Thu, 31 March 2022
Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER
#105

Editorial

Coming Soon: Car Interior As Entertainment Hub

The automotive industry is rethinking the interactions among driver, passengers, and vehicle. The passenger compartment will be transformed into a co-working space; a cinema; a game room, or just a living area. The hub of this transformation is the center screen, getting progressively bigger and bigger. And what's on this growing screen? Content, of course, and easy access to it. That's IVI—in-vehicle infotainment—and that's what we explore in this week's in-depth article.

It's not enough for this multipurpose room-on-wheels to have all the provisions and amenities for working and relaxing with recreational activities; it will also have to have all the safety required of any automobile. The upcoming DVN-Interior Workshop offers broad, deep coverage of major technologies supporting occupant safety, wellbeing, comfort, and activity. It's all about HMI; HUDs; DMS-OMS; functional surfaces; interior lighting, and air quality—all the factors to optimize user experience, with considerations akin to why people go to a movie theater!

Stay tuned and **connect with us** to access the DVN-I workshop member account. If you haven't yet registered, you'll want to **do so** while space remains available. And of course, if you're not yet a DVN-Interior member, do come **join us**!

Enjoy this weeks' informative newsletter,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

IVI: That's Infotainment!

BYTON IMAGE

IVI systems—in-vehicle infotainment—typically include audiovisual features and two-way communications tools, including standard radio and CD players, as well as hands-free phone connections, vehicle voice commands, and other types of interactive audio or video. Many IVI systems include rear seat DVD capability (RSE: rear seat entertainment) that allows passengers to watch movies and other visual media.

Another major IVI component is mobile device connectivity. Most vehicles have a range of systems that allow devices like smartphones, tablets, and laptops to connect to a vehicle for passenger use. Many IVIs also have security features at least nominally designed to prevent drivers using any video services or other distracting system elements.

With the spread of 5G and the progressive development of autonomous driving, the vehicle in the future will become a relaxing place like a living room. That, in turn, ushers in new use cases, including watching streaming movies or video gaming. These activities are already possible for occupants, under the condition it doesn't distract the driver. It will become possible for the driver as well, as soon as mind-off-the-road "driving" is possible; that means L^4 autonomous driving. When the "driver" is totally freed from that task, at L^5 (as in a robotaxi), face-to-face seating will bring its own new thrills.

Today's equipment

In 2019, 82 per cent of vehicles sold featured a touch screen, compared to 53 per cent five years ago. In the digital age, the IVI system has become a way of setting vehicles apart from the crowd. Infotainment is a question of screen technology; size; architecture, and content.

Immersive experience

The IVI system is the only component of a vehicle that consumers regard as "digital". That's why its quality has become a significant purchasing criterion for the new generation of car buyers. But according to Consumer Reports, only 56 per cent of car owners are satisfied with their embedded multimedia/navigation system. Automakers and tech suppliers know how much progress needs to be made, and are increasing their R&D efforts to set themselves apart from their competitors.

Car occupants demand to be entertained

As ADAS become increasingly affordable and the market for self-driving vehicles booms, people now do more than just drive in their cars. According to Intel's Passenger Economy study, by 2050 autonomous driving will have freed up 250 million hours in the world's most congested cities.

The automotive industry needs to rethink the interaction between driver, passengers and vehicle. The passenger compartment is picking up speed in its transformation into a cinema; living room; game room, co-working space.

RENAULT SYMBIOZ CONCEPT'S CABIN CONVERTS TO A HOME-STYLE LIVING SPACE (RENAULT IMAGE)

Renault's Symbioz is an electric concept car unveiled at the 2017 IAA in Frankfurt. Here, your car is no longer separate from your living space; it has been designed as a genuine extension to your home. The interior includes three large monitors where passengers can look up directions or watch movies on a high-definition screen. Renault designed the Symbioz as part of their Vision for Mobility of 2030 project, to show their ideas of what future autos could look like.

First, you need a big screen!

The first step is the installation of at least one wide touch screen. Ever since the 2012 launch—already a decade ago!—of the Tesla S with its 17" center screen, the industry has been competing fiercely in this field, striving to display multimedia content and offer an immersive visual experience. IVI became the hub of a vehicle's electronic system.

In 2018, Dura Automotive Systems unveiled their "AVA Unity" system concept, designed especially for self-driving vehicles. It comprises multiple screens, including a 48" HD central one. Passengers can all interact simultaneously with the giant multi-touch screen, and view their own multimedia content. All four passengers can even play video games against each other during journeys.

THE DURA AVA UNITY INFOTAINMENT SYSTEM CONCEPT (DURA IMAGE)

IVI challenged by smartphones

In 2018, 80.3 per cent of adults in the United States accessed the internet through their mobile phone. This figure is projected to grow to 84.8 per cent in 2023, according to statista.com. Apps account for 90 per cent of the time users spend on their smartphones, according to mobiloud.com (though we wonder what the other 10 percent might be… cleaning it? Charging it? Installing a new cover on it?).

In 2019, Consumer Reports created a new "hands off phone" rating system to grade the extent to which IVI systems allow non-physical interaction with functions from your mobile. Even with the highest-scoring system, 32 per cent of owners still use their phone instead of the on-board system for calling, texting, and GPS. The sample CR hands off phone scores we list here, from the June 2019 issue of Consumer Reports magazine, are a composite based on the percentage of vehicles where owners opt to use the built-in system vs. picking up their smartphone for three tasks: calls, navigation, and texting. This score measures—in real, practical terms—the usability of originally equipped IVI versus any smartphone or wearable system.

