DVN-I
Automotive Interior

Thu, 3 February 2022 Weekly Newsletter NEWSLETTER #97

Editorial

Interior Lighting Is Intelligent!

MERCEDES S-CLASS AT NIGHT (MERCEDES IMAGE)

Last week we wrote that audio is not just what one listens to when driving, and that parallel approaches are scalable for all interior human-centered design dimensions. This week's in-depth article addresses interior lighting, which—likewise—is not just what one sees when sitting in the vehicle. Interior lighting enhances the travel experience; facilitates finding and operating vehicle controls; supports infotainment, and visually improves surfaces and materials. In this context, intelligence means adapting to context; to mood. Lighting is increasingly a pillar of interaction between the vehicle and the driver, an integral part of the vehicle's safety system.

Interior lighting will be a focus of the next DVN Interior Workshop, 25-26 April in Köln. The rubric of the event is ***Experience Interior • Technology for Safety, Comfort, & Fun***. Other focal points will include driver and occupant monitoring; functional surfaces; HMI/HUD; interior air quality, and materials and sustainability. Get set to exhibit, to speak, or just to attend! Find more information **here**.

The Lunar New Year holiday is upon us, and we celebrate our Chinese members as we enter the Year of the Tiger. We're glad you're here with us, and we thank you for your support.

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

Interior Lighting Trends: Osram Applications


AMS-OSRAM IMAGES

Interior Lighting Trends

Interior lighting of a vehicle is more than a purely functional element. Modern lighting concepts have long been an integral part of an ambience perceived as high-quality and appealing. Light can increase comfort and feelings of wellbeing and safety. On a functional level, well-designed interior lighting makes it easier for the driver to find and use vehicle controls—especially at dusk or night, but increasingly also in daylight conditions. It supports infotainment, and creates a fascinating welcome and driving experience.

The further development towards autonomous driving will increase the trend to additional interior lighting applications. The car will become a personal living and working space with an increasing focus on comfort, individualization, and more and more safety functions.

Intelligent, networked, and individually-controllable interior lighting expands the range of applications. For example, ambient lighting can adapt to the mood or activity in the car when passengers are listening to music or watching a film. In dangerous situations, light can project warnings into the cockpit to increase safety in situations where the driver's perception is limited.

A personalized driving experience focuses on the wellbeing of the passengers. Soft ambient lighting, for example, with driver-selectable colors. Depending on the mood, different modes from relaxation to strong activity can be selected to add an emotional component.

Interaction with the vehicle begins as soon as the driver approaches. Sensors recognize the driver and create an individual light design or a welcome message. Dynamic interior lighting invites the driver to enter and signals readiness to drive, adapted to surrounding light-level. Depending on whether the passenger wants to work, listen to music or enjoy a film, the lighting scenarios change automatically. These extended functionalities have arisen from the ever-increasing need for relaxation, individualization and entertainment, especially on long journeys.


AMS-OSRAM IMAGES

There are a lot of possibilities to support the driver with intelligent interior lighting. For example, if the sensors detect driver fatigue or drowsiness (through a Driver Monitoring System), or a dangerous situation on the road, the colors in the vehicle can be changed automatically to warn the driver.

AMS-OSRAM IMAGES

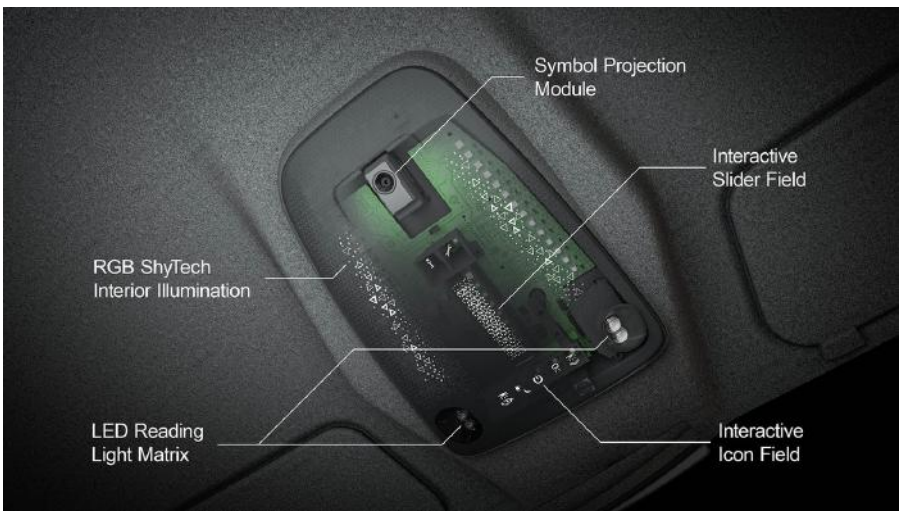
Osram AMLS (AMS Osram's AutoMotive Lighting Systems) is an independent division of AMS Osram’s automotive business unit. Headquartered in Munich, they combine lighting technology with electronics and software to develop smart, innovative lighting solutions for the automotive industry, with around 770 employees at 9 locations worldwid

