Thu, 5 January 2023
Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #142

Editorial

Interior Lighting Is Much More Than The New Chrome

Suppliers, automakers, and software providers are working on whole new kinds of interior lighting. They're driven by changing mobility concepts and increasing real and imagined clamor for new user experiences. This week's In-Depth report looks at evolving interior lighting techniques and some of the companies pushing ahead with it. You will also find coverage of new materials for mobility trends; the new Maybach S-Class; interior safety and design features; keyless face recognition; 3D printed gold components, and more.

Make a note of it: you won't want to miss the DVN Interior Workshop on 25-26 April 2023 at the Pullman Hotel in Köln, Germany. The focus is on Human-centered interior technology, and the sessions will include Human-Machine Interaction; Smart Surfaces; Safety and Driver Monitoring Systems; Interior Lighting; Comfort and Wellbeing, and Materials and Sustainability. This workshop is a matchless opportunity to present your innovations and products with lectures and exhibitions. Please **contact us** for more information, or an early registration.

All of us on the DVN-Interior team wish you; your family, and your colleagues all happiness; health, and prosperity in 2023. We're glad you're here with us! Not yet a member? Come **join in**. Sincerely yours.

Carsten Befelein
Consultant, DVN-Interior

In Depth Interior Technology

The Galloping Innovation of Interior Lighting

Interior lighting has evolved from simple plastic boxes with light bulbs inside, to advanced devices linked together as a system to provide comfort; design; safety, and electronic features. A thriving ecosystem of suppliers use light in an unprecedented variety of ways, with an ever-expanding variety of technology and technique, to create vehicle-specific interior designs with color atmospheres and different moods. Here we look at some of the main suppliers, as a preface to the extended interior lighting session at the DVN Interior Workshop this coming April.

Ansys

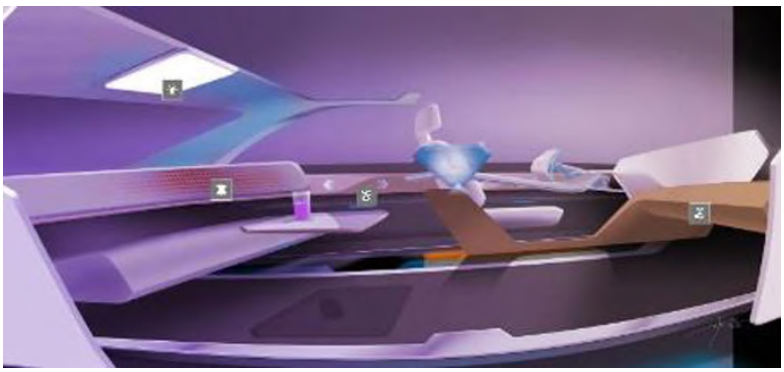
Ansys has strong competence in optical simulation of light systems, which can be leveraged to achieve customer specifications, photometric requirements, and any imaginable lit appearance.

Covestro

COVESTRO IMAGE

Covestro develops and manufactures high-end authentic material to create seamless curved surfaces, natural-until-lit surfaces, and materials for ambient lighting; IR light transmission; touch functions, and sensor integration for the likes of DMS, gesture and voice control.

Dräxlmaier



DRÄXLMAIER IMAGE

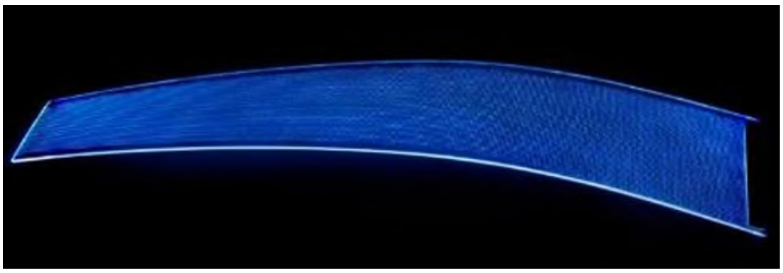
Dräxlmaier develops and manufactures high-quality instrument panels; center consoles, and door trims with ambient lighting to ensure an optimum feel-good ambience in the interior of premium vehicles. They are as individual and expressive as the vehicles to which they lend their own character.

Everlight

EVERLIGHT IMAGE

Everlight has long been committed to the continuous improvement of LED products and their manufacturing processes through intensive research and development efforts for illuminated switches and light guides; ambient lighting, and bright radiant light.