- Ford/Lincoln Sync 3: 68
- BMW iDrive (with Gesture Control): 67
- Tesla IVI: 64
- Volvo Sensus Touch: 56
- Mercedes-Benz Comand: 56
- Toyota Entune: 56

Automakers sometimes get one step ahead of the digital manufacturing giants. In 2015, BMW introduced their gesture control function on the 7 Series. This feature hit the smartphone market four years later in the Google Pixel 4. There are counterexamples, too: inspired by the likes of Alexa and Siri, Mercedes-Benz developed their own AI-powered voice assistant capable of understanding complex spoken instructions; it was built into the A Class for the first time in 2018.

Automakers can choose between two routes to build in these new functions: they can develop applications themselves based on their own infotainment system OS (operating system), or they can integrate Apple CarPlay and/or Android Auto to run their existing applications.

Tesla opted for in-house development, and Volkswagen recently made this same strategic decision through Cariad, their car software business unit. But most manufacturers favor the second option, preferring to use existing Google and Apple ecosystems.

The need for content

Ashok Divakaran, in charge of connected and autonomous vehicle analysis for Deloitte, says "There's a push to basically now tie it into the vehicle so that it can provide differentiated infotainment in a more deeply integrated way. Take Amazon Fire (TV for autos), for example: when you integrate Fire in a deep way into the functioning of the vehicle, you can then do things that (…) a mobile phone or an iPad cannot".

IN 2019, TESLA OFFERED NETFLIX AND YOUTUBE APPS ON ITS IVI SYSTEM. (POCKET-LINT IMAGE)

From more immersive technology to a growing variety of content offerings, practically every automaker has either debuted or is developing technology that expands the boundaries of in-vehicle entertainment. Tesla includes Netflix, YouTube, and Karaoke apps, for example.

Mercedes

MERCEDES MBUX HYPERSCREEN (TECHNOBLOG IMAGE)

The new Mercedes EQS is equipped with the MBUX Hyperscreen. That's Big In-Car Cinema**.** **See video**. It represents the emotional intelligence of the all-electric upper-class model: the large, curved screen stretches almost the entire width from the left to the right A-pillar. In addition to its sheer size, the high-quality, detailed design also provides a big "wow" effect, aimed right at the emotional triggers of car buyers and users. With AI capable of "learning", the display and operating concept adapts to its users and makes personalized suggestions for numerous infotainment, comfort, and vehicle functions. Thanks to the "zero layer", the user does not have to scroll through submenus or give voice commands. The most important applications are always offered in a situational and contextual way at the top level in view. In this way, numerous operating steps are taken away from the EQS driver—and for the front passenger, who receives their own display and operating area.

BMW Immersive Entertainment

BMW's Theater Screen and My Mode Theater, unveiled at last CES in January, has a cinematic theater screen that moves out of the headliner to give passengers an immersive in-vehicle viewing experience. When activated, the system, which features Amazon Fire TV for Auto integration, is accompanied by an acoustic experience created by film composer and Academy Award winner Hans Zimmer.

The cinematic viewing experience, which BMW says will be available in future models, features a 31-inch diagonal panorama screen display with 8K resolution, immersive audio and acoustics, and loungelike rear seats.

Audi Holoride VR with Elastic Content

AUDI IMAGE

Audi will become the first automaker to deploy VR entertainment in their vehicles using a system developed by Holoride, a developer of in-car VR systems for the automotive industry. Already presented in last week edition. As a reminder, Holoride's USP is that the virtual content adapts to the driving movements of the car in real time.

Panasonic IVI

PANASONIC IVI AT CES 2020 (PANASONIC IMAGE)

Andrew Poliak, Chief Technology Officer for Panasonic Automotive, summed up that supplier's perspective: "You're seeing these IVI systems become the brain of the display in the cockpit environment of cars. So, absorbing the electronics content driving your fully digital instrument cluster, absorbing the brains for the content that's getting rendered in your HUD, adding extra technologies that will be in your IVI, being able to stream Spotify and cache offline content and all kinds of cool stuff".

Sony Vision S Concept

SONY PANORAMIC SCREEN (SONY IMAGE)

The panoramic screen that fills the width of the car makes it possible to indulge in video content such as movies and games during daily travel time from place to place. The UI is designed based on ergonomics, with features consolidated into a horizontal format and consideration given to the driver's line of sight movement. The UI is also extremely intuitive, allowing the driver and passengers to freely access the content. **See video**

REAR-SEAT ENTERTAINMENT (SONY IMAGE)

