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Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #128

Editorial

HUD As HMI User Extension To Improve Safety

AUDI Q4 E-TRON AR HUD (AUDI IMAGE)

HUDs (head-up display) provide a way to display the status of the most relevant and critical information—speed; critical warnings and indications; navigation prompts, etc—to the driver in their line of sight, to minimize eyes-off-road-time.

The next step is AR-HUDs, enriched with **a**ugmented **r**eality, which stand to greatly increase and diversify the information provided via the HUD. At the same time, there will quickly come to be a critical line between alerting and distracting the driver; between augmenting and obscuring their visual field. When presenting an alert in the HUD, designers will have the challenge of rousing the driver and directing their attention, without startling or distracting them or degrading their situational awareness by occluding their view.

That's the topic of this weel's in-depth piece, and will be an important point of discussion at the upcoming DVN Interior Think Tank seminar in Köln on 28-29 November (if you haven't yet signed up, come and **join in**!).

HUDs started more than 30 years ago. This week's Coffee Corner looks at what is known as the first vehicle integrating this technology, still at that time in its infancy. This glimpse of history helps us to better understand its value.

Great to have you in the DVN community, enjoy reading this newsletter.

Sincerely yours,

Philippe Aumont
General Editor, DVN-Interior

In Depth Interior Technology

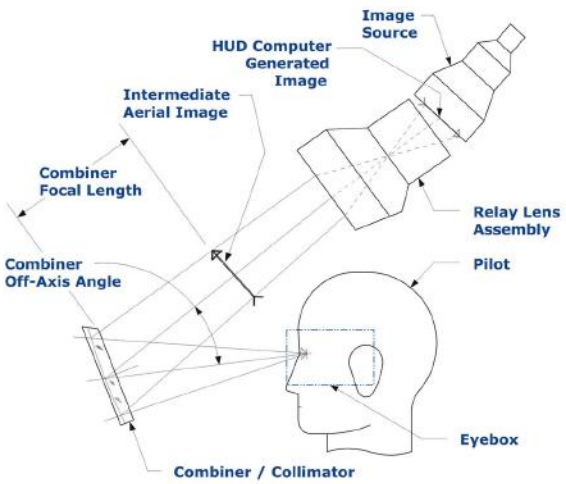
HUD Market Status and Recent Developments

RANGE ROVER EVOQUE (LAND ROVER IMAGE)

The HUD (head-up display) is an interface that relays real time information related to the vehicle; traffic, and associated environment in the driver's field of vision with their eyes kept on the road. The information can be made easy to read with no eye movement or close/far focus adaption, for the display is transparent.

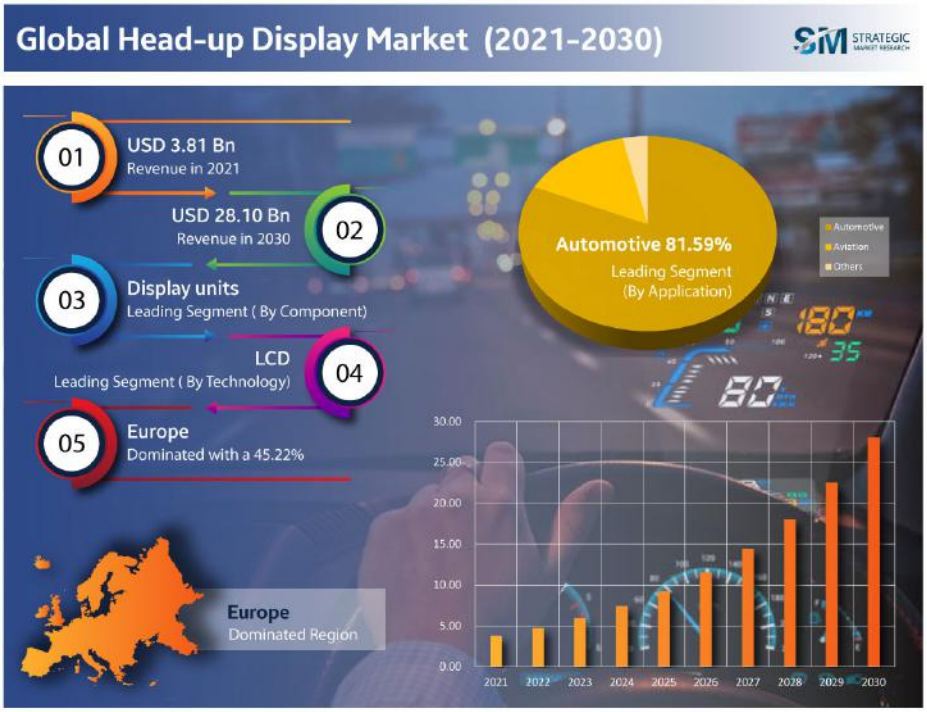
Originally, it was a military technology used to project information regarding fighter planes' speed; altitude; weapons systems; target, and so on in front of the pilot so they wouldn't need to shift their focus to the instrument panel. Since, its first use in World War II by Royal Air Force, HUDs have evolved and proliferated; they are widely used in civil aviation, and have been gradually gaining traction in the automotive realm, starting with the 1988 Oldsmobile Cutlass Supreme.

Early HUDs used a monochrome vacuum fluorescent display that was not customizable. Today's more advanced HUDs often use TFT (thin-film transistor) LCD screens, like those found in some smartphones and flatscreen TVs, with an LED backlight to generate a very bright image.