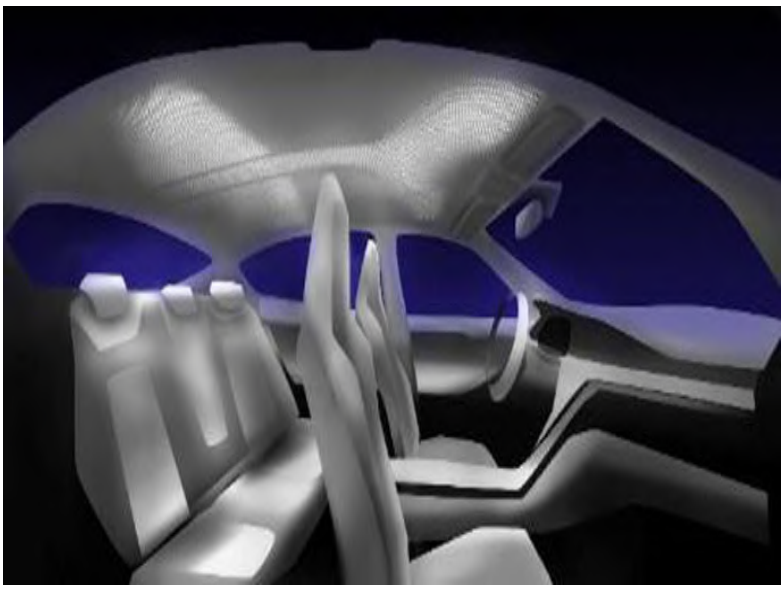
Feno



FENO IMAGE

Feno's laser-structured flat light guides are ultra-thin, very light, and can be easily integrated even into challenging surfaces. Thanks to laser structuring, the light is distributed smoothly over all surface sizes with high light output. With optional thermoforming, they even nestle up to complex surfaces.

Future Lighting Technologies (FLT)



FLT IMAGE

The FLT portfolio comprises technologies and concepts for automotive interior and ambient lighting with light modules; flexible illuminated textiles; lighted materials, and heating materials in numerous combinations on 2- and 2.5D surfaces.

Forvia

FORVIA IMAGE

Integrating technology from constituent companies Faurecia and Hella, Forvia applies dynamic interior light for interior surfaces with low- and high-power LEDs; slim light systems, and decorative surfaces. This includes overhead consoles; warning and information arrays, and multifunctional systems. For example, a backlighted surface can be implemented as a low-resolution RGB LED matrix display. It extends the display surface and

minimizes cost and power consumption. The combination of materials, lighting, and sensors creates functional surfaces with new opportunities for HMI.

Grupo Antolin

GRUPO ANTOLIN IMAGE

Grupo Antolin focuses on innovative products which surprise and interact with the human senses. The development comprises intelligent surfaces; the integration of light and its effects - often surprising and magical; attention to detail; advanced and sustainable textiles and plastics. For example, an indirect, perimetral, and dynamic light with waterfall effect provides information and warnings in the vehicle interior.

Inova

INOVA IMAGE

Inova works on interior lighting with ILaS and the digital LED ISELED. ILaS is the ISELED Light and Sensor network with embedded system of light, sensors, and actuators; efficient daisy-chainability for high speed lighting sequences and easy synchronization; simplification of color homogeneity and system design, and for a minimum installation space.

Kurz / PolyIC

KURZ IMAGE

Leonhard Kurz and PolyIC are a global design and service partner for high-tech auto interior surfaces. With the concept of an interactively-backlit door trim, the companies won the Automotive Brand Contest 2018 in the

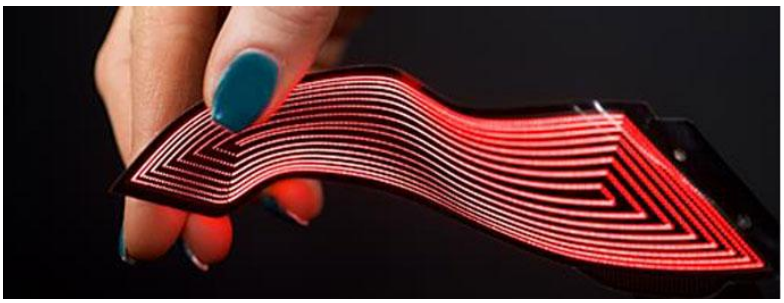
Future, Mobility and Parts category. "Cloudy Feathers" is the name of the innovative, nature-inspired day-night winning design, whose touch functionality was realized with capacitive touch sensors from the Kurz subsidiary PolyIC.

Lightworks

LIGHTWORKS IMAGE

Lightworks combines expertise in optics; electronics; mechanics, and industrialization to make a light integration process fast; efficient, and safe. Lightworks can test the feasibility of design drafts at a very early stage, to equip designers and engineers with a technical concept while preventing manufacturability problems.

Magna



MAGNA IMAGE

Magna's FlecsForm™ develops lighting technology on a thin flexible substrate surface. It enables advanced communication displays with complex animation functions for interior and exterior lighting. Magna's digital manufacturing processes ensure smooth and efficient production with flexible tools and high speed.

