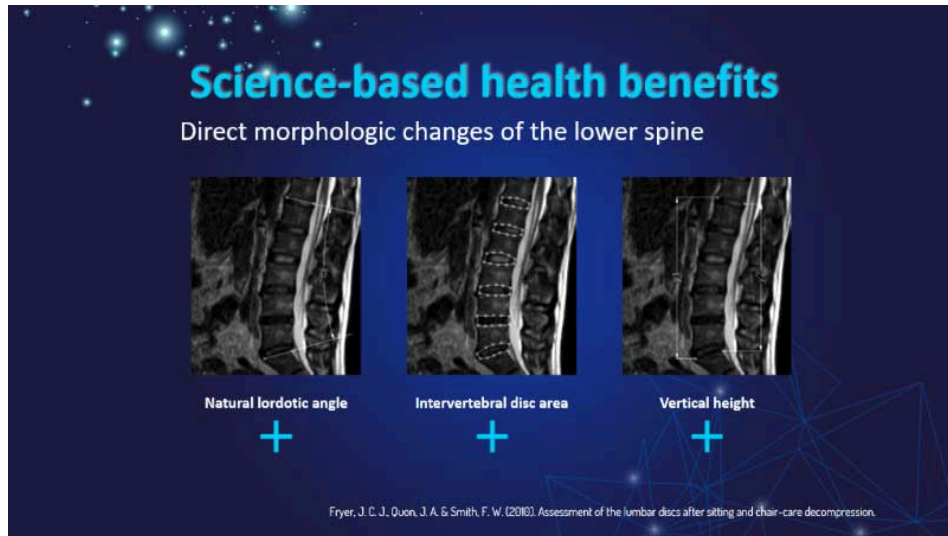
Headis is a startup company in sport studies. Dr. René Wegner introduced his innovation regarding the integration of sensors in seating to support gamified physical activity.

Becoming active in a passive environment—such as being seated as a driver—has health benefits: exercising and flexing back muscles allows relaxation and reduce risks of injuries and pain for the lower spine.

The sensors integrated in the seat generates vibrations to allow playing a game like Tetris with back movements, with visual, audio and tactile instructions guiding you through the exercises.

The sensors can be also used as DMS, to detect wrong sitting positions or fatigue, sending the driver or passenger vibrations to inform about the need to change the positions. For the automaker there could be also potential savings due to reduced number of sensors or cameras, and health insurance compensation for the driver for health prevention activities.

The project from Headis was EU-funded, and the company is looking now for support to integrate the innovation in the automotive field.

Smart & Safe Child Seat
(Francesco Ruocco, Italdesign)

Italdesign has an innovation in child seats. Some background: since the U.S. introduced minimum standards for in-car child safety in 1971, the number of injuries and death has decreased. In 2002 the isofix international standard for attachment points for child safety seats was introduced, further reducing the death rates, but since then no additional decrease has been registered. The is a warning for car manufacturers that it is time to introduce some new innovations…!
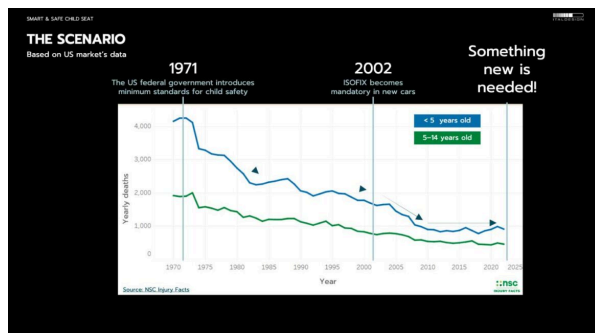
According to US Police data, in 75 per cent of relevant cases the child seat is not properly installed, and 54 to 71 per cent of fatal injuries could have been avoided if the child seat had been properly installed and adjusted. But there is no feedback to the driver informing that the seat has not been properly installed, or, even worse, that the child has unfastened the seat belt.
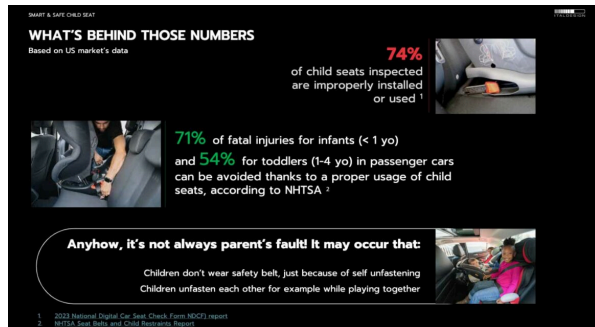
Italdesign decided to study how to improve the situation, considering also that the DMS being developed and deployed today don't detect child-seat faults like these.

Italdesign's engineering team developed a smart child seat system that detects if the child seat is properly placed and if the child has unfastened the restraints.

Key information provided to the driver includes

- The child seat is correctly engaged with the isofix mounts in the car
- The child is on the child seat
- The child is wearing the seat belt

With this type of communication — child seat to infotainment and infotainment to driver, with audio warnings and smartphone messages — it's also possible to be informed of an unfastened seat belt during driving, or if a child is still sitting in his seat when the driver is leaving the car (anti-abandonment function).

All this information is fed to the car via CAN, combining the mechanical connector of isofix, an electronic connection, and the tilting system of the isofix. The innovation could also be used to integrate other functionalities, and it can be integrated on all types and groups of child seats.

Italdesign also presented, in their expo booth, a bag-in-belt solution, all the innovations to be safer in your vehicle.

Emission-Reduced Steel for Use in Car Interiors
(Uwe Wolf, SSAB Europe)
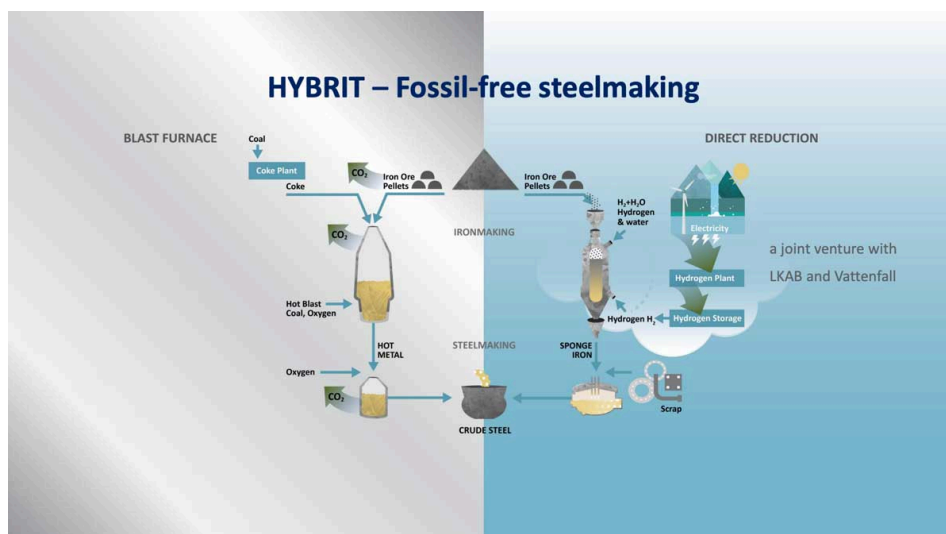
SSAB is a steel producer. Uwe Wolf highlighted the fact the demand for steel is going to increase a lot until 2050, and the recycling of existing steel will not be enough to satisfy the global demand.

New steelmaking processes are needed, because traditional method improvements will not be enough to avoid the increase of CO_2 emissions. SSAB has invented a new zero-fossil-fuel steel production process called HYBRIT. The steel reduction is made with H_2 (hydrogen), and during the manufacturing process only water is produced — no CO_2.

