DVN-I
Automotive Interior

Thu, 27 January 2022 Weekly Newsletter NEWSLETTER #96

Editorial

Interior Occupant Interaction Through 5+1 Senses

HYUNDAI MOBIS MONITORS DRIVER'S GAZE (HYUNDAI IMAGE)

Audio is not just what one listens to when driving, it is also part of the overall travel experience, and a key pillar of the safety shield. Parallel approaches are scalable for comfort, HMI, interior lighting, HVAC and IAQ—really, for all interior human-centered design dimensions: comfort is going beyond occupant posture in a seat; HMI is much more than screen readability; interior lighting widens to safety through visual alerts, climate control and air quality influence overall wellbeing.

Vehicle occupant interaction goes through our five basic senses: touch, sight, hearing, smell and taste. The sensing organs associated with each sense send information to the brain to help us understand and perceive the environment around us. Another sense, called proprioception, deals with how the brain understands where the body is in space (and any extensions of it, such as a vehicle).

Proprioception complements how the driver interacts with the vehicle and its environment. Car interior technologies support this holistic approach, and DVN Interior is continuously reporting all these new developments, while keeping always this holistic perspective. The upcoming DVN Interior Workshop (Köln, 25-26 April) is in preparation to cover it. Get set to exhibit, to speak, or just to attend! Find more information **here**.

We're grateful for your membership; you make this community stronger by being a part of it.

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

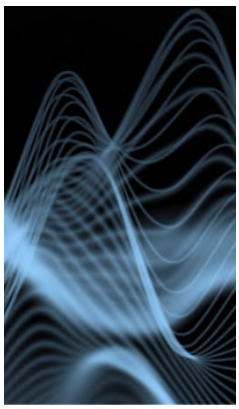
Car Interior Sound is Much More Than Audio

STEFAN SOLAKOV IMAGE

“Life’s too short to listen to bad audio” goes an old saying. And nowadays sound is much more than audio!

Vehicle audio equipment is installed in a vehicle to provide in-car entertainment and information for the vehicle occupants. Initially implemented for listening to music and radio, vehicle audio is now part of car telematics, telecommunication, in-vehicle security, hands-free calling, navigation, and remote diagnostics systems. The same loudspeakers may also be used to minimize road and engine noise with active noise control, or they may be used to augment engine sounds, for instance making a smaller engine sound bigger. As cars become electrified, connected and autonomous, the future of automotive sound is entering a new era, as occupant expectations and needs change. Sound is becoming more and more important with electric cars and new mobility habits, where the car is kind of the newest place to enjoy music peacefully. As the industry enters in parallel into a digital era, software is taking precedence over hardware components into sound and audio improvements.

Futurescope Consulting Research – Car Audio Trends



FUTURESCOPE IMAGE

In their recently published report, *Audio Megatrends for 2022 and Beyond*, Futurescope Consulting says the evolution of technology in the audio space has reached an inflection point, an advent for not just better-quality

audio, but completely new and immersive listening experiences. The way people will be interacting with sound and the devices that channel it are set to change as we move into 2022 and beyond. They summarized trends into the following directions:

Hi-Res Audio
After years of niche positioning in the music world, "high-resolution audio" has gone mainstream, thanks to a huge raft of support in streaming services such as Apple and Amazon, and products including smartphones, digital hi-fi components, and now in-vehicle audio gear.

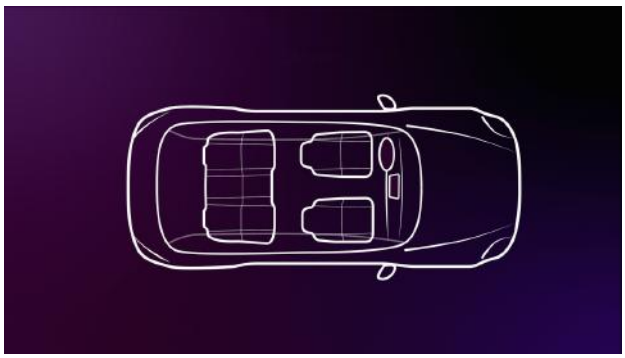
In-car Audio Experience, through Spatial and Personalized Audio
Spatial audio in a vehicle's environment works exceptionally well, as the cabin layout allows for optimized placement of speakers. Front rear and side speakers can be strategically positioned inside the car so that passengers can feel the movement of whatever they are listening to.

While this will create a far more intimate music experience, it also enables directional acoustic signaling allowing the car to provide personalized notifications, warnings or other alerts. For example, things like blind-spot protection and seat belt warnings will come from the direction of the potential problem, directing the driver's attention more quickly and accurately than a directionless audio warning.

Simplifying the Signal Chain
This means simplifying the sound process, rethinking the architecture and the software content to define where surround processing should be achieved.

Recent New Vehicles

Lucid Air



LUCID IMAGE

The Lucid Air is the World's First Vehicle to Integrate Dolby Atmos. It includes a new 21-speaker Surreal Sound system, providing a truly immersive listening experience along with enhanced in-car active audio safety features, as demonstrated in an online video. The car's "Surreal Sound" system, with front, rear, side, and height speakers optimally integrated and precisely positioned, allows the driver and passengers to feel the relative movement of individual sounds as they move around the cabin. Working with Dolby, the speaker system is tuned and perfected for the unique space of the Lucid Air using the legendary Capitol Records Studio C as the reference design.

In addition, Surreal Sound also helps increase the overall safety of Lucid Air by enhancing driver aids. The audio experience extends to the intuitive design of the Air, including acoustic signaling of notifications, indications, warnings, and all other audio emitted to alert the driver and passengers. For example, a seatbelt warning will, to the driver's ears, come from the direction of the unbuckled belt. Other warnings, such as blind-spot detection, will feature directionality to help focus the driver's attention, and the turn signals will sound to the driver as though they're coming from the indicated side of the vehicle.

