DVN-I
Automotive Interior

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Editorial

Autoshows: Reawakening Or Rebirth?

IAA MOBILITY 2021 (IMAGE: IAA)

This week's in-depth piece focuses on the upcoming DVN US Workshop set to happen 21-22 September. Don’t miss it; register to attend live or online—and as an interior expert, you'll surely want to attend the session on driver monitoring systems. Registered attendees who will not be able to travel to Detroit or aren't available on the event days will benefit from video on demand of the complete event.

The Workshop is happening in parallel with Motor Bella, the rebrand of NAIAS, now located in Pontiac, and focused more broadly on mobility. After the Chicago auto show in July, during the Chengdu show in China this week, and before the IAA now happening in Munich and the Los Angeles show in November, the Geneva and Qatar shows, the automotive industry is up and running again. But it’s not only a

reawakening after the difficult pandemic period. It’s more a rebirth, as most of the events are focused on mobility, and not only on automobiles.

Cars will remain a key component of our transportation mosaic with connected and electrified vehicles playing a critical role in helping this new world of multimodal mobility take off. Today most automotive companies and those in other industries are investing heavily to add a variety of mobility offerings to their portfolio. This much broader perspective is opening giant opportunities in interiors because of so many new use cases.

We're glad you're in the DVN Interior community! (And if you aren't yet, **see the video**, and **come join in**).

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

DVN Workshop Live and On Line, 21-22 September

The 23rd DVN Workshop will be held in Novi, Michigan, on 21-22 September at the Hyatt Place Hotel. That's during Motor Bella, the new 6-day event replacing NAIAS. All prevailing Covid safety measures in effect in Michigan will be applied, and the conference and expo spaces will be safely laid out for hundreds of in-person attendees to benefit from the full docket of lectures, presentations, and exhibitions.

Travel restrictions will prevent some would-be participants attending in person, so we have arranged for online attendance in real time or in a replay mode to account for time zones, via our DVN US Workshop online platform.

The rubric for the day-and-half conference is How to Save Lives in Nighttime Driving, with the intent to describe and discuss how new technologies can contribute to increased safety.

Why did we pick this rubric? Primarily, because of the alarming trends in American traffic deaths: 38,680 of them in 2020, up 7 per cent vs 2019, despite significantly less driving on account of the pandemic. The fatality rate hit 1.37 deaths per 100 million the worst rate since 2006. That's a trend in the wrong direction, and it seems to be gaining traction; in the second half of 2020, the number of deaths was up more than 13 per cent. It's a daunting problem in a challenging regulatory and cultural environment. DVN wants to contribute to reversing this wrong-way trend by facilitating discussion and