The resultant steel has the same properties as conventional steel, and it can be produced using both recycled steel and iron ore. Steel made with the new SSAB process has been already adopted by Daimler, who will source CO_2-free steel starting from 2026.

SSAB had developed a unique sustainable steel offer, with zero emissions in operation including purchased material!

In Depth #2 : Cockpit & HMI Session Overview

COCKPIT SESSION Q&A SESSION (DVN IMAGE)

Cockpit trends as stated by Ceres and et al include:

- Windshield displays including HUDs, transparent displays, and panoramic type will coexist, with reduced focus on distracting touchscreens
- Critical status and feedback information will be displayed near the driver's direct line of sight in a comfortable manner that is not cognitively overloading
- Tactile buttons and switches in easy reachable position, on any surface (including smart surfaces), usable without looking, will return to be a major part of automotive HMI
- Multifunction steering wheels (MFSW), with new software control platforms, will assist display of content in the optimal and least distracting way.
- Cluster display moving higher towards line of sight

UX Done the Polestar Way
(Antonio Cobaleda-Cordero, Polestar)
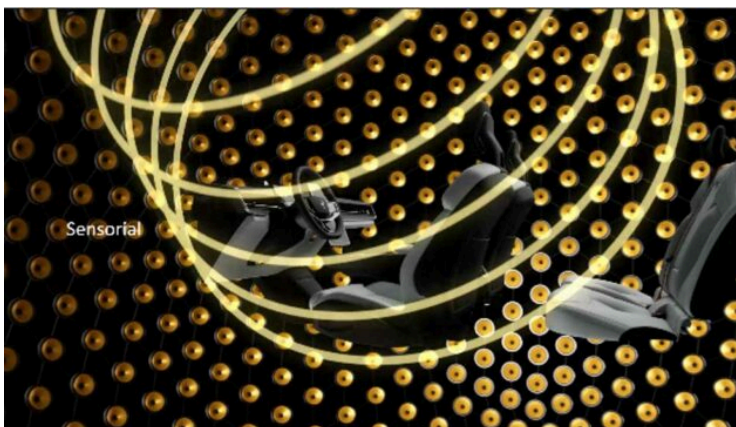
POLESTAR AND DVN IMAGES

The Cockpit/HMI session started with Polestar Design UX Research Lead Antonio Cobaleda-Cordero, who shared some of the design values and principles behind Polestar's approach to UX.

UX is paramount to build the story of the vehicle interior; it creates magical moments.

Like in a smart phone, visuals should participate, with meaningful support. Everything must be tested, like icons, colors, typography, etc. Design and design details are also reflecting the Polestar approach, where it should show, not tell!

POLESTAR IMAGES
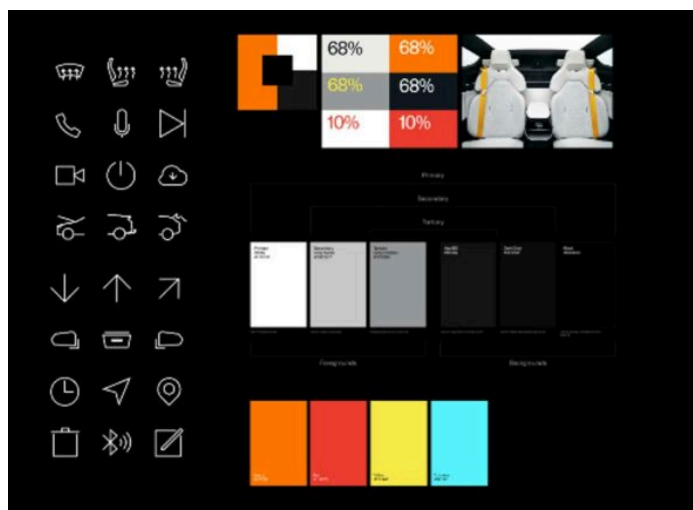
User Experience and Emotions
(Xavier Chalandon, Renault)
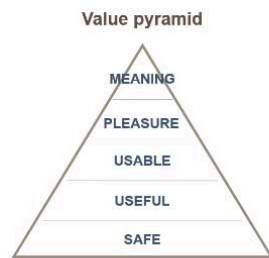
Xavier Chalandon, Renault's HMI Master Expert, described how user experience is the appraisal and behavior induced by the interaction with a product, system or service; it is holistic, expressed by values which can be structured better in a honeycomb, not really in a pyramid (Maslow).

Experience comes through perceptions and sensations, mental models and representations, physical and psychological responses, behaviors, beliefs, emotions, preferences, and so on.

Chalandon gave the example of an instrument cluster appraisal, where both pragmatic vs hedonics appraisals elicit effects.
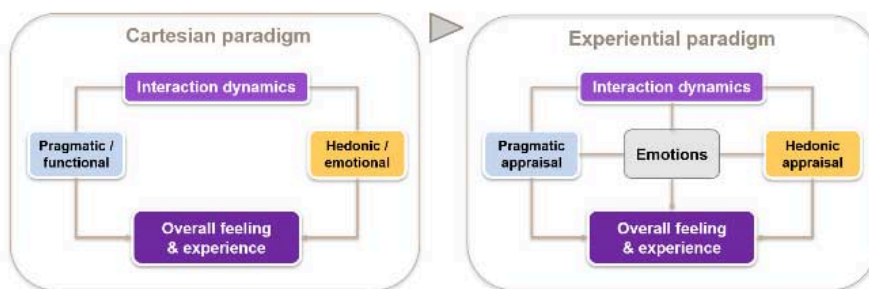
Experience goes beyond usability and look & feel. Experience is emotion + feeling. Emotions last only seconds, when feeling last hours; what is important is what we think after hours, and what we get when exiting the vehicle is the peak of feelings at the end! That's what makes emotional more memorable than functional.

Connected Ecosystems & Seamless Interiors
(Hugo Mestre, Novares)
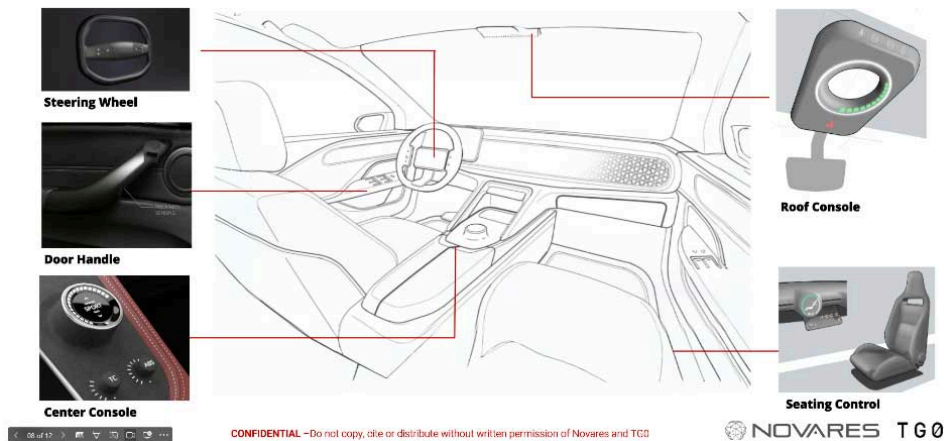
Hugo Mestre, Novares' Innovation Director, presented the company's partnership with TG0 for active plastic with smart shape for HMI solutions. This set of solutions has fewer parts and components, and uses less material.

We enter a new era for plastics—'plastronics'—to address industry needs for design freedom, affordable costs, and sustainability. This solution bridges the gap between controls and smart surfaces, it adds a brick to the display.

