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Weekly Newsletter

DVN
Lighting & ADAS

NEWSLETTER #763

Editorial

We Must Step Up And Help Seniors Drive At Night

I have half a century's experience in vehicle lighting, and as the years stack up, I am more and more convinced by the message of Dr. Peter Bodrogi—Senior Research Fellow at the Laboratory of Lighting Technology at TU-Darmstadt—who said in his keynote at the 2018 Tokyo DVN Workshop: "The current regulatory requirements are written for young to middle-aged observers, but elderly people need more light and less glare".

That's why I proposed to Geoff Draper, himself also a senior expert in vehicle lighting, to make a report on ageing drivers and how best to help them drive safely and comfortably after dark. What I retain from Draper's great work is that we in the lighting world have a unique opportunity and solution to step up and give senior drivers exactly what Dr. Bodrogi called for: more seeing light and less glare. ADB is an exact match for the prescription; it resolves the 100-year-old conflict between seeing and glare by increasing visibility while also decreasing glare to other road users (and of course, every driver is an "other road user" to everyone else). There's a sturdy argument to be made that ADB ought to be mandated, or—perhaps more quickly possible—included in NCAP ratings to encourage uptake.

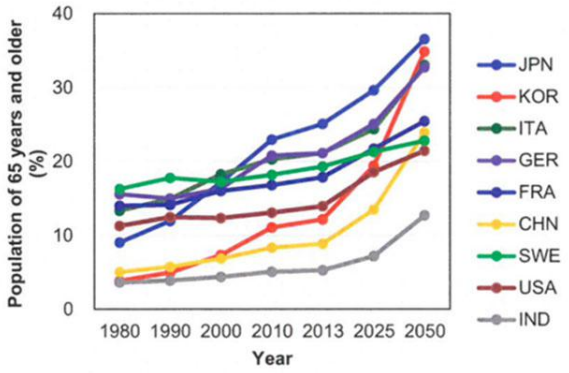
It is (past) time to focus innovative and regulatory effort on the needs of older drivers as there are more and more of them. The way to do that is with the wide proliferation of ADB, just like high/low beam headlamps were rapidly adopted for their giant safety and comfort improvement over the previous single-beam headlamps over a hundred years ago.
We have the responsibility to do this, now let's work on it!

Sincerely yours

In Depth Lighting Technology

DVN Report: Lighting Challenges With Changing Demographics

This report (Worldwide Demographic Development: Opportunities for Automotive Lighting Innovation) presents a review of recent publications, and the potential of new technologies to address issues experienced by the significant 30 per cent of drivers aged over 60 years. These drivers can benefit from lighting solutions tailored to enable them to continue driving at night and retain the independence and dignity that goes with mobility, as long as they remain medically and ophthalmologically fit to drive.



That the population of drivers is increasingly older may be well known to the vehicle lighting community, but there is no clear understanding of how this relates to the development of lighting systems and how it impacts on night driving.

In his keynote speech at the 2018 DVN Tokyo Workshop, Dr. Peter Bodrogi said "the current regulatory requirements are written for young to middle aged observers, but elderly people need more light and more contrast with less glare. In comparison to young people (around 25 years), older people (60-66 years) need double the contrast and double the illuminance, and half the glare load, in order to have the same visual performance". As an example to put this in perspective, the UK Government's official 2022 statistics show that of all UK drivers holding a full licence—40.6 million of them between 17 and 85 years old—30 per cent of them, that being 12 million, are aged between 60 and 85 years, with most being fit to drive and wanting to remain mobile.

Although more research is required, this report identifies how lighting and signalling regulations may be adapted to meet the challenges posed by the changing demographics. Of course, the work to define the actual performance requirements will require considerable effort by expert organisations including GTB, in conjunction with the UN Working Party on Lighting and Signalling (GRE).

Four key points from the report:

Age 20 Age 60 Age 75

- There is a need for the vehicle lighting community to consider how to address the demographic issues of ageing population. It is a question of industry willingness to add new functionalities for all vehicles and there are no major regulatory barriers.
- The question remains, concerning how technology can be made available to address the specific problems of the ageing drivers. This is not straightforward because many ageing drivers will not be buying new vehicles, or will be buying small cars that do not have ADB installed.
- To address the problem of the ageing driver, an 'additional visibility' function should be introduced to provide more contrast and overcome adaption issues in oncoming-glare situations. In addition to incorporating this function as part of and ADB system, there may be an opportunity to develop a retrofit headlamp or other

device to provide extra foreground illuminance that can be optionally activated as required by the driver.

- It should be stressed that the vehicle lighting community should focus exclusively on finding lighting solutions to assist elderly drivers. The task therefore is to focus on the means to reduce the glare load, increase contrast and increase road illumination. It is the role of governments to regulate the requirements for frequent eye tests to ensure that drivers have regular corrections to their lens prescription (and to detect cataracts so they can be corrected!)

ADB: MORE SEEING, LESS GLARE.

Considering these four items, ADB is likely to provide the platform, and it should be relatively easy to add additional functionality to new vehicles equipped with ADB and perhaps also existing vehicles in circulation. There are sound arguments that ADB should be *mandated*, though it is probably faster and easier to get ADB included in NCAP ratings to encourage uptake.

