DVN-I
Automotive Interior

Thu, 5 August 2021 Weekly Newsletter **NEWSLETTER #72**

Editorial

Will Microcars Resurge As BEVs?

MITSUBISHI MINICA MIEV

Microcars were an affordable-mobility solution starting during the 1950s in Europe with no solid public transport at that time. Since then, they've morphed quite a bit.

The Design Lounge this week has a look at a new breed of BEV microcars with interesting attributes. They comply with all European emissions regulations, naturally, as well as by-laws of major cities—a particularly unique trait, when making a small combustion-engine car meet the same regulations costs a fortune. These new BEVs create the lowest-cost mobility offering, and they're built for the modern urban environment that now includes per-minute rental usage, sales through non-dealer channels, and designed for usage not based upon vehicle ownership. They're devoid of the feature content creep we see in today's more mainstream BEVs.

To benchmark the other side of the hill is always important. Japan has its Kei cars (the official classification of microcars in Japan). Very interesting to see efforts to expand the market for these cars to the rest of the world, as with Mitsubishi's Minica EV.

The DMS session at the DVN Workshop next month is finalized with five outstanding lectures. The topic is really blossoming everywhere, with three additional technologies presented in this week's news. Don't miss the workshop! If you haven't already done so, you'll want to **register here**.

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

Car Interior Influences Your Mood: Citroën Study

CITROËN C-AIRCROSS CONCEPT AT GENEVA MOTOR SHOW 2017

The design of a space—its appearance, its sounds and smells—exerts enormous influence over how we feel when we're in that space. Whether it be a grocery store, a boutique, a doctor's office, a restaurant…or inside an automobile. Just look at the success of rideshare companies like Lyft, with cars quite a bit nicer inside than the average taxicab (London taxis being the exception).

The emotional impact of car interior design is complex, but by learning more about how it makes us feel, we can leverage considerations like roominess, materials, colors, lighting, simplicity, feng shui, intuitive interfaces, friendly touch points, and other suchlike.

A recent study by Citroën UK found 40 per cent of drivers believe that comfort is key to avoiding road rage while driving. In the study of 2,000 UK motorists, fully 62 per cent admit to having experienced road rage themselves, and 47 per cent say they have been a victim of someone else's rage.

IN-CAR SERENITY (CITROËN)

The Citroën Advanced Comfort program is intended to help keep drivers calm and serene on much busier, post-lockdown roads.

This program started nearly ten years ago, pursuing four objectives: filter out exterior interference for a cocoon-like ride, with solutions for suspension vibration and acoustics (driving comfort); simplify life in the car with generous, space, functional storage compartments, and an ingenious layout (living comfort); create a smoother experience with intuitive technology, driving aids that can be used every day, and digital continuity between passengers and the car (functional comfort), and ensure peace of mind by supporting drivers, organizing readouts to display only information that is truly useful, and creating a relaxed interior ambience.

Drivers receive input from all directions. To provide assistance and lighten the mental load, any new vehicle should provide a range of driving aids for everyday use. Like hill-start assist, parking assist, and automatic headlight beam selection, for example. ADAS including lane departure warning, rear cross-traffic alert, and blind spot monitoring relieve some of the driver's worry-load.

Dashboard architecture under this rubric features a large touch tablet and a larger HD screen for a naturally ergonomic layout that ranks information according to type and importance. A large glass area and panoramic sightlines also contribute to comfort: the cabin is bathed in light, avoiding any sense of confinement.

Seats are always in contact with passengers, and provide the first impressions of comfort at a glance (or at a sit-down). As well as providing support, they naturally contribute to damping out the various vibrations from the vehicle and the road surface. As part of the development process, engineers study the lines of the seat to respect the curve of the back for a better driving position, and the choice of materials used in manufacture. By using multiple layers of carefully-chosen foams with different densities and characteristics, seats can conform perfectly to the body shape of each passenger, and regain their original shape from one passenger to the next.

Citroën states that these many parameters are covered in their C3 Aircross SUV, designed with serenity and well-being in mind, to provide drivers with higher levels of comfort and help reduce road rage. The vehicle features Citroën's Advanced Comfort seats, which are said to provide increased comfort during longer trips thanks to a combination of a high-density sheet in the seat's center, and thicker, structured foam. In addition, the C3 Aircross has a raised driving position and a large glazed area to give the vehicle a more spacious feel

"Aggravated drivers are often at risk of causing harm to themselves and fellow drivers on the road," commented Eurig Druce, managing director of Citroën UK. "With 62 per cent of drivers having admitted to experiencing

road rage, it is a focus for Citroën to ensure our vehicles provide the optimum environment for driver and passenger comfort. Comfort is a key factor in helping to reduce the risk of road rage, and our team go to extra lengths to ensure that models across the Citroën range, including the new C3 Aircross SUV, deliver just that through the Citroën Advanced Comfort program."

KIA K900 WITH PANTONE AMBIENT LIGHTING

Another example is Kia's K900 with interior lighting designed in cooperation with the Pantone Color Institute. Colors influence the cabin space perception, occupant rest and tranquility, and even their ability to get "recharged" when diving. Pantone and Kia have been collaborating to create a multicolored, dynamic mood lighting system for the 2019 K900 luxury sedan.