HoloFlekt Windshield, Safer Driving and New Display UX
(Andy Travers, Ceres)

CERES IMAGE (L) · DVN IMAGE (R)

Andy Travers, CEO of Ceres Holographics, described his company's HoloFlekt windshield. He stated that automakers must prioritize safety over glitz when it comes to how drivers interoperate with information. This

does not mean HMIs can't be sexy and cool, as the latest transparent display HUDs and AI voice activation features demonstrate; but they must keep cognitive distractions to a minimum. Travers said research demonstrates that **physical buttons outperform touchscreens**; we need more controls for less distraction!

Ceres and their ecosystem have a configurable and scalable holographic-enabled laminated windshield solution, developed with Eastman Saflex and Vanceva, and Covestro. It is production-proven, automotive-certified, and far along in evaluation stages at several automakers around the world.

SDV, From Cloud to Cockpit
(Frank Uhlig, Elektrobit)

ELEKTROBIT CES 2025 DEMONSTRATOR (ELEKTROBIT IMAGE)

Considering it's a struggle for engineers to implement the correct styling from the design. It's also time-consuming for designers to check if engineers have implemented the right color, font, and spacing during internal QA sessions. Design will always be subject to sudden changes of heart; designers want to see different colors or fonts, which is a big pain for the developers.

Starting from these HMI pain points, decoupling UX/UI, using design tokens, central and tiny pieces of UI information to store design related information such as colors, fonts, spaces, animations, and so on.Their benefits are that they can be transformed and formatted to meet the needs of any platform

Elektrobit has developed a set of processes and tools called Theming Engine. It minimizes friction between design to code processes and supports easy skinning of the HMI.

Elektrobit currently develops a cloud-based solution for infotainment systems, which allows for flexible development without being tied to specific hardware.

Plastic Based Touchscreen Panels and Displaylike Switches for Auto HMI
Dr. Wolfgang Clemens (PolyIC)
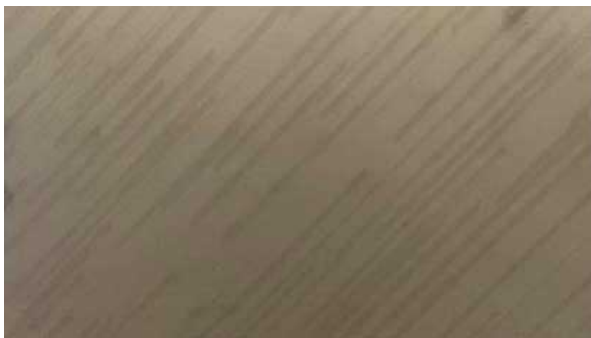
OFF

ON (POLYIC IMAGES)

There is large potential for plastic-based display and touchscreen panels, with molded plastic panels, integrated / embedded touch screen sensors, optical aspects (e.g. anti reflection), and special features (e.g. hidden display decoration, static display). He reminds us of the process technology used, IMD (in-mold decoration), which has great potential to substitute glass panels in many applications. These plastic-based display panels with IMD decoration have good optical parameters (close to glass), high design freedom (form, outline, decoration, premium look), easy combination with backlighting / switches, and typically lower cost than glass panels. The talk concluded with application examples, with Datamodul for Hidden Display, with AMS Osram for miniLEDs integrated to decorated plastic panels (Aliyos), and interactive luminous soft textile surface with touch sensors (Mento's Rainbow-Textile).

Sunrise
(Demetrio Galindez, Antolin)

ANTOLIN IMAGE

Demetrio Galindez is Antolin's Global HMI Product Development Manager. He presented Sunrise, a cockpit concept engineered for seamless transition between manual and autonomous driving, developed with the support of VIA Optronics. They provide optical bonding, glass lens, displays, touch technology, and camera solutions. Antolin leads integration of HMI, display, lighting, and electronics.

Key features of the concept are adaptative UX (manual and autonomous; driver and passengers), smart surfaces (technology and control available on-demand), and immersive experience (dynamic ambient lighting that extends display content throughout the cockpit, enhancing air vents and design lines), digital backlighting effects with matrix light and miniLED, and overall using eco-friendly materials (PersiSkin, Seaqual). Immersive experience is phygital!

The Mighty Touch
(Prof. Dr. Wolfgang Weinhold, Innowep)
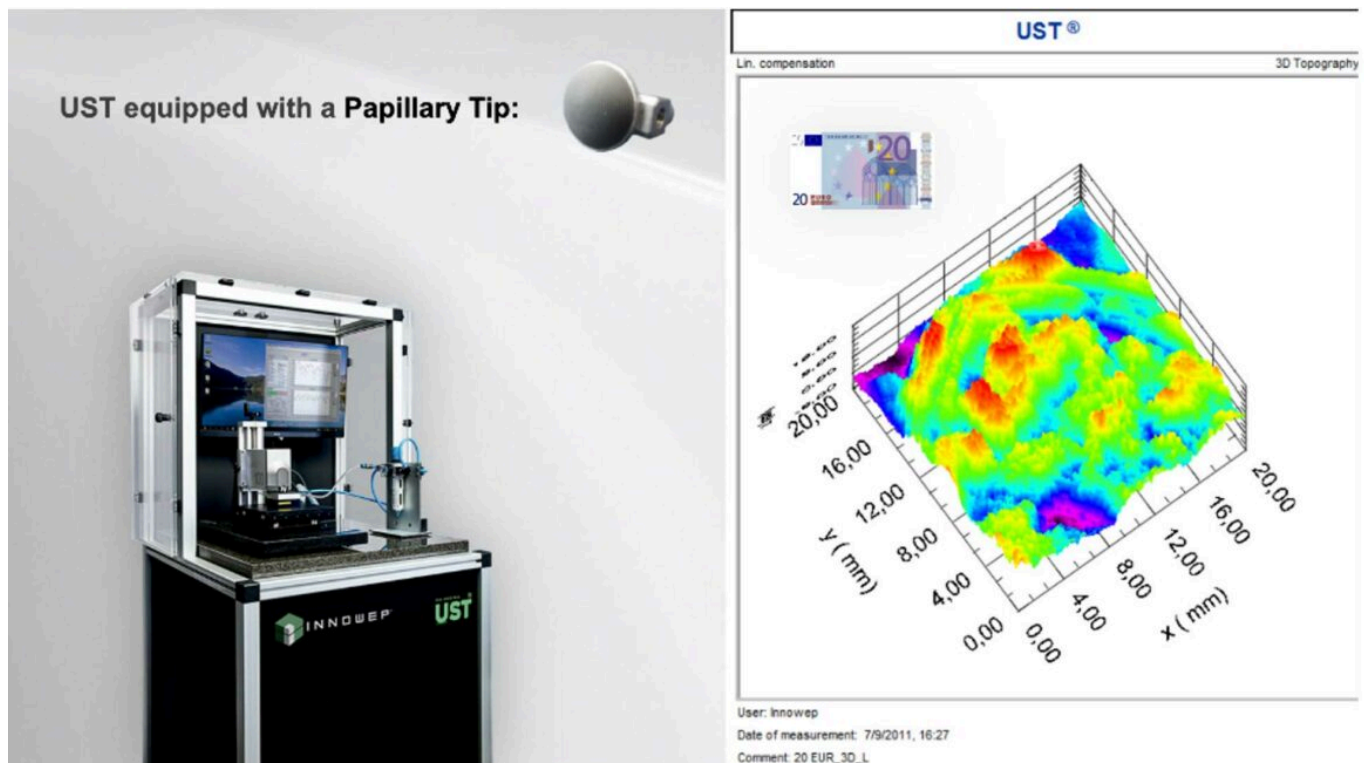
INNOWEP IMAGE

Prof. Dr. Wolfgang Weinhold, from Innowep, spoke about "The Mighty Touch", and Haptic and Durability as an HMI Function. Based on his work as an academic teacher for IPSA (Institute for Surface and Product Analysis), he reminds us what is haptics: the sense of touch, perception with the hand as an interactive organ in different phases of use (contact, grasping, palpation). He separates touch haptics (tactile) and motoric haptics (kinesthetics), with motion sensitivity. Touch is our primal sense, and each time we touch (a screen), it triggers that natural instinct, that fundamental feeling. The example of bank notes haptics analogy was very informative.