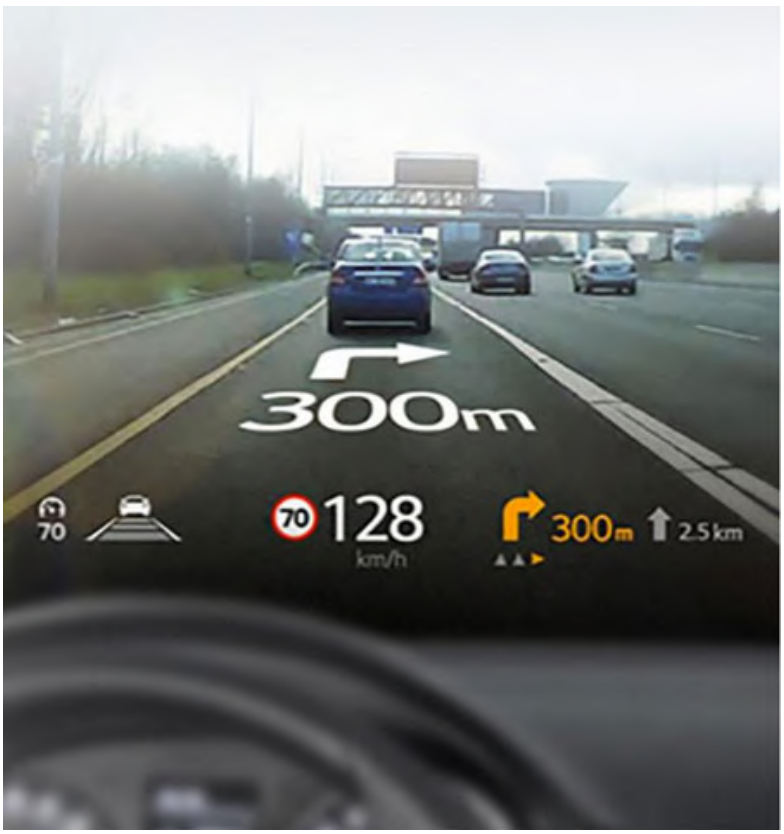
COMBINER HUD (SPIE IMAGE)

HUD systems fall into two main classes: combiner and windshield. A combiner HUD uses a screen to reflect an image to the driver, while a windshield HUD has images projected directly off the windshield. In both types, a virtual image appears beyond the surface of the reflector, helping the eyes maintain focus on both the data and the roadway.



The global HUD market is estimated to reach around USD $8bn in 2022, and $28bn by 2030, growing at a CAGR of 25 per cent over the period 2021 - 2030.

HUD and Safety



LG IMAGE

The HUD is used to improve safety. There were around 43,000 traffic-related fatalities in the U.S. in 2021. Analysis determined that adjustments made during a change in the field of vision—the driver shifting their view from road to instrument panel and back—are when most car accidents happen. Naturally, then, there could

be a big decrease in the likelihood of crashes if the information is displayed such that the driver needn't shift their focus down and up, close and far.

Aside from minimizing the dangerous view-shift, a HUD can place the most crucial information directly in front of the driver while they keep their eyes on the road. Unlike a conventional speedometer, which can shrink to the back of the driver's attention—out of sight, out of mind—a speed display in the HUD can keep the driver more constantly aware of their speed. If a phone gets connected, call information can be diplayed via the HUD, eliminating the urge to look down at the phone (though this doesn't address the cognitive load of conversing with a remote person, which is the primary reason why phoning and driving is dangerous). The driver can also keep track of music and HVAC status on the HUD.

In addition to these moment-by-moment advantages, cumulatively over the course of a longer driving voyage the HUD can decrease driver exhaustion so they can be more alert and less likely to make mistakes.

HUD in current models

MAZDA IMAGE

In order to make HUDs available on popular-price vehicles, one technique—employed by the likes of Hyundai; Kia; Mazda; Ford, and Mini—is to project the information onto a plastic panel that pops up in front of the driver, just above the instrument cluster. The third-generation Mazda 3 was one of the first vehicles to feature this type of HUD, and was quickly followed by the current Mini range. Hyundai's first pop-up HUD arrived on the Kona and Veloster, while Kia recently added it on the Soul. Ford's latest Escape also has this kind of HUD in the higher grades.

Mazda limits the information shown in the HUD to vehicle speed; road speed limit, and navigation directions. Other makers like Mercedes-Benz; BMW; Toyota, and Volvo let the driver customize the information presented, including the color of the speed readout.

HUDs are now available everywhere, even in highly price-sensitive markets; in India, for example, Toyota and Maruti have just launched cars with a HUD.

HYUNDAI SANTA FE (HYUNDAI IMAGE)

Ansys Tools to Simulate HUD Performance

With Ansys OpticStudio and Ansys Speos, optical designers can efficiently design and easily simulate the performance of their HUD system, decreasing the time to market and ensuring that the system performance meets required standards. Understanding of the development process helps to better understand how it works, and what are their key parameters.

ANSYS IMAGE

From Virtual Image to Display

In sequential mode, the parameters for the optical elements; field of view; eye box, and the HUD position can be defined and optical performance can be optimized. The design starts backward in sequential mode. Starting the simulation from the virtual image seen by the driver is convenient. The STOP surface can then be placed at the front of the system where the eye box is located. A rectangular aperture is placed on the STOP surface to describe the constraints on eye position.

