Thu, 30 March 2023
Weekly Newsletter

DVN-I
Automotive Interior

NEWSLETTER #154

Editorial

In-Cabin Sensing For Safer, More Functional Interior

This week's in-depth article summarizes the In-Cabin conference held two weeks ago in Phoenix, Arizona, including a panel session moderated by DVN. It was all about in-cabin sensing, with electronics, software, sensors, AI, optics, FoV (Field-of-View), cameras, radars, and fusion of information for reliability.

The first step, as regulation confirms, is to have reliable DMS—a technology still finding its technical footing, as there are differing opinions on the best way to detect drowsiness and false positive would have a terrible effect on market uptake.

Next steps for car interior sensing technologies are to merge DMS and OMS (occupant monitoring), and to move beyond driver monitoring for HMI; health/wellness; comfort, and personalization, leveraging the sensors already in the vehicle for safety, audio, microphones, pressure sensors and HMI. Synergy could come either way (or both): from DMS to comfort, or existing sensors to DMS. The fewer sensors there are, the easier to integrate and more reliable!

If DMS/OMS is mandated by regulation, any automaker would have to select a technology; implement it, and take the burden, but the real value with an income stream will arrive only with the additional features and services that automakers could provide to mobility consumers.

The 2023 DVN Interior Workshop is now just four weeks away, on 25-26 April in Köln, including sessions on HMI/smart surfaces; interior lighting, and DMS, the ingredients for a safe car interior. **Register here**.

Looking forward to meeting you there!

Philippe Aumont
General Editor, DVN-Interior

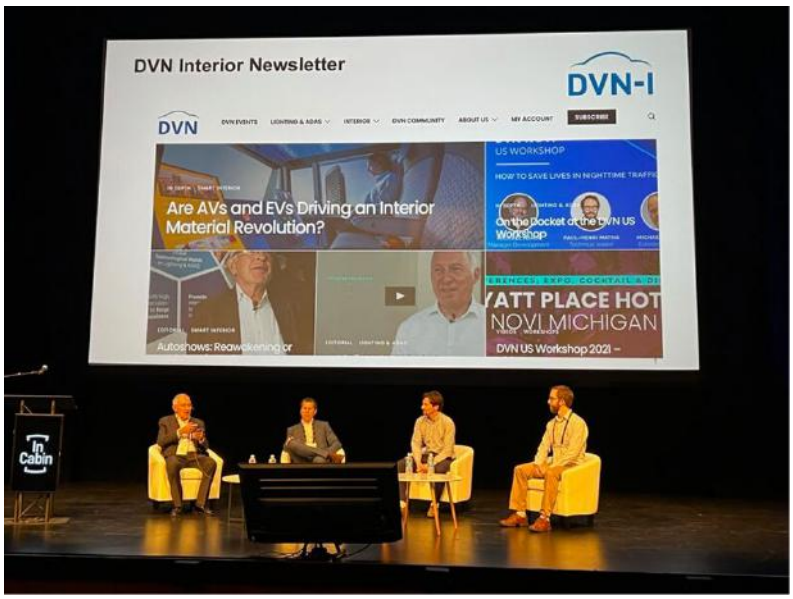
In Depth Interior Technology

InCabin Conference

DVN IMAGE

The automotive cabin interior has become the focus for automotive safety, new technology and innovation. The InCabin conference, organized by Sense Media in Phoenix, Arizona, explored new upcoming technologies and regulations and how monitoring can be used for safety, health, and drowsiness monitoring, within the latest HMI trends and technologies for the cockpit. DVN Interior attended and had the privilege to moderate a panel session about Interior lighting and the role it plays in safety, comfort, and personalization.

Interior Lighting Panel Session

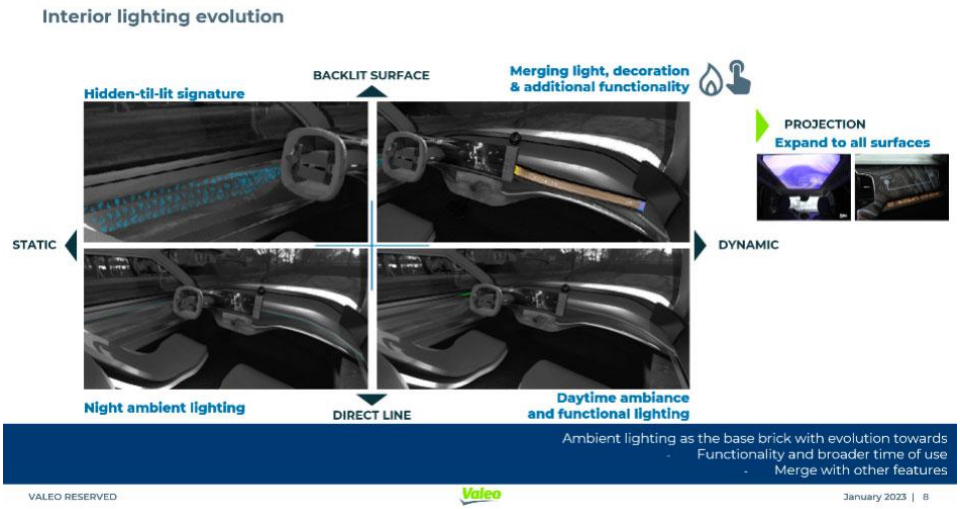


(R-L): R. WINCZEWSKI/VARROC LIGHTING, H. PICCIN/FORVIA, F. PARDO-SAGUIER/VALEO, P. AUMONT/DVN · (DVN IMAGE)

Interior lighting plays a key role for safety. Panelists in this discussion were Hugo Piccin, Forvia's technology leader of premium interior trims; Federico Pardo-Saguier, Valeo's innovation and business development director; and Ryan Winczewski, from Varroc Lighting Systems.