Consumer research, through panels, shows correlation of subjective ratings withobjective machine measurements; Signy is this translator, measuring haptic, dependent on the test, its geometry, material properties, micro- and macro topography, effective contact area, and applied load and speed. Signy supports

quality assurance in R&D, to differentiate 'expensive' and 'cheap' material, to feel criteria vs. measurement parameter , and overall to identify trends.

Series-Ready IMSE for Smarter Cost-Effective Interiors
(Dominique Heilborn, Tactotek)

Tactotek Automotive Director Dominique Heilborn described how after years of development, with participation by their full ecosystem, IMSE is ready to go into production. Its development reflects patience and perseverance.

Tactotek does not manufacture, they create technology, which they then license. Now, it is serial production ready, tested and released, scalable for mass production.

Applications include surface light, light channel, smart surface, with its complete eco-system (design rules, role of partners – component, material, equipment, scientific, service, film, injection, …), training, knowledge, tools, etc.

SDV to Experience Defined Vehicles
(Pierre Sigrist & Olivier Cros, Epicnpoc)

EPICNPOC IMAGES

The name of the company comes from 'epic' intention of UX designers plus POC for proof of concept, a kind of prototype for software developers. Epicnpoc develops digital prototypes from customer intentions with their Bowl software for fast prototyping solutions. Since its beginning in 2018, Epicnpoc has delivered 25 major concept projects to the likes of Forvia, Novares, Renault, and Mercedes.

Bowl follows an E steps agile approach:

- Connect features to actual functions / services / hardware / tools
- Define GUI layouts
- Describe the Customer Journey (Features, GUI Contents, Interaction logic)

One example was a new cluster in a retrofitted Fiat 500, to transform the mechanic speedometer into a modern cluster. Another one is Forvia Horizon, their masterpiece at CES 2024.

Their offer includes ideation and specs definition, development (rush in 3-4 weeks), and experience on real prototype.

Laser Surface Treatment Tech for Innovation, Luxury, Sustainability
(Max Blackwell, Reichle)
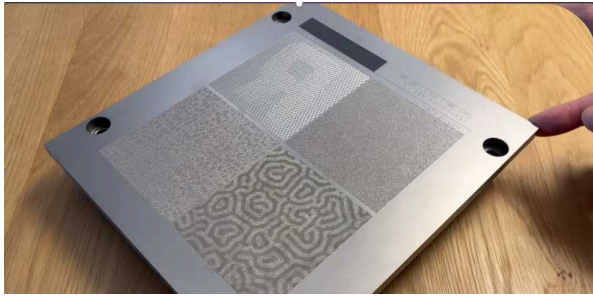
REICHLE IMAGE

The objective is to make boring interior parts interesting. Reichle Technologiezentrum is an 80-person, family-owned company developing laserwork technologies to enhance surfaces for look, haptics, and function. The company's technology can generate 3D effects on a 2D surface.

In Depth #3 : Expo Booths at DVN Interior Köln Event

Thanks to all exhibitors for their active presence, they were all pivotal in presenting new technologies, and creating an intense networking place to be!

Introduction of all exhibitors was published in a previous edition.

Here is a snapshot of all exhibitors and teams, thanks again! (all DVN pictures).

EPICNPOC

REFOND

VERRETEX

NICHIA

LUMINIT

POLYCONTACT

NISSHA

GRUNER

Interior News

IDTechEx: NIR Cameras for DMS
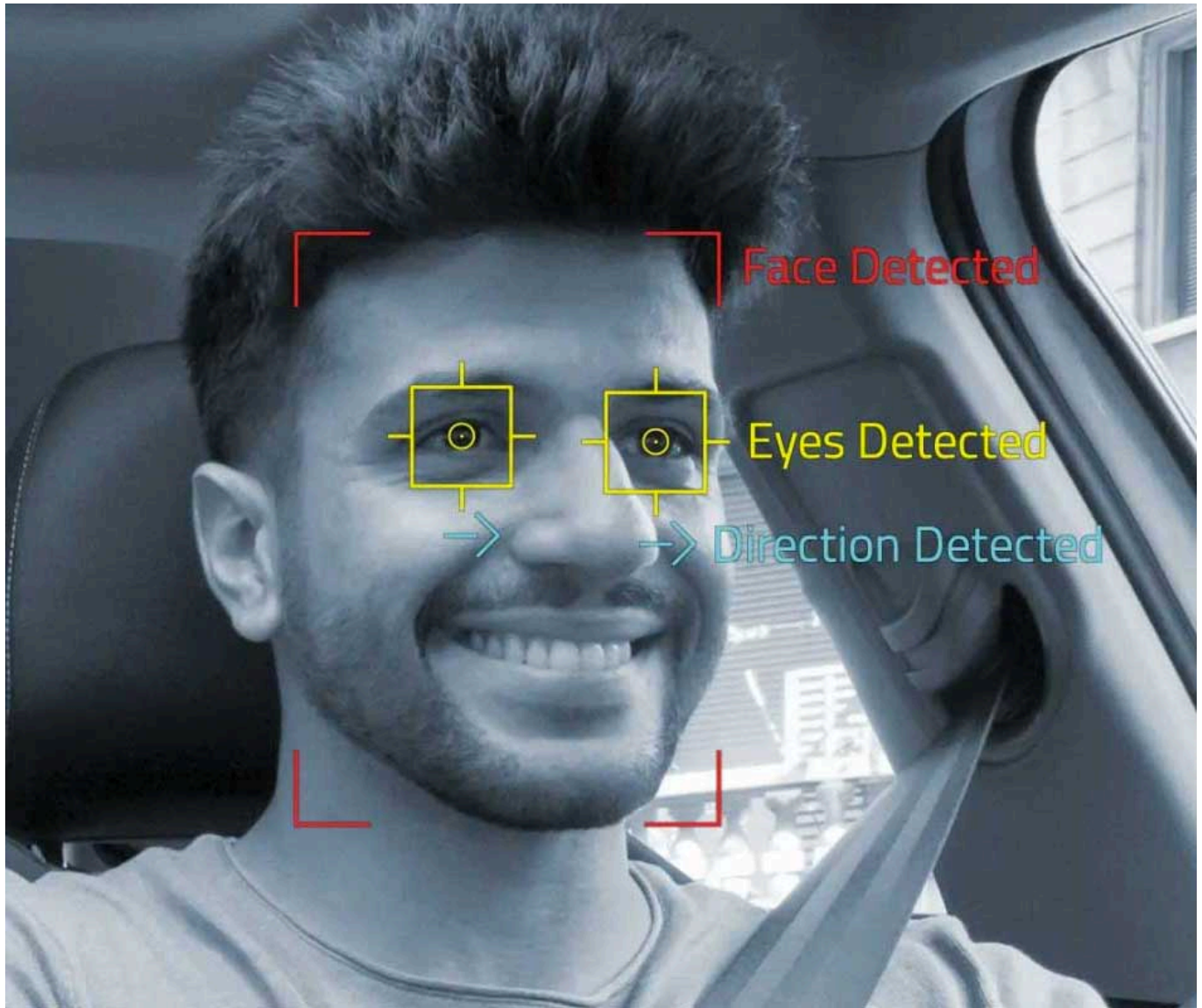
OMNIVISION IMAGE

As regulatory frameworks such as the EU's Advanced Driver Distraction Warning (ADDW) near enforcement, automakersare increasingly integrating in-cabin sensing technologies with SDV architectures, that enhance vehicle capabilities without adding extra physical components.