Of the 64 total colors available, Pantone created seven specific color settings, each with its own message and meaning; covering the color wheel from orange to purple, they're inspired by oceans, forests, skies, the aurora borealis (or aurora australis, depending on which hemisphere the car is being driven in), and other aspects of nature. These color themes have names like Refreshing Ocean, Dream Purple, Golden Insight and Peaceful Forest. There's mood lighting that changes colors as you drive. The ambient lighting is installed in the overhead console, door panels and both front and rear footwells of the vehicle to illuminate the sedan's interior with soft hues. The mood lighting system, which has started making its way beyond homes, isn't without purpose; it's designed to encourage psychological stability and relaxation for drivers and passengers, easing stressful commutes and to imitate calming natural settings.

The selected mood lighting could calm one down on stressful commutes and help drivers get through the day in a more natural setting. See the **video** to learn more.

Another piece of **research** done by Farah & Farah Personal Injury Lawyers in the US, is looking at the demographics of aggressive drivers. Their results indicate significant correlations between certain traits and aggressive driving tendencies.

But putting aside demographic—age, gender, income, education, geography—or psychographic distinctions, their findings serve to remind us all to practice a greater degree of patience behind the wheel. And in that respect, sleek and intuitive interior design is fostering quiet behavior.

Interior News

Smart Eye, OmniVision Interior Sensing Solution

INTERIOR NEWS

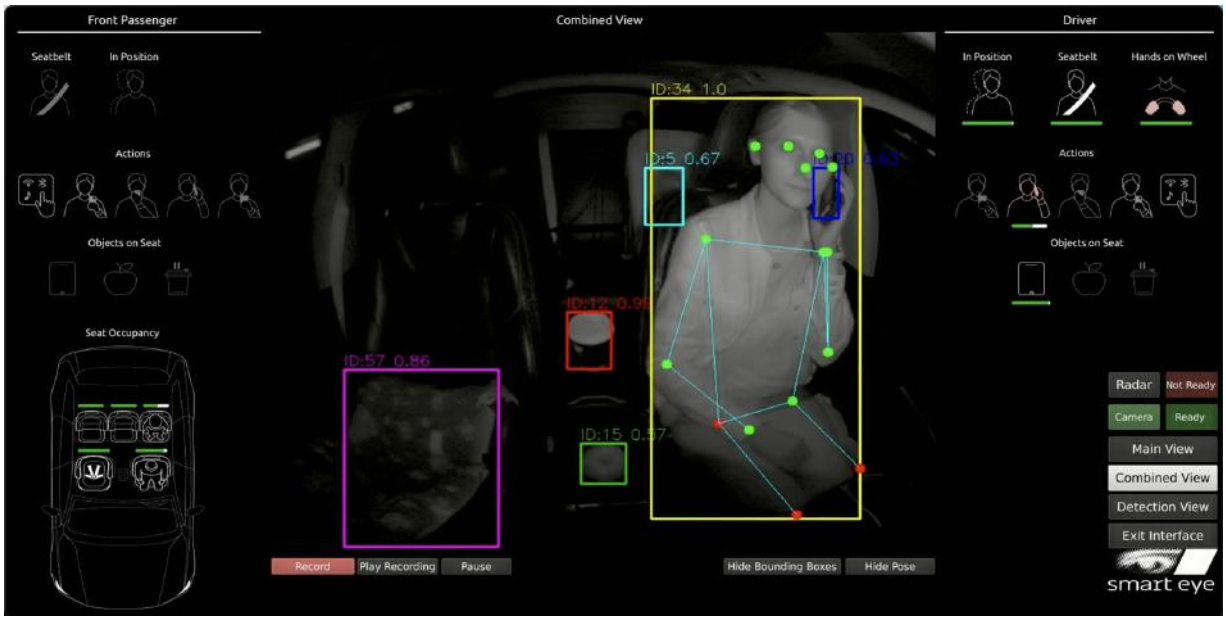


IMAGE: SMART EYE

Smart Eye is a Swedish AI-powered eye tracking technology company specializing in Driver Monitoring Systems (DMS).

Omnivision, based in California, is a leading developer of advanced digital imaging solutions, including automotive cameras to enable functions, such as facial and iris authentication, collision avoidance, gesture control, and eye tracking for a host of image-based applications

Interior Sensing AI is crucial for the automotive industry. Not only is this technology improving automotive safety, it is also enabling automakers to provide differentiated mobility experiences that enhance wellness, comfort and entertainment, says Smart Eye founder and CEO Martin Krantz.

The two companies have jointly announced a full interior sensing solution for automakers that enables complete driver and cabin monitoring with videoconferencing applications from a single RGB-IR sensor.