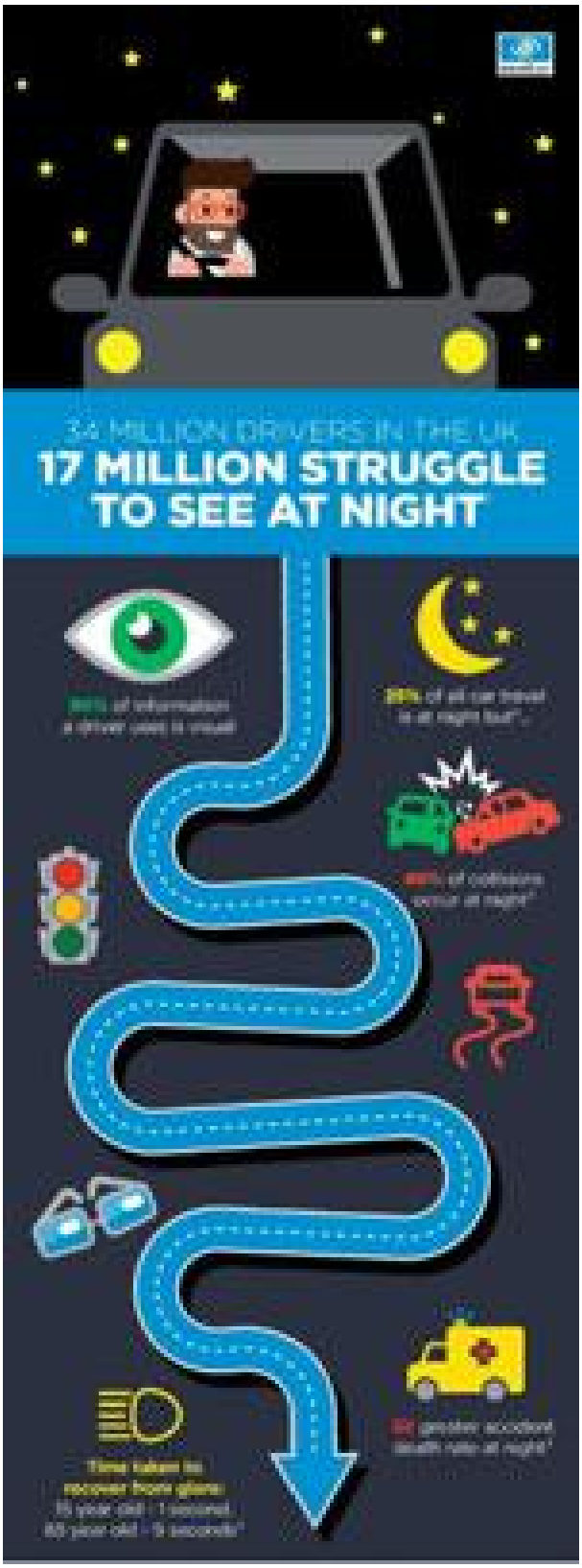
adoption of effective solutions. Lighting and Driver Monitoring System will help improving the situation.

The Workshop will include lighting technology presentation sessions on the status of safety on the roads, lighting and safety improvement, safety-technology, regulatory topics, light source innovations and technology enablers for safety at night, and µLED light sources

A special fourth session involves vehicle interiors, an increasingly important domain to enhance safety by dint of driver monitoring systems and other technology; there will be lectures from Ansys, Radiant Vision Systems, Grupo Antolin, Xperi, and Eyeris.

Drowsiness while driving is really common on long trips—maybe on short trips too, especially with increasingly capable driving assistants; human beings are better at engaged activity (such as driving) than we are at passive activity (such as supervising a highly-capable cruise control). Consider a situation where you had a hectic day at work, you are driving back home, and it’s already dark. Risk is at maximum, especially as nowadays driver is using partial automation, then taking less attention to the road and other vehicles.

Driving at night might mean roads are quieter but travelling in darkness isn't without its risks. Reduced vision makes it more difficult to read signs, spot hazards and notice other road users, while tiredness can have a huge impact on a driver's judgement and reaction times.



UK STATISTICS (IMAGE: ESSILOR)

In the US, the National Safety Council reports that half of all traffic fatalities happen at night. Similarly, in the UK, the RoSPA (Royal Society for the Prevention of Accidents) reports 40 per cent of all UK road accidents occur when it's dark—while just 15 per cent of road traffic exists between 7 pm and 7 am. Drivers impaired by alcohol or drugs mostly drive during the night, for one, and driving while tired is effectively similar to driving while drunk or stoned. The US National Sleep Foundation found that driving after being awake for 18 hours is similar to having a blood alcohol content of 0.05, and being awake for 24 hours produces effects similar to having a BAC of 0.1.

That’s the impetus behind the growing awareness that DMS (Driver Monitoring Systems) can improve automotive safety, and why such systems are set to become mandatory in major markets by 2024 (and probably important to the world's various NCAPs before then).

Here's a brief summary of the upcoming DVN Workshop's session № 4, Enhanced Safety by Driver Monitoring Systems:

• Ansys' Sen Zhang (Application Engineer) will speak about In-Cabin Sensing Systems and Simulation. DMS may combine advanced optical and electromagnetic sensors as well as AI algorithms to detect a driver’s eye movement, facial feature movement, breathing, and other parameters. Complex systems such as these require rigorous testing and validation to attain the needful level of reliability and safety. Ansys supports the development, tests and validation of DMS, to minimize development time and cost.