Marelli

MARELLI IMAGE

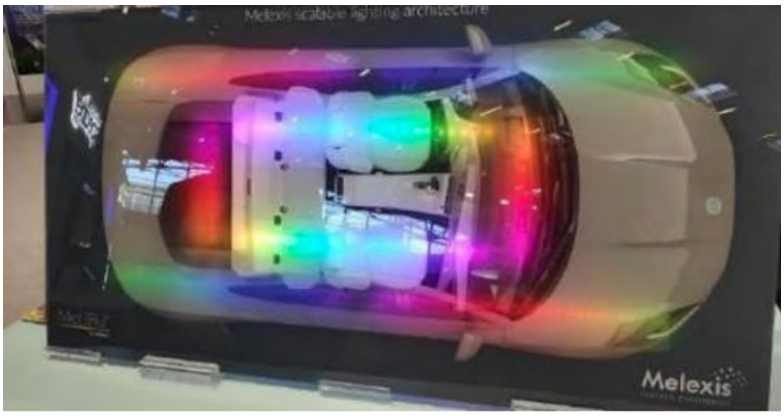
Marelli strives for a seamless, smooth integration and HMI interaction between human and machine for more comfort, a safer ride and a smarter interaction. Translucent skin and switches; AR-HUDs; multiscreen integration, and large cockpit displays are just some of Marelli's solutions to enhance the driver's experience.

Marquardt

MARQUARDT IMAGE

Marquardt focuses on total-system development—from lighting element to operating unit, integration of ambient lighting, functional lighting and HMI operation—in a single module with touch sensor technology and direct light indication for new operating and functional concepts, and intuitive and flexible systems with variable color contents.

Melexis



MELEXIS IMAGE

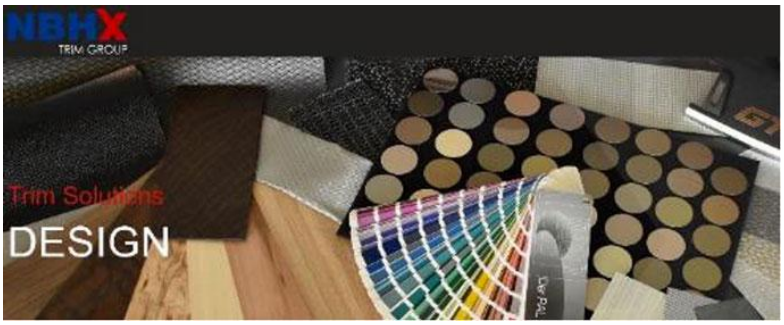
Melexis develops LIN and MeLiBu buses. LIN supports static; animated, and dynamic lighting. A LIN-based gateway architecture provides easy scalability from low- to high-end applications. For highly dynamic RGB applications, MeLiBu architecture from Melexis is the appropriate network to combine LIN and CAN-FD. It is a master/puppet based solution with self-diagnosis capability.

Mentor

MENTOR IMAGE

Mentor has an innovative RGB LED solution for demanding colored-light applications. It is based on a compact RGB base module with integrated microcontroller, suitable for a wide range of applications in direct or indirect interior lighting. It can be used as area; line, and spot light for the colored illumination of footwells; grips; cubby pockets; fabric panels; air registers; storage compartments; door sill panels; cup holders, and more.

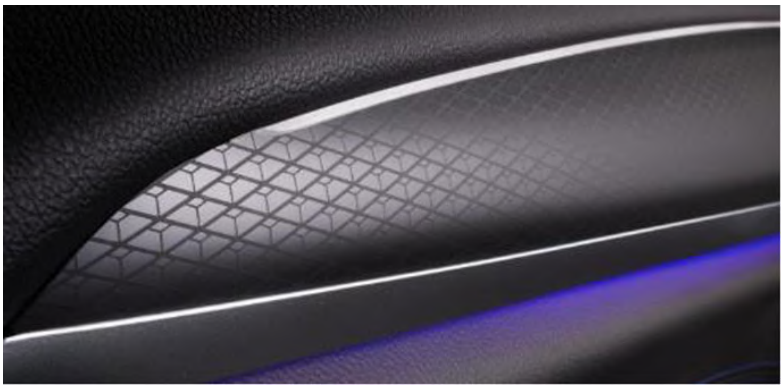
NBHX



NBHX IMAGE

NBHX supplies extraordinary designs and materials for the vehicle interior that go beyond thoughtful integration of lighting and operating functions and consider the desire for comfort in the mobile environment as well.