From Display to Virtual Image

Next, the system will be reversed in sequential mode. This enables evaluation of the real performance from the display to the virtual image. Afterward, the system will be converted to non-sequential (NSC) mode, where optical components are modeled as true 3D objects. The simulated image seen by the driver can be visualized for the designed HUD system.

Analyze the Performance in Speos

Speos is a tool to analyze the performance of HUDs. Once the system has been designed in OpticStudio, it can be exported to Speos using a STEP file. The system performance can then be computed using the HUD Optical

Analysis (HOA) tool.

HUD Optical Analysis in Speos

HOA enables quantification of the quality of the virtual image of the HUD, in terms of:

- Virtual image distance; look-down angle; look-over angle, and field of view
- Distortion; smile; trapeze; torsion; magnification; rotation; divergence, etc.
- Ghosting
- Field curvature; spot size, and astigmatism
- Specific car manufacturers' optical metrics definition and acceptance criteria when using plug-ins
- Warping data to feed pre-distortion image correction. Warping information can also be imported.

Hyundai Mobis Clusterless HUD

MOBIS IMAGE

Clusterless HUD is a new concept that disperses cluster driving information through HUD and navigation. Hyundai Mobis has completed patent registration in the US; China; Germany, and Korea. This combination of functions of cluster and HUD save interior package, which is crucial in future feature-packed interiors.

Hyundai Mobis says this new display concept is optimized for autonomous driving and EVs. The clusterless HUD minimizes driver distraction by distributing various driving information displayed on the cluster to the HUD in front of the driver and AVNT (Audio Video/Navigation/Telecommunication). The clusterless HUD is characterized by raising essential driving information such as vehicle speed to the driver's eye level.

FOUR DISPLAY AREAS (MOBIS IMAGE)

The clusterless HUD has four display areas, three at the top and one at the bottom. At the top are speed; RPM; ADAS-related information, and navigation information. At the bottom, you can see basic vehicle information such as shift mode; coolant temperature, and driving range. It can also display turn signals and system information warning lights.

The 15" clusterless HUD expands the information display area compared to existing products. It is also characterized by securing mass production by developing a new manufacturing method and optical deposition specification for a combiner mirror that implements the HUD function through the optical glass mounted on the dashboard. In addition, the driver's visibility was secured by designing the frame fixed to the vehicle, inclined toward the driver.

Young-hoon Han, Hyundai-Mobis' head of information displays, says "When the cluster and HUD are combined, it is expected to play a big role in safe driving by helping to secure space and also secure the driver's forward vision through unifying driving information".

Raythink

RAYTHINK HUD AT CES 2021 (RAYTHINK IMAGE)

Last June, Taiwan-based Raythink hauled in USD $15m in series-A+ funding to enable mass production of AR-powered HUDs for the development of vehicle navigation systems. They also announced partnership with a Chinese organization, Chengwei Capital, to accelerate the growth of the AR-HUD market in China.

Raythink provides a software development kit that allows for an AR-HUD system integration that flexibly connect maps and service data, and a user-friendly interface for easy addition of GPS, cameras, sensors,

millimeter-wave radar, lidar and other advanced driver-assistance system (ADAS) sensors. Auto manufacturers need only install it to assure safe navigation, safe driving, and provide the driver with crossroad reminders.

At present, the company has achieved AR HUD in-vehicle assembly based on a real BMW i3 vehicle, with field of view greater than 23° (measured at a distance 90 cm from the windshield) and virtual image distance over 15 meters after continuous road testing for 12 months.

Mercedes MBUX HUD

MERCEDES IMAGE

Mercedes MBUX HUD has been already introduced. However, Mercedes experts keep posting information about its superior performance. The picture here shows the MBUX AR-HUD in the S-Class.

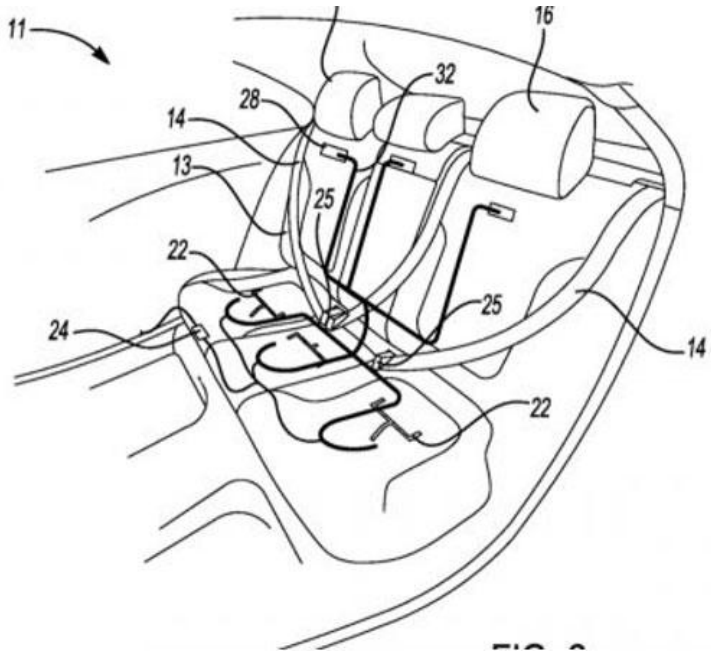
The bar has been raised with precise overlay of the virtual images and the surrounding world in all driving conditions; the general image quality, and how the AR-HUD supports the driver

Next step is really AR-HUDs, which will gradually move from CES fantasy to on-market reality. When integrated well, AR can alert a driver to hazards, to what's happening around the street corner, and inform passengers of last-mile navigation information, providing a unique and powerful tool to enhance the UX and traffic safety. Moreover, as more automated driving develop, HUDs will be a crucial nexus for handoff and takeover warnings.