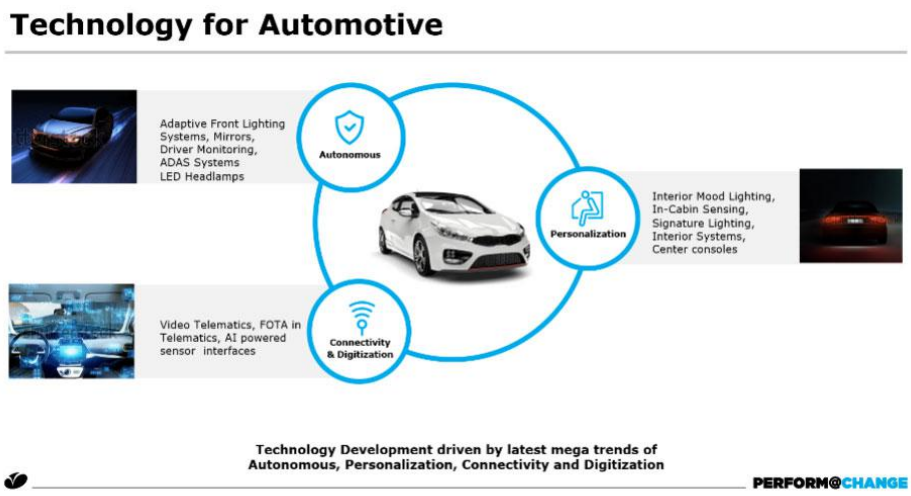
FORVIA IMAGE

Forvia Faurecia's expertise enables freedom to design, with upgradeability, support for different variants through the same tools, while adding innovational functionality and sustainability with slim packaging. Light is a signature, it can be contour light, surface backlighting, projection, magnified surfaces, holography.



VALEO IMAGE

Valeo's lighting portfolio goes from ambient, to function, up to immersive experience. Ambient lighting creates an atmosphere using architectural light, combination of light and decoration, dynamic lighting with smart LEDs for animation, and immersive merging all functions in one feature targeting a minimum look with high content. Then, surfaces come to life through projection. For a complete cockpit experience, interior lighting is one competence/technology with HMI, passenger monitoring, thermal comfort, to create a global experience.



VARROC IMAGE

Varroc entered a new growth phase after a strategic shift and divestment (partial takeover/Plastic Omnium) to become a global solutions and service provider for driver and cabin monitoring; ADAS, and connectivity with new electronics and software product lines and services, overall sensing for safer roads.

The panel discussion approached the following topics, starting as interior lighting has evolved from task lighting to advanced devices linked together as a system to provide comfort; design; safety. This new perspective is covered by the three companies on the panel.

Combining surface materials and lighting, to be staged as such, then adding sensors to create functional surfaces, can become a real new opportunity for HMI. Light-just-when-needed is a trend, to minimize driver workload and distraction.

Interior lighting is an important dimension of the user experience, and it plays also a role in safety, supporting the driver to remain vigilant.

Immersive lighting, within a more immersive experience, is another functional layer for to foster safety and comfort. Dynamic lighting is also a way to dynamize the attention of the driver. It can also give feedback to visually confirm an action, as a kind of haptic feedback

Lighting and sustainability are not contradictory, as LEDs have limited energy consumption (though of course it adds up when many LEDs are used!); the challenge is more on smart design to remain able to disassemble properly at vehicle end-of-life.

Finally, if light has gained traction into automotive cabin projects, the integration challenge, including costs, remains a high hurdle that any project must pass to keep content along the development timing.

Lectures and Exhibitions

Here's a summary of most of the presentations. Watch this space over the coming weeks for detailed coverage of innovations and their makers deserving of a more in-depth introduction to the DVN Interior community.

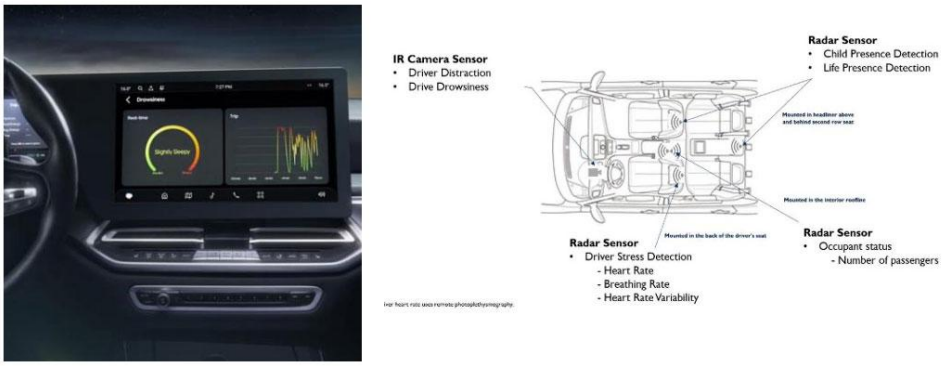
Market: Tech Insights

Mark Fitzgerald, TechInsights' Autonomoous Vehicle Service Director, showed forecasts Of a $60bn ADAS market by 2029, including $10bn for driver monitoring. Their CES report listed DMS/OMS companies including ADI; Ambarella; Aptiv; Cipia; Continental; Forvia; Gentex; Harman; Magna; Mitsubishi Electric; Omnivision; Onsemi; Seeing Machines; Thundersoft; Valeo, and Xperi. In-cabin radar solutions come from Asahi Kasai; Bosch; Harman; Infineon; Murata; Garmin; NXP, and Vayyar.

Fitzgerald said he sees the market following three generations: First solutions on dedicared hardware with 2D monocular cameras based at ~$20; second solutions effectively software-based, and a third generation transitioning from DMS to multi-seat ODS for robotaxi applications.

He said every automaker and system provider is asking for emotion analysis, but none seems to know what they want to do with it!

Harman



HARMAN IMAGES

Harman's chief ADAS/AD technology and innovation expert, Dr. Peter Amthor,explored the road ahead, as he sees it, with respect to building an immersive car and delivering personalized experiences with machine learning and sensor technologies.

Solutions must be flexible enough to adjust to individual consumer preferences while still being safe and effective, even if two drivers or journeys are alike.

Harman's Ready Care technology combines intelligent machine learning algorithms and selected in-vehicle sensors to detect a driver's personal state and propose a customized in-cabin response to mitigate safety risks and increase wellbeing. The scope includes driver distraction and drowsiness; child presence detection; vital-signs sensing, and 'stress-free routine'.

Ready Care measures real-time cognitive load via newly developed machine leaning algorithms to identify when potential distractions arise, and then offers tailored intervention strategies to bring drivers back to a more optimal awareness state. Closed-loop interventions delivered via an SDK allow for the integration of any vehicle feature or function into the Ready Care solution—including Gentherm's thermal management technologies, which will enhance future driver alertness and wellbeing features.