• Radiant Vision Systems' Matt Scholz (Automotive Business Leader) will present about Driver Monitoring System Testing. Embedded console, central stack, and dashboard display screens are becoming more common for vehicle instrumentation, navigation, and entertainment. These displays must be able to perform under a wide range of ambient light conditions, from bright sunlight to nighttime. With a built-in library of tests for luminance, chromaticity, uniformity, contrast, mura, pixel defects, anti-glare “sparkle” effects, and image sticking, Radiant will present how this could be transposed into DMS.

• Grupo Antolin Innovation Manager Benjamin Chevallier and Business Development Executive Enrique Jiménez will give a talk about Assisting Nighttime Driving With Driver and Occupant Monitoring Systems. Antolin is currently offering state of the art technologies to monitor the driver and the occupants in order to increase the safety on board. The use of these technologies, allows to detect the status and condition of the driver, but also gives the possibility of proactively modify the driver environment to improve the vision during nighttime driving or reduce the effects of fatigue.

• Xperi's talk by Product CTO Petronel Bigioi is entitled Next Generation Interior Sensing. The company, which broadcasters know best as the parent of HD Radio and DTS Connected Radio, is offering more car and truck companies to advance monitoring technologies they say are redefining the in-cabin experience. Xperi is presenting an in-cabin monitor with rolling shutter sensor.

• Eyeris CEO Modar Alaoui will present a lecture Sensor Fusion AI Enabled by Interior Scene Analysis & Modern Automotive AI Chips. This session covers the latest advancements and advantages of fusing a portfolio of vision AI neural networks with complementary in-cabin sensor data in real-time. Enabling new real-world use cases for enhanced safety and optimized comfort, this session will further cover how the next generation of AI chips will enable efficient inference capable of generating new types of data and monetization models in this third living space.

This is just a brief taste of why you should **register** for next month’s DVN and DVN-Interior **Workshop** near Detroit (and online); you’ll want to do so while there’s still space for you!

Interior News

Haptic Driver Interaction in the Nissan Ariya

INTERIOR NEWS

NISSAN ARIYA (IMAGE: NISSAN)

In developing the Ariya electric crossover, Nissan was determined to create a new look and feel for controls that drivers generally take for granted. The dashboard has been stripped clean of traditional buttons. The stylish wood grained trim bisecting the dashboard comes to life upon starting the car, illuminating a set of environmental controls just below the dashboard's surface. These integrated buttons represent a new generation of haptic feedback controls opening new possibilities in the relationship between function and design.

NISSAN ARIYA (IMAGE: NISSAN)

In the same way that we interact with a smartphone display to navigate and engage with apps, haptic feedback buttons in the Ariya react to touch, communicating through fingertip vibrations. When adjusting the Ariya's climate controls and drive modes, drivers will interact with a familiar set of icons. Because the points of interaction are felt and heard, the focus can remain on the road.