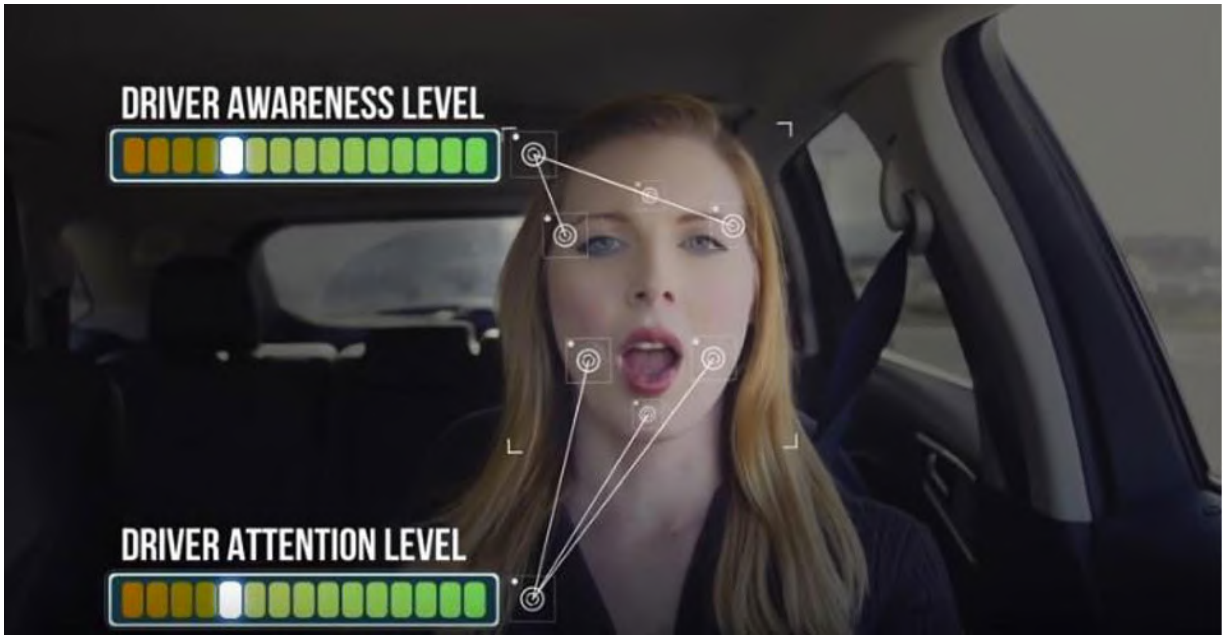
The solution is the first integrated video processing chain, which combines innovative features based on the OmniVision OV2312 RGB-IR sensor, supporting exceptional day and night performance, a media release said. The

Smart Eye's AI-based eye, mouth and head tracking technology provides EuroNCAP performance linked with full cabin monitoring and driver monitoring, featuring distraction, drowsiness and incapacitated driver detection, combined with driver identification and spoof-proof processing. The cabin monitoring also includes occupancy detection for all seats, combined with out of position, seat belt status, and forgotten-baby detection.

The action detection allows an artificial understanding of occupant actions like driver's hands on or off the steering wheel, use of mobile devices, eating and drinking—all kinds of things which can lead to driver distraction. Naturally, such a system is also key to secure handoff from autonomous to human-driven modes.

Trilumina DMS Morphs Into Full ADAS Solution

INTERIOR NEWS



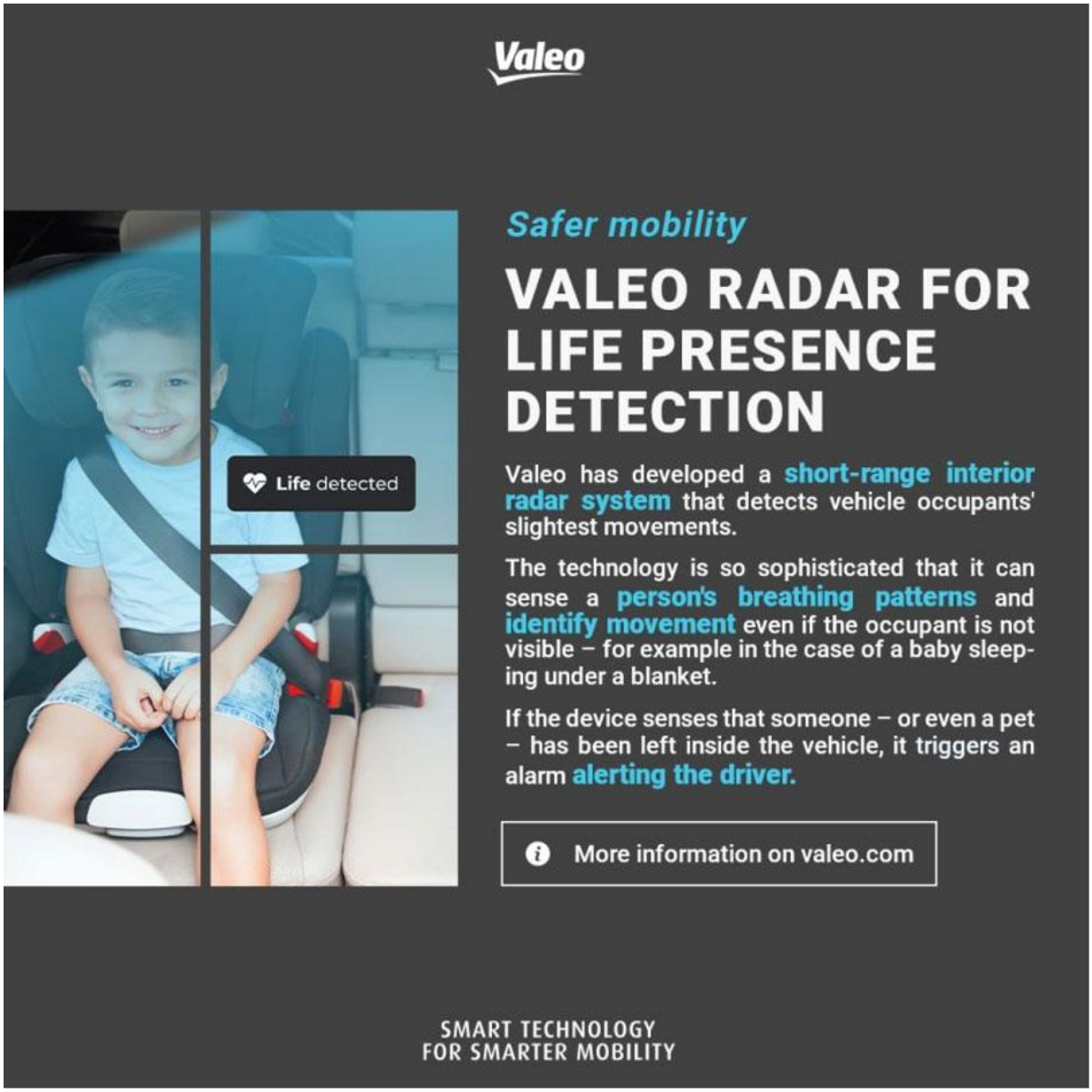
New Mexico-based TriLumina develop and manufacture optical and photonic products, including driver assistance systems and VCSEL illumination solutions for 3D sensing and lidar. These are pointed not only outward at the traffic environment, but also inward at the driver, whose reaction time can be severely degraded by distractions and impairments.

