DrivingVisionNews.com
Automotive lighting and driver assistance technologies

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Editorial

ISAL 2019 Shows Acceleration Of Lighting Tech

Recent ISALs had a strong focus on ADB, mostly looking at systems and ideas for 8, 16, and 32 segments. This year was different: still a predominant focus on ADB, but mainly on high-resolution systems, no longer with a few segments. And besides that, there was heavy concentration on road image projections, visual communication using car lamps, and other suchlike. Terms like "H7" don't occur even once in the proceedings, and "halogen" appears only a few times as a glancing comparison point. ADB technology is gaining traction worldwide; there are even rumours that some form of at least nominal ADB might be approved in the US before too much longer.

As Michael Hamm explained at the DVN US Workshop this year, more than 15 million ADB-equipped cars of about 60 models from more than 10 makers are on the world's roads without any problem. A big number, but nowhere near big enough! It is crucially important not only to develop and refine but to sell these technologies.
I see four steps to success:
1. Advertising, educating, and communicating on the benefits of ADB
2. Allowing ADB throughout the world;
3. Democratising ADB so it's available in all car segments;
4. Mandatory ADB in Europe then in the world.Now the technical constraints that confined us to high/low beam systems have been removed by ADB, we must face and act on the new reality: the high/low-beam binary has never been good enough for the job we ask of it, and people die as a result. That has to stop. Innovation must carry on, of course, but none of it matters without significant sales.

This week, news are focus on ISAL with a summary of the awarded presentations (paper, lecture, poster) then a summary of the best lectures for DVN.The next ISAL symposium will be held on 13-15 September.

Sincerely yours

DVN President

In Depth Lighting Technology

Three Awards at ISAL

ISAL Steering Committee members

ISAL awarded at the end of the symposium the best presentations, paper, lecture, and poster.
The winners received the awards from Audi's Michael Hamm.

Best paper
Investigation of Pedestrian Behavior to 3 Encounter Scenarios with AV
(Tino Singer, TU Darmstadt L-Lab)

The Laboratory of Lighting Technology of the TUD conducted a study consisting of an encounter situation between an AV and a pedestrian in a car park. The tested subjects assumed the role of a pedestrian and were set in a car park scene by using a virtual reality headset.

The AV was equipped with an additional signaling device consisting of three displays in the front of the car. In total nine signals and variations were tested in three different encounter scenarios. The moving behavior of the subjects was recorded, and decision times determined.

The study investigated the three different encounter scenarios in a car park use case. The moving behaviour of the subjects differed in every scenario. In the parking and passing scenarios, the subjects seemed to rely on vehicle dynamics. In the passing scenario, one group of subjects started to cross the road early and another group started the crossing in the deceleration phase of the AV. In this scenario subjects started walking to the destination 0.3 s earlier, when additional signals showed the intention of the vehicle.

When subjects could not directly rely on vehicle dynamics, as in the deparking scenario, additional signals attracted attention. Subjective evaluations show that scenes with symbols provide a better recognition of the intention of the AV and a better safety feeling. Furthermore, uniquely identifiable symbols got top ratings. In future research the investigated scenarios can be extended by adding additional road users. The Influence of other manual driven vehicles, multiple number of signaling interfaces or other pedestrians in a scenario must be investigated.

The best lecture
Digital OLED for taillighting from Audi

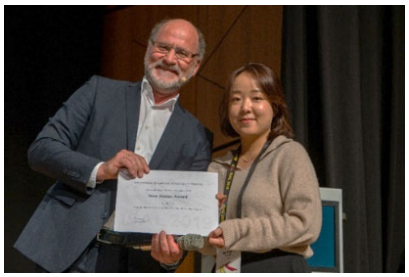
Overcoming the biggest obstacles like reliability and cost, OLEDs are ready for a larger roll out. Combining their properties with a high number of segments on each OLED element automotive exterior displays can be created within a tail lamp. The usage of those digital OLEDs will lead the way to premium Car2X communication. Audi opens up revolutionary new approaches in combining highly attractive design with complete new functionality and versatility: Digital OLEDs will lead to the most efficient and flexible light application for Car2X communication and personalization in rear combination lighting.

The uniformity combined with the ability to have a very sharp contrast ratio between different active regions in one OLED panel within very small distances, can be achieved within one OLED. More than 50 segments per OLED tile are opening up more or less an infinite number of combinations of different segment states. Having those installed in taillight applications it is possible to change the shape and appearance of the taillight signature by simple digital information. Hence, the OLED light source enables the personalisation of the tail light design. Therefore, it is not needed to change the hardware of a rear combination lamp; plenty of designs can be covered due to specific OLED and OLED-segment design.