Interior News

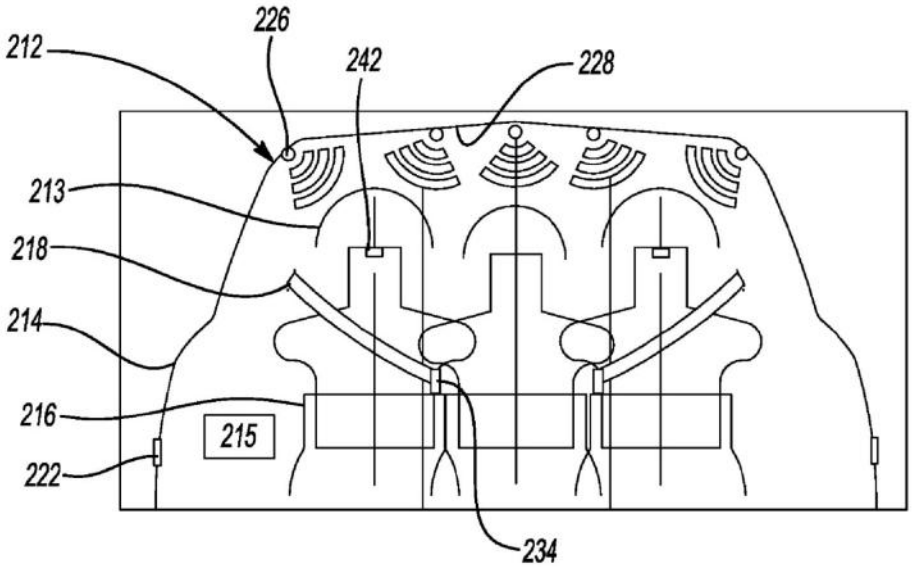
GM Patent For Automatic Head Restraints

INTERIOR NEWS



GM AUTHORITY IMAGES

GM has filed a U.S. patent application for an active head restraint system for vehicles, published on 6 September under application number US 11,433,792 B2.



The application describes a system that can detect when an occupant is seated in the vehicle. The head restraint includes an actuation mechanism that moves the head restraint into an in-use position when the occupant buckles their seatbelt. The system also includes an electronic control module capable of receiving an actuation signal if the headrest is actuated.

The system design is also capable of detecting biometric parameters in the vehicle and actuating the head restraint to an in-use position based on them. The system can detect when an occupant is seated based on pressure exerted on the vehicle seat, or by detecting when the vehicle door opens or closes. The system is also capable of detecting passenger height, and thus determine the optimal position for the head restraint.

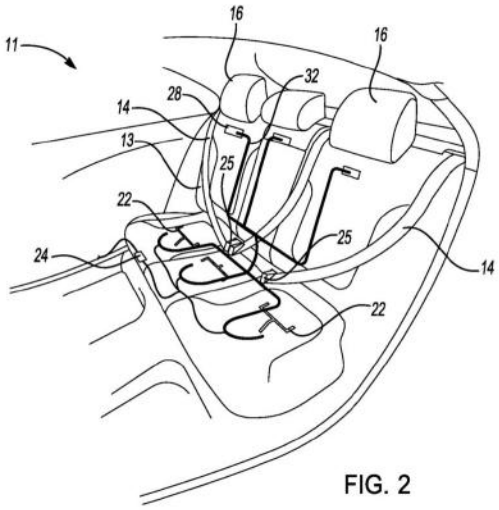


FIG. 2

While this system is obviously capable of enhancing comfort and convenience for passengers, it could also be developed as an active safety feature. Indeed, proper positioning of vehicle head restraints is critical in a collision, as sudden movement can cause passenger whiplash or injury to the cervical vertebrae, especially for rear occupants.

Chiropractic Endorsement for Volvo Seats

INTERIOR NEWS

VOLVO IMAGES

An ACA (American Chiropractic Association) endorsement is given to products of the highest quality after a series of reviews, analysis, testing, and evaluation by a review board of Doctors of Chiropractic, with final approval from ACA's Board of Governors.

Volvo's ergonomically-designed seats have been endorsed by the American Chiropractic Association, the largest professional chiropractic organization in the US. The endorsement was granted for the brand's entire vehicle lineup this past May.

Volvo Cars USA's head of product and technology Jim Nichols says "Seats designed by Volvo Cars ensure drivers and passengers never have to sacrifice comfort, design, or safety when on the road. We're thrilled to be recognized by the American Chiropractic Association with an endorsement that reaffirms our industry-leading approach".

Volvo believes that sitting comfortably helps minimize driver fatigue and maximize the industry-leading safety features found in and around the seats of Volvo vehicles. Integrated into every seat are Volvo safety innovations including the Whiplash Protection System (WHIPS), Side Impact Protection System (SIPS), and Run Off-Road Mitigation which can help reduce the risk of injury in the event of a crash.

Even Volvo's distinct head restraints—which are not height-adjustable—are specially designed to provide increased whiplash protection.