TRILUMINA
Advancing Illumination to Sense Your World™

Trilumina directly integrates lidar to detect distractions and drowsiness. it tracks the driver's gaze and head position while scanning the whole interior with no moving parts. Its laser can illuminate up to 13 different zones, with a 45° × 30° field of view. Near-IR light is emitted at 910 or 940 nm by a semiconductor laser just 1 ×2 mm, creating a highly efficient, low cost, compact, DMS. The system illuminates only where's needed, and doing it real time!

Valeo Radar For Life Presence Detection

INTERIOR NEWS



To prevent children from being accidentally left behind in vehicles, Valeo's short-range interior radar system detects vehicle occupants' slightest movements and breathing patterns.

According to NHTSA, the number of children dying in cars from heatstroke, either because they were left behind or became trapped, has increased in recent years. In 2019, more than 20 leading automakers committed to including some form of rear seat reminder system as standard equipment in their vehicles no later than the 2025 model year.

Radar technology has advantages over cameras for this sort of function, including a wider detection range, operability in all light conditions, privacy (no visual image is produced), and even covered objects can be detected

accurately. Too, radar operates without complaint in a wider range of temperatures and humidities.

Radar-based cabin monitors containing cameras are used to complement a camera-based vehicle occupancy monitoring system. Such imaging radar sensors can be seamlessly mounted in the headliner or above the rearview mirror facing the vehicle occupants.

Millimeter wave radar represents the next generation of radar technology. It works very similarly to a camera flash, which briefly illuminates the subject before taking a picture. Instead of using light from a camera flash, millimeter-wave radar uses pulses of radio wavelengths. With a conventional camera, the flash light is reflected through the camera lens to capture a scene in low light conditions. While millimeter-wave or "imaging radar" uses an antenna and static random-access memory (SRAM) to record its images. The radar only captures light that has been reflected back to the radar's antenna.

This reflected light is called a "point cloud" and each frame shows the dimension, shape, position and movement of all vehicle occupants. From these radar images, deep learning algorithms can be used to determine what they are. As part of a driver or passenger monitoring system, radar can be used to detect subtle movements or even the breath of a person inside a vehicle, such as a sleeping child under a blanket or the presence of pets.

Adient's Futuristic New Seat

INTERIOR NEWS

ADIENT FLOATING SEAT (CLEPA)

Seat supplier Adient is doing more than keeping pace with key megatrends such as the move to electrified and autonomous cars. Andreas Maashoff, Adient's director of design and technology for Europe, spoke about automotive and interior megatrends, and provided details on his company's "floating seat", in a podcast from ANE, sponsored by Italdesign.

Maashoff spoke about CASE as Trends, where EV and Digitalization is accelerating. He described the car interior as the "3rd place" (complementing home and office) in people's life continuum. As the seat remains always linked to passengers, it is most often the centerpiece of any concept car. New mobility scenarios create many user opportunities for the seat to swivel, recline to a semi-liedown position, offer zero-G positions, built-in sound, etc.

Maashoff said 4 out of 5 passengers are already in autonomous mode, and when self-driving is ready, you just apply these already implemented solution to the driver seat.

In parallel, seat content is increasing, because of EV architecture and cost pressure; such as lightweight, low block height, audio, etc to open underbody space for batteries.

Adient developed together with Kostal and PSS (Premium Sound Solutions) the Floating Seat presented last year, and which has been rewarded with third place in the Cooperation category of the CLEPA Innovation Award. This seat is a test bed for the future, with floating mechanism, body driven activation, audio and HMI integrated, with touch display, massage function and a "sound cocoon" that envelops the user in a private sphere of sound.

LIFESIZE REPLICA OF CAPTAIN KIRK'S CHAIR FROM STAR TREK (IMAGE: GREEN HEAD)

The Floating Seat offers features harkening to the ultimate chair in the galaxy, the one belonging to Captain James Tiberius Kirk of the USS Enterprise!

Continental at IAA: HMI To The Next Level

INTERIOR NEWS

At the 2021 IAA Mobility show in Munich next month Continental will show how they are continuing to improve user experience and driving the trends in design and innovation. Continental will present their newest displays, sound systems, access solutions and surface materials—the technologies which will take human-machine interaction to the next level.