Mercedes S-class

BURNMESTER IMAGE

Mercedes-Benz cars are getting Dolby Atmos this year; they are planning on integrating spatial audio into the S-class, which uses the latest M-BUX interface. Mercedes' implementation of Atmos will include 31 (count 'em!) speakers scattered around the car—including six 3D speakers above passengers, four near-ear speakers for the two front seats, and an 18.5-liter subwoofer. Each seat also features two hidden exciters, for a total of eight in the car, and everything is powered by two amplifiers with a total of 1,75 kilowatts of power (for those keeping track of carbon budgets). It comes from The Burmester High-End 4D Surround Sound System, and is demonstrated in its own online video.

Acura MDX

ACURA IMAGE

The 2022 Acura MDX offers an ELS Studio 3D® 16-speaker system. Included are four ultra-slim overhead speakers for true surround sound. The system was developed by Acura and Panasonic, and tuned by Grammy-winning music producer Elliot Scheiner.

Honda Civic

The all-new 2022 Civic is the first with an available Bose audio system. It's got 13 speakers including a subwoofer, and brings a giant upgrade over standard equipment in the base model (4 speakers) and the midrange model (8 speakers). The premium system includes Bose's Centerpoint 2 and SurroundStage digital signal processing made specifically for the Civic's minimalistic interior. Honda promises that every listener, regardless of position, will find themself "placed in the middle of the music", Dynamic Speed Compensation technology automatically adjusts volume and tone based on vehicle speed.

Jeep Grand Wagoner

JEEP IMAGE

The Jeep Grand Wagoner has a McIntosh MX1375 "Reference" audio setup, company's first-ever automotive 'reference' system—see DVN Interior 23 September 2020. There are 23 speakers and what's being described as one of the highest-performing 12-inch subwoofers in the industry, all powered by a 24-channel, 1.375-kilowatt amplifier.

Genesis G90

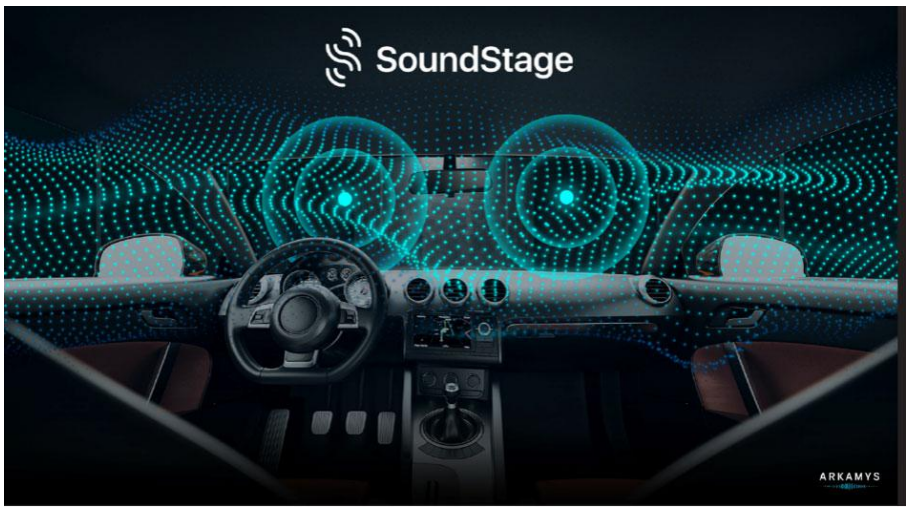
GENESIS IMAGE

The sound system in the G90 is from Bang & Olufson, with 23 speakers and "Virtual Venue", a which provides virtual concert hall acoustics.

CES 2022

CES typically bristles with audio technology, as it intersects consumer electronics and vehicle technology. Many companies stayed home this year because of Covid, including Harman, JVCKenwood, Pioneer, Alpine, Sony Mobile, Kicker, Metra, AAMP Global, AudioControl, Cerwin Vega/Diamond Audio, and others. Nevertheless, we spotted some interesting companies on our CES virtual tour:

Arkamys



Arkamys is based in Paris, France. Their specialty is in the domain of audio software and automatic tuning tools for the automotive industry. They have a global expertise in the realm of high-quality 3D sound enhancement and custom designed algorithms, bringing to the market a premium sound experience to mainstream models and a transcendent sound experience to high-end models. Arkamys takes its roots in the Château d'Hérouville music studio next to Paris that saw some of the greatest rock albums recorded, and the world of motion pictures post-production being transcended by Arkamys spatialization process. Arkamys is providing sound processing to more than 80 million cars on the road worldwide.

Two demo vehicles took center stage at CES 2022, with traditional speaker set up, and an innovative speakerless configuration. There was an Audi e-tron with Arkamys' complete audio software suite: next generation sound demonstration of the enhanced user experience thanks to the improved audio quality from Arkamys Soundstage, just using the standard built-in speakers. Demonstrations were made with seven different sound profiles: natural, dynamic, acoustic, cinema, podcast, and so on, using 8 or 10 standard speakers, demonstrating how to reach the best audio rendering quality while saving on cost, weight and space. Some of the audio profiles have been tuned

using Arkamys' new automatic solution: Smart Tuning. In a context of growing demand for autonomy, ADAS or lidar features, Arkamys presents the 3D Sound Alerts solution, also on demo with positioning, spatialization and motion effects for driver assistance (ADAS) alerts and in-vehicle notifications (navigation, turn signal, and others).

There was also a Peugeot 3008 with Arkamys sound enhancement software and Continental Ac2ated sound actuators system: the "sound without speakers" demonstration of Arkamys Soundstage enhancement of a revolutionary sound system from Continental with 6 actuators, using the car cabin interior to generate sound, reducing weight and space by up to 90 per cent. The demo car allows for direct comparisons between actuator sound and classic speakers or a hybrid configuration.