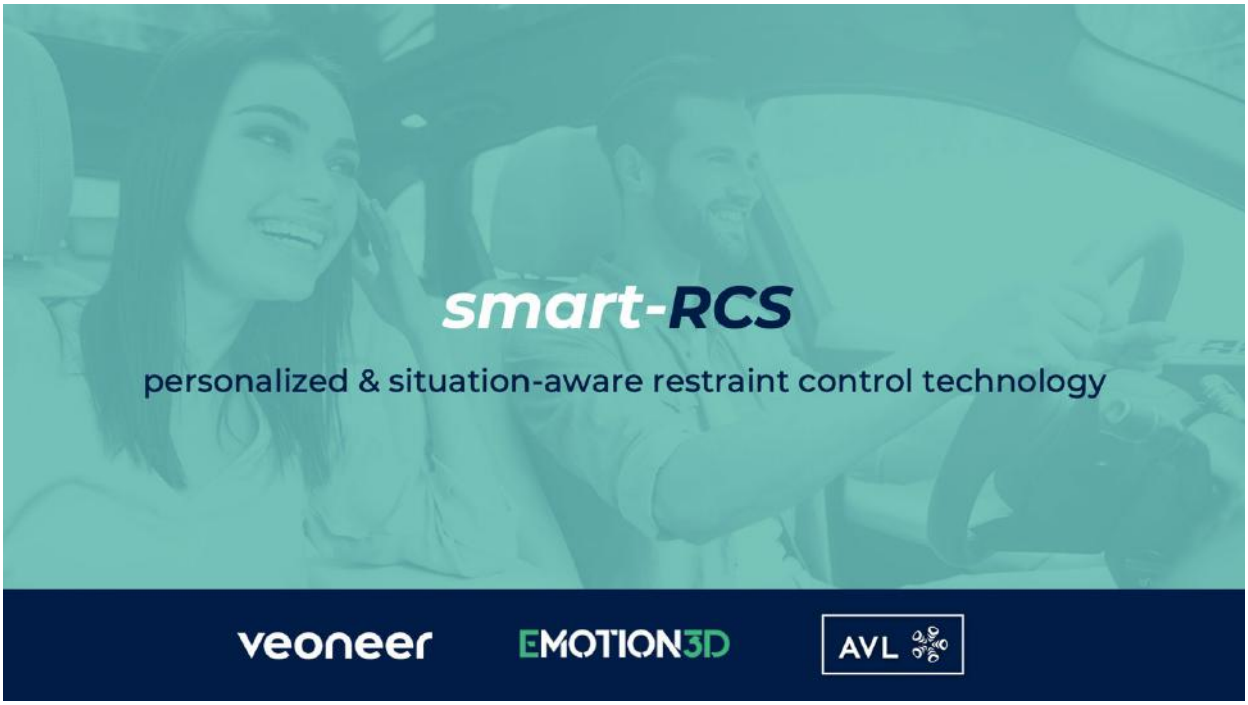
Haptic feedback buttons are grouped in two areas in the Ariya: on the main dashboard and on the adjustable central armrest. The goal was to give the technology a natural and responsive feel for a wide variety of drivers. Following extensive testing, the team settled on electrostatic buttons that are not only bigger than traditional haptic controls, but also more broadly spaced. This allows for a realistic and intuitive feeling for users, and also generates a kind of air pressure "kick". This amplifies the tactile feedback with the click sensation of a traditional mechanical button, despite no traditional physical button being involved.

The development of the haptic controls required that every possible scenario be tested repeatedly to ensure easy use for a wide range of drivers. That meant extensive testing by people with different size fingers and fingernail lengths, and with different button-pressure strengths and engagement angles. Gloved hands were also tested to ensure button activation.

A unique sound was developed to satisfy user expectations and to be as pleasant as possible.

Personalized Restraint Control by Veoneer, emotion3D, AVL

INTERIOR NEWS



Automotive technology company Veoneer—presently being fought over in a takeover tug-o'-war between Magna and Qualcomm; camera-based in-cabin monitoring software solution provider emotion3D (see DVN Interior In-Depth 22 April 2021), and automotive development, testing, and simulation experts AVL have been collaborating to develop the world's first personalized and situation-aware RCS (restraint control systems).

An RCS triggers the vehicle's passive safety system. Occupant safety systems rely on active sensors and microprocessors to trigger pre-crash and in-crash occupant protection—such as tightening safety belts and deploying airbags—when it judges a collision is inevitable.

Current passive safety systems perform best for the average male, personalized through a 50th-percentile dummy representing a 175-cm, 78-kg car occupant. This is suboptimal for everybody who deviates from this average—shorter and smaller adults; children; elderly people, and women. A study conducted by the University of Virginia found that seatbelt-wearing female occupants are 73 per cent more likely to suffer from serious injuries than seatbelt-wearing male occupants. As long as passive safety systems cannot discern individual occupants' characteristics it is impossible to achieve optimal protection for everybody.

A smart RCS provides precise real-time information according to the body metrics of the vehicle's passengers, to improve safety. The "Smart RCS" project is conducted within the European Commission's Horizon 2020 Fast Track to Innovation funding program. Over the next 24 months, the project partners will develop an innovative restraint control system able to personalize the actions of passive safety systems in event of a crash. Using a 3D sensor to understand the vehicle interior, the system will consider a wide range of relevant, personal and situational factors such as physique, position and pose, weight, and gender.

The introduction of personalized RCS will require to break new ground also in terms of testing and validation methodologies.