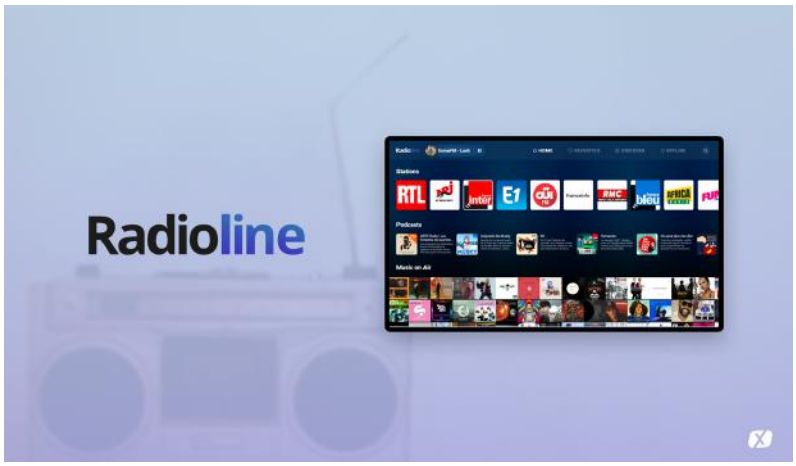
Screens are also installed for rear seats. Each occupant can enjoy individual entertainment, or the same content can be synchronized on the three screens so that everyone can enjoy watching together as if they were watching TV at home, or a movie in a theater.

Land Rover Dual View

LAND ROVER TOUCH PRO SCREEN (JLR IMAGE)

In 2010, Land Rover equipped their Range Rover with a 12” touchscreen in the dash and a technology known as Dual View. When looking at the screen from the driver’s seat, you would see the usual radio or satellite navigation system display, while a passenger looking at the same screen could watch their favorite DVD. **See video.** This parallax barrier technology was also available in the 2009 Mercedes S-Class.

Foxxum, Radioline IVI System



Global smart TV solution provider Foxxum, will be working on an IVI solution with Radioline, a global radio and audio provider, after having successfully made Radioline’s smart TV app available on all Foxxum OS-enabled devices in the past.

Radioline’s automotive app offers the largest catalog of over 110,000 local and worldwide radio stations; web-radios, and over 10 million podcast episodes, with curated and premium content catalogs including news; sports; talk, and music, with channels such as World’s Best and HQ Radio. The app is available in 18 languages, with an intuitive UI designed for in-car experience.

The IVI app features a unique one-touch export of tracks to streaming playlists—Deezer, Spotify, Apple music; search engines; downloadable podcasts; a player, as well as mini-player modes without advertisements (oh, that's another thing: IVI means a fat pipe for pushing advertisements to vehicle occupants at any and all times); plus multi-device features where content is synced and can be streamed from several devices—from CTV and mobile to IVI.

Conclusion

In the 2018 J.D. Power survey carried out in China, consumers prioritized a fast in-vehicle infotainment system, equipped with a high-resolution screen and in-built 4G connectivity (now it would be 5G). The challenge for the automotive is twofold: IVI has to be smart and efficient; consumers will never understand why $50,000 car's capabilities are inferior to those of a $700 smartphone. And users do not want to pay additional money; 41 per cent of respondents wanted the price of services—including subscription to the 4G network—to be included in the vehicle purchase price, while 51.3 per cent of respondents said they would "tolerate" a subscription cost of €5 to €10 per year. The automotive value chain will find it hard to make business models profitable (speaking of those advertisements…!).

Interior News

Warwick's ElectroAcoustic Panels

INTERIOR NEWS

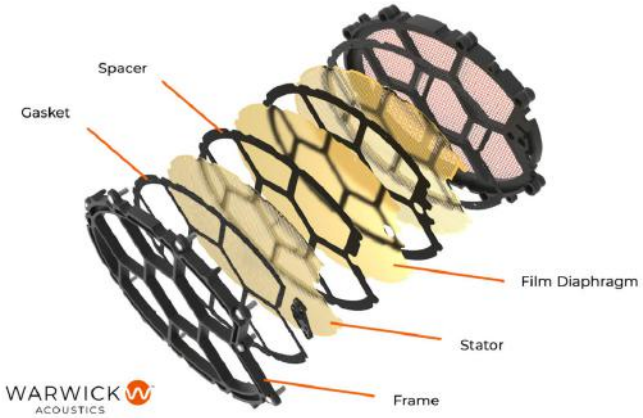
WARWICK ACOUSTICS IMAGE

UK-based audio technology company Warwick Acoustics is hoping to disrupt the automotive in-car audio market with the introduction of their ElectroAcoustic Panels, based on electrostatic loudspeaker technology. The company has already deployed their technology in high-end headphones, which have won multiple industry awards. They have also spent the last five years conducting an automotive R&D program, and now intend to break into the in-car audio market.

Warwick says in addition to the panels' audio qualities, they're around 75 per cent lighter than conventional speakers while consuming 75 per cent less power—an important factor vis-a-vis EVs.

Unlike conventional speakers, the panels can be molded into diverse form factors and incorporated into almost all car interior surface designs. This creates additional space for passengers within vehicle interiors and gives automotive manufacturers the freedom to innovate visual interior designs, creating distinctive new in-cabin experiences.

Warwick CEO Mike Grant says "It is exciting to finally exit 'stealth mode' after many years of intense R&D. While we have proved our electrostatic loudspeaker technology in the high-end headphone market, securing widespread critical acclaim for unequaled, immersive and precise sound quality, it was always clear that it was in the automotive sector where the initial significant opportunity for the company lies".