Continental's displays will have two highlight themes: Automated Driving and Server-Based Architecture.
Other major themes of the exhibition will be: sustainability, user experience, intelligent mobility, safety, and movement.

The Automotive Technologies of Continental comprise autonomous mobility, safety, vehicle networking, information management, technology trends, services and rubber and plastic solutions mostly used for skin surface in interiors.

Camera, lidar, radar and control units from Continental provide the necessary information for highly automated driving and pave the way for autonomous mobility.

Continental's safety functions include assistant systems for active safety and occupant and passenger protection systems for passive safety. 5G connectivity and hard- and software for intelligent electronic control units belong to its vehicle networking. The information management includes new

display solutions, head up displays, in-cabin sensorics, combi instruments and multimedia systems. One focus in the area of technology trends is on electric vehicles with the special features like intelligent battery sensors. Continental also offers technical services and security technologies with diagnosis and engineering solutions.

Faurecia at IAA: Technologies For Carbon-Neutral Mobility

INTERIOR NEWS

At 2021 IAA Mobility, Faurecia will show off their latest innovations for a sustainable cockpit and zero-emissions mobility.

Major megatrends have long been shaping our world and technology disruptions are beginning to shift the center of gravity in the automotive world. For Faurecia, this means changing the way the Group thinks and designs vehicle technologies in line with its commitment to become carbon-neutral. By focusing on key trends, such as electrification and human-centric design, an environmentally-driven industry to vehicle automation, Faurecia aims to address future mobility needs with safe, affordable and sustainable solutions.

Faurecia will also be demonstrating ultra-low emissions technologies and new hydrogen solutions to support the transition to zero emissions mobility.

Technology highlights and solutions to support a circular economy approach:

- Sustainable Materials (recycled, renewable and bio-sourced) integrated in instrument panels, center consoles, door panels for light-weighting vehicles and lowering CO_2 emissions footprint
- Faurecia Seat for the Planet innovation program that focuses on using fewer and more sustainable materials for weight saving and CO_2 emissions reduction as well as designing new module architectures for easy assembly and disassembly to facilitate recycling, reconditioning and refurbishing (see DVN Interior #49)
- Displays technologies with optical bonding and energy savings including IRYStec software that improves visibility while saving energy as well as e-mirror solutions to ensure safer driving and improve fuel economy
- Zero emissions hydrogen solutions to optimize the system architecture and integration of tanks and stack systems in a light commercial

vehicle chassis. Faurecia will also showcase the next generation of recyclable hydrogen tanks that aim to improve the environmental footprint

- Low emissions technologies such as the electrically heated catalyst, to reduce pollutants for hybrid vehicles.

In short, visitors can discover how Faurecia innovates to reduce the CO_2 footprint of its products by using sustainable materials and processes plus designing to extend product life and recyclability.

The Design Lounge

Return Of The Microcar: Now as a BEV!

THE DESIGN LOUNGE

Born after World War Two devastated Europe's' infrastructure, micro or 'bubble cars' were an affordable mobility solution until Europe's subway, bus, and rail systems could be reconstructed. We're talking here about cars like the BMW Isetta, the Messerschmitt Kabinenroller, the Goggomobil, and other suchlike. Today with new ICE and emission restrictions taking hold in European cities, microcars are poised to make a comeback using BEV technologies.

BMW Isetta

Messerschmitt Kabinenroller

GOGGOMOBIL

Technically, these new microcars are not cars at all. They fall into a specific regulatory area of scooters and e-bicycles (quadracycles are included) that do not need to meet automobile safety standards. Speed limited to 100 km/h, they are not allowed for highway use but built for the modern urban environment that now includes per-minute rental usage.

Not necessarily based upon vehicle ownership, these new BEVs' create the lowest-cost offering for customers as a mobility-solution. As such, they are built to the lowest possible cost, in stark contrast to the the high cost and feature content of most modern BEVs today.

RENAULT TWIZZY

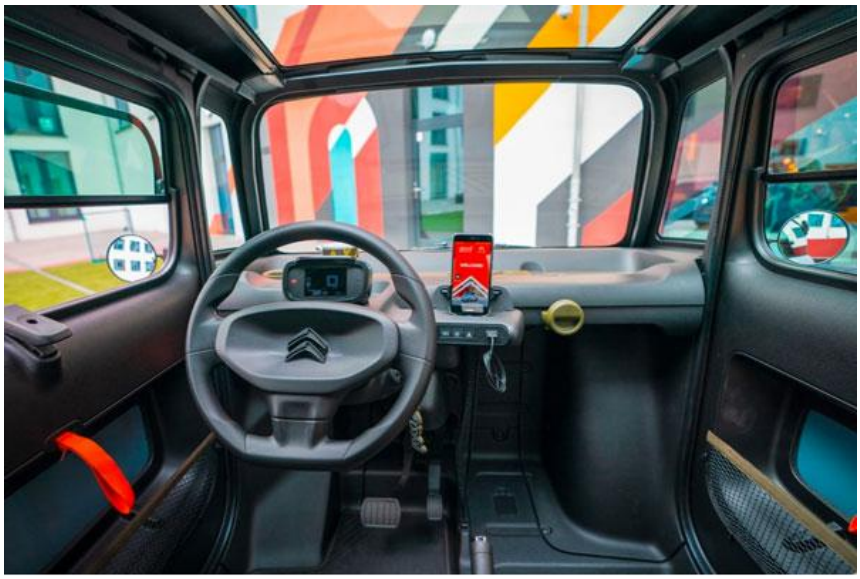
Renault, with their Twizzy, was the first automaker that offered a BEV micro-car for the modern world. It is a narrow 1+1 vehicle where the passenger sits behind the driver sit that allows users easy mobility in Europe's most crowded urban environments.