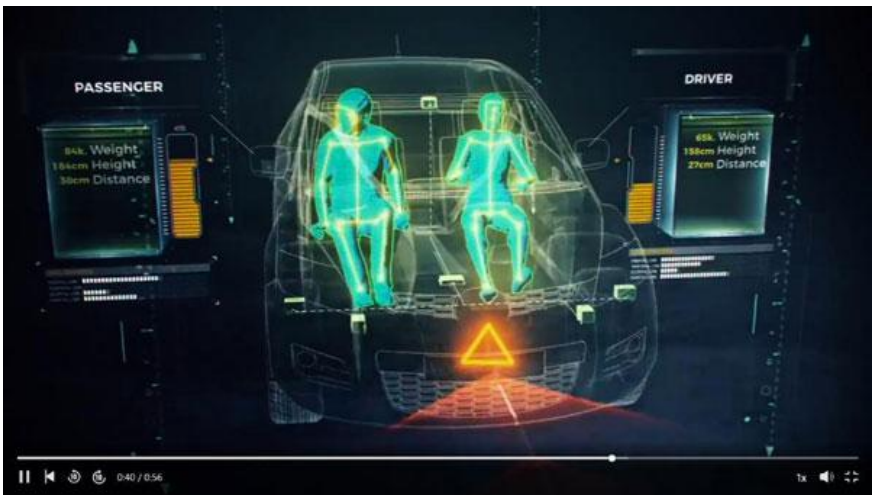


IMAGE: VEONER /EMOTION3D/AVL

Luxia's Dashboard of the Future

INTERIOR NEWS

IMAGE: UNITY

Unity Technologies is an American video game software development company based in San Francisco, and Here Technologies is a Netherlands-based company providing mapping and location data. Luxia, a collaboration between games engine Unity and maps expert Here, is showcasing their latest generation of in-vehicle entertainment and navigation displays.

Using Here's 3D city data, Unity has created a futuristic, wide-screen demo of an embedded infotainment system called Luxia. The screen shows you where you are in a 3D map of the surrounding area. Information and alerts relating to that location will pop up on the screen as the driver approaches them. HVAC, navigation and entertainment imagery can all appear on the screen at different times, as appropriate.

The same 3D display can be used for screens of different sizes. It can be adapted for a high-end vehicle or for a more affordable car with a more basic display.

It combines possibilities of Unity’s real time 3D, with Here Premier 3D cities, as shown in an online **video**.

“Unity real-time 3D engine can be used for AR and VR, digital twins, simulations and in-car experiences," says Senior Product Manager Yao Zhai. “You can visualize and render things in real-time, and it requires much lower hardware resources than traditional 3D technologies."

“If you look at the new generation of cars and the hardware behind them, they are much more powerful and the experience is getting closer to the smartphone," Yao said. “Cutting edge 3D displays have started to emerge as well. These new technologies have laid the foundation where we are able to significantly improve what we can offer compared to a decade ago."

THE DISPLAY, SHOWN HERE IN NIGHT MODE, ADJUSTS ACCORDING TO THE LIGHT (IMAGE: UNITY)

The experience is very different, because it gives really immersive feeling. It's easier to display a lot more information which makes HMI safer and more intuitive. Drivers can interact with the HMI screen by visuals, touch or voice. The brightness of the screen adjusts according to whether it is night or day, and designers can use Unity to make prototypes very quickly to validate HMI and make sure it is not too distracting for the driver. To make it safer, Luxia brings relevant information to the driver when needed, instead of the driver having to scroll and dig to find it.

Luxia also adjusts contextually. For instance, the screen will be different on a busy shopping street compared to traveling at high speed along a highway, with different levels of detail. It can show completely different information again when the car is parked. For instance, while an electric vehicle is charging, it can show the driver a game or stream a video.

Composite Rear Seat Structure from Faurecia, IRT Jules Verne

INTERIOR NEWS

A tailored automotive rear seat structure has been developed and manufactured with a one-shot hybrid thermoplastic composite technology combining organo sheet as a backbone, back-injected short fiber compounds, and metal inserts. The part replaces an assembly of nine metal parts to yield a net shape complex part with high function integration and a fully automated manufacturing process. Organo sheets are high-performance, semi-finished materials with carbon, glass, or aramid fiber fabrics embedded in a thermoplastic matrix.