Panel Discussion 2

DVN IMAGE

The topic was, What's next for in-cabin? Future outlooks for technology, industry, regulation; how is the industry changing and how can we prepare for this? Are further industry collaborations the way forward?

The panel was moderated by Junko Yoshida, cofounder and chief editor of the Ojo-Yoshida Report. Panellists included Nandita Mangal, Aptiv's HMI-Vehicle Experience Platform Owner; Allen Lin, GM Driver Monitoring, Night Vision, and Interior Camera technical specialist, and Caroline Chung, Engineering Manager at Veoneer (acquired recently by Magna).

The industry will have to come together as a whole and drive DMS for the technology to make it to production in a near-term timeline. Research funding and grants; regulatory requirements; industry partnerships; various consortium workgroups, and automaker input and support are all critical.

It always takes a considerable amount of time for an update in regulations, so automakers and regulators should be prepared for candid discussions on how to allow for technology deployment before the regulations can catch up. They see a significant need for collaboration on this front, through upfront technology and roadmap mutual sharing, development discussions and demos, and finally either swift regulatory updates or production allowances.

IAV

IAV IMAGE

IAV vehicle safety development engineer Patrick Laufer gave a lecture on body height and weight estimation of vehicle occupants. IAV is a Berlin, Germany-based engineering services company.

In order to minimize the injury of occupants during a crash, an intelligent adaptive occupant restraint system can use the information about body height and weight of each occupant to improve the safety of each one individually. Both information can be obtained with an interior camera that is normally used for driver monitoring tasks. The presented method makes a first height prediction based on the vehicle's occupant face only and fuse its result with further body height-related features. Subsequently, the weight estimation approach uses the height prediction and fuse this result with further body weight related features. This method embraces the utilization of convolution neural networks and a machine learning-based regression.

Mono camera-based height and weight estimation replaces costly camera and weight sensors to adapt airbag deployment according to the occupant to be protected.

Sony Deepsensing Solutions

SONY IMAGE

Jan-Martin Juptner, Business Development Manager Automotive at Sony Depthsensing Solutions, gave a lecture titled Reliable In-Cabin Awareness for Occupant Safety Via Multi-Sensor Fusion. His company is developing a next generation of smart 3D-driven applications, building on Sony's many breakthroughs in semiconductor and digital imaging technologies.

Current 2D IR DMS systems and upcoming next generation 2D RGB/ IR OMS systems (≈2026) are expected to rely fully on 2D information. Sony believes that in the future, advanced occupant state, posture and context awareness will be needed to achieve a safer in-cabin for all occupants. Therefore, several sensors need to be fused, to not only cover the monitoring of the driver, but understanding the activity and behavioral context for the driver and all passengers. With this understanding the active safety systems step up in performance and passive safety systems can be optimally supported, such as active restraint systems for FMVSS 208 compliance, or even whiplash protection.

Sony is leveraging SoftKinetic, acquired in 2015 for their gesture recognition software platform. Sony described the necessity of sensor fusion, confirms the statement by research and shows ways how to enable safe in-cabins

Novelic

NOVELIC SYSTEM IN A RIVIAN TEST VEHICLE (DVN IMAGE)

Novelic is a self-sustaining provider of mm-wave radar sensors, perception solutions, and full-stack embedded systems. They have a large portfolio of mmWave radar sensors and IPs that enable to develop custom products for automotive, autonomous driving, robotics, and IoT systems.

DTS/Xperi

SENSE MEDIA IMAGE

DTS/Xperi delivers user experience through sound; sight, and sensing. Experience happens in the vehicle, the 'third space' after home and work, from safety to in-cabin UX and infotainment. It includes HD Radio, DTD Connected Radio and FotoNation, their DMS.

Adrian Capata, DTS/Xperi's in-cabin sensing lead, went through his presentation from basic to advanced, from driver to occupant, from safety to UX. In short: three lanes of changes: sensing, algorithms, UX. Sensing is multiple, and reliability comes from sensor fusion, maintaining privacy, going beyond DMS, up to health and wellbeing. Next concept is the 'augmented cabin': simplifying complexity, hiding technology and empowering the user.

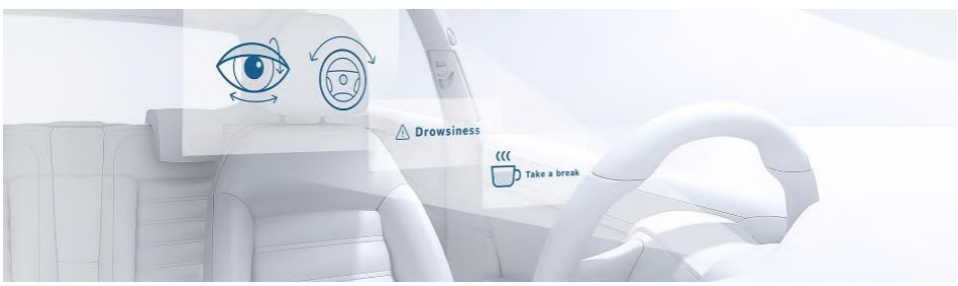
Capata's presentation was completed by an amazing parallel perspective by Greg Plageman, Hollywood serial producer (The Peripherical), where you have to imaging a space, and make it tangible (car interior, or TV show!). And the story of the car cabin as the third space is kind of becoming a movie studio, based on imagination and technology, with devices, in a context.

Hyundai

HYUNDAI HCD-11 NUVIS CONCEPT 2019 (HYUNDAI IMAGE)

HMI will also be an important factor in ensuring that these systems can optimize in-cabin safety and one key question and challenge of today is how to re-engage a driver when they are noticeably distracted. Dave Mitropoulos-Rundus, a senior engineer at the Hyundai America Technical Center, described active ongoing research to understand the most effective way to reorient a driver's attention. The question is to understand if a driver can manage multiple tasks. **The answer is no!** People cannot do more than one thing at once; there is nothing such as 'multitasking'. We can rapidly switch attention, but at a cost, with slower performance and decreased accuracy. What people are doing is divided in different modalities: audio and visual. Cabin designers must add modalities beyond sound and sight, in the direction of touch and smell.