The Twizzys' interior has durable and easy to clean materials. Mostly of made of lower-cost plastics, there is not a soft-touch surface in sight. Even windows and doors are optional to keep the weather off the occupants.

CITROËN AMI

Citroën's version of this kind of quadracycle, the two seat Ami, has taken a different approach. Using a single door on both sides, the interior is completely enclosed although the side windows are of the pop-up variety.

Citroën's approach does allow for cargo to be transported, which is not readily available with the space of the Renault Twizzy.



Although built to a cost and very basic, the interior space of the Ami is quite open and airy.

The Ami interior is also built to the lowest cost possible while still allowing for basic necessities. Plastics are again used exclusively throughout the interior while trimmed materials are nonexistent.

MICRO MOBILITY *SYSTEMS MICROLINO*

Inspired by one of the original bubble-cars, the Microlino dives into the style and nostalgia of the Isetta, but now as a BEV vehicle.

The forward opening door and overall layout the original Isetta is used for the Microlino along with the plastic interior materials as seen with Renault and Citroën's offerings.

The front instrument/door panel uses a very clean and simple aesthetic although upgraded with a full color display for the instrument cluster that contrasts it (up-market?) from the Renault and Citroën cars. Airbag? None.

ELECTRIC BRANDS XBUS

A new mobility solution provider called Electric Brands, based in Germany, is bringing a completely different approach. Instead of referencing the postwar bubble cars, they are introducing a platform of mobility solutions that conform to the current non-car regulatory standards.

The Xbus and its multiple variants are not two seat city commuters, but able to carry up to four passengers. There are four doors, with utility/cargo/load-bed variants available. Also based on BEV technologies, these vehicles have hub-drive electric motors in each wheel offering limited off-road capability. Speed: up to 100 km/h.

Although built to the lowest cost/price possible, the Xbus target is not the urban city commute but rather a low-cost, functional work and leisure vehicle…that is not a car.

The interior has a larger full-color display and a host of optional items like a wood-floor for a camper-van variation the includes a mini-stove and sink.

Only time will let us know if these non-car BEVs will have a following in the marketplace but it does show us an alternate approach to the high-content BEVs offered by other automakers today.

News Mobility

_Car Interiors Unplugged: On Hiatus

Car Interiors Unplugged will resume after summer.

Ford, Argo AI Self-Drive On Lyft Network

NEWS MOBILITY

IMAGE: FORD

Ford and their partner Argo AI will start a self-driving ride-hailing service with Lyft in Miami and in Austin, Texas, later this year. It will be the biggest commercial robo-taxi rollout to date.

This three-partner deal brings together the key ingredients of a good recipe for autonomous taxicabs: a big automaker (Ford), an autonomous technology creator (Argo), and a major ride-hailing company (Lyft). The plan is to begin significantly expanding the initiative in 2023, with the ultimate goal of dispatching over 1,000 self-driving vehicles in the six U.S. cities where Argo has been testing, including Washington, DC.

As part of the deal, Lyft is getting a 2.5 per cent stake in Argo, which has received a combined USD $3.6bn investment from Ford and Volkswagen Group. Lyft isn't making a cash investment, but is providing Argo access to

fleet and safety data that will provide a detailed road map to help establish a large-scale autonomous taxi service.

The autonomous taxi service will begin with fewer than 100 self-driving hybrid Ford Escape crossovers in Miami and Austin, each accompanied by two human minders—a backup driver behind the wheel who's ready to take over if needed, along with a worker who monitors the technology driving the operation.

The vehicles will use open routes, and passengers will have the option to choose an autonomous vehicle from the Lyft app on their phone at no extra charge. In addition to ride-hailing, the self-driving Ford Escapes also will be used to deliver groceries and other small items in partnerships with other companies.

The overall goal of the partners is to turn self-driving as a normal technology consumers can trust.

Harman In-Car App Store: Alternative To Google?