This shift, evident at CES 2025, marks a pivotal moment in the automotive industry as makers leverage existing hardware—such as infrared and RGB cameras—to develop new revenue streams and enhance user experiences.

IDTechEx, in their "In-Cabin Sensing 2025-2035: Technologies, Opportunities, and Markets" report, explores how this convergence is shaping the future of smart mobility.

For example, Hyundai has developed an in-car system capable of analyzing and assessing over 10 different parameters in real time, including the driver's posture, seat belt usage, and vital signs. This approach not only reduces costs but also improves efficiency, flexibility, and scalability.

Unlike traditional visible-light cameras, NIR cameras operate in low-light and night-time conditions, making them ideal for continuous and reliable driver monitoring regardless of ambient lighting.

These cameras use infrared illumination, which is invisible to the human eye, allowing them to capture high-quality images without distracting the driver. This makes them particularly effective for tracking eye movements, detecting drowsiness, and identifying distracted driving behaviors. Additionally, NIR cameras offer improved accuracy in recognizing facial expressions and gaze direction, enhancing overall safety and compliance with regulatory standards.

One limitation of near-infrared (NIR) cameras is their inability to penetrate physical obstacles, such as seats. This presents a challenge when monitoring passengers in the second row of a vehicle. However, mmWave radar can detect movement and vital signs (e.g., hear rate, etc.) through soft materials like seats, making it a suitable solution for monitoring rear-seat occupants. This technology is particularly useful for child presence detection, occupant monitoring, and safety features that require awareness of all passengers in the vehicle.

As occupant monitoring is not yet mandated by regulations, radars often come as an optional component for vehicles. It cost between USD $30 and $40, which is still considered as significant, so, application only in mid- to high-end vehicles.

Overview of In-Cabin Sensors by OEM

OEM	Technology	Sensing Method	Number of sensor	Type	Function
Audi	AI:ME (concept)	2D IR	1	DMS	Eye/gaze tracking
	N/A	Radar	1	OMS	Occupant monitoring
	Fitdriver (concept)	ECG	1	DMS	Health monitoring, heart rate, stress level, etc.
BMW	N/A	3D Camera (Didn't reveal the type, likely ToF)	1	OMS	Gaze recognition, Gesture control
	N/A	Radar	1	OMS	Vital-sign monitoring
	Extended Traffic Jam Assistant	2D IR	1	DMS	Eye/gaze tracking
GM	Super Cruise System	2D IR	1	DMS	Eye/gaze tracking; Head motion/position
	Super Cruise System	Steering Sensor (capacitive)	3	DMS	Hands-off detection
Li Auto	N/A	3D ToF	1	OMS	Occupant Monitoring, Gesture Control, Eye/Gaze Tracking, Facial Recognition
	N/A	2D IR	1	DMS	
Jaguar Land Rover	Driver Condition Monitor	ADAS and steering input	1	DMS	Eye/gaze tracking
Subaru	Driver Focus (EyeSight Driver Assist)	2D IR	1	DMS	Eye/gaze tracking; Head motion/position; Facial Recognition
Mercedes-Benz	Attention Assist	2D IR	1	DMS	Eye/gaze tracking
	2021 E-Class	Steering Sensor (capacitive)	2	DMS	Hands-off detection
	S-Class	3D ToF	1	OMS	Gesture Control
Nissan	ProPILOT	2D IR	1	DMS	Eye/gaze tracking
	ProPILOT	Steering Sensor (torque)	1	DMS	Hands-off detection
Lexus	Driver Attention Monitor	2D IR	1	DMS	Eye/gaze tracking; Head motion/position
Toyota	Driver monitor system	2D IR	1	DMS	Eye/gaze tracking; Head motion/position
	Cabin Awareness (concept)	Radar	1	OMS	Occupant Monitoring
	Steering Wheel	Steering Sensor (torque)	1	DMS	Hands-off detection

Note: IR stands for infrared, in fact, some of the wavelengths (e.g., 940nm) are considered as near infrared (NIR) but in this table, IDTechEx uses IR instead of NIR.

OVERVIEW OF IN-CABIN SENSORS BY OEM (IDTECHEX GRAPHIC)

Alibaba AI in BMW New Class for China
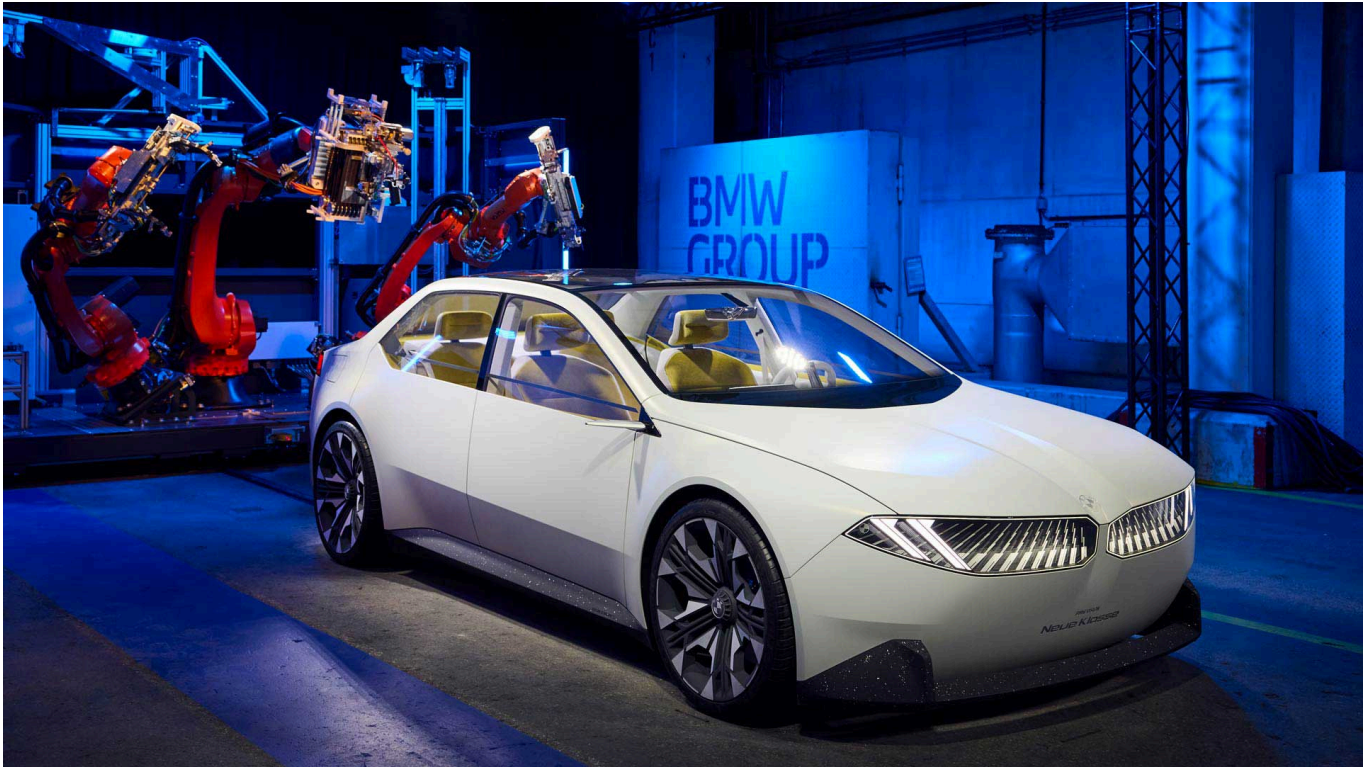
BMW IMAGE

From 2026, BMW's New Class cars will carry LLM (large language model) technology from Chinese company Alibaba.