Novem



NOVEM IMAGE

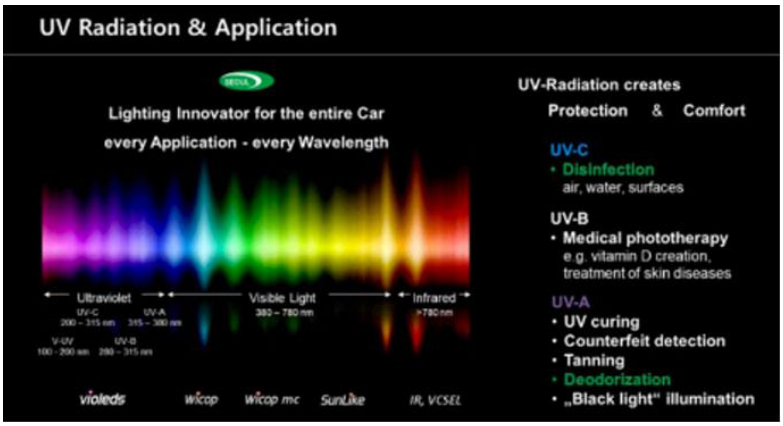
Novem processes high-quality materials such as wood; aluminum; carbon, and premium synthetics as well as materials not traditionally used in car interiors, such as porcelain and fiberglass. The result: exclusivity; functionality, and optical brilliance, amplified by ambient and back-lighting of materials in center consoles; instrument clusters, and door panels.

Plastic Omnium

PLASTIC OMNIUM IMAGE

A digital projection systems developed by Plastic Omnium and AMS Osram offers options for customizing the interior. Digital projection systems extend the classic exterior welcome scenario, when entering the vehicle, to the dashboard. There, the projection is synchronized with the ambient lighting and adjusted according to the mood of the passengers. Digital micromirror modules can flexibly project different types of light carpets and light animations inside and outside the vehicle to improve visibility and orientation or for example to display warning symbols and signals to the occupants or to the surroundings.

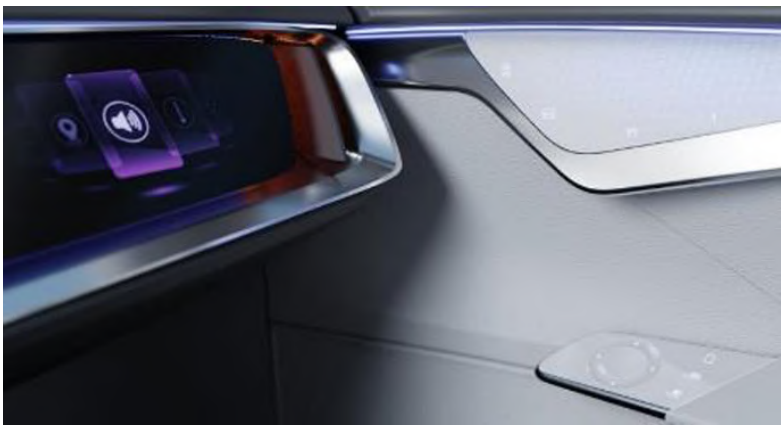
Seoul Semiconductor



SEOUL SEMICONDUCTOR IMAGE

In addition to their extensive portfolio of visible-light automotive LEDs, another of Seoul Semiconductor's specialties is UVEDs—ultraviolet-emitting diodes—which can be applied for deodorization with UVA in combination with a photocatalyst, and sterilization with UVC using his company's Violeds technology. UVA purification removes bad odors and VOCs faster than ionizers, and UVC effectively disinfects air in vehicle HVAC systems by deactivating 99 per cent of bacteria on interior surfaces.

TactoTek



TACTOTEK IMAGE

For the integration of lighting and electronics in interior components TactoTek uses in-mold structural electronics (IMSE) technology. This technology makes surfaces thinner; lighter, and more durable, while retaining all the æsthetic and tactile qualities provided by plastic; wood, and other materials. IMSE integrates lighting and electronic components into 3D injection-molded plastics to create a seamless structure.

Weidplas

WEIDPLAS IMAGE

Based on computer-aided optimization of light guides, a previously-unattainable homogeneous illumination is achieved with a high light output. Optimization software enables the calculation of light guides in complex 3D contours and geometries. The high efficiency of the light guides is achieved by corresponding microstructures in the light guide, between 50 and 200 µm in size. These very fine structures enable efficient, thin-walled light guides which usually don't require additional diffusers.