Bosch



BOSCH IMAGE

Mitigating unsafe driving situations using interior monitoring systems was the topic covered by Fabiano Ruaro, Product Manager for Interior Monitoring Systems at Bosch. That means to address other traffic safety facts, such as drunk and distracted drivers. In-vehicle sensor data streams (e.g., real time steering data, driver

camera-based eye tracking) in conjunction with machine learning, promises an effective, affordable, scaleable path in the detection and prevention of drunk driving, and one that reaches drivers in-situ.

DRIVE is a project collaboration of the Bosch IoT Lab, with the University of Berne Institute of Forensic Medicine; the Center for Digital Health Interventions (CDHI) at ETH Zurich and the University of St. Gallen. The overall project goal of DRIVE is to build a reliable in-vehicle drunk driving detection system and targets the following two main research questions: To what degree of accuracy can drunk driving be detected from today's real-time vehicle sensor data streams (CANbus)? And how accurately can drunk driving be detected from future real-time vehicle sensor data streams, i.e., driver video monitoring (including eye tracking) and physiological data?

DRIVE can be considered as a first step towards a scalable system for detecting general driver impairment. Based on safety-relevant deviations from their normal driving behavior, such a system could inform drivers in a timely manner about their limited ability to drive. No matter if they are impaired by drugs or by medical incapacitations, e.g., hypoglycemia in case of people with diabetes.

Smart Eye

SMART EYE/AFFECTIVA IMAGE

With this advancement of technology, future regulations and customer expectations, the focus is now being directed at the ways that driver monitoring can be enabled to enhance the safety of all passengers and other car users. Detlef Wilke, Automotive Solutions VP at Smart Eye, explored the latest research in intoxication research and what opportunities there are to use DMS technology to enhance road safety. Smart Eye's DMS uses sensors, such as in-car cameras, computer vision, and artificial intelligence to bring insight into the driver's state and behavior. It covers behavior after intoxication, namely DUI for Driver Under Influence. System assessment ends up to the status of: Unfit to Drive. Intoxication is the cause, behavior is the consequence the system assesses, where it needs to have as less as possible false positive for trust.

The automotive solutions are powered by Smart Eye company Affectiva (acquired in 2021), contributing their Emotion AI and deep expertise in machine learning and data acquisition. Built on deep learning, computer vision, speech science and massive amounts of real-world data, Affectiva's technology can detect nuanced human emotions, complex cognitive states, activities, interactions and objects people use.

Optalert

OPTALERT®

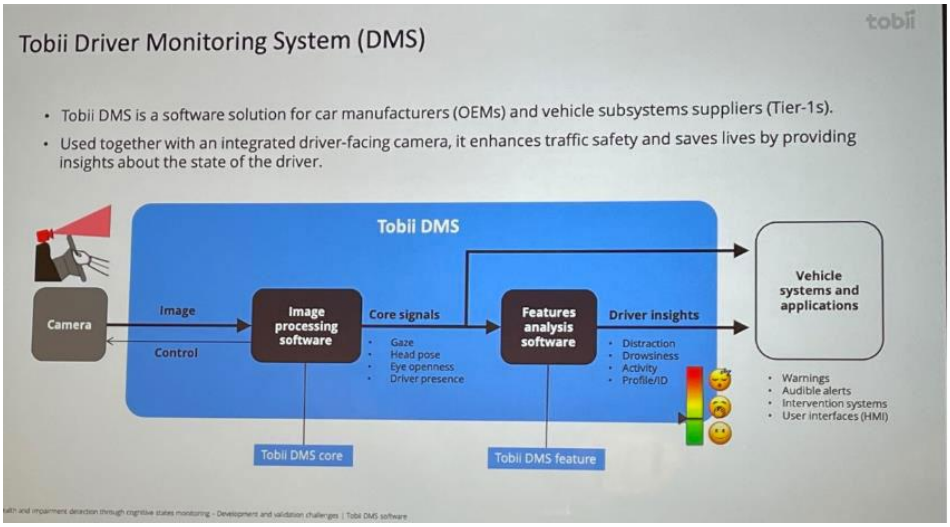
Alert & Alive

This Australian company is developing—for 20 years now—driver impairment detection, with an algorithm for objectively quantifying deterioration in cognitive function, the Johns Drowsiness Scale (JDS™). See DVN-I's in-depth interview with Optalert CTO **here**.

Vision-based AI for drowsiness detection: a high-risk approach to a solved problem. That was the title of their Trefor Morgan's presentation. AI is unlocking ground-breaking innovation in so many fields. Quantifying drowsiness in drivers is one of these problems. It requires a solid understanding of how drowsiness is expressed biologically. Not yawns. Not perclos. Not heartrate variability or other features affected by the environment. And certainly not features of sleep which are far too late!

Vision-based AI approaches come with a range of risks that Morgan outlined. He then showcased a much more scientifically sound approach that is the most accurate way to measure impairment from drowsiness. And as a bonus, it requires very little processing power, so the DMS chip can focus its clock cycles on more intensive operations.

Tobii



TOBII DOCUMENT (DVN IMAGE)

Tobii, based in Stokholm, Sweden, has two decades' experience as experts in eye tracking. They are on a mission to build technology that understands human attention and intent—what they call attention computing.

Clémentine François is Tobii's biomedical engineering manager. François gave a lecture entitled Health and Impairment Detection Through Cognitive States Monitoring—Development and Validation Challenges. This presentation covered how to develop solutions to detect health and impairment of drivers through physiological and cognitive states monitoring (e.g.,cognitive load and stress). The eye reflects 80 per cent of the brain activity! François discussed the challenges to develop and validate such solutions, covering which data to use, which sensors, and which ground truth. She also desdcribe the relevant use cases of such solutions for in cabin focusing on safety, wellbeing, and user experience.

MicroTech Ventures

MICROTECH
VENTURES

Harvey Weinberg, Director of Sensor Technologies at Microtech Ventures, talked about radar-based vital signs monitoring: how it works and why you might want to use it. Microtech Ventures is focused on strategic venture

capital, angel investing, and M&A advisory services, to accelerate the development of sensors, MEMS, and microtechnologies.

Vital signs come from instant swelling of the skin at every heartbeat, visible on the face, neck, chest. And a radar can detect these movements using micro-ranging and micro-Doppler measurements.