Segmentation and Contrast ratio, Creating unique design possibilities

Each segment can be designed individually. Hence, significantly different segment shapes and sizes within one OLED panel are possible. Thus, precise patterns can be directly created by the segment shape instead of using a multitude of tiny OLED segments requiring complex driver electronics and suffering from edge aliasing effects. In addition, high luminance values of ≥ 2.000cd/m² at deep red colour coordinates are already possible, outperforming display based approaches in this application, by far.
By following this approach, it is also possible to develop one OLED module that can be used in many different cars while still being able to provide an individual design of every taillight signature. This is opening up a huge potential to initiate a dramatic cost down process for OLED applications also in A- and B-segmented cars . Next to design driven modifications of the taillight signature, it is now also possible to take this highly segmented taillight to display further information in the rear of a car, e.g. for following traffic or pedestrians.
In conclusion, OLED lighting can be applied in automotive without any risk. New functions have already been implemented by segmentation which can only be applied meaningful by OLEDs and no other light source. It enables personalization of tail light designs andcCar-2-X communication capabilities, making the digitalization of cars visible to the outside world.

Best poster
Visibility Improvement Using Guide Function of Turn Signal Lamp
(Hye-Jin Han, SL Corporation)

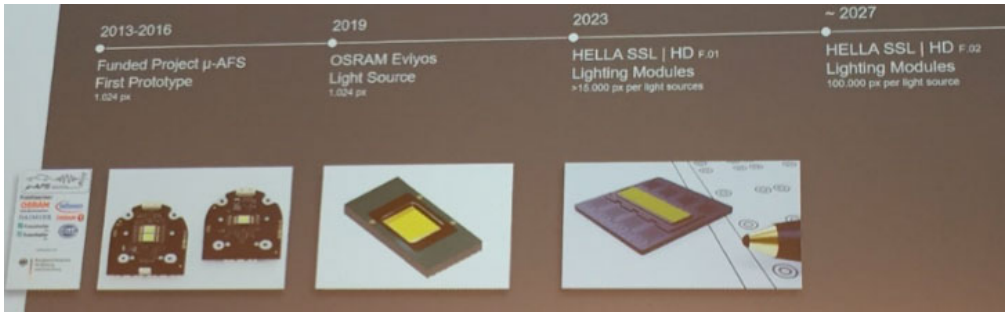


Many traffic accidents occur at road junctions, some of them because other drivers or pedestrians can't see or recognise the intended direction change of the vehicle.
SL, in cooperation with Yeungnam University, have developed a turn signal guide light to improve visibility of the turn signal. The experimental results showed better identification time when both direction-indicator lamps and the new turn signal guide lights versus conventional direction-indicator lamps alone.
A guide function of turn signal lamp was developed to project a marking pattern on the road to indicate the turning direction of the vehicle. Han and her team evaluated the recognition time and gaze points in three different situations to find out the effect of the guide function on the judgment of turning direction. They investigated the visibility and glare level of the guide function of the turn signal lamps using the prototype devices.
14 graduate students and 4 faculty members of Yeungnam University participated in the experiment. The team measured the time taken to recognise the direction of turning and observed the gaze points of a pedestrian positioned at a right front distant point from the right-side signal indicator and of a following driver position at a right rear distant point. The result from the T-junction road showed that the turn signal lamp with guide function significantly reduced the detection time of the turning direction. Compared with the turn signal only condition, average response time to the turn signal with guide lamp significantly decreased.
Another representative situation to evaluate the visibility of the turning signal is a lane change of a preceding vehicle. The comparison between each condition show that the guide lamps were helpful to recognise the direction of lane change. The difference was significant only at the right side.
For the evaluation of the glare effect, there was no difference in the discomfort glare score when the guide lamp was used and its directional angle was kept below 15°, compared to the case where only the conventional turn signal lamp was used. When we compared the total glare from the two conditions on the dry and wet surface, the results were almost the same.
The results of this study show that the guide function of turn signal lamp is effective to improve the visibility and it could reduce vehicle accidents and increase pedestrian safety.

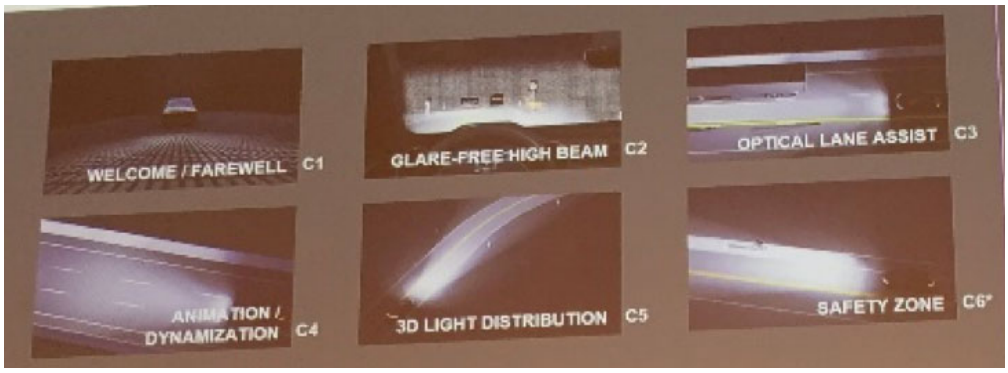
HELLA' Kleinkes: HD-SSL lighting and LED-Displays Will Open the Future

In his lecture «Boost Safety & Styling – New HD-LED systems for front and rear systems» Michael Kleinkes explains how HD-SSL lighting and LED-Displays will offer new means for digital lighting at front and rear lighting, with the benefit on safety, on styling, on animation and on communication for the vehicle owner but also for other road users.