Dirac

DIRAC IMAGE

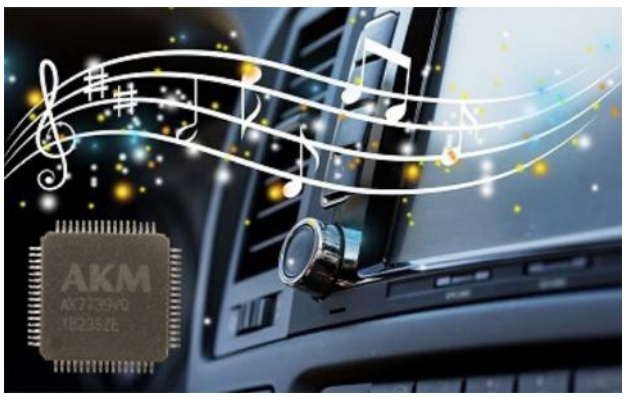
Dirac is a global company with headquarters in Uppsala, Sweden, and R&D facilities in Copenhagen, Denmark and Bangalore, India. They have partnered with car brands including Rolls Royce, Volvo, Polestar, and BMW.

The Dirac upmixing technology analyzes source content and splits into component parts with different spatial attributes. From this real-time decomposition, the upmixing technology intelligently generates a multichannel version of the same content and distributes it to multichannel-capable sound systems. No additional surround sound processor is required.

Unlike similar multichannel processing solutions, which create audible distortions and artifacts that were not part of the original stereo recording, Dirac's upmixing technology employs new patent-pending algorithms to minimize such effects, so the results sound accurate, natural, and immersive.

Dirac's upmixing technology will debut first for the automotive market as part of the Dirac Virtuo spatial audio solution. Dirac Virtuo is a key component of Dirac's Intelligent Audio Platform, the company's modular approach to perfecting automotive sound. In cars, Dirac Virtuo with upmixing technology can create a true surround-sound experience at every seat when listening to standard stereo content. The upmixing technology is customizable, so automotive sound engineers can tailor the immersive in-car experience.

AKM (Asahi Kasei Microdevices)



AKM IMAGE

AKM is a brand name of electronic component solutions of Asahi Kasei Microdevices Corporation, an Asahi Kasei Group.

Monitoring sound with a low consumption of energy is challenging because it requires a continuous stream of data. AKM has developed a product, designated AK5706, for sound monitoring with ultra-low energy consumption. This system responds to arbitrary audio to activate the system only when it senses a sound so that the entire system can consume less power through continuous monitoring. As a result, this technology will accelerate monitoring through sound to countless new applications.

Alpine

ALPINE IMAGE

Alpine announced two new in-car receivers at CES 2022. Both receivers support Apple's wireless CarPlay as well as lossless audio, allowing for improved high-resolution music playback from files encoded using the FLAC and APE codecs.

The new 9- and 11-inch "Halo Floating" touchscreen receivers both come with 1280 × 720 touchscreen displays and require just a single-DIN space in dashboards. There's even an adjustable bracket in the box that should ensure the receivers fit as many different types of cars and dashboard design as possible.

Announced via press release, Alpine is pushing the high definition audio aspect of both receivers while noting that the new offerings improve on the already benchmark floating design from 2018.

In conclusion, the car cabin is the latest place to enjoy music peacefully. Sound is also part of the safety system, with audio alerts coming from the direction of the potential problem. It could even go further, like the Bosch SoundSee system presented at CES—not yet for automotive applications, but maybe someday.

SoundSee is an AI-equipped system already installed in the ISS (International Space Station). Installed on board Astrobee, NASA's autonomous free-flying robot, SoundSee's integrated microphones pick up ambient noise in space. Using AI, the Bosch technology then analyzes the audio data in order to detect potential anomalies and to flag areas requiring maintenance work. SoundSee was developed together with Astrobotic as part of a NASA research partnership. **See video**.

Interior News

No Yoke: Drivers, Reviewers, Safety Experts Reject Tesla's Steering Unwheel

INTERIOR NEWS

Brash Tesla CEO Elon Musk is notorious for his tweets, one of which last Autumn declared the steering wheel passé, like a played-out fad. And besides, he said, it blocks the gorgeous view of "Full Self-Driving", Tesla's imaginatively-named L2 driver assistance system.

Forgotten in the zeal to disparage the wheel, perhaps, is the inconvenient fact that while children can pretend to fly airplanes and spaceships, they aren't allowed to drive automobiles—and among grownups, the yoke is generating unfavorable spitback and pointed questions about unsafety.

The widely-respected auto testing experts at Consumer Reports say the yoke is a constant nuisance, a literal pain, and raises safety concerns. Specific squawks ranged from the mundane ("My hands hurt after a few hours behind the [Tesla] yoke") to the longitudinal ("10 of our test drivers chronicled every time it slipped out of their hands during a turn, every ache and pain from gripping the handles during a highway cruise, every time a tester's hands didn't fit on the grips, everyt ime we accidentally honked the horn while trying to make a turn, and every time we had to look down to see which turn signal was which"), to the alarming ("Backing out of the driveway, my hands slipped off [the yoke] multiple times, which was startling").

They described the yoke as awkward to use:

Traditional methods of making a sharp turn—hand-over-hand and shuffle steering—are impossible (…) taking turns at higher speed, when [the yoke] is providing more significant resistance in your hand, there's nothing to catch if you lose your grip, so you can end up momentarily losing control mid-turn. You probably don't grip your steering wheel tightly, but that's exactly what the yoke forced drivers to do. There's nowhere to rest your hands, even if they start to hurt, so you have to grasp the yoke's handles. Even those without carpal tunnel or repetitive strain injuries had similar complaints: one of our testers took a three-hour highway trip and hand soreness was the first thing he mentioned afterward. Another tester said her hands are too small to get a good grip in the first place, as the yoke seemed too thick, apparently designed for larger hands to hold. She had to grip the yoke uncomfortably harder than a traditional steering wheel.