Yanfeng

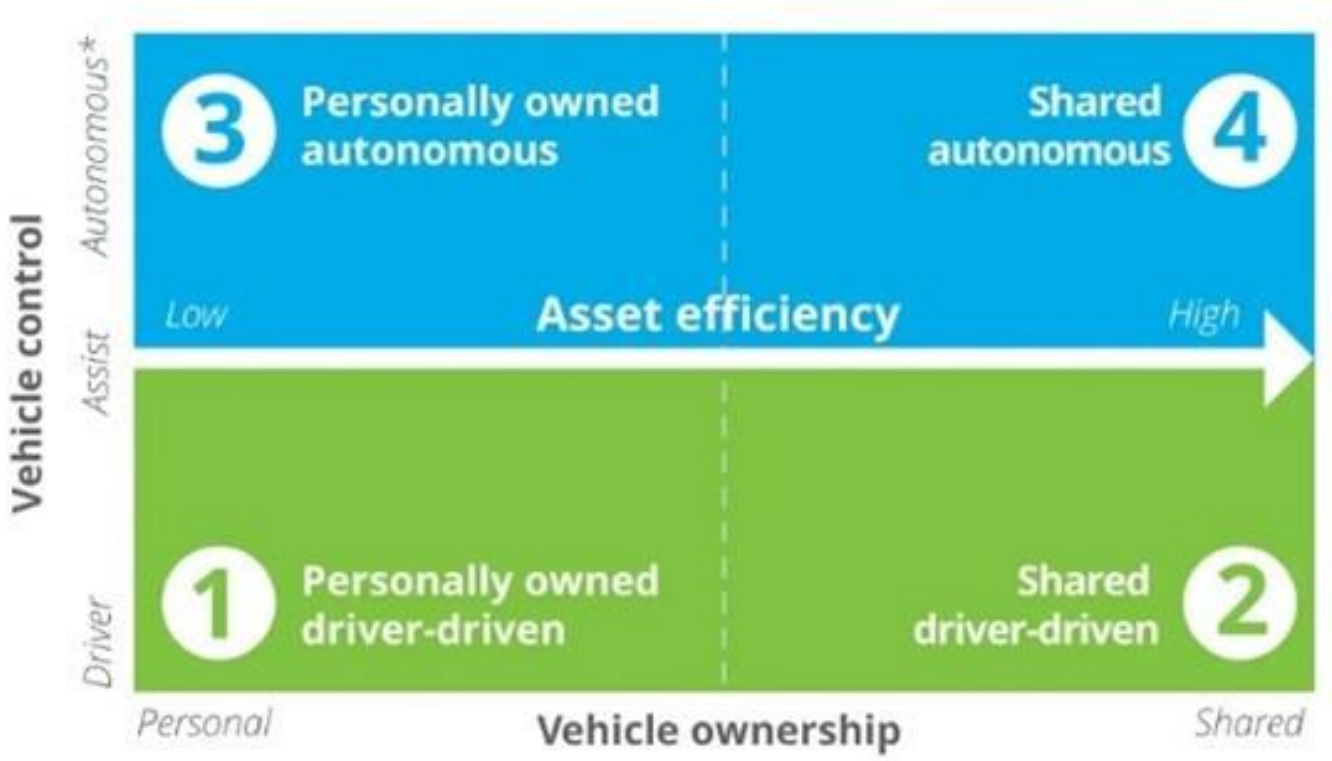
YANFENG IMAGE

Yanfeng works on luxury research studies and presents the results in concept vehicles, where digital technologies and innovations transform the interior's features into a user-centric, luxury experience. Interior lighting plays an important role to create the right atmosphere, and to spotlight design features. Lighting is also a communication tool, guiding the user on how to engage or control features as they go through each experience mode.

Interior News

Daikin Chemical Meets Needs of 4 Key Mobility Trends

INTERIOR NEWS



DELOITTE GRAPHIC

A recent Deloitte study examined major industry transformations and their effect on material selection. The research found the four states shown in the blue and green graphic here are likely to coexist for the foreseeable future. The significance of EVs is a certainty, with strong pushes and pulls as regards interior materials in terms of low mass (light weight); interior coatings, and in-vehicle experience. From a materials standpoint, the accelerated path to electrification demands automotive engineers and suppliers review the way they establish specifications.

Daikin Chemicals, a raw material supplier, is supporting the shift from ICE to EV, and offers innovative materials - fewer high heat plastics and rubbers, more easy-to-replace and service commodities. There is also a new demand for high-end, lightweight polymers.

Lightweight Materials
A fundamental challenge with the transformation from ICE to EV, which previously included fuel efficiency and emissions reduction.

Interior Coatings
There is an increased demand for haptic surfaces for electronic screens and surfaces which reduce dirt, fingerprints, and contamination. In this field Daikin has several surface modification options. Examples include Optool, an easily-cleaned, anti-fingerprint transparent coating for screens and sensors; Optoace, an ultrathin waterproof and abrasion-resistant film for increased performance of electronics, and Unidyne, a water- and oil-repellent solution for textiles and non-wovens.

Improving the User Experience
The driving experience is slowly shifting from a focus on comfort and safety towards an in-transit experience featuring connectivity and entertainment. OLEDs; flexible materials; haptic surfaces, and antimicrobials are among hot topics that will contribute to this experience.

Daikin's DAI-EL material offers new tactile experience while being resistant to human fluids, UV, and more. Fluoropolymer film especially for EVs allows the capacitor to achieve higher heat resistance and high energy density, with a smaller size.