HD-SSL Light Sources are based on a super-integration of one single silicon application specific integrated circuit (ASIC) supplying several thousand of LED pixels individually They are supposed to become the light sources for future HD headlamp modules.



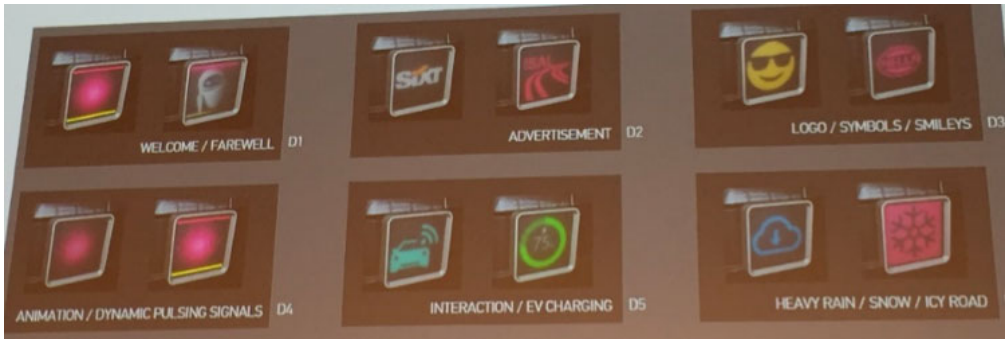
Smaller pixel sizes, larger light emitting surfaces, higher number of pixels, higher luminance, contrast between the pixels, homogeneity of the luminance, will allow new use cases with high light quality and performance.



The Use Cases of HD-SSL can be split up in use cases which support safety and those which have a major styling impact.

Automotive exterior displays are the next evolution step for sophisticated signal functions. They will be placed at front, rear and wherever they are useful. The display technologies currently under discussion for automotive applications are LCD, AMOLED, LED matrix systems, and µLEDs with size less than 0.3 mm

Personalized Welcome Animation / Advertising Video Signal lighting functions are on the way to transform into new styling possibilities and safety features by HD technology features. In near future car makers will offer digital products to their customers like personal animations/videos showed anywhere on the car body.



Car sharing/rental companies can use this feature to present their brand on all cars of their vehicle fleet. Regarding the requirements for the display it must be considered that the end-customer pays an additional fee for this digital product.

Valeo' Reiss: Few Thousand Pixels make all Functions

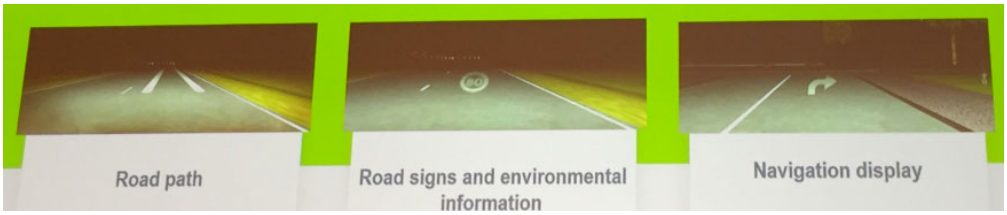
In his lecture «Road Marking Solutions with Pixelized Light Source», Benoit Reiss explains how few thousands of pixels are

already offering nice features which improve safety for both drivers and other road users and how this kind of architecture is also compatible with Glare Free solutions, using similar Monolithic light source as well, making then an optimized global system

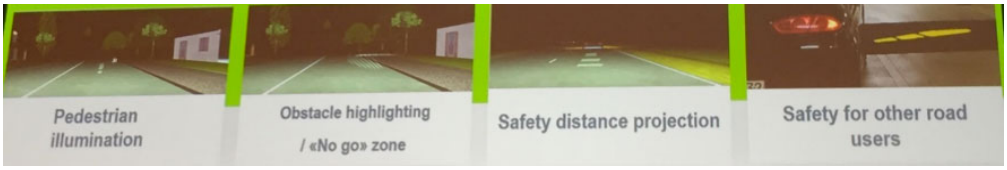
For many decades, front lighting functions in the automotive industry was just about low beam and high beam. Just recently, the introduction of Glare Free High Beam allowed an increased visibility for most driving conditions.