They described inconveniences and safety threats the yoke brings with no concommitant benefit:

The shape of the yoke adds an unnecessary layer of confusion, especially during a three-point turn. As you rotate a round steering wheel you always know what to expect, even when you aren't looking, [but] with a yoke, you might get a corner, a flat side, or nothing at all. Instead of applying the consistent torque that's necessary to turn a steering wheel, the odd-shaped yoke requires various different degrees of push and pull forces, which can cause the car to lurch instead of steering smoothly. In other cars, the turn signal stalk sits behind the steering wheel and does not

move as the wheel turns. But the Tesla's turn signal buttons move as the yoke turns, [so when the yoke is upside-down, the left arrow button activates the right turn signal and vice-versa]. Multiple CR testers found it extremely difficult to figure out which button to press without pausing to look down at the steering wheel, and a few made some turns without signaling to avoid dealing with the button issue.

They told about the multilayered faultiness of the user interface:

If you engage the turn signal switch with a light press, the turn signal will flash three times—useful for indicating a lane change—and the yoke will vibrate once to alert you that it's active. Press it harder and the yoke will vibrate twice, while the turn signal will stay on until the driver cancels it by pressing the button again. It's hard to make a distinction between the two because there's no physical button to press. It's especially tricky on a bumpy road. Buttons on the yoke are touch-sensitive and flush mounted, which makes them too easy to activate unintentionally. I inadvertently flashed my high-beams at oncoming traffic multiple times, only realizing I'd done so after the yoke vibrated to let me know I'd pressed one of the touch buttons. Other drivers had similar problems. "I accidentally washed the windshield and honked the horn at innocent road-goers while making turns," says Knizek. And another driver who actually had to use the horn when an oncoming truck was about to cross the center line couldn't find the horn button in time to press it.

They also had words to say about that beautiful view Musk says the yoke unblocks:

The Model S allows the front passenger to play video games and browse the internet while the car is in motion. Doing so takes over the entire screen and can be a massive distraction to the driver.

And they rated the car accordingly:

The updated Tesla Model S probably would have garnered the highest road-test score we've ever recorded if it weren't for its new yoke-style steering wheel. The yoke and the other control changes that come with it bring major compromises in usability, maneuverability, and comfort. It proved a constant nuisance. For instance, turns that require hand-over-hand movements—such as pulling into a driveway or parking—leave one of your hands without part of the wheel to hold onto. It's also extremely difficult to keep both hands on the yoke as you unwind the wheel after taking a turn. In some cases, the yoke simply slipped out of our test driver's hands, which is dangerous. And despite the names of its standard Autopilot and optional $10,000 "Full Self-Driving Capability" features, the Model S doesn't drive itself, making the yoke that much more ill-advised.

We found that we always had to look down at the wheel to activate [the yoke-mounted touch button] controls, rather than operating them by feel as you would with a stalk. There also isn't any actual gear selector, mirror-adjustment switches, direct steering-wheel adjustment, or a simple way to redirect the dashboard air vents. All of these functions have to be performed through the main infotainment display screen, and they are impossible to accomplish without looking away from the road.

The driving position would be excellent, but the yoke forces unpleasant hand positions and shoulder postures that were actual pains for many of our drivers. There are several ways you can hold onto the yoke, but none of them proved comfortable or as secure as grabbing a traditional round steering wheel. Wrapping your thumbs around the top portions of the yoke seems most similar to the "9 and 3" position, but doing so proved awkward and uncomfortable, while placing your hand underneath the horizontal spoke doesn't feel any more natural or secure.

And other grownups besides those at Consumer Reports had similar reactions. Elektrek said *This is a clear example of Tesla already having its eyes on [real] full self-driving and taking steps a little too early*. Not long later, Elektrek reported that a Tesla owner managed, at great expense and staggering difficulty—he had to write new firmware—to swap a round steering wheel and conventional control stalks into his Model S from a Model 3. The owner's comment: *I planned to set the car up as Yoke + stalks for my normal config, and to toss the round wheel on for fun, rarely. But then I got the controls on the round wheel working, and I'm not going back to the Yoke.* CleanTechnica had similar reports on other round-wheel swap, including one by a hillclimb racer who apparently considered the yoke unacceptable: *It was critical […] that he get a normal steering wheel on the Model S Plaid for the race. He doesn't consider the yoke to be safe for racing (or other things).*

Discussion threads sprouted on Tesla enthusiast forums asking for help ditching the yoke in favor of a real wheel, and expressing disgust at the pointlessness of it all: *Come on, let's not fix things that are perfectly functional. What happens when Elon Musk decides round tires are boring, too?*

Aftermarket steering wheels began to pop up, for those willing to spend two or three or four thousand dollars to opt out of Musk's fighter pilot fantasy. Elektrek again:

Hate the stupid yoke? That's OK, we get it. In fact, everybody who actually drives their cars gets it. Unfortunately, not all feature packages are compatible with the replacement. If you got the cold weather package, for example, you'll lose your heated wheel function. [Aftermarket wheels] also lack the gear selector and turn signal stalks found on a Model S built with the standard wheel, so while you'll get a conventional shape, you're still stuck with the push-button wheel controls. The lesson seems so stark as to scarcely need stating: appropriate user interface design is a matter for adults doing scientific research and applying knowledge and reason to optimally adapt the machine to the human—not fatuous flights of fancy forcing the human to accommodate the machine and the chutzpah of the owner of its maker.