It's the work of a collaborative project between Faurecia and IRT Jules Verne, a **mutualized industrial research center dedicated to manufacturing** set up in 2012 as part of a French National “Investissement d’Avenir” (Future Investment) program.

Challenges in rear seat structure are weight, cost, and strength—the latter being crucial, as most rear seat structures include seat belt anchors and retractor mounts. The project partners focused on the one-shot thermo stamping and back injection process because it combines the fast cycle time, high automation level, and industrial robustness of injection molding with the great mechanical strength of composite processing.

The hybrid thermoplastic composite rear seat backrest weighs 1.5 kg and is 30 per cent lighter than the steel reference. The seat, which is production-ready, was successfully tested with results closely comparable to those of the reference steel seat.

New Process to Revolutionize MicroLED Displays

INTERIOR NEWS

Researchers at ETRI, the Electronics and Telecommunications Research Institute in Korea, have devised a simplified, cost-reduced process and associated materials to create microLED displays. The team created 1-mm^2 microLEDs, which provide a more vivid display compared to LED and OLED displays. The new display has high luminous efficiency and could be used in a variety of fields.

A new adhesive material facilitates the new core process of simultaneous transfer and bonding. As its name suggests, it combines transfer and bonding into one process. When a homogenised laser is applied to the film, microLEDs can be attached in seconds. The new materials can be attached with additional microLEDs, such as for defective pixel repair, a task which cannot be accomplished with available technology.

The key to the new process is applying the homogenized laser to a large area and heating only part of the attached piece to mount microLEDs to the display panel substrate. Materials for the new technique were developed independently, and the team believe their process can be further simplified for manufacturing.

The Design Lounge

Genesis GV60 Premium BEV

THE DESIGN LOUNGE

The latest BEV from the Hyundai-Kia-Genesis group is the Genesis GV60. Based on their dedicated EV platform shared with the Ioniq 5 and EV6, this variation for the Genesis brand is the most luxury/premium oriented.

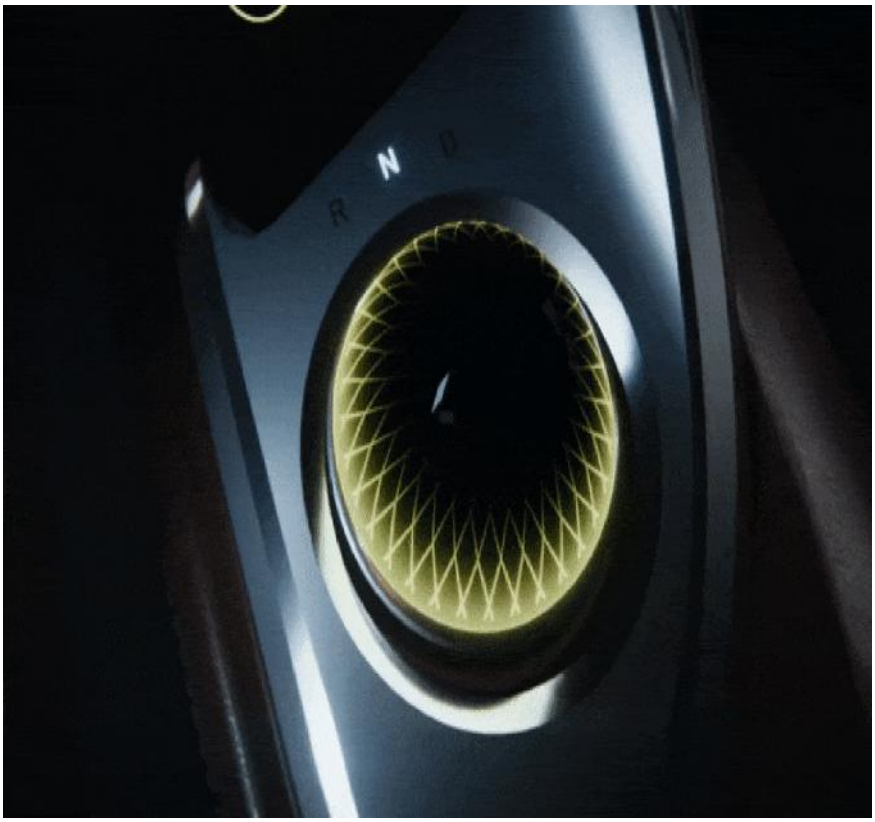
The overall design and feel of the interior is of a premium quality, and more traditional and conservative in execution. There's an abundance of leather covering the instrument panel and door trim surfaces. Detailing of switches and controls are unique for the GV60 as demonstrated by the steering wheel, which has a Bentley feeling to it, similar to that used in the other Genesis model interiors.