HD for ADB and road marking

Until now, most of road marking functions have been demonstrated with projection units using hundred thousands of pixel, like DMD or LCD technologies, and discreet pixelized light source. Now it is possible to achieve with much more affordable solution, composed of only a few thousands of Pixels.
- Functions which are directly addressed to the driver in "normal" driving conditions, meaning driving conditions that do not include emergency situations.



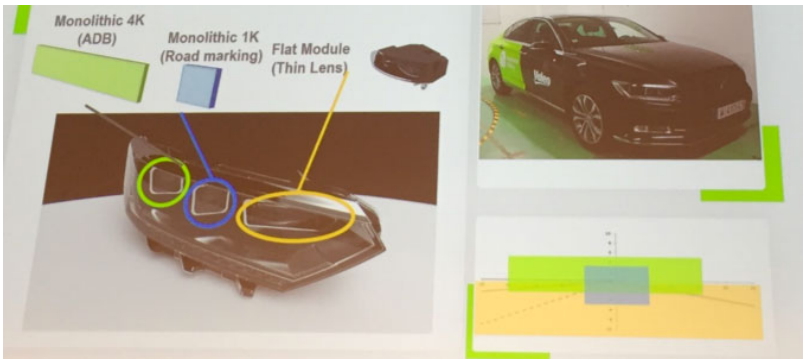
Examples with: Road path/Lane Marking, Road sign, Navigation display
- Safety alert functions require a high reaction speed from the complete system.
Examples with Pedestrian illumination, Obstacle highlighting / No Go zone, Safety distance projection, or Safety for the other road users



- Welcome scenarios are seen just to show to people that the lighting system has many functionalities with its high definition lighting unit.

Among different solutions (matrix of micro-mirror, LCD screen, scanning system and high density matrix of LED), the high density matrix of LEDs, also called Monolithic technology, is the one being the most efficient when combining the different use-cases since it is a pure additi system.
One technical drawback of such a system is obviously the resolution of the projected images, especially when DLP technology and its 1.2 millions Pixels. In fact, what is important in such a projection system is the quality of the image on the road. Besides the source itself, the quality of this image is limited also by the the optical system, which has to correct from optical aberrations, as well as the road surface and other environmental effects.

In case of a HD lighting system, the Valeo solution consists in having a specific Electronic module interface, for Picture Control Module. In fact, this module and its associated software are directly creating the image so that the rendering fits perfectly with the driver's needs.

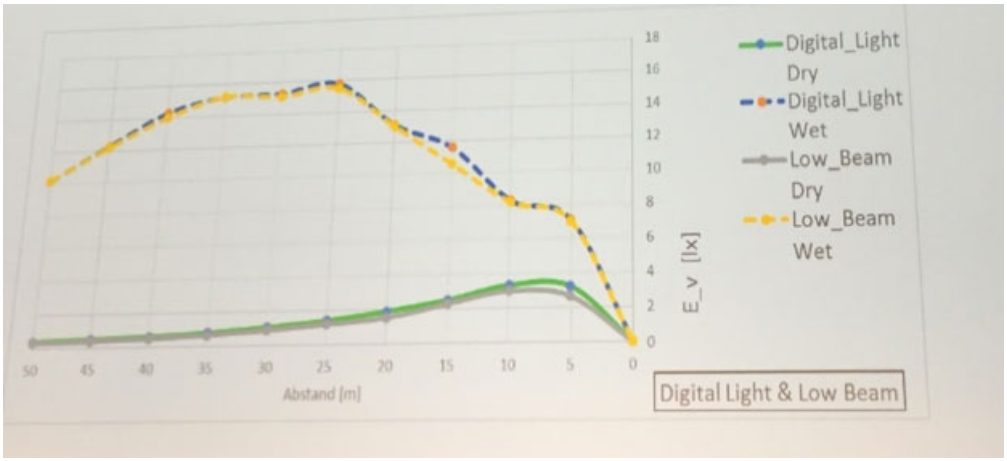


The developed system is flexible enough to require only low adaptations between 1000 and 1 000 000 pixels solutions, and to fit with most of OEMs architectures.

Audi's Hamm: There is no Evidence that Digital Light Cause Negative Impact

In his lecture "Real Driving Benefits and Research Findings with Digital Light Functions", Michael Hamm investigates the impact of new digital functions to road safety and distraction or glare. The outcome showed that there were no additional glare contributions found but strong indications that digital light is improving traffic safety.

In a test setup a construction zone with quite moderate narrowing from 3.75m to 3.10m was rebuilt. Target was the investigation of a Construction Zone light with stripes that indicated the width of the car. In the setup the outboard of the interesting lane was limited with delineators and a car on the second lane should be overtaken. The speed was 80km/h for the test car and 60km/h for the second lane car. The outcome showed that the drivers that were overtaking with construction zone light did use much less steering wheel corrections and the gas pedal position was kept 15% more constant than in a standard low beam configuration. 95% of the drivers gave a very good or good rating to the Construction Zone light. So less corrections and higher constancy of speed indicate that in such difficult situations the additional projections give better estimation capability for the driver. The test drivers could pass the construction zone more safely without generating dangerous situations.