Senseair IR to Measure Alcohol on Exhaled Breath

INTERIOR NEWS

SENSEAIR IMAGE

Senseair is a Swedish provider of air and gas sensing technology, with expertise in non-dispersive infra-red (NDIR) technology. They develop and produce what they describe as the smallest and most cost-efficient high-precision, low-power sensors for high-volume production. Measuring gas in the automotive industry has various benefits. For example, by detecting ethanol on the driver's breath, drunk driving can be prevented. The system is designed to give a pass/fail reading of breath alcohol content in a few seconds.

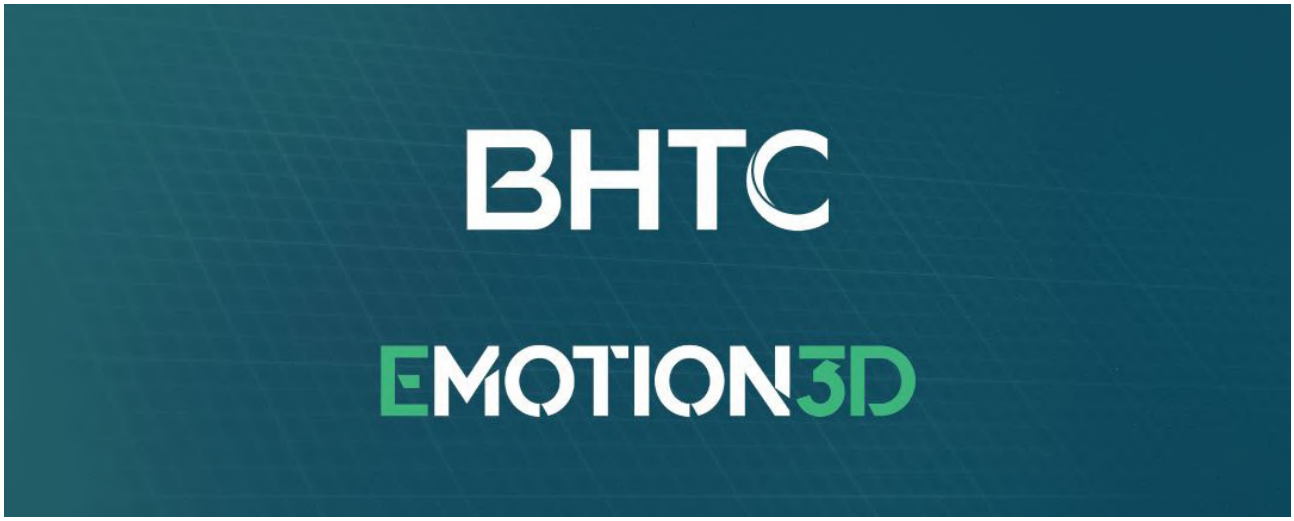
The system, as described in an **online video**, draws the driver's exhaled breath into a sensor, which measures the concentrations of alcohol and carbon dioxide present. The known quantity of carbon dioxide in human breath serves as an indicator of the degree of dilution of the alcohol concentration in exhaled air. Molecules of alcohol and tracer, e.g. carbon dioxide, absorb infrared light at specific wavelengths. The Senseair device make use of non-dispersive infrared technology to analyze infrared light beams on the breath sample and calculate the alcohol concentration.

The prototypes under development are being rigorously tested using state-of-the-art wet gas breath simulators. The simulator blends gases such as carbon dioxide, nitrogen, and oxygen with moisture to create an artificial exhaled breath that matches the composition, temperature, and pressure of natural human breath. Ethanol can then be added to the breath at various concentrations. The system is prompted through voice activation.

The development effort is being conducted in close collaboration with the Driver Alcohol Detection System for Safety (DADSS) Program, a public-private partnership between the Automotive Coalition for Traffic Safety (ACTS) (a Virginia nonprofit representing the world's leading automakers) and NHTSA, the US National Highway Traffic Safety Administration.

Integrated HMI-DMS from BHTC, Emotion3D

INTERIOR NEWS



BHTC and Emotion3D are collaborating on an Integrated HMI and driver monitoring system.

BHTC is a climate controls specialist for HMI system solutions. In addition climate performance, it also includes intuitive and ergonomic operation of HMI systems, in the segments of control systems, climate control units, center information displays and integrated center stacks.