Both companies have jointly announced that they will develop a new AI assistant for the cockpit based on Alibaba's Qwen LLM, and the Banma cockpit platform based on it. Alibaba, which has been investing heavily in their AI business area for several years, is already cooperating with Chinese car manufacturers Xpeng, Zeekr, and Leapmotor in this field. BMW is already cooperating with the company in other areas.

For BMW, the aim is to catch up with leading Chinese car manufacturers such as BYD as quickly as possible. Their cars are rapidly transforming into autonomously-navigating living rooms on wheels, equipped with progressively-improving software and AI, full of entertainment electronics, practical driving assistance, and navigation.

BMW is following a global trend with this partnership. German manufacturers are abandoning the development of completely in-house software in favor of teaming up with technology companies. VW, for example, is cooperating with Rivian in the USA and Horizon Robotics in China, while Mercedes-Benz is investing in the Chinese AI start-up Momenta.

Partnerships with local suppliers are also about being able to respond faster and better to the wishes of Chinese buyers, very open to modern technology and having increasingly high expectations. For car owners there, a car is an entertainment hub, a digital assistant, and a social space—an extension of their digital lifestyle, according to BMW employees in Beijing.

The first model to be equipped with Alibaba AI will be the iX3, to be launched next year. BMW's own cockpit assistant IPA will be able to interact better with drivers using Alibaba's AI. For example, while driving, they can be recommended nearby restaurants with good reviews on the internet and the appropriate price range, or a hotel with a view of the mountains, without having to take their eyes off the road or touch a screen. The AI will be able to interpret the driver's mood and react accordingly, it is said.

The new BMW models will improve what the industry calls 'multimodal input': from spoken commands to tracking pupil movements, hand gestures or recognizing certain postures of the driver. BMW speaks of 'humanlike capabilities' for conversation and control in the cockpit.

Digital Twin is Revolutionizing the NVH Development Process
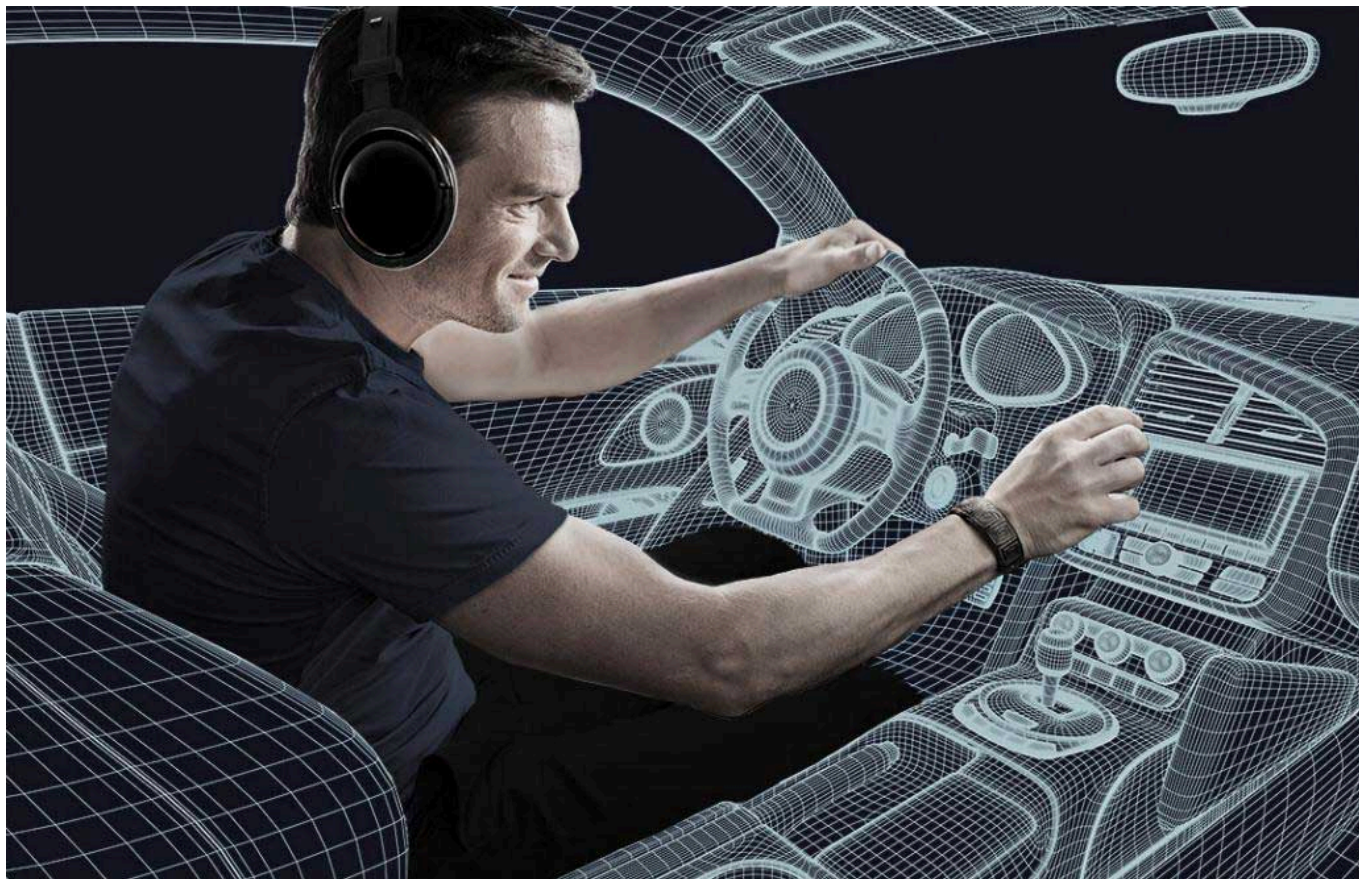
INVH COMPANY IMAGE

NVH simulation saves costs, development time and physical prototypes. Developers, decision-makers and customers can experience the NVH performance of future vehicles in virtual test drives. They evaluate variants in an early development phase and secure design decisions at an early stage.

For a realistic driving experience, the simulated vehicle must react to driver interaction in real time. The resulting noises and vibrations from the drive, tires, road surface and wind are auralized accordingly.

Challenges include:

- Processing and combining measured and simulated data (CAE, TPA, Active Sound Design)
- Mapping complex driving models (transmission strategy and energy management for CVT, hybrid, etc.)
- Auralize artifact-free and realistically
- Integrate drivetrains on the basis of test bench data
- Virtual engineering & prototyping
- Benchmarking
- Comparison of variants
- Virtual modification
- What-if analysis
- Target noise definition
- Listening and feeling instead of interpreting diagrams

Whether on the desktop or in the dynamic vehicle simulator, an NVH simulator enables valid decisions. It combines binaural technology, calibrated multimodal playback and advanced auralization algorithms. It also offers interactive sound design tools, extensive interfaces and easy data set creation.