Low beam vs Digital light in wet and dry conditions

In a second setup, it was investigated whether there is additional glare from digital projections. This was investigated in dry, wet and very wet road conditions. Test drivers had to assess the glare of different lighting situaions. The glare rating was performed on a 2- and 3 lane road in order to check different glare angles. 44 test persons participated. The results in photometry and de Boer ratings showed that there was no significant increase in the glare ratings at all from digital projections.

AL's Rosenhanh: Driving Behavior, Significantly Influenced by Road Projections

In his lecture "*Traffic Safety Benefits provided by High Resolution Headlamp Systems*" Olaf Rosenhahn demonstrates that the driving behavior is significantly influenced by road projections, the car is much better centered and traffic safety is improved by the road projections.

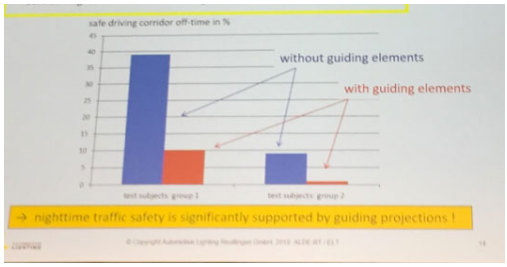
High Resolution Systems in headlamps provide highest flexibility during all adaptive driving situations in nighttime. High flexibility in cut-off line management (low beam & ADB) generate significant advantages in range and visibility for the driver. In addition to these advantages the opportunity of assistance projections on the road for driver information or driver assistance are realized by high resolution headlamps.
With a test car equipped with a DMD projection system integrated in a prototype headlamp an investigation of driver assistant

guidelines as a road projection in a real driving situation was carried out with test subjects. The target was to investigate if the guideline elements, which are projected to the road in front of the car, have an influence on the driving behavior.

For the analysis of the driving behavior the lateral position of the car on the own lane was measured by the on board camera and analyzed after each test run with and without road projection guiding elements. For the characterization of the driving behavior, a safe driving corridor was defined. The test subjects drove along a construction zone with a width of the lane of about 2,40 m and the car width was 1,90 m between the tires outboard side. The safe driving corridor was therefore defined as car width + 25 cm on each side.

In conclusion:

- The "safe driving corridor" was left for 25% of time without road projection guidelines.
- With guideline projections the "off-time" is reduced in average to about 5%.



This clearly demonstrates that the driving behavior is significantly influenced by road projections, the car is much better centered and traffic safety is improved by the road projections.

PSA’s Goncalves: Acceptable resolution with less than 10,000 pixels

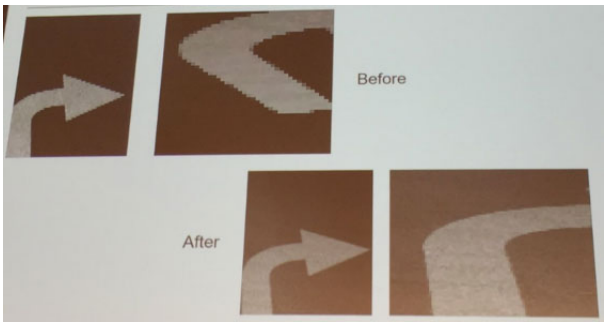
In his lecture «Optimized ADB Symbol Projection», Whilk Goncalves proposes the usage of a reduced and optimized set of simple pictograms, easily recognizable to bring additional but not redundant information to the driver. The usage of anti-aliasing techniques enabled to treat images and pictograms for being projected at lower and medium resolution on the road in the context of ADB head lighting with an acceptable quality rendering.
For segments used for guiding and construction, arrows and simple shapes can be represented at an acceptable resolution with less than 10,000 pixels.

Recently, HD-LED modules opened the way to new communication possibilities, besides the scope of traditional low and high beam, enabling the projection of symbols and pictograms on the road. Despite the temptation of displaying a big and varied number of pictograms and information on the road, we are facing the saturation and visual pollution it could bring about, with difficult information recognition, if we also consider other displays already available in the cockpit (HUD displays, standard displays, etc.).

To manage which symbols will be projected in harmony to the existing HUD

Concerning the symbols to be projected on the road, we have seen many examples in recent works, where a rich variety of drawings can be in principle used, placed at different locations in the driver's field of view, distance. However, when dealing with this kind of communication, a first question is to better understand what is the perception from the driver's point of view, who will be subjected not only to the graphical information available from the headlamps and other accessory lamps, but also from the traditional displays inside the cock-pit, including the head-up displays (HUD) and other augmented reality displays.