Together with thin-film technology company Kurz and plastics manufacturer Syntech Plastics, AMS Osram has developed a new skylight console that combines advanced interior lighting functions with elegant design (see DVN Interior 9 Noember, 2021). Today we present more information:

AMS-OSRAM IMAGE

This overhead light console has matrix LED spotlights for a pleasant reading light that can be regulated in intensity, distribution, position, and white tone. Projections in the car also offer a way to display relevant information while driving without the need for a separate display. Projection can enhance interior surfaces through projected decoration patterns—which cna even be animated.

The console includes a static or semi-dynamic projector, which can project individual motifs onto different surfaces to convey information or create patterns or animations.



AMS-OSRAM IMAGE

Animations integrated in the module are matched to the design of the decor surface and can be adapted to different driving situations or vehicle interactions. The light structures in the decor are invisible and only light up for an alert or when a call comes in (for example)—always matching the ambient lighting.

The console has a fully integrated capacitive touch sensor system that replaces conventional buttons. The high transparency of the touch sensor technology enables intuitive activation. The ceiling light can be easily expanded

with additional functions such as haptic feedback via a piezo actuator, proof control and a hands-free function for more complex applications. The design of all components is designed for compact dimensions, high system efficiency and safe connectivity.

The entire decor unit is produced using the in-mold decoration process, which is more economical and sustainable than conventional production methods. This is achieved by combining various steps into a one-shot process, resulting in a reduction of CO_2 emissions. Neither the wafer-thin touch sensors that replace the switches and buttons nor the decorative layers have a negative impact on the recyclability of the device.

The lighting system and integrated electronics were contributed by Osram AMLS. Leonard Kurz is responsible for the HMI technology, including the Shy-Tech design. The capacitive sensor foil for touch operation of all functions is provided by the Kurz subsidiary Poly-TC, and the CO_2 cleaning process comes from Baier, also a subsidiary of the Kurz Group. The injection molding machine with integration of decoration and sensor as well as the CO_2 cleaning system was developed jointly by Wittmann-Battenfeld, Kurz and Syntech.

The back-molding of foils was one of the major technical challenges of the project. The foils had to withstand the heat of the process, be clamped precisely, and the sensors had to be held in the mold by a vacuum. Curing takes place under UV light; flake residue from the film is completely removed from the finished functional part using liquid carbon dioxide.

The result is a module that all partners are convinced already anticipates future developments; Syntech key account manager Helge Schröder says "Lighting and operation are fully integrated (…) in the center is an ergonomically well-thought-out control panel. It has five sensor fields with haptic feedback and a touch slider, also sensor-controlled, for dimming ambient and reading light. The LEDs reproduce any desired RGB color combination. A built-in gobo projector casts individually selectable image marks or design elements down onto the center console".

The interface eliminates the need for all parts and tools that were previously required for switches, controllers and wheels. The module surface is mounted directly on the housing with built-in lighting technology and all sensor data is fed directly into the vehicle's on-board IT system.

AMS-OSRAM IMAGES

Projection systems offer many other opportunities to shift customer experience into a new environment. Compact symbol projectors can be easily installed in the door or in the overhead console for welcome scenarios, with projection in front of the door when opened, or on the driver window. These individual welcome scenarios give the driver and occupants a good feeling even before they step into the car.

These are the kinds of innovative lighting systems that are rapidly becoming ever more important as vehicle are increasingly automated.