ZF's Glass Fibers for SDVs
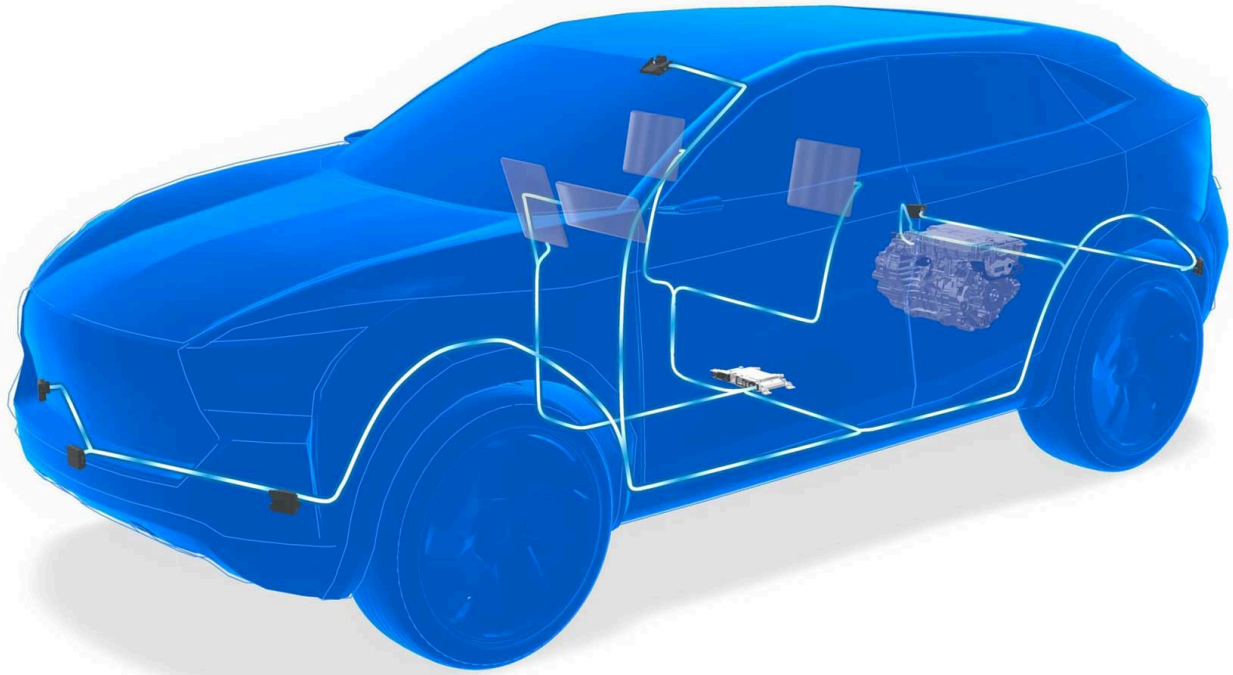
ZF IMAGE

Optical data transmission is based on the transmission of light signals through fiber optic or plastic fiber optic cables. Fiber optic cables offer a high bandwidth and low losses. Their advantages lie in high data transmission rates and reliability. Already 20 years ago, optical systems such as Media Oriented Systems Transport, (MOST) were introduced, which used polymer fibers as the physical layer for data transmission. The new standards, however, such as optical multi-gigabit Ethernet according to IEEE 802.3cz-2023, are based on glass fibers, which offer a higher bandwidth and lower losses.

ZF therefore also sees fiber optics as a key technology for future vehicle electrical systems and has further developed their ProAI high-performance computer for optical multi-gigabit Ethernet in automotive applications. According to ZF, newly developed chips and connectors can be used to transmit data via automotive-grade optical fibers in accordance with the IEEE 802.3cz standard. Development partners are the German automotive supplier MD Elektronik and the Spanish semiconductor company KD.

Oliver Briemle, Head of Cross-Domain Computing at ZF, says the technology enables short- and long-distance transmissions of up to 40 meters. According to the company, series production is possible as early as next year.

Why Are Screens Still Central in the Car?

INTELLIAS IMAGE

Many drivers want clear cockpits with dials or buttons, in Europe and America. In China, customers want special audiovisual experiences.

With almost 22 million units sold in 2023, China is the largest car market in the world, and the most important single market for German manufacturers Audi, BMW, Mercedes-Benz, Porsche, and VW. This poses a particular challenge: people in Asia have different expectations of technology and ideas of design than Europeans. This is particularly evident in the design of car cockpits, which differ significantly in the target markets.

European vehicles still have a combination of software and hardware for control, which enables efficient blind control with precise feedback. A look at China gives us an idea of what lies ahead. A great deal of attention is being paid to the development of screen technology there: OLED (Organic Light Emitting Diode) and AMOLED (Active Matrix OLED) screens impress with their high contrast ratio, bright colors and energy efficiency and are therefore being used more and more frequently in cars. Huawei has launched a light field display for cars that is designed to offer users a more realistic and intense visual experience.

With light field technology, light beams are captured and projected from different angles. In contrast to conventional displays, which show the same image to both eyes, light field displays generate a slightly different image for each eye. This simulates depth perception in the real world and creates a three-dimensional effect without the need for special glasses.

Other trends: Curved and flexible screens are on the rise, as they offer better ergonomics and aesthetics and can be integrated into different interiors at the same time. AR technology is being integrated into head-up displays and infotainment screens to display navigation instructions, safety warnings and other information in the driver's field of vision. This is already a reality in China.

So where is the journey heading? Will we soon only see models with hyperscreens like in the Mercedes-Benz EQS in Germany, following the Chinese idea of cockpit design, or will we remain pragmatic and reduced in design? Either way, infotainment will be part of the car in the future. According to a study by McKinsey, car manufacturers without good smartphone integration will lose potential customers. For around a third of new car buyers, the functions for integrating phones with Apple or Android operating systems are a purchase criterion.

The fundamental question is: do large screens bring real added value or do they tend to lead to information redundancy? If you can't offer real added value with large displays, then you don't need them. Then smaller displays that don't overload the driver with information will suffice. Less is then more. However, automated and autonomous driving change everything: when occupants no longer need to concentrate on driving, but have time for other things and need spaces to do so - for meetings or movies, for working or simply relaxing: Then more really is more.

Mercedes S-Class, Refined

MERCEDES IMAGES

Mercedes-Benz is investing in the S-Class. Drivers can now drive autonomously on the highway at speeds of up to 95 km/h. Previously, this was only permitted up to 60 km/h. The Level 3 system "can be used in the normal flow of traffic behind a vehicle in front on the right-hand lane of the highway". More than 35 sensors such as cameras, radars, ultrasonic sensors and lidar are used in the large Mercedes to ensure that semi-autonomous driving is as safe as possible.

In the meantime, the driver can devote themselves to other activities if necessary and does not have to be attentively involved in the traffic situation. According to Mercedes, the system is still able to hand the driving task back to the person behind the wheel at any time if necessary. If the driver does not react, the S-Class stops safely, in a controlled manner and in a way that can be understood by the following traffic. This function is based on a special positioning system that determines the position of the car with centimeter precision and thus recognizes which lane it is in.

As part of the facelift, Mercedes is carrying out an MBUX upgrade in the S-Class. By integrating ChatGPT into the voice assistant, the aim is to enable fluid conversations between the car and its occupants when the key phrase "Hey Mercedes" is spoken. To answer questions, the S-Class accesses the Microsoft Bing search engine via the Microsoft Azure Open AI Service.

Mercedes is also optimizing the navigation view by enabling a high-resolution bird's eye view of the Google satellite image and expanding the entertainment offering. Those who pay for the Entertainment Plus package will be able to use streaming services such as YouTube or Ridevu from Sony Pictures on board the S-Class in future. And not only in model-maintained variants, as Mercedes is offering all these MBUX improvements as an over-the-air update for all W223 models delivered to date.

Passengers enter the interior of the Mercedes S-Class Edition via black door sills with illuminated Mercedes-Benz lettering. They then take their seats on nappa leather seats in one of three color variants. A head-up display and the Burmester 3D surround sound system are also on board at no extra cost. A digital edition emblem displayed on the screens of the MBUX system rounds off the three editions for the new Mercedes S-Class.

Above all, however, Mercedes-Benz is expanding the Manufaktur program for the S-Class, with which customers can design their vehicle even more individually. Over 50 new paint colors and 25 new options for the interior are available, from hand-finished textiles to fine wood inlays, according to Mercedes.

In the home of the S-Class, customers' individual wishes are realized by hand. It is all about the highest level of quality. From the clay model, you can create your own S-Class with your own paintwork, your own fabrics and an individual steering wheel with precisely positioned stitching.

Roger Federer plays a central role in the current play-off. The Swiss tennis legend stands for precision and a wealth of variety on the court like no other world-class player. He has mastered his craft and is still held in high esteem worldwide as a sportsman and as a personality. From a marketing perspective, the long-standing Mercedes brand ambassador is therefore the perfect personality for the manufacture, which is based in Sindelfingen.