ELECTROACOUSTIC PANEL STRUCTURE (WARWICK ACOUSTICS IMAGE)

Antolin, Uniphy in Advanced Smart Surfaces Pact

INTERIOR NEWS

Spain-based interior tier-1 supplier Grupo Antolin and 3D smart-surface technology specialists Uniphy have agreed to collaborate on in-car user-interfaces. Grupo Antolin will combine their advanced decorative and lighting technologies with Uniphy's revolutionary Canvya™ smart-surface solutions to enable new highly functional 3D touch-control surfaces that are beautiful, intuitive, robust, safe, and economical.

The resulting HMIs will take advantage of the design freedom with high-performance touch contours such as longitudinal or circular sliders; concave/convex touch-surface dials; touch-gesture, and proximity recognition, together with the integration of displays and advanced lighting solutions.

Grupo Antolin's state-of-the-art car interior technology, together with their integration experience of
3rd-party solutions into their products, will be paired with Uniphy's 3D smart-surface technology to deliver user interfaces with great added value.

Uniphy's solution combines novel algorithms and patented technologies to allow standard materials and components and mainstream manufacturing processes to deliver feature-rich and freeform 3D smart interfaces. The Uniphy solution enables designers to freely and affordably create striking, robust HMIs that offer intuitive, natural experiences. The technology unifies non-conductive, pressure-sensitive touch sensing with physical HMI features including dials, buttons, and sliders. It also supports haptic feedback and proximity and touch-gesture recognition as well as additional proprietary HMI features.

Uniphy CEO Jim Nicholas will speak at the upcoming DVN Interior Workshop in Köln on 25-26 April with a lecture entitled "Can automotive HMI be Safe as well as Beautiful, Intuitive, Robust and Economic?"

Register here

Polybion's Celium is Vegan Performance Bio-Textile

INTERIOR NEWS

POLYBION IMAGE

Polybion, a Mexican company growing biomaterials for industrial applications, will scale up production at their bacterial cellulose facility after closing a USD $4.4m Series A funding round. At maximum capacity, the company's solar-powered world's-first bacterial cellulose bio-manufacturing facility will produce 100,000m^2 per year of Celium, the company's proprietary biotextile.

Celium is the first in a series of new biomaterials Polybion plans to create. Produced from the most abundant and versatile material on Earth—cellulose—it is an animal-free leather substitute said to have high-performance characteristics suitable for a range of automotive uses including vehicle upholstery.

Cofounder and CEO Axel Gómez-Ortigoza says "Scaling the production of Celium, a sustainable alternative to animal-based textiles and petroleum-derived synthetics, is a huge step on Polybion's mission to bring performance and possibility to 21st-century designers and materials engineers".

Polybion was founded in 2015 by Axel and his brother Alexis, and Bárbara González Rolón. Together, they developed the tools and technology to grow high-performance bio-assembled materials by upcycling agro-industrial food waste and harnessing living organisms such as bacteria. They use waste as raw material; and they design, produce, and finish products under the same roof .

LEIMSA: A Multipartner In-Mold Electronics Project

INTERIOR NEWS

LEIMSA PROJECT BRIEF AND PARTNERS (LEIMSA IMAGE)

The LEIMSA project addresses the development of disruptive components for the interior of the vehicle of the future with purpose of following the market evolutive trends in the automotive industry and anticipate materialization. The project was presented by Simoldes Plastics and Celoplás early this month at Techblick's Printed, Hybrid, Inmold, 3D Electronics conference.

Simoldes is an important automotive plastic supplier with strong mold making capabilities, They're headquartered in Portugal, where they got their start in 1981. Celoplás is also a plastic molding supplier from Portugal.

The intended results of LEIMSA will be integrated decorative elements and distinctive functionalities with the least possible operations, using emergent technologies in the mold (in-mold operations) and lightweighting techniques such as in-mold decoration (IMD); in-mold labeling (IML); high pressure forming (HPF); and in-mold electronics (IME), for the development of intelligent and haptic surfaces, with attractive 3D seamless design and an immersive, UX-centered human-machine interface.

LEIMSA DEVELOPMENT PROJECT MILESTONES (LEIMSA IMAGE)

LEIMSA also aims at the capacitation of the consortium as well as the creation of robust value chain. The first Milestone of the project was achieved in October 2021 with the construction and presentation of the first interactive mockup of the concept developed. This preliminary mockup was constructed using several prototyping technologies at CEIIA. It is an impressive, life-size demonstrator of the concept enabling evaluation of ergonomics aspects; UX and UI studies, and the experience of a lightweight and seamless design.

3D-Printed Accessories for Peugeot 308

INTERIOR NEWS

ACCESSORIES IN A PEUGEOT 308 (PEUGEOT IMAGE)

A range of accessories for the Peugeot 308 mark the first time 3D printing technology has been used for car accessories by an automaker. Available on the Peugeot Lifestyle shop, the add-ons include a sunglasses holder; a can holder, and a phone/card holder.

The 3DP accessories come from a joint effort by Peugeot's design, product, and R&D teams in collaboration with HP; Mäder, and Erpro. They are 3D printed using the new HP Multi Jet Fusion (MJF) 3D printing technology. The aim is to offer innovative products that are pleasant to the touch, light, solid, and easy to use, and which enhance the interior well-being offered by the 308.

3D printing reduces manufacturing constraints compared to injection molding, which means creative freedom for designers and greater possibilities for the complexity of parts with reduced weight; greater strength, and fewer assemblies. And it makes for agile production with enormous customization possibilities, mass production with shorter lead times, and no need for storage thanks to on-demand production.