Interior News

Cerence AI Co-Pilot for Safety, Convenience

INTERIOR NEWS

CERENCE IMAGE

Cerence Co-Pilot is an intriguing first-of-its-kind in-car assistant—and CES Innovation Award winner, as we reported three weeks ago. Massachussetts-based Cerence specializes in providing automotive assistants; over 400 million vehicles are equipped with Cerence technology.

The Co-Pilot analyzes voice, gaze, gesture, and touch, as well as data from the car's sensors, while flexibly integrating with cloud services to keep drivers informed safe, and productive. In this way it really does act as a virtual co-pilot, assisting the driver with real-time information such as upcoming severe weather conditions; heavy traffic; alternative routes; next service station, etc. Alerts can be provided for expected or unexpected vehicle maintenance issues (like tire pressure, oil pressure, and other such). The AI-powered co-pilot connects with drivers the same way humans connect with one another: through voice, vision, touch, and gesture. It can even suggest ordering and paying for a driver's morning coffee when they are a mile from their favorite coffee shop.

The Co-Pilot information is conveyed to drivers on the vehicle's infotainment screen, along with audio/light alerts and potential mobile alerts as well. It is based on Cerence's Connected Vehicle Digital Twin platform, which includes a virtual replica of the car based in the cloud, featuring all of the vehicle's sensor information. Decisions are made in the cloud, enhanced by contextual applications, and then pushed back to the car.

Co-pilot stands to improve safety, Cerence says, by alerting the driver whenever necessary, including drowsiness or loss of vigilance. It manages HVAC, infotainment, navigation, and other aspects of the in-car experience.

The amount of sensor data available in cars is growing exponentially, therefore AI-powered co-pilot opportunities will help drivers to remain safe, productive and entertained on the road. Vietnamese EV startup VinFast is the first automaker to adopt Cerence's digital-twin solution.

Covestro's CO2-Neutral Polycarbonate

INTERIOR NEWS

3D DISPLAY DEMONSTRATOR (COVESTRO IMAGE)

In 2017, Bayer Material Science became independent and began operating as Covetro. Covestro announced recently their first carbon-neutral Polycarbonate (PC) material. PC is widely used in Interiors, for structural components such as instrument panels and light guides; colorful high- or low-gloss or leather-like interior surfaces, and decorative film-based, back-injected parts.

PC resins and blends offer favorable combination of high mechanical performance, surface quality and durability at high temperatures needed to ensure interior performance in term of color, light, haptics, and surfaces. And now Covestro's Makrolon PCs are said to be climate-neutral from cradle to factory gate thanks to the use of renewable electricity in production processes and the introduction of raw materials from mass-balanced biowaste and residues.

Since Covestro received ISCC (International Sustainability and Carbon Certification) Plus mass balance certification for two of their European sites at the end of last year, they have been supplying PCs partly obtained from renewable raw materials. These are added via the mass balance approach, and lead to a significant reduction in the carbon footprint. The company has now acquired certificates of origin for their Ürdingen plant from non-subsidized photovoltaic renewable electricity plants. These are allocated to the specific electricity demand of selected mass-balanced products for chlorine electrolysis—essential for the production of PC—and other process steps.

The mass balance approach, a chain-of-custody method, introduces fossil and alternative raw materials into the value chain while leveraging the existing chemical infrastructure with high efficiency and economies of scale, accelerating the industry's transition to a circular economy of plastics.

BMW Commits to Responsible Leather Sourcing

INTERIOR NEWS

BMW IMAGE

The BMW Group is emphasizing its corporate responsibility in the field of sustainability, by becoming the second automotive manufacturer worldwide to join the Leather Working Group. The aim of this not-for-profit, multi-stakeholder organization is to ensure uniform environmental and social standards for leather supply chains worldwide and to certify manufacturers.