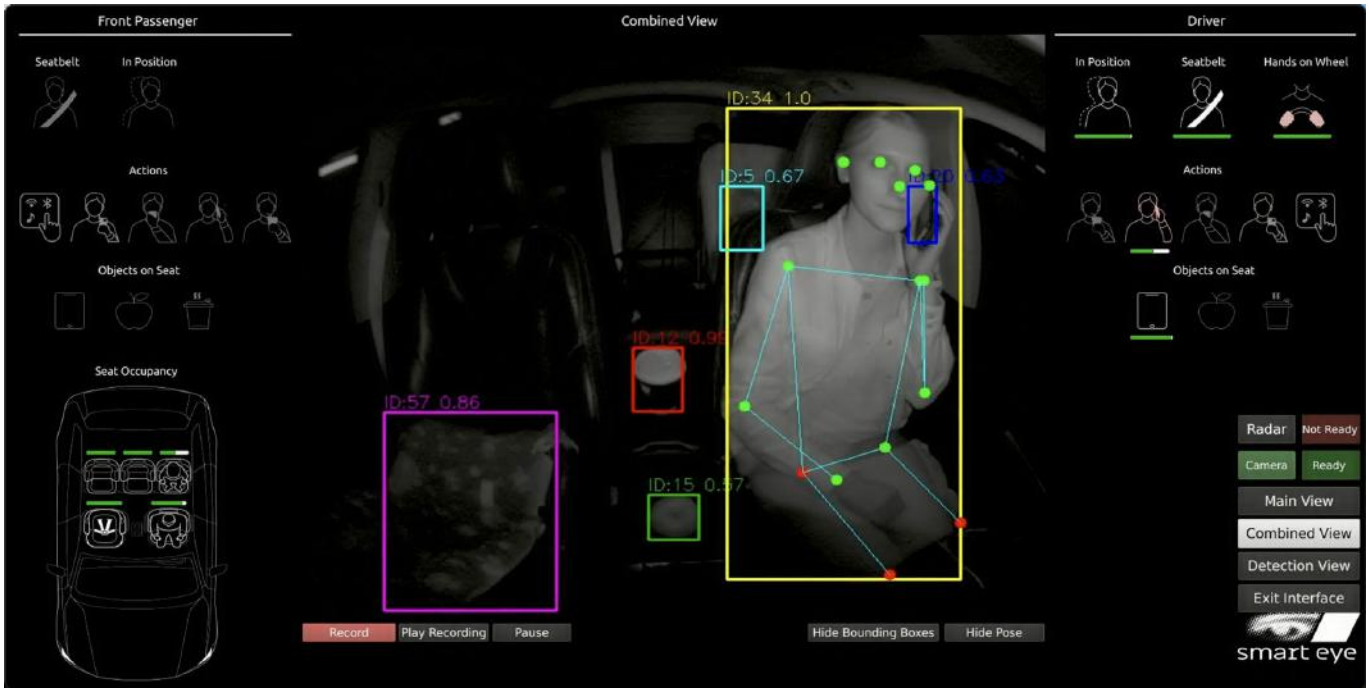
While safety is always a priority, these seats are also designed for luxury and comfort. They include ventilated climate control system and a massage function.

Volvo says their seats are designed with significant input from osteopaths, with the target of avoiding aches and pains after a long journey.

Volvo has also announced that their EVs will be completely leather-free, instead using high-quality and sustainable alternatives. In addition to the currently available tailored wool blend, future Volvo seats will use Nordico, a new material made of textiles from recycled PET bottles; bio-attributed material from sustainable forests in Sweden and Finland, and corks recycled from the wine industry.

Smart Eye and Omnivision's New DMS

INTERIOR NEWS



SMART EYE'S INTERIOR SENSING SYSTEM (OMNIVISION IMAGE)

Interior sensing AI and Driver Monitoring System (DMS) software producer Smart Eye, from Sweden, and Omnivision, a California-based developer of advanced digital imaging, analog and touch & display solutions, including semiconductor, have announced their jointly-developed solution for accurate automotive interior sensing.

The system uses Smart Eye's algorithms for interior sensing AI and Omnivision's RGB-IR BSI global shutter sensor for in-cabin and occupant monitoring systems to deliver automakers with interior sensing functions. The solution is fully compliant with General Safety Regulations (GSR) and Euro New Car Assessment Program (NCAP) requirements.

The GS sensor from Omnivision is said to benefit from the smallest 2.2-micron pixel and highest 940nm near-infrared (NIR) sensitivity in its class. The company's solution enables single-LED designs, as opposed to two to four LEDs. This reduces power consumption; size, and cost. Glow is minimized thanks to the company's Nyxel NIR technology. The technology uses novel silicon semiconductor architectures and processes to achieve the world's highest quantum efficiency for DMS: 36 per cent at the invisible 940nm NIR light wavelength. This helps to deliver the clearest driver images for use by AI software algorithms. Small pixels and a-CSP package further reduce camera module size.

Smart Eye DMS provides complete driver and cabin monitoring, tracking eye gaze, body key points, activities and objects in a vehicle, seat occupancy and more.

Smart Eye's automotive VP Detlef Wilke says "Interior sensing requires sensors that offer high-end performance in complex environments. As the next generation of cars are brought to higher levels of autonomy, the innovative interior sensing capabilities enabled by these advanced technologies will be in high demand from [automakers]. This longstanding partnership with Omnivision positions us to meet the needs of the industry both today, and in the future."

And Omnivision's automotive marketing director Andy Hanvey, director of automotive marketing at Omnivision, said: "The next-generation pixel meets these requirements and only requires one LED. When combined with Smart Eye's cutting-edge algorithm, this is a compelling solution".