The GV60 uses a darker colorway with larger contrasting metallic elements and detailing, while…

…the Ioniq 5 differentiated itself with a very light colorway with more discreet detailing…

…versus the EV6, with its dynamic lines and material mix; clearly the most sport oriented of the three.

When comparing the GV60 to the other brands, we can see how the door panels have vertical pulls and that floor console becomes a more dominant control element of the interior design. The design detailing and technical functions are unique for Genesis and the GV60.



When the vehicle is off, or stationary, the Crystal Sphere has a design reminiscent of a paperweight or an Orb, with integrated ambient mood lighting in its spherical form language. To start driving, the orb is activated by flipping it over to reveal a polished metal prindle. Buttons are used for Park and selecting drive modes, while turning the orb selects reverse, neutral, or drive.

By incorporating this unique prindle interface, Genesis has evolved their premium crystalline UX/HMI controls used on their other models into a uniquely BEV oriented interface. This further differentiates the GV60 in both design language and function, form the Ioniq 5 and EV6.

News Mobility

_Car Interiors Unplugged: On Hiatus

Car Interiors Unplugged will resume after summer.

Opel Focuses On Micromobility

NEWS MOBILITY

ROCKS-E (IMAGE: OPEL)

Opel wants to shape the inner-city traffic of the future with an electric micro-mobile. The Rüsselsheim-based Stellantis company will officially present the Rocks-E for the first time at the IAA motor show in Munich. The vehicle transports two passengers and light luggage without local emissions, can travel up to 75 kilometers without a charging stop, and is expected to start at a price below €10,000.

The 2.41-meter-long Rocks-E is based on the Citroën Ami, which was presented in 2019 (and in DVN Interior March 12, 2021), and relies on the same compact box shape on the outside as its sister. The two occupants enter through side doors that open in opposite directions; luggage is stowed in the passenger footwell. The seat for the second occupant is mounted slightly to the rear, which should benefit legroom.

The drive is provided by a 6 kW (8.2 hp) electric motor powered by a 5.5 kWh lithium-ion battery. The battery can be fully charged within three hours at a 230v household socket. Charging at a public pillar is possible by means of a type 2 adapter. This makes the Rocks-E particularly suitable for short-distance traffic in the city center. In view of the main area of use, the maximum speed is limited to 45 km/h, which not only limits energy consumption but also makes the micro-vehicle usable for young people. A scooter driving license (class AM) is required, which is available from the age of 15 in European countries.

The Rocks-E can be ordered starting this Autumn. Opel has not yet announced when it will be delivered. Officially, this is because more important small car markets such as France and the Benelux countries will be supplied first, where the Citroën Ami is already in the streets. The Rüsselsheim company does not name a price, but the Citroën Ami is available in France from around €6,000. The low price is also possible because the Ami and Rocks-E do not fall into the "M" passenger car category, but into the "L6e" category for light motor vehicles—so equipment and crash safety standards are relatively lax.

In France, the Citroën Ami is sold through dealers, but also through music and household retailers, to attract younger buyers. A car-sharing option is available wherein the car can be used from €0.26/minute, after a non-binding subscription offered at €9.90/month.

Waymo Launches Robo-Taxis in San Francisco

NEWS MOBILITY

IMAGE: WAYMO

Google's sister company Waymo, which specializes in autonomous driving, now wants to offer its robo-taxi services on a larger scale in San Francisco. After more than twelve years of testing in the Californian metropolis, the service will be opened up to a wider public. The company belongs to the US corporation Alphabet, like the online giant Google.