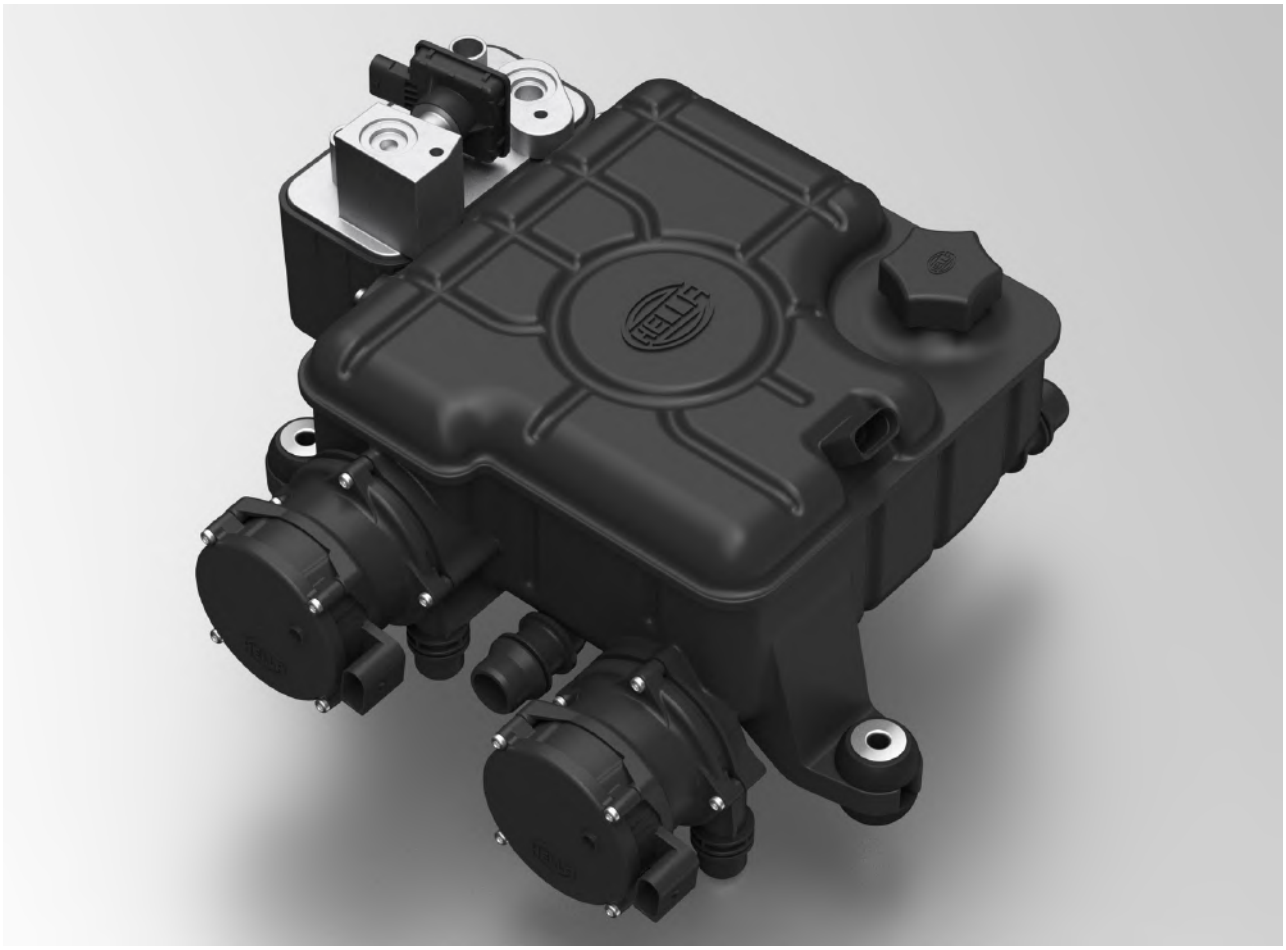
Created in 2005, the Leather Working Group sprang from of a consortium of well-known brands and leading leather manufacturers that came together to focus on sustainability within the leather industry. Founding members included brands such as Adidas, Clarks, Ikea, Nike, Marks & Spencer, New Balance, and Timberland. It represents about a quarter of the world's leather producers, from tanneries to leather-processing industries and associations to retailers and buyers. Bentley was the first automaker to join last year.

BMW Group's head of supply chain sustainability Nadine Philipp says "As a leader in supply chain sustainability, joining the Leather Working Group is the next logical step for us; leather is still in demand from our customers, depending on the model and region, and is very important in the premium segment. That is why supporting sustainable production and processing of leather at our suppliers is a priority for us. At the same time, we still want all our customers worldwide to be able to choose the optimal product, so we also offer leather-free vehicle equipment options".