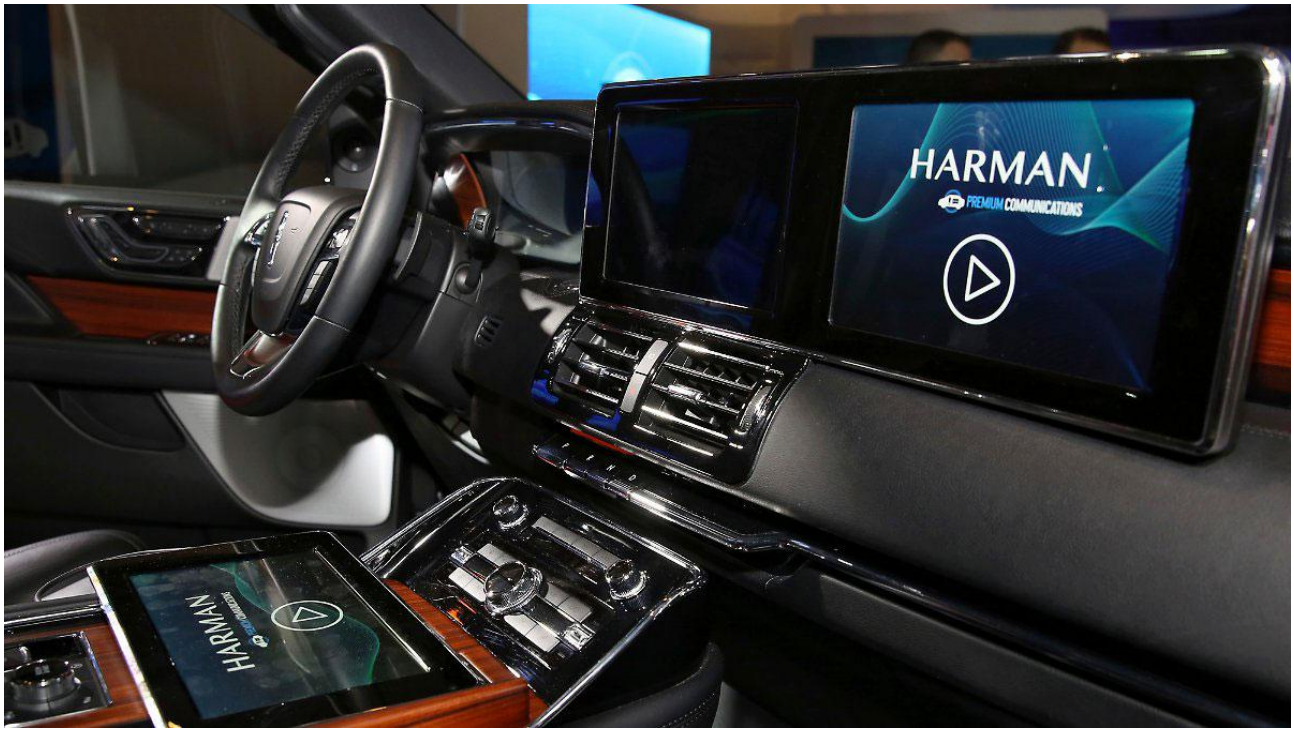
Emotion3D is a software provider for camera-based in-cabin analysis (see profile in DVN Interior 22 April 2021). With cameras installed inside the vehicle, their Cabine Eye software analyzes all occupants' characteristics, states and activities to enable a wide range of safety and user experience functions. The in-cabin analysis system will be at the heart of future vehicle concepts as it enables the currently most paramount factors in automotive development: ideal user experience, seamless human-vehicle interaction and optimized safety.

The combination of HMI displays and in-cabin analysis in one system offers unique interaction in addition to mandatory driver monitoring features. The system covers all soon-to-be-mandatory driver monitoring functionalities and offers innovative user experience features.

BHTC's display and climate control products can be equipped with cameras that observe either the driver only or the whole in-cabin space. Emotion3D's Cabin Eye software is used to process the video stream provided by the cameras to derive valuable information about the driver and other occupants. Based on this information, driver drowsiness and distraction as well as sudden sickness warnings conforming to the GSR (General Safety Regulation) and EuroNCAP can be issued. In addition, the solution enables a wide range of user experience features such as personalization and gestures. The tight coupling of BHTC's HMI products and Emotion3D's in-cabin analysis modules enables a unique, intuitive human-vehicle interaction. BHTC presented a demonstrator at CES 2022.

New-Car Shortage Fuels Used-Car Radio Sales

INTERIOR NEWS



PICTURE ALLIANCE /AP IMAGE

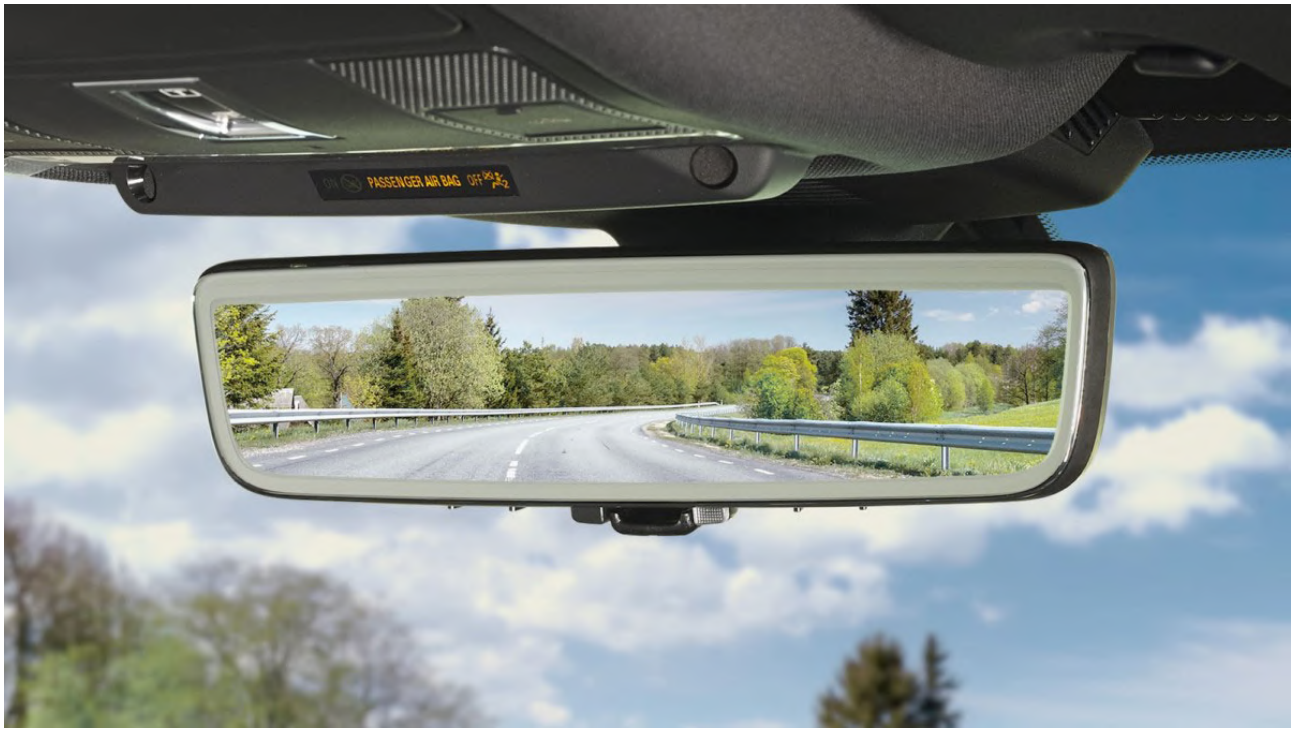
The sale and installation of new hi-fi systems in used cars has long been considered a dying model. This is because most cars are now equipped with extensive infotainment technology that can't readily be upgraded like past models could. Due to the acute shortage of new cars, though, mostly on account of the chip shortage, the business is reviving.