Those who want to be transported free of charge through San Francisco in the self-driving Jaguar I-Pace electric SUV can apply via the "Trusted Tester" program of the Waymo app. In return, however, users must sign a non-disclosure agreement and provide the company with data and feedback. Although the cars are fully autonomous, a safety driver remains on board for the time being.

Even if Waymo remains far from a mass market breakthrough, the pilot project in California is an important milestone. So far, the company has only been testing the service in a suburb of Phoenix - without a safety driver. However, the weather conditions, traffic volume and infrastructure around the desert city in the state of Arizona are significantly more favorable for self-driving cars than in the chaotic metropolis of San Francisco, and its wet and cold climate.

Google's robot car program was merged into Waymo in 2016; the company is considered particularly advanced in the development of systems for autonomous driving. However, the competition is not sleeping. In San Francisco, competitors such as GM's Cruise have been testing self-driving electric cars for years. In October 2020, Cruise announced they will send the first cars onto the roads there without a safety driver at the wheel.

General News

Smart Cockpit R&D by Joyson, Huawei

GENERAL NEWS

The Joyson Electronics Group, based in Ningbo, China, last year restructured its activities in the field of car infotainment and connectivity. In the new company, named Joynext, Joyson is bringing together Joyson Preh Car Connect and Preh Car Connect, based in Dresden, Germany. Preh was established in 1919 and has been part of the Joyson Group since 2011. Within the Group, Preh represents the automotive electronics division.

With more than 1,200 employees worldwide, Joynext connects people and technology. As a long-standing supplier to the automotive industry, its technology in the fields of car infotainment, vehicle networking/ connectivity gateways and telematics can be found are currently deployed in millions of vehicles worldwide.

Huawei and Joynext recently entered into a pact to cooperate on R&D and innovation of intelligent automotive cockpits. Under the agreement, the products they are about to jointly develop will carry Huawei's core modules of smart cockpits, Harmony infotainment operating system, HMS (Huawei Mobile Services), a core capability platform, and Harmony application ecosystem. Based on Huawei’s platform capability, Joynext will provide a complete cockpit solution encompassing domain controllers, operating system, as well as application-level software and hardware.

In the future, Joynext and Huawei will deepen their collaboration in a bid to improve the core computing capability, optimize systematic architecture, and design the next-generation smart cockpit. Huawei will start installing its HarmonyOS-A smart cockpit operating system in automobiles this year, Wang Jun, president of Huawei's Smart Car Solution Business Unit, said on June 18 at the 2021 China Auto Forum.

Best-Selling Vehicles in the World By Country

GENERAL NEWS

[Click here for larger view]

The best-selling cars change along time and generation. But also, along countries, where consumer preferences are different for goods, and vehicles are no different.

In a story published by Visual Capitalism, using infographic from Budget Direct Car Insurance highlights the best-selling vehicles in the world, using 2019 year-end sales data.

Consumers in dense countries might prefer smaller cars, while countries with wide expanses (and parking spots) open the way for larger trucks. Likewise, rugged terrain might call for vehicles that can adapt and scale quickly. Purchasing power per country has also a role.

And it's linked to which manufacturer has invested in the country. As the world's largest automakers have raced to attract consumers in every corner of the globe, they built factories, renamed models, and even built specific cars to fit the tastes of individual countries. Many countries with large automakers had local models as the best-selling vehicles, especially in Europe.

Toyota dominates, and had the best-selling vehicle in 41 of the 104 countries tallied. They also had the world's best-selling vehicle in 2019, the Toyota Corolla, though the sedan only took the top spot itself in five countries. And Toyota's Hilux is the best seller in 16 countries, including Argentina, South Africa, and Australia.

Smaller cars (including sedans, hatchbacks, and subcompacts) made up the majority of best-sellers, with 57 of the best-selling vehicles by country. And bigger vehicles (light trucks, SUVs, and vans) were best-sellers in 47 countries. SUVs, alone, are best seller in 20 countries.

The Tesla 3 is the best seller in only two countries: Netherlands and Norway.

Interesting perspective, when EV and SUV are on all the media front pages, whatever the reason. Reality is still very different.