In PSA first approach, simple shapes are interesting as construction lines, selection arrows, segments, some simple drawings.
Via a mathematical treatment of the image, we can obtain smooth and acceptable projection of icons even at relatively lower resolution.



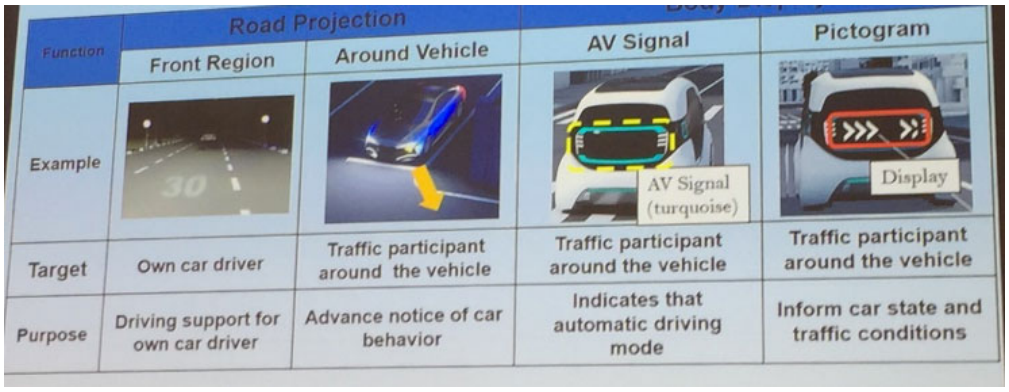
Anti-aliasing methods – Examples

Anti-aliasing methods – Examples

We can see the low resolution effect on the projection of an arrow on the road. The staircase-like pixilation can eventually be seen or not depending on the projection distance and the level of details in the image, the state of the road, its reflectivity, etc. To reduce this pixilating effect, we have used anti-aliasing methods to reduce noise by adding some blurring effects at the image outer. We can see the result from the anti-aliasing filtering. Both set of images were projected using the same resolution.From the driver's perspective, with a much lower resolution than initially expected, we could obtain an acceptable smooth image.

Koito’s Shibata: 6kcd at 3m to notice the road projection

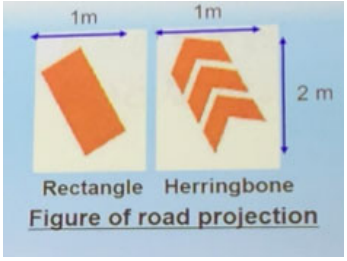
In his lecture «*Requirement Performance of Road Projection Lamp in Conjunction with Turn Signal Lamp*», Yuichi Shibata from Koito, talks about the required luminous intensity of road projection lamps to inform crossing pedestrians of an approaching vehicle. He describes a road projection lamp in conjunction with a turn signal lamp to reduce traffic accidents involving collisions with cyclists and pedestrians.
Specifically, he indicates the required luminance contrast that is necessary for both pedestrians in the vicinity of a car and cyclists to detect the road projection on the road. Experiments were conducted from weak daylight to nighttime.
If the luminance contrast between the road projection and background is more than 0.22, a pedestrian using a smartphone can recognise the road projection under weak daylight. The value of luminance contrast is lower than the results of past experiment. It is easier to recognise road projection under low luminance contrast because of the color difference between white and amber.



Half of nighttime accidents occur at intersections. In terms of behavioral situations, about half of the accidents happen when the vehicle collides with another road user while entering an intersection or hits another road user while turning left or right. In terms of accident types, the ratios of accidents between a four-wheel vehicle and a pedestrian, motorcycle, or bicycle are on the increase.
One of the causes of accidents at intersections is that vehicles, pedestrians, motorcycles, and bicycles fail to notice other road users' movements. We assumed that the new lighting function of road projection could help them communicate to each other their intention and moves more effectively, thereby helping reduce traffic accidents. In this study, we focused on a road projection lamp that, when the vehicle is about to turn left, projects signs in sync with the turn signal lamp to experimentally determine the brightness (luminance contrast) necessary for other road users to notice the road projection not only at nighttime but in weak daylight as well.

The accident scenarios considered in this study were in the scenario A : "While turning left at an intersection, the vehicle risks hitting a motorcycle squeezing alongside, going straight ahead" and in scenarion B : "While turning left at an intersection, the vehicle risks colliding with a pedestrian traversing the crosswalk".

Experimental condition
- Two projected patterns are analysed : Rectangle and herringbone



- Ambiant illuminance : 10Lx, 50Lx, 100Lx, 800Lx
- Five conditions of the brightness of the projection

Under different brightness, pattern, and ambient illuminance of road projection, each subject answers 40 conditions about their sensory evaluation. Further, experiments were done to measure how quickly the subjects noticed the vehicle turning left with only the turn signal lamp flashing, according to each scenario and at various levels of ambient illuminance.