This situation is prompting many consumers to upgrade old vehicles with more modern audio technology, instead of getting a new model, decontented from its most attractive features. At Harman, business with retrofit solutions grew by 30 per cent last year. Harman, which owns brands including Harman-Kardon and JBL, mainly supplies automakers directly. However, the production downtimes in view of the global chip shortage mean that more car buyers are switching to used cars and then wanting to install new audio technology. Market researchers now increasingly see retrofit solutions as a growth driver for the coming years.

At CES, Harman audio product manager Dave Rogers said his company "has also been hit across the board by shortages of semiconductor products; the only chips we are getting enough of are the ones in wireless earphones. For all others—whether amplifier chips or Bluetooth modules—supply is limited. At the same time, consumer demand for audio technology in the pandemic remains strong".

Gentex Interior Tech at CES

INTERIOR NEWS



FULL DISPLAY MIRROR (GENTEX IMAGE)

Gentex is a longtime supplier of electro-optical products for the global automotive industry. They're best known for supplying nearly every major automaker with connected-car technologies and advanced electronic features that optimize driver vision and enhance driving safety.

This past September, Gentex bought Israel-based Guardian Optical Technologies, which developed an infrared-sensitive, high-resolution camera combining machine vision, depth perception, and micro-vibration detection. This proprietary sensor configuration allows the system to not only monitor the driver, but also the entire vehicle cabin and all its objects and occupants, assessing their behavior, gestures, and activities.

A year ago, Gentex bought Vaporsens, which developed a nanofiber chemical sensing technology capable of monitoring the vehicle's cabin air quality and identifying potential airborne contaminants.

Both technologies were highlighted in a new driver and cabin monitoring demonstrator that will be featured prominently at Gentex's CES 2022 booth. The demonstrator provides an immersive experience that allows visitors to see what the system's machine vision camera sees, understand its decision-making processes, and learn about corresponding features sets.

The Gentex driver and cabin monitoring system tracks the driver's head pose, eye gaze, and other vision-based metrics to determine driver distraction, drowsiness, and readiness for return of manual control in semi-autonomous vehicles. It can also track passengers and their behavior, as well as objects and other environmental factors. It can even turn the vehicle into a mobile communications center for making a video phone call, conducting a meeting, or capturing an in-cabin selfie.

Gentex's CES booth also highlighted their expertise in digital vision by demonstrating new features for the Full Display Mirror, an intelligent rear-vision system that uses a custom camera and mirror-integrated video display to optimize a vehicle's rearward view. The system captures video from a rearward-facing camera and streams it to a unique mirror-integrated LCD that provides the driver with an unobstructed, panoramic view behind the vehicle.

No Loudspeakers: Continental Turns Cars into Sound Boxes

INTERIOR NEWS

CONTINENTAL IMAGE

In future, automakers and their suppliers will be able to produce audio without loudspeakers in the vehicle. The Ac2ated audio system from Continental makes the car itself vibrate. The car as a sounding body, like a violin! To produce good 3D sound, car developers have to accommodate between 10 and 20 speakers in the car for high-end systems. First problem: front loudspeakers often annoy designers, from a package and a styling standpoint. They weigh up to 15 kg and hog up an installation volume of as much as 30 liters; when especially in electric cars, every gram and every cubic centimeter counts.

Continental's speakerless solution responds; Ac2ated uses "actuators" instead. They're located in the A-pillars, the doors, and the roof, invisible to the driver. The transducers consist of a magnet and a coil that generates micro-vibrations. These vibrations excite components and surfaces in the vehicle to oscillate. "If you imagine a violin for comparison, the transducer corresponds to the bow and the strings," explains Dimitrios Patsouras, Head of the NVH Competence Centre at Continental Engineering Services. "The bridge of the violin corresponds to the position and connection of the transducer to the surface, which in turn forms the sound body."

The A-pillar is suitable for high frequencies, while the door panels have the right characteristics for generating the mid frequencies," says Patsouras. "Similar to the speaker technology, we use large components such as the roof lining or the rear shelf to generate low frequencies."

The result: sound in the car—without a visible loudspeaker. According to Continental, the system weighs only one kilogram and requires an installation volume of only one liter, depending on the version.

News Mobility

Road Safety: 5G Project in Germany

NEWS MOBILITY

Starting this month, the smart city project "5G-trAAffic" in the city of Aalen, Baden-Württemberg, Germany, will test the use of 5G for traffic control and to increase traffic safety by using networking to detect possible collisions or near-accidents and warn the participants in time. The search for parking spaces is also to be controlled centrally. Other project participants are the Centre for Digital Development (ZDE), Bernard Technologies, T-Systems International, Connected Mobility and researchers from Fraunhofer IAO, Helmut Schmidt University Hamburg and Aalen University.

Real-time traffic control would also be possible with the help of 5G data and could reduce congestion and waiting times. To this end, the ZDE is providing a private network for the project in addition to the public 5G network of Deutsche Telekom. Various sensors such as video cameras or motion detectors at two intersections are to monitor the traffic. A special smartphone app can also be used to record movement data from test persons. The project is funded by the Federal Ministry of Digital Affairs and Transport as part of the 5G implementation funding with a total of 2.6 million euros.