Ultra Luxe Interior in Maybach S-Class

INTERIOR NEWS

MERCEDES-BENZ IMAGES

At 5.5 meters long, the Maybach S-Class is 18 centimeters longer than the long version of the standard Mercedes-Benz S-Class. The upgrade to the rear ensures that the standard executive dual seats allow independent adjustment of the seat cushions and backrests. In addition, the footrests attached to the front seat and the electrically extendable legrests—5 centimeters longer than in the previous model—provide a continuous, comfortable reclining surface for a pleasant sleeping position. The car is brimming with luxury, especially in the rear, as the new Maybach S-Class is primarily intended as a chauffeur-driven car.

Interior innovations include a massage function for the legrest and heating for the necks and shoulders of rear-seat passengers. Active Driving Noise Compensation ensures that hardly any road or vehicle noise can be heard inside the already extremely quiet vehicle.

Also new for back seat riders: automatic seat belt extenders called Belt Butlers. Those who don't feel like opening their door themselves can have the driver do it at the touch of a button. The door closes again with a

simple gesture. And the Active Ambient Lighting for the rear passengers—comprising 253 LEDs—also gets a wider range of adjustment.

MERCEDES-BENZ IMAGE

The same multimedia interface (MBUX) as in the regular S-Class is used for the five available partial LED screens. This allows the Maybach to take advantage of the enormous number of proven control options for vehicle systems and functions. The multimedia system can recognize passengers' movements and gestures via 3D laser cameras in the headliner in order to respond with service settings. For example, the rear Seat Belt Butler is automatically activated when the passenger's reaching movement is detected.

Bored With Driving Your Tesla? Play Games!

INTERIOR NEWS

TESLA IMAGE

Owners of Tesla's new Model S and Model X vehicles will soon be able to play thousands of games through the car's infotainment system. The feature is powered by Steam, a distribution service for digital video games.

Tesla's update release notes indicate that any Steam Deck-compatible game will also be Tesla-compatible, meaning games like Cyberpunk 2077 and Elden Ring will now be playable in the car, among many other titles.

In addition, the Tesla vehicle will also utilize Steam's cloud syncing feature, allowing gameplay to continue from any other Steam-compatible device.

The gaming service requires 6 GB of DDR memory and extra-cost premium connectivity.

Toyota Patents Counterforce Seatbelt

INTERIOR NEWS

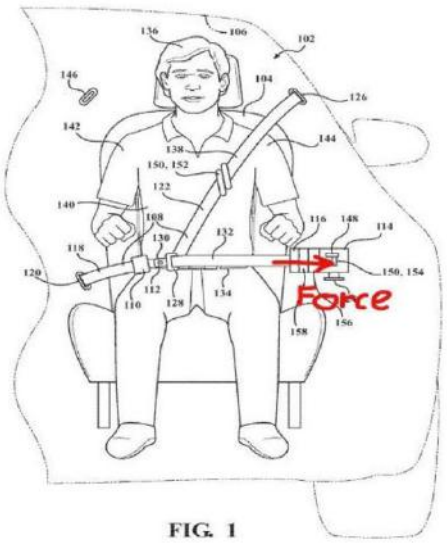


FIG. 1

Seatbelt pretensioners are ubiquitous; they yank the slack out from the belt the instant before a crash, to hold the occupant in place. Now Toyota has patented a new technology to apply force to a seatbelt in response to non-crash deceleration of a vehicle.

The general idea, as described in the **patent**: a force can be applied to a seatbelt in response to deceleration of a vehicle. Information about the deceleration of the vehicle can be received. In response to a receipt of the information, a signal can be generated to control an actuator to produce the force. The actuator can be different from any existing pretensioner; load limiter, or locking mechanism, and the force can be proportional to the deceleration. The force can be sufficient to limit forward movement of a person wearing the seatbelt.

New Interior Design for Hyundai Kona

INTERIOR NEWS

HYUNDAI IMAGE

The latest Hyundai Kona small SUV has been designed with a driver-centric interior to deliver a versatile living space that caters for the practical and æsthetic needs of its occupants.

With an EV-derived, futuristic design, the Kona has been elongated to 4,355 mm to maximize interior space—that's 150 mm more than the previous Kona. The larger interior space delivers an array of practical features and an evolved in-car experience to provide for different lifestyles. The EV-derived universal architecture benefits from a sporty layout with a floating horizontal C-pad to emphasize the vehicle's wide interior.

Situated at the front of the vehicle are dual 12.3-inch displays and a floating module to deliver infotainment to drivers and passengers. The column-type shift-by-wire has also been relocated from the center console to behind the steering wheel to provide a cleaner-looking cabin and additional space for occupants' belongings. There's standard-equipment ambient lighting. The second-row, curveless bench seat offers maximum comfort and convenience for passengers.

Keyless Face Recognition in '23 Genesis GV60

INTERIOR NEWS

GENESIS IMAGE

Several new advanced biometric features are being added to Genesis' first dedicated electric SUV, including what is stated to be the world's first face recognition technology for keyless entry, plus an air purification system and a digital key.