As well as leather from certified suppliers, BMW also offers customers alternative interior materials. They already source all leather in the BMW iX from a certified manufacturer. The natural leather is tanned in an especially environmentally-friendly process that relies on olive leaf extract. BMW's leather-free alternatives include textile options such as Alcantara® and Sensatec, and BMW is researching resource-efficient leather alternatives such as Deserttex®, which is made from cactus fibers, and the durable and fully recyclable plant-based Mirum®, from the startup Natural Fiber Welding, in which BMW Ventures acquired a stake in 2021.

Hella Coolant Control Hub for Interior, Battery and Electronics

INTERIOR NEWS



HELLA IMAGE

The Coolant Control Hub (CCH) from Hella integrates all the necessary functions for thermal management in the form of a subsystem. It is based on a modular principle and connects three thermal circuits in the vehicle with each other: the battery thermal circuit, the interior thermal circuit and the thermal circuit for power electronics and electric motor. The resulting reduction in components allows overall costs to be reduced.

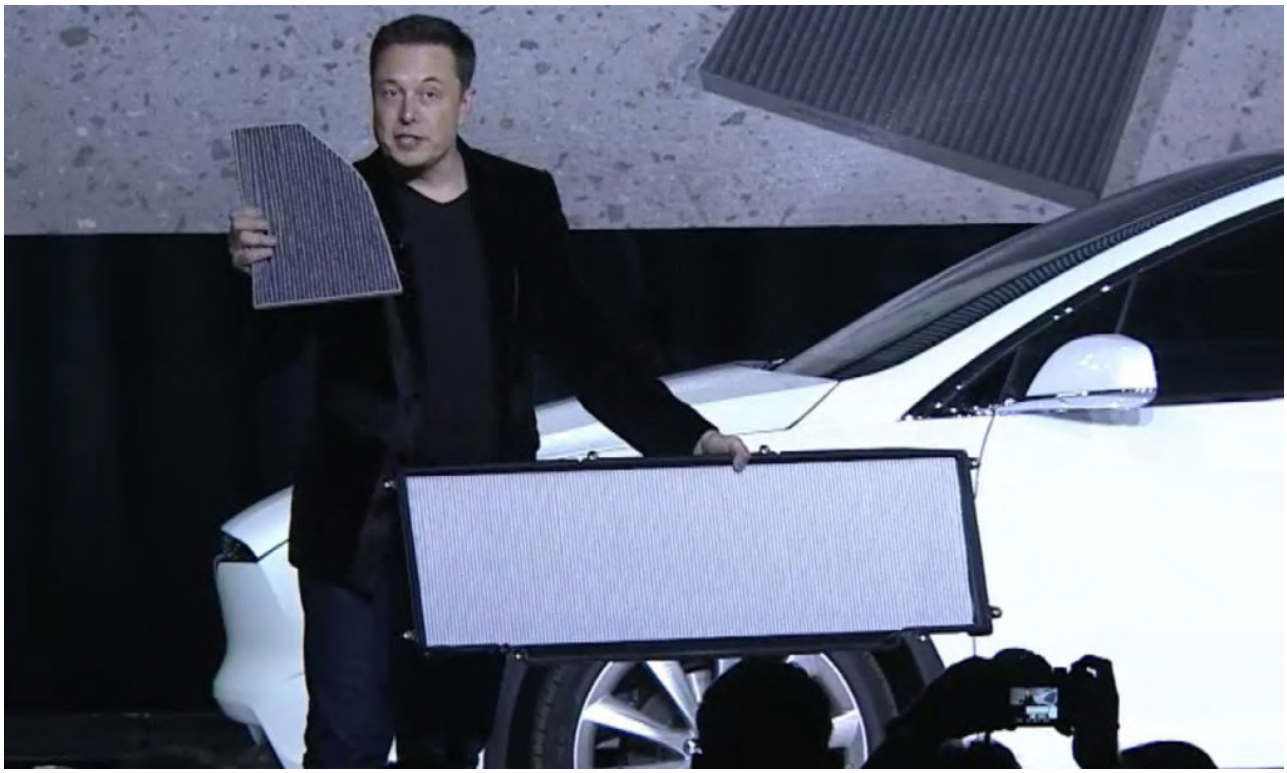
The centralization of thermal management should lead to an optimal distribution of thermal energy in the vehicle. The modular system can be adapted for customers depending on the architecture. It reduces complexity, as the CCH combines, for example, multi-way valves, actuators, distribution systems, electronic circulation pumps, expansion tanks and heat exchangers as well as sensors in one product. Hella has already applied for a patent for the 7-way valve. It enables optimum heat recovery and thus increases efficiency by ensuring demand-based distribution of heating or cooling requirements for the vehicle's critical components.