Results

- In the situations assumed in this study, people do not notice an approaching vehicle in weak daylight condition, even if the vehicle flashes ordinary turn signal lamps.
- The lamp luminosity that allows all road users to notice the road projection under the experimental conditions in this study was 6,350 cd for a projection distance of 3 m and an installation height of 0.7 m. In the future, we will continue evaluating the prototype by mounting it on vehicles and examining its effectiveness. Further, we will study the effective light distribution of road projection in other scenarios, working toward the legalization of road projection lamps.

ZKW’s Klädtke: 5S to Summarize the Future of Lighting

To open the session of *«The future of the automotive lighting»* at ISAL, Ralf Klädtke makes a talk on his vision .
He starts by automotive evolution: The car of the future is electrified, autonomous, shared, connected and yearly updated, the foreseeable trends suggesting that autonomous and shared mobility will increase greatly by 2030.

Coming to lighting, he presents the 5S which summarizes the market trend :
Smaller, Safer, Smarter, Sustainable, Style

• Smaller

We see the evolution, model after model for every brand.

• Safer

Road projections, Animations and pictograms to communicate.
Light-in-motion-effects, exterior displays.
Sensor integration 360° at the 4 strategic corners.
Artificial Intelligence, ECU, SW, Sensor Fusion..

• Smarter

High resolution ADB using camera and artificial intelligence.
Expected marketshare of 15% by 2025, growing strongly in all market segments.
High resolution DLP, µLED, Laser Scanner.

• Sustainable

High efficiency and low weight lighting technology optimizing vehicle power consumption and range with minimized environmental impact
High efficient reflector module

• Styling

Exterior displays and supplemental lamps.
Light-in-motion effects & Animations for individualization.

To conclude, Ralf presents the market trends :
"Digital" lighting for conventional cars & AV New
Communication Functions
Communication Car to Driver/pedestrians
Construction guidance lighting

DRIVER ASSISTANCE NEWS

Blickfeld's Long-Range MEMS Lidar

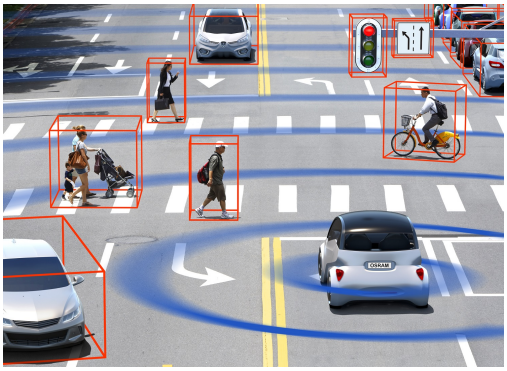
German sensor developer Blickfeld have launched a new a MEMS-based solid-state lidar for the detection of objects up to 250 metres away.

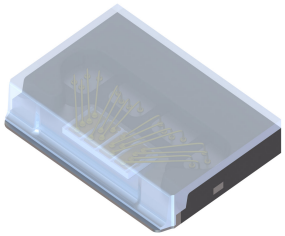
Blickfield say their Cube Range sensor is a robust, powerful 3D solid-state lidar for the mass market, with tight resolution of 0.18° and a range of 150 m with 10% reflection; up to 250 m with higher reflection. The core of the new sensor is a proprietary silicon MEMS mirror embedded in a coaxial structure based on commercial standard components.

With the launch of the Cube, Blickfield now offer a full lidar suite for autonomous vehicles. Co-founder and CEO Dr. Mathias Müller calls the Cube central to his company's "extraordinary lidar which, thanks to its outstanding properties, is particularly suitable for driving at highway speed because it provides reliable environmental images even under these conditions".

New Osram Lidar Lasers for AVs

Two new Osram infrared high-power SMT components for lidar extend options for system developers. They offer 125 watts per channel and an efficiency of up to 33%. Osram introduced the first 905-nm laser to the market more than ten years ago; they say it is today's most commonly used wavelength for automotive lidar.





The four-channel version of Osram's new laser features a chip with four emission areas for 480 watts of optical power. This enables a much longer detection range than other lasers, yet with dimensions of just 3.35 × 2.45 × 0.65 mm, it's only slightly larger than the single-channel-version at 2.0 × 2.3 × 0.65 mm.

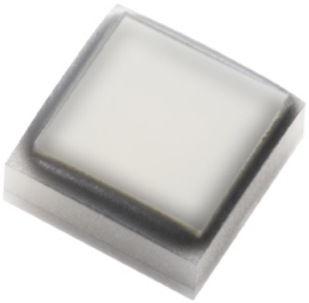
The two new high-power lasers expand Osram's photonics portfolio for lidar applications and offer ease of use for the customer in their system integration. Osram Opto Semiconductors product manager Rena Lim cites the new lasers' high power and extended duty cycle range of up to 0.2% in as the reasons for equipped lidar systems to "reach a longer detection range in the application and better resolution".