Their portfolio presented here includes bitsensing, a Korean startup for 60-GHz radar in-cabin sensing; Caaresys, an Israeli startup for radar based vital sign measurement; IEE, with radar based child presence detection; Nextium, a Spanish engineering provider leveraging Ficosa and Panasonic technologies, and Vayyar for their high channel count radar for general in-cabin monitoring.

Immervision

Patrice Roulet-Fontani is cofounder and technology VP at Immervision, a Montreal-based optics-and-lens company. He presented Optical Design Technology for In-Cabin Imaging Systems.

Immervision's 'Deep Seeing' technology rests on commercially-ready patented technology breakthroughs: Wide-angle optics with panomorph vision for augmented resolution and flawless viewing, sensor fusion with data-in-picture to dramatically improve data collection from video frames and image processing algorithms including real-time adaptive de-warping for outstanding image quality.

Vehicle imaging systems are moving away from the narrow field of view driver monitoring system towards a wider field to capture the entire cabin—front and rear occupants. This means combining DMS with more modern user experiences such as occupant identification and video surveillance, in one single sensor that reduces cost and impact on interior design.

He discussed how advanced freeform lens with smart pixel management maximise the resolution on the driver while capturing the entire cabin in varying lighting conditions, and showed how advanced image processing algorithms including de-warping, deliver the best pixels for either human or computer vision to maximize the application efficiency.

Conclusion

Many technologies are available for DMS, as the upcoming regulations in Europe and the rest of the world are fostering technology innovation. DMS is the first mandatory step, and further value will come from health; wellbeing monitoring, and personalization, including adjustment of passive safety according to the real person to protect.

In recent months, there has been a marked increase in automakers and suppliers exploring and planning car designs that combine DMS and OMS for future models. The trend is expected to pick up further as regulatory requirements and safety protocols enter effect around the globe.

Really, it is tech for the good!

Interior News

Stanley's High-Power IR-VCSEL for In-Cabin Sensing

INTERIOR NEWS

STANLEY IMAGE

Stanley Electric is a Japanese electrical manufacturer with a large share in the vehicle lighting and electronic equipment fields. They celebrated their 100th anniversary in December 2020.

DVN IMAGE

In their booth at InCabin Phoenix, they showed an automotive-qualified camera system evaluation kit for real-time 3D imaging VGA solutions, by collaborating with Melexis, Lumentum, and Sony Semiconductor Solutions.

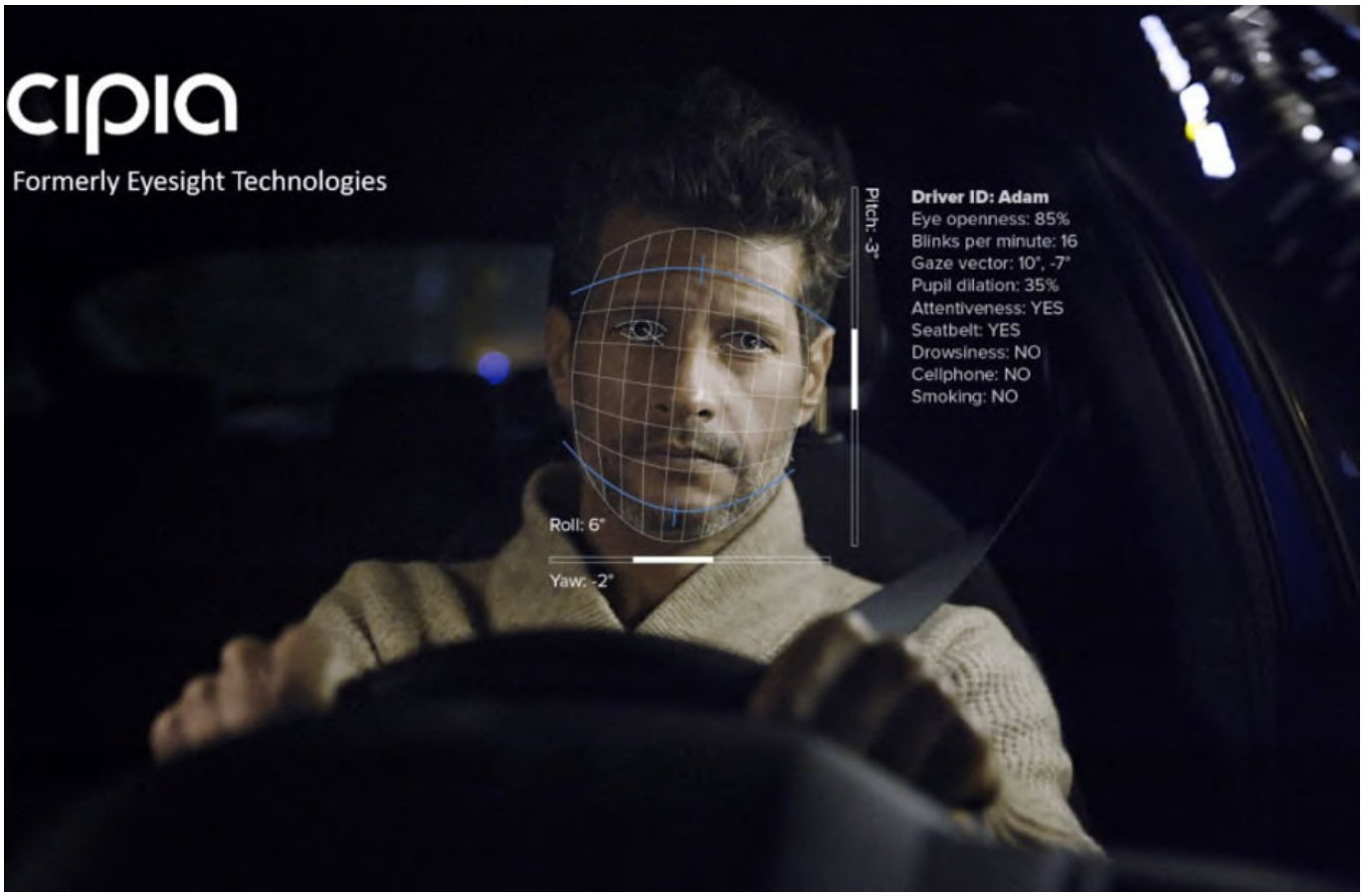
This evaluation kit is a complete camera system providing high accuracy and sunlight robustness, powered by a ToF image sensor (MLX75027) from Melexis, high-power IR VCSEL array from Lumentum, which is well packaged to meet the automotive requirement by Stanley, and automotive laser driver (CXD4029GG-W) from Sony. It was possible to experience a real-time visualization demonstrated and discover its potential for use in secure DMS and HUD applications, with 3D Emotion software.