"One key to successful electrification lies in efficient thermal management," says Björn Twiehaus, managing director responsible for the global electronics business at Hella.

For vehicle interiors, efficient thermal management is key as cars are increasingly electric, to manage vehicle range and occupant comfort simultaneously.

Tesla's HEPA Interior Air Filter

INTERIOR NEWS



ELON MUSK IMAGE

Tesla has a new **video** to demonstrate the effectiveness of their HEPA (High Efficiency Particulate Air) filtration system and "Bioweapon Defense Mode" on the Models Y, S, and X. The two technologies combine to keep nearly all traces of pollution and particulate matter out of the vehicle cabin. Tesla claims the filtration system removes 99.97 per cent of airborne particulates, protecting occupants from polluted air.

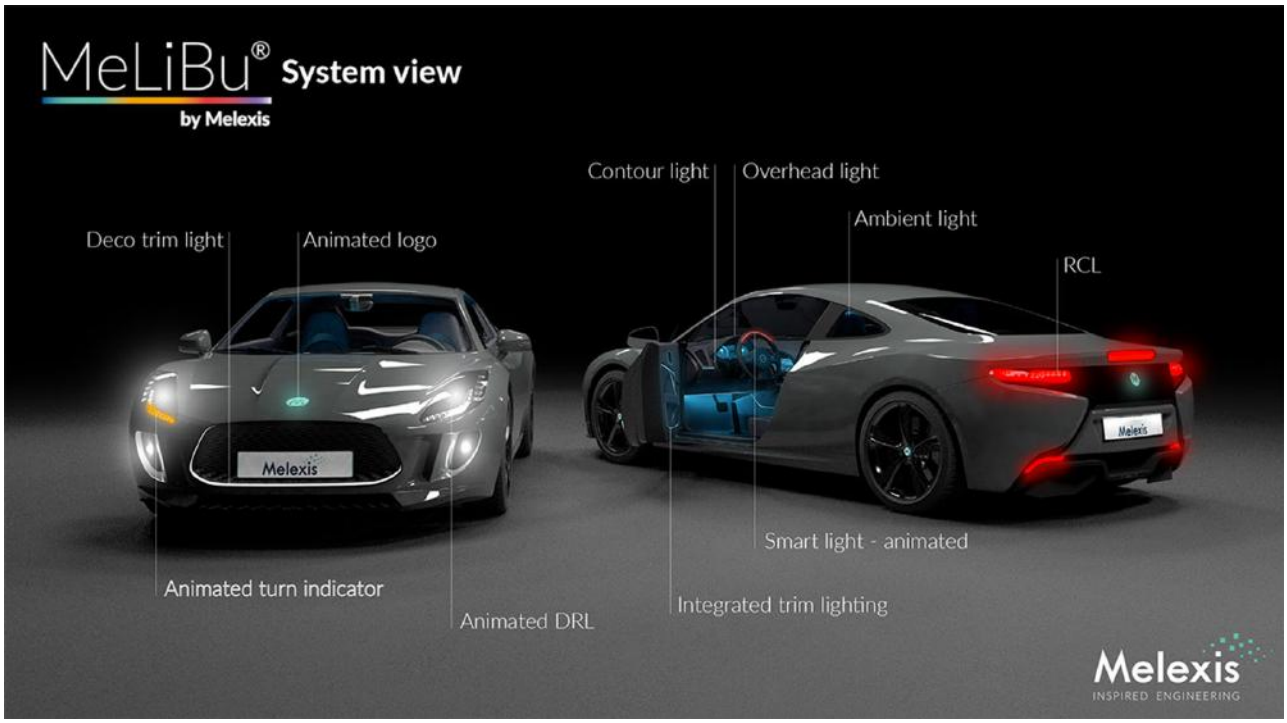
For the demonstration, Tesla used a giant bubble, parked a Tesla Model Y and a BMW X3 inside it, and then lit smoke bombs in the bubble. The HEPA filter-equipped Tesla had "Bioweapon Defense Mode" activated, while the BMW only had its standard filtration system. Tesla had an employee sit in the driver's seat of the Model Y during the experiment, while the X3's cabin remained empty.