IIHS: Drivers Want Monitoring Tech with Automated Systems

INTERIOR NEWS

BMW IMAGE

The Insurance Institute for Highway Safety asked more than 1,000 American drivers for feedback on three partial automated systems: lane centering; automated lane changing, and driver monitoring. The results of the survey reveal more drivers would prefer hands-on versions of the safety features their vehicles are equipped with. For example, some lane-centering and lane changing systems don't require input from the driver but those generally find less support in the survey. IIHS also says drivers generally prefer driver-initiated systems over vehicle-initiated ones.

The majority of drivers said they would feel more comfortable with driver-monitoring systems. These include, for example, sensors on the steering wheel and a camera aimed at the driver's face tracking the direction they are looking, to help ensure the drivers remain ready to intervene if something goes wrong. In general, more than half of the surveyed consumers said they would at least consider buying a vehicle with some sort of automated semi-autonomous functions.

Automotive Cloud for VW Software in 2025

INTERIOR NEWS

VW IMAGE

By 2025, the Volkswagen Group wants to have completed a uniform, Internet-based software platform for equipping almost all Group cars with newly developed apps - and thus also anchor more wireless updates in the coming car generations. The target date for the "Automotive Cloud" (VW.AC), which will then be as fully developed as possible, is thus shortly before the planned launch of the future core model Trinity. This is intended to extend the modular logic from the powertrain to the entire vehicle IT.

Cariad manager Thomas Bierwirth says "From the middle of the decade, we want to connect all group cars; the digital services should be available to our customers at least 99 per cent of the time".

Costs and complexity could be reduced with standardization. The aim is to further shorten delivery times. For many new models, these are now twelve weeks instead of up to one and a half years, as was previously the case.

Bierwirth cited air conditioning via smartphone app as an example. "One question that arises when the car is in sleep mode is, for example: How do I wake it up? In what way does the system ramp up certain components of the air conditioning system - depending on the battery's state of charge?" Something like this, he says, requires precise coordination between IT development and actual implementation in the car. Another case, he says, is security aspects of personal access to the vehicle.

Basically, he says, the uniform cloud for all models is about providing developers with tools so that apps can access functions in the car simply and easily. "Until now, a lot of in-depth knowledge about the specific systems of each vehicle platform has been required on the developer side," Bierwirth explained. "With the cloud platform, these processes can be simplified and new functional offerings are possible more quickly."

The transfer of different profiles, implementation of regional preferences and observance of regional legal rules can also be done better this way, he said. For example, "remote start" functions - starting the car's engine via app - are particularly in demand in the United States. Authorities in Europe do not allow this. In Asia, on the other hand, VW had problems meeting the wishes of some consumers for unusual functions such as a "karaoke app".

Volkswagen Buzz and Cargo EV Interiors Revealed

INTERIOR NEWS

VW IMAGE

Volkswagen has unveiled the interiors of both the ID.Buzz multi-purpose vehicle and the ID.Buzz Cargo vans

For drivers of the ID.Buzz, a freestanding 13-cm ID-Cockpit displays all relevant information, while the Ready 2 Discover infotainment system with a 25-cm touchscreen is located in the center of the dashboard. Depending on the version selected, App-Connect including App-Connect Wireless for smartphone integration and digital radio is standard.

The ID. Buzz benefits from an Online Connectivity Unit with SIM card to enable access to online services and We Connect and We Connect Plus vehicle functions. Volkswagen says owners will be able to purchase and download additional apps and services through the infotainment system's in-car store. It will also be possible to use the Apple Music and Spotify streaming services via the infotainment system with or without a connected smartphone. Both vehicles will leave the factory with software version 3.2—the latest version so far—which can be updated over the air.

The ID.Buzz features separate driver and front passenger seats equipped with adjustable interior armrests, while top trim versions have the option of an exterior armrest in addition to power adjustment and memory and massage functions. The rear seats are a 40:60 split triple bench with folding backrests. It is also possible to slide the two sections of the bench seat lengthwise by 14 cm to create additional space.

The five-seater is equipped with up to eight USB-C ports, the ID. Buzz Cargo has up to five. All USB-C ports (except the 15-W port in the rear-view mirror bracket) use USB Power Delivery charging to deliver up to 45 W. An additional option is a 230-volt outlet for larger electrical appliances, located in the passenger seat frame. The 230V outlet can be used even when the vehicle engine is off.

The ID.Buzz also comes with the interactive ID. Light, a narrow, luminous strip that runs across the windshield in the driver's field of vision. The light provides the driver with intuitive information. Depending on the color, a signal to the right of the light strip indicates obstacles to the right in front of the vehicle, or when the light is all red, it means "Brake Caution."

The ID.Buzz comes standard with 10-color ambient lighting; Volkswagen Commercial Vehicles also offers a 30-color version. Illuminated areas include the light strip in the instrument panel and the decorative trim and shelves in the doors.

Both versions also use a range of innovative materials and processes to ensure that leather is not used anywhere inside their respective vehicles. The steering wheel rim is now made of a plastic that looks and feels like leather. It's also used for the ID's seat covers, floor coverings and headliner. One of the fabrics is made of so-called Seaqual yarn, made of fibers consisting of 10 per cent marine plastic and 90 per cent recycled PET bottles.