VCSEL means Vertical Cavity Surface Emitting Laser, and is a type of semiconductor laser. Conventional semiconductor lasers (edge emitting laser) emit light in a horizontally to the substrate, whereas VCSELs emit laser light vertically to the substrate. VCSEL is characterized by its small size, high luminous efficiency, low power consumption, and high directivity. Since VCSEL die can be arranged in two dimensions, the output as a package can be increased, and it also features a high-speed response that enables highspeed pulse lighting (high-speed modulation) in the gigabits

According Stanley, the main advantages of VCSELs in in-cabin IR sensing applications are irradiation pattern; response speed; emission spectrum, and low impact of temperature on emission wavelength.

Cipia DOMS Finds Automaker Favor

INTERIOR NEWS



CIPIA IMAGE

Cipia, formerly Eyesight Technologies, is an Israel-based AI computer vision in-cabin automotive solutions provider. They have been awarded a design win from a new customer: a US EV maker. The company's Driver Sense DMS and Cabin Sense OMS will be integrated into an electric SUV to be sold globally, set to start production next year, and will be running on Nvidia and Qualcomm SOCs.

Cipia CEO Yehuda Holtzman said, "This design win with a second US auto manufacturer further cements Cipia's position as one of the leading providers of in-cabin sensing solutions" to the world's automakers.

Driver Sense DMS monitors a vehicle's driver, analyzing facial features such as head pose, eye gaze and eye openness to infer driver distraction and drowsiness, as well as spotting cellphone and seatbelt use.

Cabin Sense OMS is a natural expansion of this technology to also cover the passengers in the vehicle, useful to track the occupancy of a car and the behavior of its passengers. This new announcement brings Cipia to a total of 30 design wins, over 10 platforms and 7 makers globally. Several of these models are already in production and available on the roads today..

Cipia's automaker customers currently include two electric car manufacturers in the US, SAIC Motors, Chery; an American car brand in China, and one additional leading car manufacturer in China.

Kurz IMD VarioForm: Decoration, Sensors in One Process Step

INTERIOR NEWS

Leonhard Kurz won the 3rd main prize of the Bavarian Innovation Award for the IMD VarioForm® process with functional in-mold labeling (IML). The prize is given to outstanding innovative achievements and is therefore only awarded to a select few companies and service providers. VarioForm technology is a process to decorate plastic elements and add functionality in a single processing step.

The desire for HMI is not only a major topic in the automotive sector. Organic product shapes, backlit surface designs, and replacing buttons and switches with touch operation are central approaches in many industries.

Kurz developed IMD VarioForm with functional IML as a series-ready process that can be used in various sectors. Kurz has roots in surface decoration, but goes beyond that here, not least thanks to the expertise of their various subsidiaries. Design aspects, backlighting, and touch sensors play an important role in a holistic concept of the final components

Technology was developed in cooperation with injection machine experts at Wittmann Battenfeld, and tool experts at GKTool. Sensors come from Kurz subsidiary PolyIC, and can be 3D-deformed due to their ultra-thin metal mesh support structure.

Kurz has succeeded in bundling the four manufacturing steps of decorating, thermoforming, integrating a sensor, and punching a component in one production stage directly in the injection mold. Plastic sheets are formed in 3D using a high-pressure forming process that combines pressure and temperature. A specially developed foil feed device is used to refine the component, which guides the laminate foil through the tool. The blank is then cut fully automatically into the right shape, followed by the injection of a thermoplastic melt as a functional in-mold label. An example of this technological innovation is a specially designed component with a slider control function and backlighting.

BMW's Panoramic Full-Windshield HUD for DEE

INTERIOR NEWS

BMW IMAGE

The expansive BMW Panoramic Vision head-up display will be available starting in 2025 on vehicles using the brand's 'Neue Klasse' platform. The tech is an evolution of iDrive that adds the ability to create project information across the entire windshield.

BMW development management boardmember Frank Weber says, "With our new BMW Panoramic Vision, the windshield becomes a single large display that opens up completely new possibilities for designing our vehicles. Be it that the driver himself decides which information he wants to display in the field of vision or that all occupants can see all content. The revolutionary projection and the significantly clearer cockpit create an impressive new spatial and driving experience".

BMW Panoramic Vision debuted on the iVision Dee (Dee for Digital Emotional Experience) concept at CES in 2023 (**DVN coverage here**). The massive HUD included touch-sensitive sensors on the instrument panel that the company called the Mixed Reality Slider. More controls for it were on the steering wheel. There were five selectable modes that allowed the driver to pick how much info was on the display. This innovation fits perfectly with the Digital Emotional Experience which give its name to the vehicle.

We'll see more of what BMW is planning at the IAA Mobility event in Munich in next September. The company will present new details about the Neue Klasse platform there, including info about new control and information elements for iDrive.

The first two production vehicles riding on the 'Neue Klasse' architecture will be a mid-sized car and SUV. They'll reportedly be roughly similar to the 3 Series and X3, but these vehicles will purely come as EVs. More vehicles will ride on the 'Neue Klasse' platform later. Production will begin in Hungary in 2025. Assembly will then expand to Munich in 2026 and Mexico in 2027. By the end of the decade, the plant in Spartanburg, South Carolina, will build multiple models on these underpinnings, too.

Hyundai Pledges to Keep Physical Buttons

INTERIOR NEWS

HYUNDAI IMAGES

As with most automakers, Hyundai has jumped on the dual-screen layout with tablet-like displays mounted on the dashboard. However, the Korean brand hasn't given up on conventional controls. While many competitors are simplifying their interiors by integrating most functions into the center screen, a lot of the features inside a Hyundai are still accessible by simply pressing a real, actual button.

Shown here is Hyundai's newest car, the 2024 Kona, with its pair of 12.3” displays and plenty of conventional buttons along with a couple of knobs. Sang Yup Lee, Head of Hyundai Design, told Australian magazine Cars Guide that the reasoning behind the decision to retain old-school controls is due to safety concerns: "When you're driving it's hard to control the touchscreen, this is why when it's a hard key it's easy to sense and feel it."