The video shows how the cabin of the EV remained free from red smoke as the interior of the BMW got invaded by it. After the experiment, a Tesla thermal systems engineer removed the Model Y's massive activated carbon filters and the HEPA filters underneath them, revealing that they had captured a lot of red dust.

The HEPA filter used in Teslas is inspired by air filtration systems used in hospitals, clean rooms, and the aerospace industry. According to the New England Journal of Medicine, though, the Covid 19 virus is sized between 0.06 and 0.14 nm, too small to be caught by this kind of filter.

Melexis: Animated Light with Scalable MeLiBu Architecture

INTERIOR NEWS



MELEXIS IMAGE

MeLiBu (Melexis Light Bus) is a high-speed, low-BOM, robust automotive communication system that enables applications with high RGB LED counts for animated light animations within cars. The system is optimized for automotive use, and allows for integration into LED driver products. It is based on CAN-FD physical layer and UART communication with self-synchronization. The differential CAN-FD PHY supports advanced safety applications according to ISO 26262. The system is already on the road with multiple automakers having validated and implemented MeLiBu.

Key features & benefits:

- Controller-and-puppet based system
- CAN-FD PHY differential interface (high-speed 2 Mbit)
- License-free
- Every standard MCU can be used as Controller for car communication
- CAN-FD over UART communication
- Real differential bus structure enables simple wiring harness
- Simple synchronization of light animations over the full car via MeLiBu
- Delay-free communication system between LEDs
- Multiple bus segments can be distributed over the full car
- Real time update of >1,000 LEDs without any delay in one bus segment
- ISO 26262 support
- Freedom to use any LED
- One IC to drive multiple LED

Key differentiations:

- Ability to connect multiple LED modules together on one MeLiBu via a wiring harness
- High EMC & ESD robustness
- ISO 11898 compatible (CAN-FD PHY standard)
- Low cost per light node

Despite the complexity of the required architecture around the body control unit, lighting and animation is gaining in popularity for comfort and safety purposes. This requires high flexibility in the car architecture for lighting evolution without reprogramming the BCM; EMC & ESD robustness in a harsh environment, and fulfilling space requirements to fit in any location within the car.

News Mobility

Geely: Record Sales, Multiple Brands for Mobility

NEWS MOBILITY

LEVC TX TAXI (GEELY IMAGE)

China's Geely Holding has achieved record sales with its various car brands in 2021. According to a press release, the company sold a total of 2.2 million vehicles last year, an increase of 5 per cent compared to 2020. Among others, the Swedish premium manufacturer Volvo belongs to the group. In Europe, the Chinese are also active with Polestar, Lynk & Co, Lotus, and LEVC.

The Chinese made a large part of their business with Geely Auto. This part of the company, which in addition to the core brand Geely also includes Lynk & Co and the two new electric car brands Geometry and Zeekr, recorded 1.3 million deliveries last year.

Since spring 2021, Lynk & Co cars are rolling on European roads, offered in a membership model similar to a subscription. Volvo accounted for almost a third of Group sales in 2021 with 699,000 units, more than 5 per cent compared to the previous year. Volvo attributes the growth primarily to the high demand for electric and hybrid vehicles. Volvo's electric car offshoot Polestar sold 29,000 units; the Malaysian brand Proton increased its sales by almost 5 per cent to 115,000 units; EV brand Zeekr, launched last year, accounted for 6,000 deliveries; and electric commercial vehicle brand Fabrizon sold 42,000 units. Geely did not give specific sales figures for the Chinese e-car brand Geometry and the British manufacturer of electric taxis and vans, LEVC (London Electric Vehicle Company).

This year Geely wants to increase its sales to 2.5 million units across all brands. Sales of electrified vehicles in particular are expected to increase significantly.

Geely is now regrouping multiple brands, targeting global markets, expending through their younger brands, through multiple business models, within most of mobility segments (personal, commercial, taxis) and going progressively all electric.

Mitsubishi Electric Kei Cars for City Mobility

NEWS MOBILITY

MITSUBISHI K-EV CONCEPT X STYLE (MITSUBISHI IMAGE)

Mitsubishi is one of the early pioneers of modern mobility, and a leader in kei cars—the Japanese vehicle category for the smallest street-legal passenger cars with restricted dimensions and engine capacity—and in EV technology; they launched the original i-MiEV in 2009. The i-MiEV is still in production and sold even in Europe under Stellantis brands.