Ouster Team Up With Nvidia

Ouster Lidar, a provider of high-resolution lidar sensors for AVs, robotics, and mapping, have teamed up with Nvidia to advance development of commercial AVs.

Ouster are working with Nvidia to provide lidar sensors for use in level-3 to -5 autonomous driving systems being developed by major global automakers, targeting production in 2022.
The lidar perception system, based on the high-resolution Ouster OS2 lidar, runs on the Nvidia Drive AGX platform. Nvidia's full-stack software delivers 360° sensor processing, mapping and path planning.
For autonomous driving systems, Ouster's structured lidar data can increase input processing speeds up to a hundredfold over traditional unstructured lidar data when using vector processors like Nvidia's GPUs. This enables faster object recognition and lower power requirements for the autonomous driving system.

IREDs For Face Recognition From Everlight



Everlight have released three new infrared emitters for automotive applications.
Their VS-FI3535 series is suitable for driver facial recognition and can perceive the driver's eyes and facial expressions to easily identify gaze focus, daze or distraction. The ALS-DPDIC17 series can be used for automatic dimming of rear view mirrors and dashboard lights; it's in a tiny package of just 2 × 2 × 0.63 mm with 16-bit resolution, 160mA operating current, and a sensing luminance range of 0.0033 to 83,000 lx. And the IR12-21C/TR8-AM, paired with the PD12-21C/TR8-AM, provides improved accuracy and sensitivity in touch screens—even when the user is wearing gloves.

Aptiv, Hyundai in AV JV

Aptiv (formerly Delphi Automotive) and Hyundai are forming an autonomous driving joint venture

to advance the design, development, and commercialisation of level-4 and -5 autonomous technologies, furthering the partners' leadership position in the global self-driving ecosystem. The two companies will begin testing fully driverless systems in 2020, and plan to have a production-ready autonomous driving platform available for robotaxi providers, fleet operators, and automotive manufacturers in 2022.

As part of the agreement, Hyundai and Aptiv will each have a 50% ownership stake in the JV, valued at a total of USD $4bn. Aptiv will contribute their autonomous driving technology, intellectual property, and approximately 700 employees focused on the development of scalable automated driving solutions. Hyundai operations Hyundai Motors, Kia Motors, and Hyundai Mobis will collectively contribute vehicle engineering services, R&D resources, and access to intellectual property.
The new JV will be led by Karl Iagnemma, president of Aptiv's Autonomous Mobility division. That's headquartered in Boston, with technology centres across the USA and Asia. The JV's Korean operations will serve as a key technology centre as well as a base for vehicle modification.

India Nixes AVs on Jobs Concern

India's Transport Minister Nitin Gadkari says as long as it's up to him, AVs will remain banned in India—not because he thinks they're unsafe or insufficiently developed, but because he doesn't want to risk throwing any drivers out of work.

But is that the real reason? Perhaps not. An analysis in Indian technology news channel Fossbytes suggests there's a world full of data showing that adopting new automation technology actually increases the number of available jobs, and there are more directly pragmatic reasons India isn't ready for AVs: even in built-up areas, "basic infrastructure like fully functional traffic ligths, clearly highlighted [pedestrian] crossings, and traffic signs are not present (...) on a road without proper infrastructure, the AI would be much less competent in its operation.", says the author.

Moreover, because most AVs are EVs, there's another obstacle: India hasn't got much of an EV charging infrastructure.

GENERAL NEWS

Daimler End Combustion Development, Go Full-Steam on EVs

Daimler's recently-introduced latest versions could also be the last versions of their internal-combustion engines. The German giant have ended engine development; from now on, electric vehicles will take precedence. According to German motoring magazine Auto Motor und Sport, Daimler's development chief Markus Schaefer says the resources currently used in the development of fuel-burning engines will be redirected to electric powertrains and batteries—though he didn't rule out this decision being revisited in the future.
The move is evidence that Daimler have accepted that the future is electric and are getting onside with the likes of Tesla, who have shown there's demand for powerful, feature-packed, expensive EVs.

Nissan Recall for Rear Camera Faults

Nissan are recalling 1.2 million vehicles in the U.S., Canada, South Korea, and Israel on account of noncompliant rear-vision camera displays. The recall campaign affects some 2018 and '19-model Nissan Altimas, Frontiers, Kickses, Leafs, Maximas, Muranos, NVs, Pathfinders, Rogues, Sentras, Titans, and Versas as well as Infiniti Q50s, Q60s, QX30s, and QX80s.

The problem: drivers could adjust the rear-view camera display such that the image is no longer visible, and the system would not provide the required default image when the vehicle is put into reverse gear, according to NHTSA documents.
Nissan will update the rear-visibility system software to remedy the condition on affected vehicles.