A partnership between HP and BASF has devised a new material: Ultrasint thermoplastic polyurethane (TPU) makes durable, strong and flexible parts. It is a perfect material for impact-absorbing parts that require high elasticity, and for flexible meshlike structures. The material can be used to produce parts with a high surface quality and a very high level of detail.

HP Multi Jet Fusion (MJF) 3D printing technology starts with the transfer of a digital CAD file to a 3D printer. The process works by depositing a binder onto a powder. It uses a print head to selectively apply fusing and detailing agents to a polymer powder bed, which is then melted by heating elements to form a solid layer. After each 80 µm layer, more powder is added to the previous bed and the process repeats until the part is complete. When the build is complete, the entire powder bed with the encapsulated parts is sent to a processing station where most of the remaining powder is removed by vacuum suction. The parts are then sandblasted to remove the powder residue before going to the finishing department, where they are painted for aesthetics.

Vibracoustic Absorbers Improve Seat NVH Performance

INTERIOR NEWS

VIBRACOUSTIC IMAGE

NVH specialist Vibracoustic, headquartered in Darmstadt, Germany, has developed seat absorbers to help reduce vehicle weight while improving ride comfort by reducing seat vibrations, if they are integrated as early as possible in the design phase.

Lower weight is a critical factor for moving vehicle, and especially for BEVs, to increase vehicle efficiency and performance. As BEVs are also quieter, it is at the same time a challenge to increase comfort and avoid unwanted vibrations and noise. With the seat absorbers, vehicle manufacturers can now develop front seats that are much lighter while reducing structural resonance vibrations.

The seat absorbers are usually integrated in the upper part of the backrest to counteract unwanted vibrations and reduce them by up to 70 per cent, says Vibracoustic. The absorbers can be flexibly adapted to the application with a variety of design concepts and installation methods.

In addition, the absorbers can be used together with heavy internal seating systems—massage, heating/cooling, and entertainment components, for example. Here, the higher center of gravity increases the vibrations and additional damping is required. The absorbers can also be used to minimize the vibration of the headrests. The absorbers are also particularly effective when it comes to ensuring comfortable viewing of entertainment on the rear seats. It has also specific benefit with the passenger seat when it is empty.

The Design Lounge

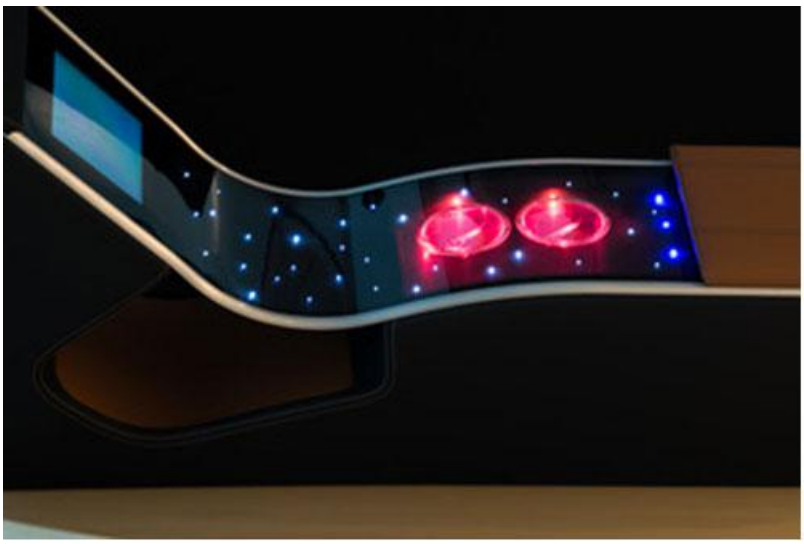
Something Special in Concept Cars

THE DESIGN LOUNGE

FORD SUPER CHIEF CONCEPT (FORD IMAGE)

Behind the scenes of nearly every automaker are the specialty fabrication companies who support the maker's design studios with concept car builds and various interior prototype builds to realize the ideas and concepts for an ever-changing automotive market. In this issue, we are looking at one company that's done this for thirty-nine years very successfully: Special Projects, located near Detroit in Plymouth, Michigan, provides award-winning design and fabrication services for the automotive, aerospace, industrial, marine, and military industries. They're one of those rare companies worldwide that can handle in-house projects and processes within their own facilities.

Interiors YES!



Although the industry knows Special Projects for doing excellent precision fabrication work on the exterior of concept vehicles, many do not know that they excel in building interiors from scratch, as well, using some of the most common materials like leather, foam, and steel. But along with that, Special Projects also excel in using new advanced materials finding their way into car interiors. VP and general manager Terry Steller says

"Our expertise with new innovative materials in plastics, fabrics, and LED lighting has caused us to think and fabricate differently from years ago. As a result, vehicle interiors have become so sophisticated with electronics, lighting, sensors and, making them all work together is a real technological art".

And it is. Despite Covid, in 2022, the sophistication of interiors of vehicles continues to evolve at an almost frantic pace. The use of synthetic leatherlike material with design patterns that come to life when illuminated is materials gaining in use and interest. Adding sensing technologies to these materials enhances the capabilities and opens up some unique interiors for the future. According to Ken Yanez, CEO and Owner of Special Projects, "The new concepts being designed by [automakers] are pushing the envelope for design and fabrication. For example, LCDs appear almost everywhere within the cockpit, from the front to the back of the interior. We have even seen them used on the ceiling and floors."