The 2023 GV60 will see the introduction of Face Connect, which lets vehicle users access the car using just their face. This is made possible through the use of a face recognition sensor with a deep-learning image processing controller, enabling the GV60 to be locked and unlocked without using a physical key. The solution is set up using the Genesis Connected Services (GCS) app, with customers only needing to access the car once with the physical key once before face recognition can be used for entry. The driver's fingerprint can also be used to start the car.

An LED indicator located on the B-pillar lets drivers or occupants know the car's status. The owner's data is stored securely on encrypted software in the vehicle; no biometric data is uploaded or stored remotely. Users of the system needn't carry their keys with them.

The new Digital Key feature enables customers to access the vehicle and lock or unlock the car using a smartphone or a smartwatch. It welcomes users when approaching the vehicle by turning on a puddle lamp and opening the side mirrors. The real-time virtual key can also be shared with up to three people via a smartphone.

3D-Printed Gold in New Bentley

INTERIOR NEWS

BENTLEY IMAGE

By dint of additive manufacturing - 3D printing - Bentley will install up to 210 g of 18-carat yellow gold inside the coach-built Mulliner Batur coupe. Customers can decide if they want 3D-printed gold to be added to a number of driver touchpoints including the 'Charisma Dial', which encircles the start/stop button and is used by the driver to change driving modes. Gold can also be applied to the Bentley's vent controls on the dashboard, or as a gold insert on the steering wheel.

All of the gold is sustainably sourced and is 100 per cent recycled from old jewelry, which is ground down and turned into a powder for the 3D printing technique. Each 3D gold part is digitally designed using CAD models, before they are printed using a process with laser melting printers. The components are then hand finished by jewelers, using traditional techniques to achieve a high-quality, polished finish. The pieces are all hallmarked in Birmingham's Jewellery Quarter as a sign of having solid material authenticity.

Dr Matthias Rabe, R&D boardmember at Bentley Motors, says "One of the key benefits is that it is efficiency led, cutting down on the cost and complexity of a myriad of jobs but maintaining the value of a rare resource".

The Design Lounge

Ford Edsel, a prime example of a failed product launch

THE DESIGN LOUNGE

WIKIMEDIA COMMONS & PUBLIC DOMAIN IMAGES IN THIS ARTICLE

Frank Sinatra, Louis Armstrong, Bing Crosby, Rosemary Clooney, Bob Hope and a handful of the era's biggest celebrities were some of the hosts of Ford Motor Company's Edsel Show on 13 October, 1957. It was a one-hour CBS special that earned an Emmy nomination for best single program of the year.

The Edsel's design brief was to make the car as identifiable as possible, from any distance. Indeed, that was the case once the car came out on the streets. It was certainly distinctive, integrating many new features for its time; the most emblematic of all, at a moment that any American car used overextended horizontal graphics as

a front-end identity feature, was that Edsel went for a vertical front grille (which bore an unfortunate—or perhaps deliberate—resemblance to a part of the female anatomy not generally discussed in public; in polite conversation it was likened to the facial result of sucking on a sour lemon).

Many technological fads of the era were represented in the interior. There were 'Teletouch' transmission control pushbuttons at the center of the steering hub; a rolling-dome speedometer that would turn red when speed limit was exceeded; seatbelts, and a single rotatory switch for both heating and cooling. With a turn of a key on the dashboard, the trunk would open electrically. Ford went as far as hiring a poet to come up with names for the model range, such as the 1958 Edsel Bermuda station wagon; it was dressed up with faux woodgrain Di-Noc to look like the wood-bodied wagons of yore. Look at the design of the taillights: two barrel wings pointing the opposite way.

Operating the left turn signal caused a right-pointing chevron to flash! A similar observation was made decades later about the rear turn lights on the VW B5.5 Passat. Fun to point and laugh about, but in reality this "wrong way" complaint is a nothingburger; by the time an observer gets close enough to see not just the flashing light but its specific shape, they have already taken measures to avoid hitting the car (or not!).

The Edsel was a disaster for Ford, and the marque lasted only three model years. It failed at the task of defining the car of tomorrow, but much like then, it still stands out in today's classic car shows.

News Mobility

Cars Self-Drive in Rural Zones, Too

NEWS MOBILITY

GOMARTI IMAGE

Rural Americans are not the most obvious early adopters for robotaxis, but they need transit innovations far more urgently than people in more densely populated communities, and are far more willing to accept them. For autonomous technology companies, that's an opportunity to establish the reliability and usefulness of technologies that have struggled to gain acceptance in cities and suburbs. In Grand Rapids, Michigan, one company is partnering with government and the community to serve the need.