The Design Lounge

Ferrari Purosangue SUV Design "E Fascino"

THE DESIGN LOUNGE

YAHOO IMAGES

Ferrari's first SUV (though Ferrari refuses to call it one) uses a combustion engine.

Ferrari design chief Flavio Manzoni's team has disguised the car's size and height. And even if format is unfamiliar, it's unmistakably a Ferrari. "We don't use the family feeling strategy on our cars," says Manzoni, "but there are some design elements that are part of the Ferrari language, a kind of vocabulary that we use."

Interior volume is maximized thanks to relatively short overhangs, as is ease of entry due to suicide rear doors that open out to 79°, via a power-actuated mechanism. The easy access is important, especially since there's not a whole lot of legroom for the two rear occupants. However, there's headroom that helps make the interior feel more vertically airy and spacious.

The redesigned steering wheel includes all the touch controls for the "hands on the wheel, eyes on the road" philosophy seen on previous Ferrari's. Ahead of the front seat passenger is a 10.2" screen that can display most of the same data the driver sees, should they want it, along with all the infotainment menus.

The cabin is a combination of high-tech and modern, with individual rear bucket seats that looks like front seats. The leather seats have an upscale feel, reinforced by Alcantara carpet trim. Symmetry is apparent everywhere in the interior, with a dashboard that sculpts its form around the driver's digital instrument cluster and a passenger screen that's larger than those in Ferrari's sports cars.

There are power-operated rear frameless doors. The rear seats look attractive and comfortable, and allow for a compact 480-liter trunk; these rear seats fold down for added storage. Between the rear seats is a flip-up leather cover for two cupholders; it also includes a small multimedia control dial and numerous shallow storage compartments.

Trim options include a new dark brown semi-aniline leather for the seats; carbon fiber with fine copper wire threads woven in, and floor covering made from a bulletproof ballistic fabric used in military uniforms. Ferrari says 85 per cent of the trim on the demo-car has been sustainably produced. This includes recycled polyester for the headliner; carpet made from recycled fishing nets, and a special version of Alcantara also made from recycled polyester.

Price for all this? Around USD $400,000.

Parallax

THE DESIGN LOUNGE

COFFEE CORNER
DVN
Interior

GYROSCOPIC GUNSIGHT IN SUPERMARINE SPITFIRE (WIKIPEDIA IMAGE)

(With a rangefinder camera), what you see in the viewfinder won't be quite what you get in the photograph. It's because of parallax, the effect where the location of an object appears to diverge when viewed from unrelated positions along two different lines of sight. Many animals, alongside with humans, that have two eyes with intersecting visual fields, use parallax to gain perception of depth. The principal of stereoscopic vision references an aptitude of the visual brain to register a sense of three-dimensional space from dissimilar optical inputs.

From a passenger's point of view, an analog (needle) speedometer might appear to display a slightly different speed than when looked straightforward from a driver's perspective. This is a result of the view angle in combination with needle displacement over the numerical dial plane, eventually amplified by their form. Items that are closer, due to foreshortening, demonstrate a wider parallax than others situated further away, consequently parallax may well define distance.

In a completely different chronicle, WWII night fighter pilots were having great difficulties to synchronize with radar operator's vocal instructions while they moved towards their targets. The Royal Air Force experimented several solutions and possible layouts in order to reduce reaction time during the operation. A second radar display was finally added in front of the pilot. During night missions though, the contrast of the bright radar screen was blinding the pilots and made almost impossible to locate the target in the dark sky. By October 1942 they had successfully combined the radar image with a projection from their standard instrument panel. This layout gave birth to an artificial horizon that facilitated furthermore head-up flying. The use of HUDs extended beyond military applications and in the 1970s was introduced to commercial aviation, while in late 80s in the automobile. In 1988, the Oldsmobile Cutlass Supreme became the first production car with a head-up display.

The HUD is a great intellectual synthesis making the sum total of available technologies into this one intricate object that can do so many things. It could certainly be replaced by a whole range of single instruments as speedometer, GPS, touch screen, projector, that each individually could perform one of its functions but none could accomplish all-in-one, with eyes on the road and hands on the wheel!

News Mobility

GM Doubles Super Cruise Road Network

NEWS MOBILITY

GM IMAGE

General Motors' Super Cruise hands-free driver assistance technology will be expanded to enable hands-free driving on a wider range of roads in the U.S. and Canada. The enhancement will be made available free of charge via OTA update in late 2022 for all new GM vehicles built on the company's VIP electric architecture with Super Cruise.

Currently, the ADAS system works on mapped highways. After the upgrade, Super Cruise will be able to operate on additional state and federal highways, which are a combination of undivided and divided highways.

When turned on, Super Cruise uses precise lidar mapping data, real-time cameras, radar and GPS to ensure that the vehicle navigates safely and hands-free in the selected lane. A combination of all the above systems—sensor fusion—keeps the vehicle centered in its lane.

The intelligent solution can also accelerate or brake to maintain a selected following distance. It can steer to maintain lane position, and on some models, the system can make driver- and system-initiated lane changes when passing slower-moving traffic or to change from a lane that may end. Super Cruise also tracks the driver's head position and eyes in relation to the road to monitor attention.

Routes that can be driven hands-free after the update include Route 66; the Pacific Coast Highway, and Trans-Canada Highway.

Mario Maiorana, GM's chief Super Cruise engineer, says "We're adding Super Cruise to more vehicles than ever before and on more roads so more customers can experience it".