As interiors continue to evolve and become more occupant-rich with technology and creature features, companies like Special Projects must adapt and be the first ones to figure out how to make it work in reality. After all, they take the dreams and creativity of the automaker and turn them into an actual branded product suitable for showcasing at the various auto show's around the globe.

No Small Task

An average concept car, exterior + interior, from start to finish can take over a year to build, especially with all the hardware and software and programming needed. But as the global competition for vehicles increases, so does the complexity of the designs and technology. So what used to take a year or more to fabricate, build and assemble is turning into much shorter times for the concept vehicle fabricator. Special Projects senior program manager Randy Hovey says "We see timelines shrinking for the actual concept build coming from the [automaker]. Sometimes as fast as six months for us to fabricate an entire car from the frame upwards".

Why is this happening?

The industry is in a growth spurt with the inclusion of electric vehicles and the need to get those ideas and concepts out as fast as possible to the consumer. Competition between the dominant global automakers and the need to move quickly drives this unprecedented growth and sets the pace. New technology and the expression of ideas with that new technology have also become a driving force.

Water Flows Downhill

Companies like Special Projects have learned to adapt and even grow under these challenging times. They have learned the craft of collaboration, versatility, and expert execution. In addition, there is a title wave of new technology flooding our senses every day, especially in automotive. As a result, companies like Special Projects have learned to increase their knowledge of technology and integration over time. In many ways, they have become experts with emerging technology and, in some cases, are the first to see it and use it as Terry Steller sees it. "Every day is a new challenge or a problem that needs solving. As the complexity of concepts vehicles increases, so will the capabilities of Special Projects." Next time you are at that auto show and marvel at that particular concept car, remember there is a very skilled company behind it all, turning dreams into reality for all of us to enjoy.

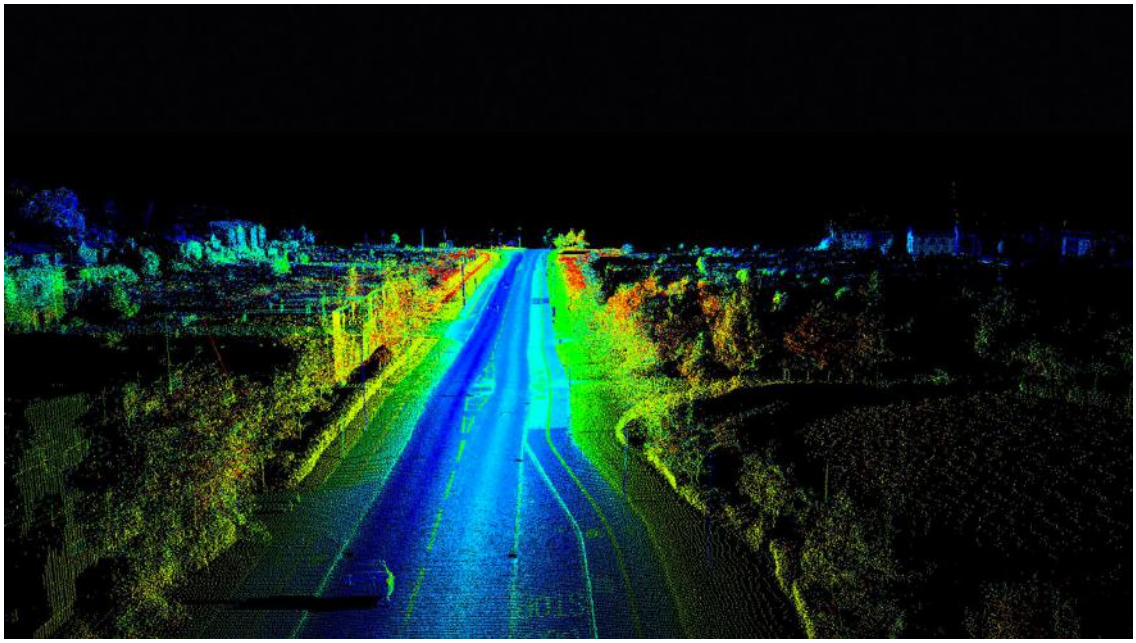
For more information, please visit Special Projects

All images courtesy of Special Projects

News Mobility

What Can Autonomous Vehicles See and Hear?

NEWS MOBILITY



BMW IMAGE

Numerous driver assistance systems aim to relieve the driver's workload, to monitor their state, help them park, or observe the blind spot. Cameras, lidars, and radars detect relevant objects in the environment, outside and inside the vehicle.

In the automotive industry, Ultrasound is widely used as 1D object detection for parking assistance. Ultrasonic sensors are very robust against external influences; darkness or direct light irradiation, dust and dirt are no problem. Barbara Brauner from Toposens, a Munich startup with the world’s first 3D ultrasonic echolocation sensor, says "The sensor is small, light and energy-efficient, does not require a downstream processing unit and provides small amounts of data, since only the position and not the nature of the objects is detected".