That company is May Mobility, an autonomous-shuttle company based in Ann Arbor, Michigan. CEO Edwin Olson says they were looking for a rural community "where we could really demonstrate that we could help". The help, as Olson views it, comes down to replacing or supplementing low-performing buses with May's on-demand, point-to-point, autonomous shuttles. Olson says the cost of May's shuttles is on par with typically inefficient rural bus services, while providing better service hours and shorter wait and trip times.

GoMarti's Toyota Sienna minivans are equipped with L^4 autonomous technology that enables them to drive in most conditions without a human taking over. However, a human operator remains behind the wheel, mostly for local conditions requiring human-driver intervention, such as icy roads; poor visibility, or a roundabout. Over time, performance should improve and the role of the human operator will become less relevant, though it's easy to imagine older rural passengers feeling a great deal more secure with a human in the driver's seat.

For May Mobility, achieving uneventful rides has been challenging. For example, AVs that operate in cities often rely on tall buildings as navigational aids, but in a rural setting there are fewer such landmarks. So May Mobility erected what Olson calls "totem poles": simple visual markers along featureless stretches of the GoMarti service area.

Cupra Born Protects VRUs

NEWS MOBILITY

NETCARSHOW.COM IMAGE

Cupra's city-focused BEV, the Born, is designed to help reduce driver stress levels in streets populated by pedestrians and cyclists. It will feature ADAS specifically tailored to protect the more vulnerable road users in congested urban streets. The car comes equipped with an acoustic system to alert vulnerable road users to its presence. While all new EVs must be equipped with Acoustic Vehicle Awareness Systems to emit sound when travelling at less than 12 mph, the Born system is clearly perceptible at speeds in excess of 25 mph.

It backs this system automatic emergency braking capable of detecting both pedestrians and cyclists, as well as other vehicles. If the system detects an imminent collision with a cyclist or pedestrian, it will first provide visual and audible warnings to the driver and, if the driver still fails to brake in time or with insufficient braking effort, maximum braking is automatically applied. The system can detect people crossing the road; travelling along the side of the road, and those who cross from behind an obstructed view such as a parked car. It works both day and night.

On top of this, Exit Warning works by providing visual and audible alerts to vehicle occupants about to open doors to leave the vehicle. The system detects if another road user - a bicyclist, most likely - is passing the vehicle as an occupant goes to open a door, negating the need for occupants to remember to use the 'Dutch Reach' technique of reaching across and operating the door handle with their inboard hand, thus causing them to twist around and look over their shoulder, so they might see an approaching bicyclist.

General News

Valeo at COP27 for Electrification, CO2 Reduction

GENERAL NEWS

VALEO IMAGE

Valeo went to the United Nations Conference of the Parties (COP27) held in Sharm Elsheikh, Egypt, as a renowned leader in vehicle electrification and provider of CO_2 emission reduction solutions.

Touting their longrunning efforts towards sustainability, Valeo took part in the French pavilion's panel discussions on decarbonization affordability and circular economy. Most notably, Valeo took the opportunity of being an active advocate for sustainable mobility to sign the Zero Emission Vehicle (ZEV) declaration with the United Nations - a global acceleration of efforts towards 100 per cent zero emission cars and vans by 2040.

Valeo's exhibition shed light on their 2021 climate report and latest products and systems that make vehicles cleaner; safer, and smarter, yet affordable and adaptable to individual needs. Among these products are the Valeo eAccess 48V, 48V iBSG, High Voltage eDrive, and battery cooling.

Valeo is currently on a rigorous mission to fulfill their CAP50 plan to achieve 100 per cent carbon neutrality in operations by 2050, with a focus on industrial processes; energy consumption; supply chain, and use phase. CEO Christophe Périllat says his company "made a very strong and ambitious commitment to achieve carbon neutrality by 2050 and reach just under half of this objective by 2030. Valeo's emissions will have decreased by 45 per cent across its entire value chain—including CO_2 emissions from suppliers, [our] own operating activities and the end use of [our] products—compared with 2019. This commitment is our contribution to a major societal issue, the fight against global warming. And naturally, we will continue to invent, design and develop technologies that contribute to cleaner mobility in all its forms".

New Marquardt Plant, More Developers in India

GENERAL NEWS

MARQUARDT IMAGE

The Marquardt Group has opened a new development center in Pune, India. According to a recent press release from the company, the mechatronics specialist has doubled their previous development capacities at the site. The new building will employ 450 people, with focus on new products for electromobility.

In addition, Marquardt is starting construction of a new production facility nearby to "serve the rapidly growing demand of Indian vehicle manufacturers in particular even better", in the words of CEO Harald Marquardt.

On an area of more than 20,000 square meters, the supplier has planned their own electronics production in addition to several assembly lines by mid-2024. The Indian teams will work closely with the company's other development sites in Germany; Romania; the USA, and China. Around 10,200 employees currently work for the Marquard Group at 21 locations worldwide. Annual sales were recently around €1.3bn.