NEWS MOBILITY

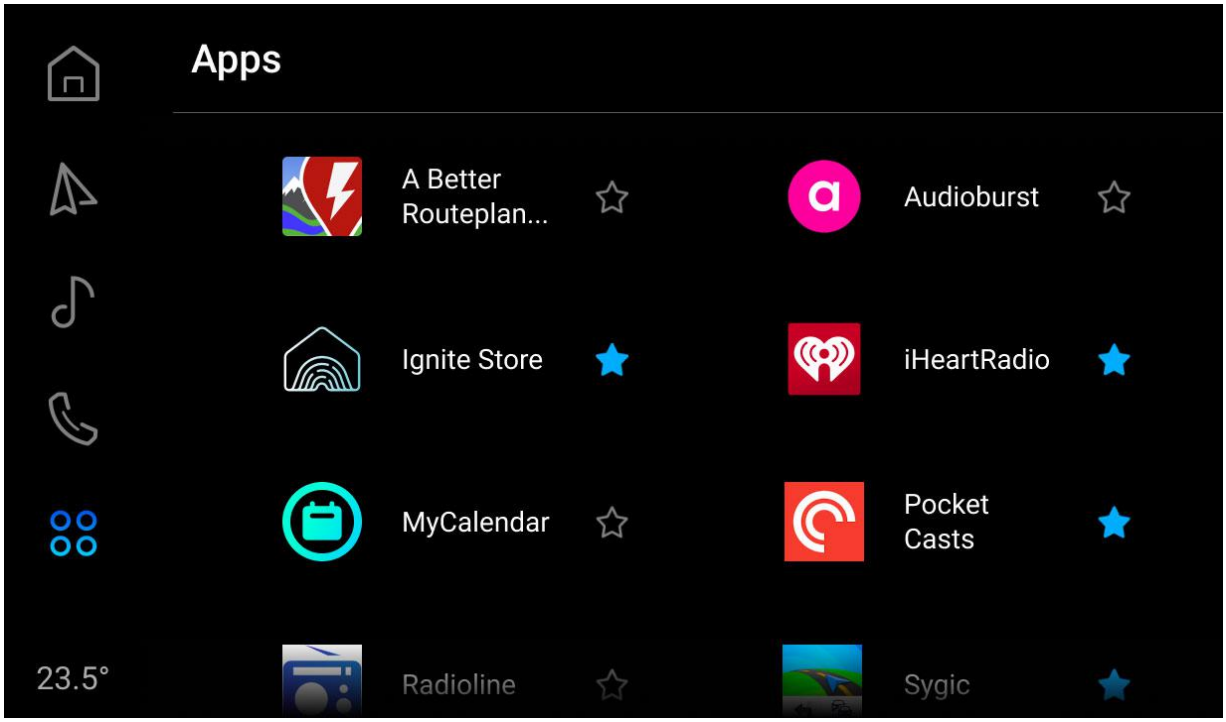


IMAGE: HARMAN

Harman's Android Automotive-compliant in-vehicle app solution, called the Ignite Store, allows automakers to choose non-Google products for key features. Fiat Chrysler will be the first automaker to use Harman's app store. More customers will follow in 2022, Ignite Store Director of Business Development Daniel Zloczower said in a podcast with ANE Douglas A. Bolduc.

Harman became in 2017 a wholly-owned subsidiary of Samsung Electronics. They design and engineer connected car systems, audio and visual products, enterprise automation solutions; and services supporting the Internet of Things. They own famous brands such as AKG, Harman Kardon, Infinity, JBL, Lexicon, Mark Levinson, and Revel, mostly known for premium audio.

Harman Ignite Store is like an App store in any vehicle. Publicly launched in 2018, it is the leading connected vehicle platform which enables car makers to develop, manage and operate their own in-vehicle app store. Compliant with Android Automotive OS, Ignite Store was recognized as Fast Company's 2020 Innovation by Design Award.

With the Ignite Store, the vehicle becomes an extension of the consumer's digital lifestyle. It allows drivers to subscribe and install third-party apps, such as Spotify, Yelp and TripAdvisor, as well as automaker-developed services such as vehicle health and "Concierge Mode," bringing everyday applications that we have at home and on our phones to the car.

It's a complete app ecosystem, it is infrastructure-agnostic, it works through any navigation system, it is automotive compliant (safety, intuitiveness), and supports automakers to keep data ownership and control.

It supports the three new experience concepts—Gaming Intense Max, Creator Studio, and Drive-Live Concert—that address modern mobility needs and wants. These were on display at Harman's technology showcase, ExPLORE, in parallel with CES 2021.