Due to their wide range of applications, Camerasystems in automobiles are used for interior monitoring and environment detection. For example, they are used in the automatic high beam function, in DMS or HMI hand gesture control. Especially in object recognition, stereo camera systems have many advantages. And Springer Reference's Handbook of Driver Assistance Systems says increasing computational capacity enables both advances in image processing and the use of greater resolutions of the image sensors, together with higher frame rates; improved sensitivities and other developments in the field of camera sensor technology. But cameras depend on good visibility conditions. Darkness, heavy rain, snow, fog, and dirt hinder their ability to function.

Lidar is an optical measuring method to locate objects in the immediate vicinity and determine their distance, speed and direction of movement. A laser emits light pulses at regular intervals, which are reflected by the objects. The light reflected back from the surface of the object allows conclusions to be drawn about its position and composition. Lidar beams can sometimes be severely attenuated by fog and poor visibility, especially sea spray.

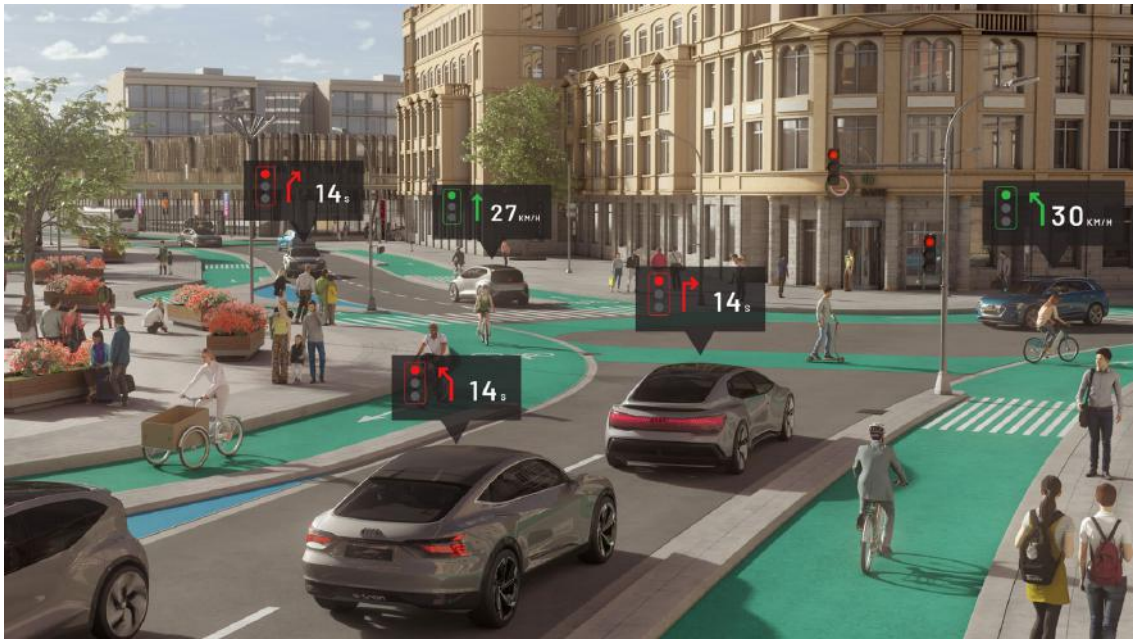
Radar systems cannot detect lane markings, but they also work in very poor visibility conditions. Radar makes it possible to measure distances and speeds. It emits electromagnetic waves that can be used to obtain information about objects. Radar systems work in different distances and are used, for example, to avoid collisions. Radar are also used in vehicle for child presence detection and object detection.

Sensor Fusion, combining data from numerous types of sensors, can help put together a detailed and accurate representation of car's environment; its driver's behavior, and who's doing what inside the car, especially after dark.

Next to the sense of sight, the sense of hearing is the second remote sense that is crucial. Many applications of sonic intelligence technology are conceivable: horns; reversing signals from trucks; tram signals; emergency call functions from outside; recognition of road characteristics; monitoring of vehicle characteristics and voice recognition and control. Machine learning algorithms can be used to assign different sounds to different types of vehicles, bicycles and pedestrians, determine the angle of arrival and estimated distance, and decide whether the road user is moving away or approaching.

Allianz on Autonomous-Drive Insurance

NEWS MOBILITY



AUDI IMAGE

As reported in DVN Interior on 10 March this year, the German federal government created the Autonomous Driving Act, as the first country in the world to do so.

After this important step, one of the most important questions is how to handle insurance coverage for road accidents. Major insurer Allianz has now given an answer to this: No problem, says Allianz board chair Klaus-Peter Röhler. At the ninth Allianz Auto Day at the end of September, he said "We will also offer insurance cover to 'autonomous driving novices' and 'technical supervision' and insure them in the liability insurance".

Since new technology is not without its faults, accidents will continue to occur, especially in mixed traffic with non-autonomous vehicles. The public's trust in autonomous systems is only guaranteed if the causes of accidents and near-misses can be clarified. Röhler emphasized that "it is now important that we find a reasonable solution for Europe that allows us to be able to clarify traffic accidents in an uncomplicated manner in the future as well, in order to compensate traffic victims quickly and not to destroy the public's trust in the new technology".

In future, data from systems such as radar, lidar, and camera recordings would be needed for accident investigation. This would be the only way to record and evaluate accidents or near-accidents involving pedestrians, for example. In anonymized form, this data would also have to be made available to accident research and the automotive industry so that errors can be corrected quickly and systems improved.