Mitsubishi gave the press a preview of the K-EV Concept X Style ahead of the 2022 Tokyo Auto Salon, together with Minicab MiEV B-Leisure style, for “solo camping”, equipped with camping basics like roll-out awning, integrated camping table, and folding cot. Inside, the rear space of the little van folds fully flat for a bed, while the cabin can be configured with a low table, chair, and a rug to enhance comfort for dining and/or remote working.

Kei cars were never successful outside of Japan, with a few Suzuki and Daihatsu exceptions. Probably they are seen as too specialized and too small for most models to be profitable. As mobility is getting electrified, it can change the story, to become a perfectly city mobility tool because of its small size and light weight. Perhaps the rest of the world will give kei cars a try!

General News

J.D. Power Finds Low Satisfaction in OEM Apps

GENERAL NEWS

The percentage of vehicle owners using OEM apps continues to increase year over year, with 38 per cent of respondents indicating that they use the app at least half of the time that they drive, according to the J.D. Power 2021 U.S. OEM ICE Benchmark Study released last week.

The usage rate is highest for US OEMs, with almost half of owners using it half of the time and 27 per cent saying they use it each time that they drive.

But brand apps are related to the third most problematic feature cited by owners in the J.D. Power 2021 U.S. Initial Quality Study. Issues with connectivity and incorrect information are plaguing apps and creating dissatisfaction for users, which causes many owners to abandon their brand's app.

"Owners are looking for accurate real-time information about their vehicle, which many apps are currently not providing," said Frank Hanley, senior director of global automotive consulting at J.D. Power. "While app speeds are improving, accuracy and stability are not in many cases. The apps are also lacking many of the features that owners want, causing many owners to say that the app is providing no real value."

Following are key findings of the 2021 study:

App usage is increasing but satisfaction isn't. Among the four main performance indicators for the app—appeal; content; ease of use; and speed—speed has the lowest level of satisfaction.

Apps still lack functionality. Most desired apps include remote controls; navigation assistance; service monitoring; and status/diagnostic information. No app in the industry is currently providing a good execution for all these features.

Willingness to pay for app features remains low. Among app users, 28 per cent say they would be willing to pay up to $5, though 58 per cent say they are not willing to pay—perhaps feeling that being able to control the car ought not to require additional spending.

And dealership help remains key. Assistance with setup and feature explanation is increasing app usage and satisfaction.

Among the 32 brands benchmarked in the study, the top-performing apps are Tesla, Volvo Cars, Hyundai, Genesis, and Subaru.

To improve the situation is vital for automakers, as apps are now a core part of brand satisfaction.

Renault, Nissan, Mitsubishi To Invest Billions in EVs

GENERAL NEWS

RENAULT NISSAN MITSUBISHI

Allied automakers Renault, Nissan, and Mitsubishi will invest €23bn in electric vehicles over the next few years. By 2030, more than 30 new battery-powered vehicles are to be developed on the basis of five common platforms —including a successor to the Nissan Micra to be produced within Renault's ElectriCity manufacturing hub North of France, together with future Renault 5, and a replacement for the Renault Zoe. The money would be in addition to the €10bn the group has already spent on electrification.

The plan, called "Alliance to 2030", reportedly aims to strengthen cooperation among the carmakers. with a shared vision on electrification and connected mobility. The five joint platforms are expected to cover 90 per cent of the electric vehicles the companies plan to develop and bring to market by 2030.

Jean-Dominique Senard, chairman of the Alliance, said the effort amounts to the Alliance "accelerating to lead the mobility revolution and deliver more value to customers, our people, our shareholders and all our stakeholders", and said the member companies have adopted a common roadmap towards 2030, sharing investments in future electrification and connectivity projects: "These are massive investments that none of the three companies could make alone; together, we are making the difference for a new and global sustainable future; the Alliance becoming carbon neutral by 2050".

The Alliance is working with partners to halve battery costs by by 2026 and cut them by an additional 15 per cent by 2028. By 2025, electric vehicles in the compact class should cost about the same as combustion-engine cars, according to the target. It is expected that the alliance will also share the solid-state lithium-ion battery technology developed by Nissan.

In Europe, Japan, the US, and China, 15 Alliance plants already produce parts, motors, and batteries for 10 EV models on the streets, with more than one million EV cars sold so far.