He went on to mention Hyundai will retain hard buttons for as long as possible, but said it might be only a matter of time before most functions will be built into the touchscreen. He was referring to vehicles equipped with an L^4 self-driving system, in which using a touchscreen wouldn't be a safety risk since the car would be doing all the driving.

In the meantime, Hyundai is sticking with traditional controls. Even a car with a futuristic design such as the Ioniq 6 electric sedan still has shortcuts outside of the touchscreen for the air conditioning and other often-used functions. While many rival brands are simplifying their interiors by integrating most functions into the center screen, a lot of the features inside a Hyundai are still accessible by simply pressing a button. “But the day will come when everything will be moved inside the big screen,” Lee is convinced.

Continental Develops Zone Control Units with Infineon

INTERIOR NEWS

CONTINENTAL IMAGE

Continental will cooperate with semiconductor manufacturer Infineon in the development of server-based vehicle architectures. Accordingly, the system supplier will use the Aurix TC4 microcontroller (MCU) for its zone control units. A special feature of the MCU is a special memory technology (RRAM) that allows the vehicle software to remain on standby. Functions such as parking assist, climate control and suspension are thus ready for operation within fractions of a second when the vehicle is started. Other focus applications are radar, chassis & safety and powertrain/electrification.

According to Continental, the central computer architectures are designed as a platform. Different requirements of the automotive manufacturers could thus be individually configured with little effort. The zone controllers now being developed by the two suppliers form the middle level of the E/E architecture - between the server level (high-performance computers, or HPC for short) and the basic level with numerous sensors and actuators. The microcontrollers are to meet current standards for cyber security and be certified according to ISO/SAE 21434.

The platform is standardized to the extent that existing application software can be used for new vehicle models. "This significantly reduces the time-consuming validation effort," says Gilles Mabire, CTO Continental Automotive. "It is also possible to integrate third-party hardware and software," adds Jean-Francois Tarabbia, head of the Architecture and Networking business unit at Continental.

In the E/E architecture, a zone control unit bundles all electronic and electrical connections in a local section of the vehicle. Data flows from different domains of the vehicle merge in the zone control units. The data is processed and passed on to the HPCs as the top control level via Ethernet connections. Conversely, the zone control units, as the coordination point, ensure the execution of commands at the server level.

The Design Lounge

Kia EV9: Interior Space & Functions, 'Opposites United' Design

THE DESIGN LOUNGE

KIA IMAGES

Kia drew on their Opposites United design philosophy and Technology for Life pillar, which aim to ensure that the technology and innovation “promote positive, intuitive interactions between humans and machines”. These values played a key role in the design of the EV9’s interior, with designers working to prioritize space, comfort, and technology. At the center of this design philosophy is a new visual identity evoking positive forces and natural energy, with contrasting combinations of sharp stylistic elements and sculptural shapes. ‘Opposites United’ is based on five key design principles: ‘Bold for Nature’, ‘Joy for Reason’, ‘Power to Progress’, ‘Technology for Life’, and ‘Tension for Serenity’.

Built on the Electric Global Modular Platform (E-GMP), the EV9’s long wheelbase and completely flat electric vehicle architecture enables the SUV to benefit from a spacious cabin, fostering connections between occupants while enabling them to relax in “lounge-style comfort” in all three seating rows. The Kia EV9 can be optioned as a six or a seven-seater.

The main innovation is that seats in the second row can be swiveled 180° to a saloon layout, or even 90 degrees to the side for easier access. This functionality is possible thanks to the completely flat floor. Additionally, The third-row seats benefit from cup holders and charging points.

The EV9 features an open, floating panoramic dashboard which extends from the steering wheel to the center of the vehicle. Providing a digital experience are two 12.3" touchscreens integrated with one 5" segment display. These enable the driver and passengers to control various functions. The EV9's extended display high-definition audio visual, navigation and telematics (AVNT) screen delivers an immersive experience and enables a connection to the digital world.

Below the AVNT screen are hidden touch-type buttons to enable start/stop functions in addition to further AVNT and HVAC controls.

"The Kia EV9 breaks new ground, aiming to redefine standards for design, connectivity, usability and environmental responsibility," said Karim Habib, executive vice president and head of Kia Global Design Center. "The Kia EV9 offers customers an exceptionally high-quality proposition and a fresh EV perspective in the family SUV sector. This new vehicle typology provides instinctive experiences and excellent comfort for not just the driver, but all occupants, through innovative use of space, technology, and design."

Studebaker

By Athanassios Tubidis

THE DESIGN LOUNGE

COFFEE CORNER
DVN
Interior

DVN IMAGE

What does driver monitoring, comfort, health, and personalization have to do with a Studebaker Lark from 1960? In my wildest efforts to find common grounds, I failed. Nonetheless, one of these cars, in immaculate white, was placed at the entry of a national park during the days of the In-Cabin conference in Phoenix, AZ. Contrasting by far the seminar's subject, it appeared as a reminder of the passage to modernity, like most classics do. Unlike the conquest of mechanical motion since late 1800s, the post war era had many short-lived yet astonishing episodes that changed the perception of industrial products. The passage from the late '50s to early '60s has a particular significance in automotive thinking and it turns out that the specific vehicle labels that pivotal moment.

If you ever wondered which company fabricated the horse-buggies, prairie schooners or covered wagons that pioneers used to conquer the west, many of them were Studebakers, the world's greatest vehicle manufacturer in the mid-1800s. Vehicles as in carriages. Thus, their enterprise, starting as a workshop in South Bend Indiana*, lasted for over 100 years! Respect.

The Studebaker brothers, as history aficionados, had acquired the carriage that Marquis de Lafayette used on his tour in the United States in 1820s as well as the 4seater carriage president Lincoln rode the night of his assassination. In addition to their passion about vehicles, the specific ones were used as the equivalent of today's show-cars. Exposed in local Studebaker outlets, they would attract attention and curiosity, drawing more interest about coach building. The brothers saw the value of their industry both as history and as an evolving business domain. They were very engaged and contentious on the core of their trade that back then they had defined as 'mobility'. In 1902 they started making cars, yet until 1919 they were still making horse drawn buggies.