The owner of a vehicle could be injured if the self-driving technology has failed. Since the owner cannot make a claim against themself under the current legal situation, they would only be left with a claim under product liability law against the car manufacturer. Allianz believes the vehicle owner must also be legally protected in their vehicle if they did not contribute to the accident through their own fault, for example by disregarding an error message. "We are discussing a product solution for Germany in which the vehicle owner will also be integrated into the protection of the motor vehicle insurance as an exception in the event of an accident caused by the vehicle," said Röhler.

General News

Tesla Spends Most on R&D; Least on Advertising

GENERAL NEWS

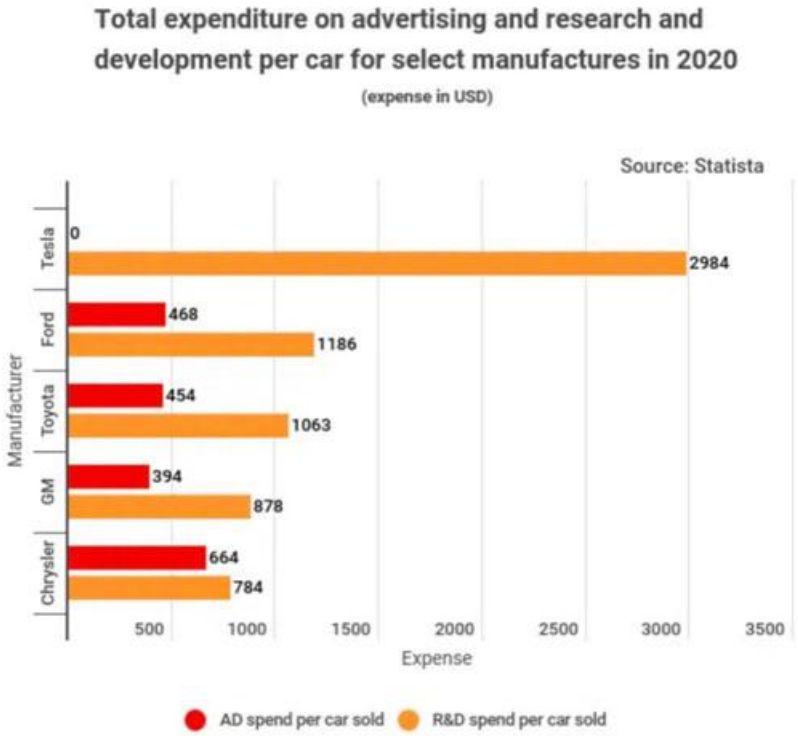
TESLA MODEL Y (TESLA IMAGE)

A new report shows Tesla spends more in R&D per car than any other automaker by a wide margin, and the least on advertising per car sold.

Tesla is now the biggest automaker in the world by market capitalization, despite selling only a fraction of the number of cars that other big automakers are selling. The electric automaker is growing fast, with a capacity to deliver over a million vehicles per year.

Tesla aims to maintain what is perceived as their EV technology lead, and they are investing heavily to do so. A new report from StockApps.com compared R&D spent per car sold from all the biggest automakers and found Tesla to be in the lead. According to these data, Tesla spends about USD $3,000 on R&D per car produced. That's three time the industry average of roughly $1,000 per car and higher than the collective R&D budgets of Ford, GM, and Chrysler per car.

Additionally, Tesla's entire R&D spent goes into improving technology for electric vehicles, with no split for an internal combustion engine business.



Tesla doesn't spend any money on advertising, relying entirely on tweets by notoriously cocksure CEO Elon Musk and an almost cultlike following of owners and cheerleaders. Marketing costs also went down significantly last year after Tesla ended its owner referral program for vehicles.

It seems to be working; delivery timelines for new orders extend into next year for some versions of its vehicles.

Geely Push Hybrid Technology R&D

GENERAL NEWS

ZEEKR 001 INTERIOR (GEELY IMAGE)

Based on the "Smart Geely 2025" plan, the automaker will invest a total of C¥150bn (€21bn) by 2025, and continue as the top brand in China, which means that Geely's average R&D investment in the next four years will reach C¥30bn (€4bn). In fiscal year 2021, Geely achieved revenue of C¥101.6bn, a year-on-year increase of 10.3 per cent; profit attributable to shareholders excluding share-based payment was C¥6.06bn (€860m), a year-on-year increase of 9.4 per cent; profit attributable to shareholders was C¥4.85bn (€700m); net profit was C¥4.35bn (€620m); cashflow reached a record high of C¥28bn (€4bn), a year-on-year increase of 47 per cent.

In 2021, Geely Automobile's cumulative sales volume was 1.328 million units. Although they failed to achieve their annual sales target of 1.53 million units, they still firmly rank as the top-selling passenger car of Chinese auto brands. This year, the Geely Auto brand will launch eight hybrid models, including five "Raytheon Super Electric Hybrid" models and three "Raytheon Oil Hybrid" models. In addition, Geely will release an alcohol-electric hybrid model. Under their Zeekr brand—please don't confuse it with Zika, the similarly-pronounced virus transmitted by mosquitos—there'll be a new luxury smart pure electric MPV. And their Geometry brand will launch a new pure electric SUV as well.