The Design Lounge

Employee Choir Designs BMW HypersonX Voices

BMW IMAGE

The BMW Group Sound Design Studio has developed a sound concept for the next generation of BMW vehicles scheduled for launch in 2025.

BMW Operating System X enables drive sounds tailored to the driving situation at hand in Personal Mode and Sport Mode. The immersive spectrum of audio effects has been designed to increase the holistic user experience.

Fueled by the all-electric Neue Klasse models, BMW aims to create a holistic driving and user experience using elements of the BMW Panoramic iDrive concept such as the new HypersonX soundscape. The system is made up of 43 sound signals and special driving sounds for Personal Mode and Sport Mode. The multidimensional spectrum adapts the sounds to the driving situation at hand, to create an emotional interaction between the driver and their vehicle.

The automotive sound experience has been made possible by the technological advances in hardware and software brought by the Neue Klasse. BMW Operating System X and a newly developed control unit enable a significant expansion of the dynamic range.

The spatial modulation of the drive sound immerses occupants in the soundscape generated by HypersonX. Under acceleration, for example, the vehicle gives the impression of moving between different three-dimensional layers of sound. The drive sounds have been inspired by tones from nature and structures from the worlds of art and science. HypersonX has fewer basic notes than the sound experience previously employed, but the acoustic spectrum has grown to include a new dimensional level. This gives the sound more 'color', depth and precision. The middle and lower frequency ranges of the sound spectrum have been enhanced to create a well-balanced acoustic ambience.

Adding a human touch, a choir of BMW Design Studio employees creates a welcome sound. Carefully isolated elements of the choir welcome and treat the driver to moments of joy and human warmth.

"The unique sound spectrum of HypersonX plays a major role in giving a Neue Klasse model its own, highly distinctive character acoustically. Through our focus on precision, warmth and lightness, we can create a direct emotional connection between the driver and their vehicle," said Renzo Vitale, creative director of sound design at BMW Group.

More than nine million sound instances based on BMW's sound DNA were generated and then filtered to fit the BMW. The result creates an emotional connection between human and vehicle in all driving situations and brings a positive, congenial and inviting aura to the acoustic presence of the Neue Klasse.

News Mobility

Audi's App for Mobility CO2 Footprint
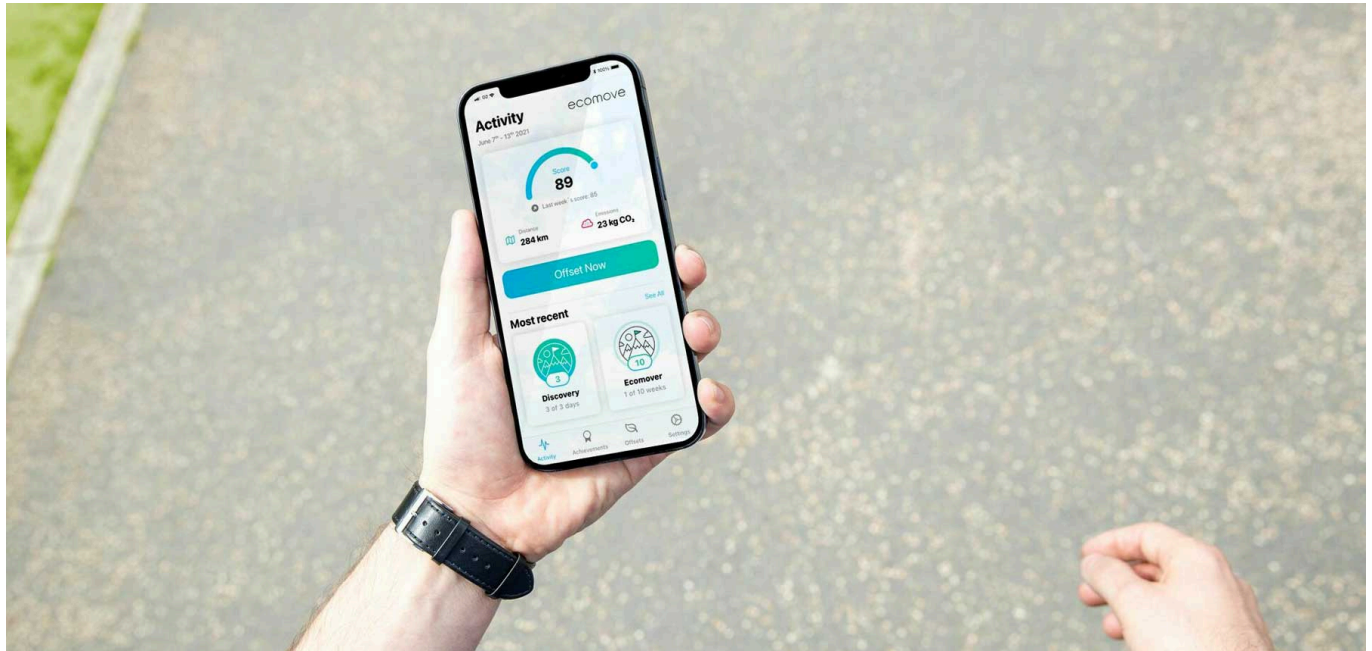
AUDI IMAGE

Audi's Denkwerkstatt has developed a new app called Ecomove to help users understand and reduce their personal carbon footprint caused by mobility, and offset unavoidable emissions. To do this, the Audi app automatically recognizes, for example, which means of transport users use are currently traveling and calculates a personal mobility score. To improve this score, Ecomove playfully motivates users to make their mobility more sustainable. There are rewards in the form of trophies for a positive change in behavior.

There is also the option of offsetting the remaining CO_2 emissions with climate credits. There are technological and social projects as well as reforestation concepts to choose from. For example, users can invest in solar parks or support water treatment projects.

"We wanted to develop an app that makes something as abstract as CO_2 emissions tangible and encourages people to rethink their own mobility," says Jan Schäfer, Ecomove project manager at the Audi Denkwerkstatt. The Audi Denkwerkstatt is the VW subsidiary's ideation and incubation hub in Berlin. Permanent and temporary employees of the Ingolstadt OEM develop digital business models in small cross-functional teams at the interface between the Group and the start-up ecosystem.

In the perfect mobility world, only one app is needed. All means of transportation should be visible and directly bookable in it. Travel time, travel costs and travel comfort could be perfected. The annual Mobility Services Report - but also a look at the smartphone - show how far away such a vision is from reality. Most people have numerous applications that help them to be mobile.

The development of mobility services has been very volatile in recent years. The global crises have played their part in this. It is difficult to predict today which forms of mobility will prevail. Many people are still unfamiliar with smart mobility services. Only just under one in ten Germans use Uber, Free Now and co. In the app you have an overview at the different types of service and their subcategories - from car sharing and e-scooters to robotaxis.

General News

Car Remains Preferred Means of Transport to Work

GENERAL NEWS

SP-X IMAGE

Whether for the journey to the office or to a meeting: according to a survey, employees generally use their car to get to work. Even in summer, more than two thirds of respondents travel to work by car or motorcycle, according to the study by the Institute for Mobility at the University of St. Gallen. Of these, 83 per cent stated that they drive a combustion-engine vehicle.

This means that commuter traffic still has considerable potential with regard to the traffic turnaround. According to the survey, more than 40 per cent of all traffic in Germany is attributable to work-related journeys. With appropriate offers, employers could encourage their employees to switch to alternative means of transport.

According to the survey, many companies are already trying to do this. More than half of the employers surveyed offer employees the Job-Ticket for regional and local public transport. In most cases, employees receive a subsidy for the public transport season ticket (in Germany: €58 per month).