A number of episodes followed bringing them through WW1 as vehicle suppliers for the English, the French and the Russians (world was great back then!). In post war-times they hired some of the most well-known designers, such as Raymond Loewy and Virgil Exner, to conceive their vehicles up to contemporary norms. In stark contrast to the 1950s, the passage to the '60s, with more buyers demanding smaller cars, signified a new perception of the automobile. Societal matters were taken in consideration with a more educated view on market segments, as factors that influence car design thus, packaging and new vehicle morphology became crucial. However, established construction methods, dated hardware and consequent financial engagements, were holding industry back from such a jump. A brilliant idea though brought the Indiana company up-to-date. Maintaining only the center section of the old unsuccessful 1953 sedans, while putting a shorter front and rear end on it resulting to a compact car in a low development cost. The successful attempt assigned a great section of the market to Studebaker demonstrating resilience.

As the industrial paradox goes, very often innovation does not come from the specialist sector. The electric light did not come from the continuous improvement of candles neither refrigeration from harvesting ice and snow. Kodak invented the digital camera. As far as driver monitoring, comfort, health and personalization, in

our days, the future automobile is being configured by (automotive agnostic) semiconductors, a very different industry sector and business mindset, forcing OEMs to readjust their vision.

Unlike hundreds of coach brands that did not survive the shift from carriages to the automobile in the early 20th Century, Studebaker stood for the opposite.

* *In Bendix Woods County Park near South Bend, Indiana, 5000 threes were planted in 1937 spelling Studebaker when viewed from an airplane. This was formerly the Studebaker proving grounds, and much of the track surface is still visible to this day. Just google earth on satellite mode: 'Bendix Woods Park'.*

News Mobility

Research: Data Exchange for Safe Intersections

NEWS MOBILITY

CONTINENTAL IMAGE

The "Dekor-X" project (Decentralized Communication Space Intersection) aims to make inner-city intersections safer for all road users through so-called decentralized communication, without having to build additional infrastructure. Intelligent, automated vehicles are to exchange information from their sensors with each other and expand their field of vision. This would allow the vehicles to "look around the corner," for example, or receive information about what is happening in front of other cars.

In addition, the information collected would be sent to a cloud, where it would be used to create movement patterns learned over a long period of time. These models would be made available to the networked vehicles again and could thus warn of possible dangers and adapt driving style and driving corridor. The project will develop concepts and methods for motion model generation, communication channels and information processing in the vehicle.

The project is part of the lead initiative autonomous and connected driving of the German Association of the Automotive Industry (VDA) and is being funded by the German Federal Ministry of Economics and Climate Protection with around 7.5 million euros for three years. In addition to the consortium leader, research partners include Valeo, Continental, Denso, Coburg University of Applied Sciences and Chemnitz University of Technology.

Continental wants to use the collected data to create an AI-based prediction model that can predict the behavior of road users at the intersection. “In critical situations, this prediction could then be used to warn users of hazards or intervene in driving functions in a protective manner,” said Markus Fischer, project manager at Continental. “The Chemnitz University of Technology's task is to improve vehicle environment awareness by networking with other vehicles and the traffic infrastructure,” he said.

General News

IAA MOBILITY 2023 To Promote Dialog Between Industries

GENERAL NEWS

The German Association of the Automotive Industry (VDA) has been the organizer of the IAA since 1897. In 2021, the event moved from Frankfurt to Munich, and Messe München has been a cooperation partner since then. With the change of location, IAA MOBILITY 2021 was completely re-conceptualized and transformed from a car-focused trade fair into a platform for globally relevant mobility topics. The new IAA MOBILITY now sets cross-sector thinking impulses and intensifies dialogue with actors from the economy, politics, media, and society.

The orientation of IAA MOBILITY focuses sharply on two target groups with its program: The Summit, including the Conference, curates B2B topics and takes place at the Munich exhibition grounds. The Open Space in the heart of Munich appeals to a broad audience and makes all forms of mobility tangible. By informing, touching, and testing, IAA MOBILITY brings all forms of modern mobility to end consumers.

With the support of various stakeholders, IAA MOBILITY aims to shape the future of mobility by fostering collaboration and innovation across industries. The event will provide an ideal platform for networking, knowledge sharing, and discovering new technologies and solutions to address the growing demand for sustainable and connected transportation.

In addition to exhibitions, conferences, and panel discussions, IAA MOBILITY 2023 will also offer test drives, live demonstrations, and interactive experiences for visitors to immerse themselves in the world of connected mobility. The event will continue to serve as an catalyst for driving change and advancing the global mobility ecosystem.

Jürgen Mindel, Managing Director of the German Association of the Automotive Industry (VDA), emphasizes: "The new key visual of IAA MOBILITY impressively demonstrates how important it is to understand and shape mobility as a connected ecosystem. This is the power that must emanate from a mobility platform like IAA MOBILITY."

Larger Smart Model to Debut at Shanghai

GENERAL NEWS

SMART IMAGES

Smart's second new model will be a compact, full-electric, coupe-styled, crossover that will debut at the Shanghai auto show on April 17, go on sale in China by the end of the year, and arrive in Europe in early 2024.

Smart Europe CEO Dirk Adelmann told Automotive News Europe that the #3 ("hashtag 3"), as it will be called, will be "bigger, roomier and sportier" than the #1, a small electric SUV that is just now reaching dealers and customers in Europe.

Smart, an electric-only, 50-50 joint venture between Mercedes Benz Cars and Zhejiang Geely Holding Group of China, will launch a new model each year until 2027, when they will have a range of five or six models, Adelmann said.

He added that Smart is reserving the #2 designation for a future minicar that could eventually replace the ForTwo minicar. The two-seat citycar will continue to be built until spring 2024 in Hambach, eastern France, in a factory which Mercedes-Benz sold to the UK off-road startup Ineos Automotive in December 2022.

The small SUV is being built in China and exported to Europe, although Covid lockdowns have meant that production has been slow to ramp up.

Adelmann said the #3, at about 4,400 mm long (Similar size to the VW ID.4), is a proper compact model, while the #1, at 4,270 mm, sits between small and compact crossovers. Automotive News Europe classifies the #1 as a small crossover in its market segmentation.

Compared to the #1, the #3 is 130 mm longer and sits on a 35 mm longer wheelbase that increases rear legroom.