General News

Porsche Partners With Zync, Embedded App And API

GENERAL NEWS

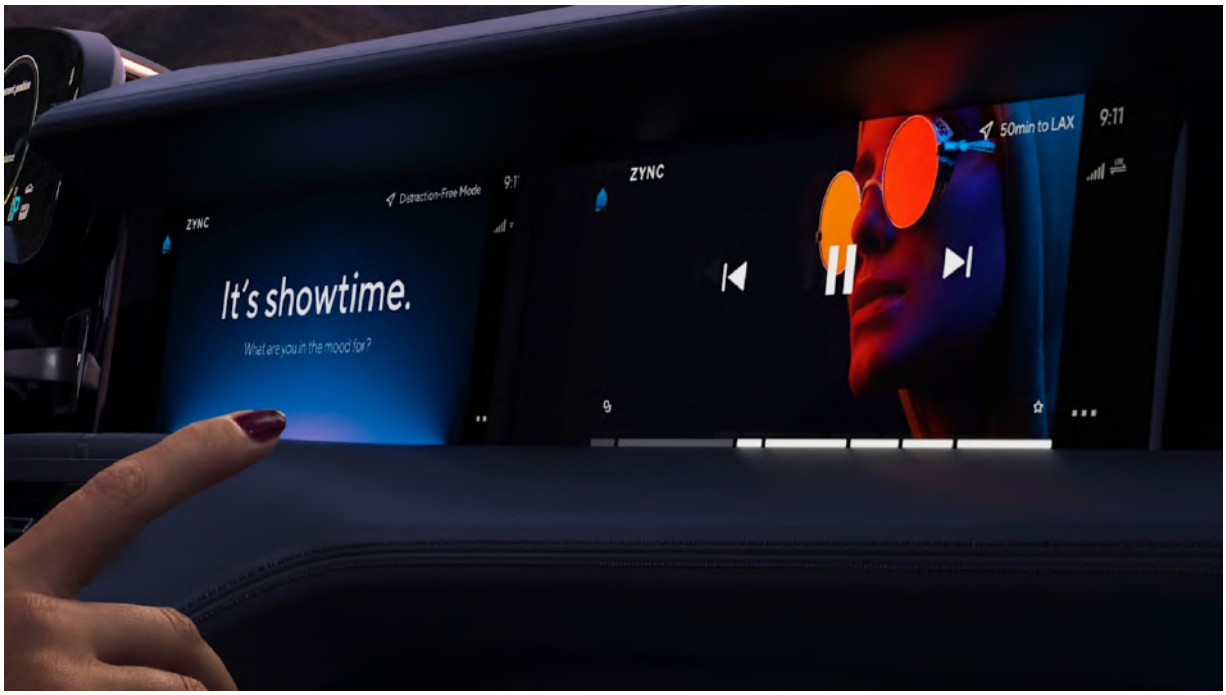


IMAGE: PORSCHE

Porsche is expanding their start-up ecosystem with Zync, which is to become a strategic partner through their company building team Forward31. This digital subsidiary is cooperating with external entrepreneurs to create new digital business models, to strategically expand the scope and presence of Porsche Digital in this way.

forward 31

The Porsche Digital Company Builder

Zync's technology, San Francisco-based "passenger experience company", aims to bridge the gap between the entertainment and automotive industries, by enabling media content to be delivered to cars via a central partner. Thanks to a newly developed software solution and international partner network, streaming offers from third-party providers, for example, can be integrated directly into vehicles' entertainment systems. Zync solution is

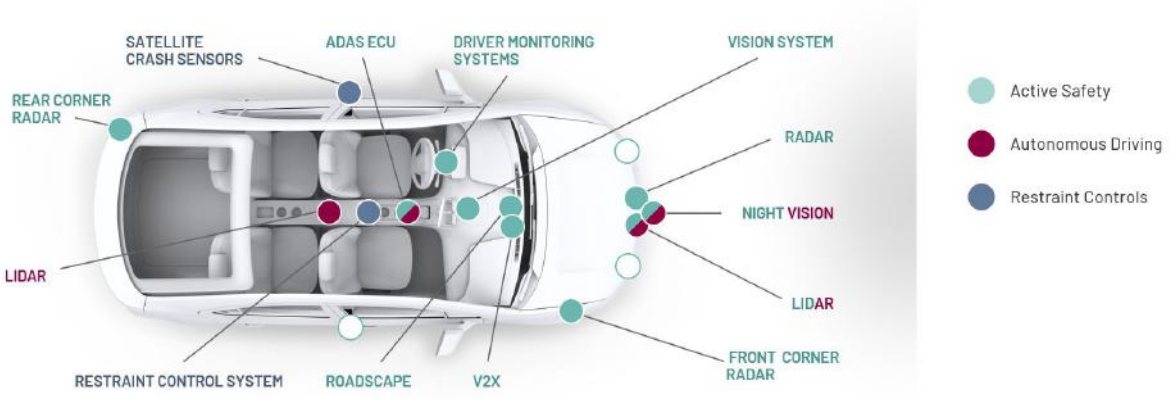
based entirely on existing infotainment architectures, which means that hardware adjustments are not necessary. In addition to car manufacturers, Zync is also aimed at new mobility providers.

Beyond hosting a number of diverse media collaborations, Zync also has access to curated libraries of premium content. These are personalized through intelligent algorithms and recommended based on user interests, travel duration and current mood. By 2023, it will be able to integrate further functions such as interactive video games or online shopping as well.

Through the partnership, Porsche says they are pursuing their interests in business areas beyond their core while focusing on developing new solutions for the in-car entertainment of the future. The overall target is to reimagine how we spend time in the car, within the context of EVs and related software, and beyond that, the increasingly automated driving experiences, and the fully-autonomous of tomorrow.

Magna Buys Veoneer To Boost ADAS Offer

GENERAL NEWS



Canada-based auto parts conglomerate Magna International is buying Swedish rival Veoneer for about USD $3.8bn in cash—that's $31.25 a share, nearly 60 per cent up from the stock's closing price. Veoneer were spun off from longtime safety equipment supplier Autoliv in 2018, and will be merged with Magna's existing ADAS business, an activity of their Electronics Division.

Magna can supply a considerable proportion of a vehicle's components and also operates a contract assembly unit in Graz, Austria.

Magna CEO Swamy Kotagiri said "Veoneer's complementary technology offerings, customer base, and geographic footprint make it an excellent fit with our ADAS business, and the acquisition strengthens our global engineering and software development talent base".

Annual synergies of about USD $100m are expected by 2024 from the deal, which was unanimously approved by both Veoneer's and Magna's boards and expected to close by the end of this year.Canada's Magna will strengthen its ADAS product line by acquiring Sweden's Veoneer, spun off from Autoliv in 2018.

Magna says they will operate Veoneer's Arriver™ sensor perception and drive policy software platform as an independent business unit, as Veoneer does currently. Magna is also acquiring Veoneer's "leading global position in restraint control systems". Veoneer also developed Driver Monitoring System, already presented in DVN Interior (Feb 4, 2021)