ADAS: Path to Autonomous Driving

NEWS MOBILITY

AUDI IMAGE

Driver assistance systems support the driver of motor vehicles and take over his tasks in certain scenarios. The objectives of driver assistance systems are to increase driving safety, enhance driving comfort, improve efficiency and pave the way to autonomous driving.
Basically, a driver assistance system needs different sensors, an electronic control system that evaluates the sensor data and then sends control signals - either to loudspeakers and displays to warn the driver (Driver Monitoring) or to actuators to actively intervene in the vehicle control.
Current vehicle models normally use ultrasonic sensors for parking assistance, cameras for recognizing objects, radar and lidar for measuring the distances between the own vehicle and objects in the surroundings and determine the relative speeds. Adaptive Cruise Control and Active Lane Keeping Assist automatically regulate the speed and steering angle of a vehicle. Driver assistance systems can be divided into three categories according to their mode of operation:

Category A - Informing function: These functions inform the driver about events in the environment of the vehicle. They thus expand the possibilities for receiving information that are necessary for the safe guidance of a vehicle. The information is provided via human-machine interfaces (HMI). This can be symbols on the speedometer, in the exterior rear-view mirror or on the head-up display. Acoustic or vibration signals such as warning tones are also included. The functions of category A have an "indirect" effect on the driver. Most of Driver Monitoring System is part of it.

Category B - Continuously acting automating functions: These systems operate over a longer period of time and intervene directly in the guidance of the vehicle. This category includes, for example, adaptive cruise control, which automatically maintains the preset speed while monitoring the distance to the vehicle in front. In the functions of this category, the driver and the assistance system share the driving task.

Category C - Intervening emergency systems: In emergency situations, automated systems can often react faster than humans. For such cases, the car industry has developed so-called emergency systems, some of which are already mandatory by law or will become mandatory for all new cars within the next few years. Examples are the emergency brake assistant (AEB), which detects obstacles and automatically initiates emergency braking or an automatic avoidance system. It complements Cat A, like Driver Monitoring, with emergency braking, when the driver doesn’t react after a threshold time level.

"Autonomous Mode" as defined by Bast (Bundesanstalt für Straßenwesen = Federal Highway Research Institute in Germany) is analogous to SAE L**4** and L**5**. Here, the vehicle's systems take over all driving tasks; the occupants no longer need to intervene.

General News

Beaten Apple: First Huawei Car Available for Order

GENERAL NEWS

HUAWEI IMAGE

Huawei, the Chinese multinational technology corporation known for their smartphones—and their ongoing attempts to convince western governments their 5G network devices aren't spying for the Chinese Government—has unveiled their first car, without admitting it's a Huawei car. But managers of the tech company were on stage when the "Aito M5" was presented recently. Chinese car news outlet Gasgoo said *Huawei, which claims not to build cars, has launched the first Harmony car, built almost entirely by Huawei.*

Huawei has been investing heavily in numerous car components for years, and the new model is the first time they have all been combined almost simultaneously. Namely the "Harmony OS Smart Cockpit", also "Huawei Sound" and the "Huawei Share" function.

The car has a camera that uses facial recognition to detect the driver and load their profile and preferences into the vehicle. The software looks very fast and fluid, user friendly, so their software developers appear to have done a great job and taken some inspiration from other products on the market.

The Aito M5 has a glass roof, a big dashboard tablet, flush door handles, minimalist interior design, and otherwise like that. Huawei says they wanted to design fashionable cars for young people and that’s what inspired them to design the Aito. The dash has a 15.6″, 2K HDR display which offers touch controls over vehicle functions like directing the air vents, which on past-model cars was a manual process requiring vehicle occupants to grasp the vents and move them in the desired direction.

There’s a crystal gear selector as an option—a bit of bling likely to be appreciated in the Chinese market. A massage system adds to the heating and cooling already included in the seats. A HUD for the driver provides information like the vehicle speed, speed limit, and lanekeeping setting.

The interior also supports a wireless charging space, support for both USB Type A and Type C, and Huawei’s own SuperCharge technology that is capable of charging a laptop at 66w, or a phone at 40w.

The car is sold through Huawei's sales channels and can be picked up from Huawei shops for test drives. If you have a smart watch from Huawei, you don't need a key.

Huawei's strategic move to automotive could eventually parallel that by Sony, who presented their Vision S 2 at CES.

Three Chinese Brands in Ten Most Innovative Vehicles

GENERAL NEWS

BYD TANG (BYD IMAGE)

With BYD, Great Wall Motors (GWM) and Geely, three manufacturers from China have been able to climb onto the list of the world's top ten most innovative car companies, according to the newest innovation report from the Center of Automotive Management (CAM) in Germany.

Rang¤	Autohersteller¤	Punkte¤
1¤	VW¤	366¤
2¤	BMW¤	282¤
3¤	Daimler¤	269¤
4¤	Tesla¤	199¤
5¤	Hyundai¤	141¤
6¤	Ford¤	138¤
7¤	Stellantis¤	136¤
8¤	BYD¤	127¤
9¤	Great·Wall·Motors¤	116¤
10¤	Geely¤	100¤

BYD, for example, scored 127 points in CAM's innovation index, improving from 20th to 8th place compared to the previous period. Great Wall increased its score to 116 points and climbed from 18th to 9th place. Geely, however, slipped from 6th to 10th place, with the score of Volvo's parent company falling by 15 per cent to 100.

CAM explains BYD's significant rise primarily with a broad electric-vehicle push, which at an early stage produced a large number of purely electric vehicles (BEVs) in various segments. They describe the rise at Great Wall among other things with world firsts that are ready for series production, such as gesture-based autonomous parking function in the Wey Mocha.

VW remains the most innovative car company with 366 points, while BMW (282) and Daimler (269) swapped second and third place. Fourth-placed carmaker is Tesla with 199 points, followed by Hyundai (141), Ford (138) and Stellantis (136).

Tesla and the newcomers from China are strong innovators and put the established manufacturers under enormous competitive pressure. The Japanese manufacturers have lost innovative strength, with Toyota falling back to 13th place.