China Makes Greater Use of 4D Radar

NEWS MOBILITY

NXP IMAGE

There's new trend in automated driving in China: the move from 3D to 4D millimeter-wave radar. The first car models equipped with it are just coming onto the market, international suppliers are in a race to mass produce it, and at least 20 Chinese manufacturers are also already developing their own products.

Because of the rapid iteration of technological routes in the Chinese auto industry, it would be risky to proclaim 4D millimeter shafts definitively as the next big thing. But a lot is currently suggesting that the new devices will occupy an important place in the future hardware equipment of cars.

Bot 3D and the new 4D radars provide data for distance; speed, and azimuth. The fourth, newly added dimension is the height of the detected objects. At the same time, the precision of the overall environment perception can be increased, and the devices cost about one tenth of what a lidar costs.

Changan Auto recently unveiled their first model with 4D millimeter wave radar, the Deep Blue SL03. The radar comes from one of the busiest Chinese suppliers in this segment, WHST (Wuhu SensorTech Intelligent Technology). The official launch of SAIC's Rising Auto R7 model is expected before the end of this month; it will be equipped with a 4D radar from German manufacturer ZF.

With better sensor technology and increased computing power gradually overcoming the previous hurdles in the use of these technically demanding systems, more and more manufacturers are now betting on the 4D millimeter waves. The new trend could help automated driving become established in China even faster than previously expected. For drivers, the new devices increase safety. Existing problems in the detection of static objects can be solved by the height measurement, and the detection of road signs, manhole covers or overpasses can be improved.

Unlike lidar, 4D millimeter-wave radar works reliably even in snowfall and heavy rain, detecting pedestrians or bridge abutments that are still several hundred meters away and giving driving computers more reaction time. For the industry, the significantly lower production costs compared to lidar are also very attractive.

General News

Dr. Schneider Files for Insolvency

GENERAL NEWS

DR. SCHNEIDER GROUP HQ (DR. SCHNEIDER IMAGE)

Dr. Schneider has filed for insolvency. The supplier from Kronach in Bavaria has run out of financial resources despite an ongoing restructuring plan. According to the company, the order situation is said to be good, but the Covid 19 pandemic has caused financial difficulties.

Supply bottlenecks for certain components and the resulting highly fluctuating call-offs would have led to significant sales losses: minus 13 per cent from 2019 to 2021. In addition, higher raw material and energy prices are squeezing margins.

Production is to be maintained in full, the company says. The insolvency affects around 2,000 employees in Germany. The independent companies in China, Poland, Spain and the USA are not part of the insolvency proceedings, according to a statement.

According to insolvency administrator Joachim Exner, depending on the economic situation of the supplier, it is conceivable that new investors will be found or an insolvency plan will be drawn up. In the latter case, creditors would have to agree to a settlement.

"In principle, I see good chances for a turnaround," says Exner, referring to Dr. Schneider's portfolio and customer relationships. The company specializes in products for vehicle interiors. These include ventilation systems, decorative trim, storage systems and center consoles, for example.

Since the beginning of the year, structures at Dr. Schneider have been undergoing major restructuring. With a restructuring plan, the management wants to simplify processes and build a leaner organization. In addition, less capital is to be tied up in the company's own value chain. Additional staff cuts will be made, with the supplier relying on offers of voluntary redundancy: Severance pay and early retirement.

It is also reported that the company needs to invest more in the regions of North America and China. To do this, the supplier now needs an investor. The business cannot be expanded on its own. With a total of 4,000 employees, Dr. Schneider generated sales of €450m in 2021.

Magna Enters Micro Mobility Space, Invests in Yulu

GENERAL NEWS

MAGNA EVP MATTEO DEL SORBO (L), YULU CEO AMIT GUPTA (R)

Yulu Energy, headquartered in Bengaluru, has about 200 employees.

Auto component and system supplier Magna is headquartered in Ontario, Canada. They make seats; lighting; sensor-based systems like DMS and ADAS, and even complete vehicles. Now they're entering the micromobility market with a USD $77m investment in Yulu, a shared electric moped operator based in Bengaluru, India, with plans to jointly launch a battery-swap service company.

Magna's investment is part of Yulu's $83m Series B funding round, in which Bajaj Auto also participated. Along with the funding, Magna will hold a seat on Yulu's board of directors. Yulu's latest round will help the company expand to an additional 15 cities in the next 18 months, and potentially beyond India in the future, according to Magna.

"Micromobility presents a great opportunity for additional growth for Magna, and joining forces with Yulu helps us expand our business into this rapidly growing sector," said Matteo Del Sorbo, Magna's executive vice president and global lead for Magna new mobility, in a statement.

Earlier this year, Magna acquired the technology; IP, and assets of Optimus Ride, an autonomous shuttle company, to further expand its ADAS offerings.

The new battery swapping entity is currently registered as Yulu Energy, and has 200 employees. It will be Yulu's exclusive battery swapping partner and will build up the infrastructure required for millions of swaps per week.

Magna says they intend to leverage Yulu's strong market position and network in India to grow Yulu Energy, which the company describes as a Battery-as-a-Service (BaaS) company. The company says Yulu Energy will

be similar to Taiwan's Gogoro, which operates a growing battery swapping network to service private consumers with their own electric two-wheelers.

Yulu Energy aims to eventually serve both consumer and fleet markets, but will start with delivery fleets using Yulu's MaaS operations, which include about 10,000 electric two-wheelers throughout Bangalore, Delhi and Mumbai.