Lighting News

DVN Study Now Available

LIGHTING NEWS

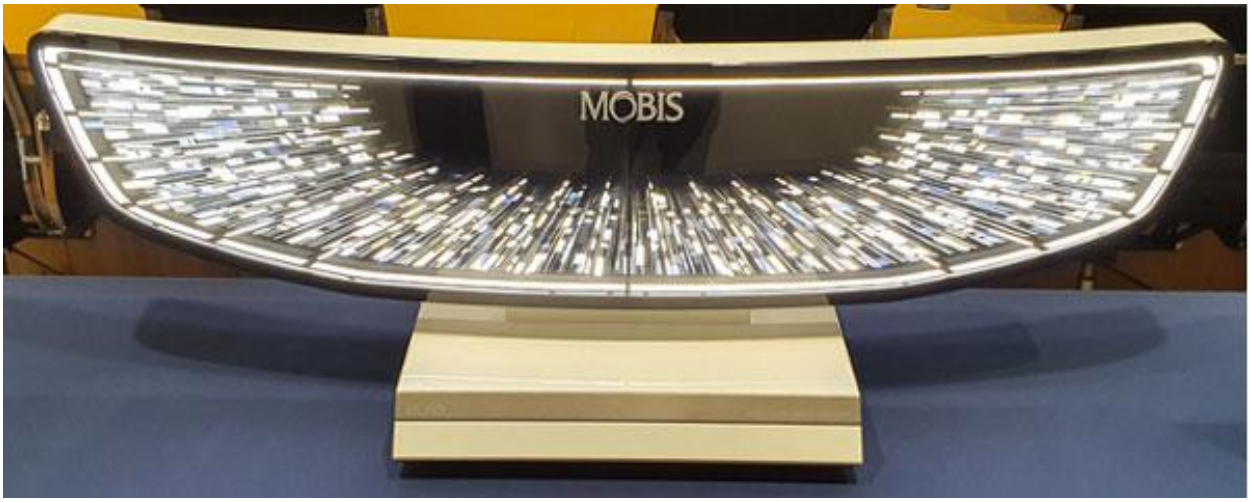
The lighting community is now able to get the electronic booklet and one week later three samples for each order. **DVN Market Forecast on New Lighting Systems—Technologies and Skills to Succeed** presents the market perspective of new lighting elements like illuminated grilles and logos; signal projections; road projections; ADB; laser light sources; OLEDs; communication displays, and more. For each new function, the study shows data-backed market potential forecasts.

Get your copy today, from the **DVN website**. Questions about the study or your order requires special handling? Just **drop us a line**; we'll be glad to help you.

The DVN team of twenty people work tirelessly to help the lighting community; **informing** with weekly newsletters; monthly reports, and yearly studies; **networking** with Workshops, Conferences, and Seminars, and **promoting** achievements in the exhibition booths and on DVN website pages presenting innovators and innovations.

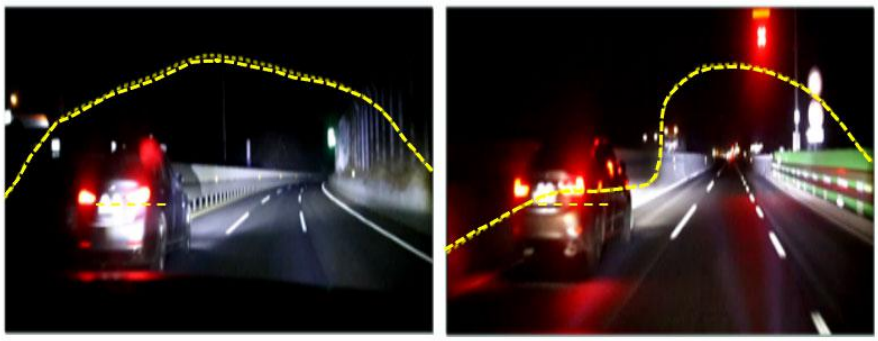
New technologies from Hyundai Mobis

LIGHTING NEWS



Hyundai Mobis is developing various technologies to prepare the era of AV.
Three areas of innovation: ADB control systems that improve ADB performance through interworking with ADAS sensors, thin headlamps from LED modules equipped with prismatic optical systems, and grilles with 3D image applicable to EV.

Advanced ADB



CURRENT DEVELOPMENT RESULT
GLARE BY OVERTAKING VEHICLE (RIGHT TRAFFIC (E, US)

CURRENT DEVELOPMENT RESULT
GLARE ON THE CURVED PATH(EUROPE USA)

The existing ADB system has caused glare according to driving and road conditions by applying only information from the front camera.
As a way to improve this, Mobis proposed a new control system that connects ADAS sensors such as rear radar and navigation added for autonomous driving with ADB.
This system is significant in that it improves ADB performance without increasing costs.

For example, overtaking cars and curved paths were predicted to prevent driver glare and improve safety.

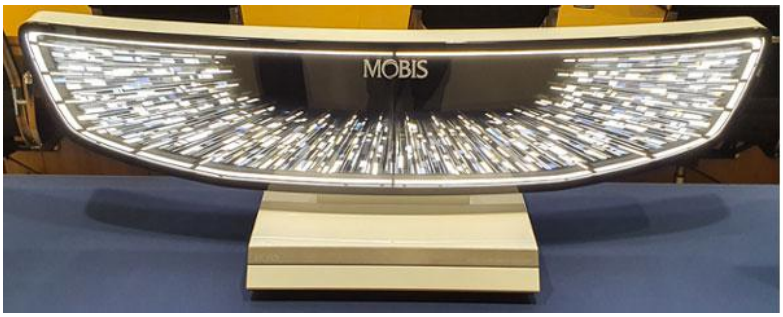
Thin Prismatic Headlamps

The prismatic optical system is characterized by Mobis' unique lens technology that emits DRL and low beam from the same surface.

This combination of DRL and low beam functions enables miniaturization of headlamps. The height of the lens may be reduced to 12 mm, and various heights of the lens may be provided according to the needs of the customer.

Lenticular Grille

In electric cars, the role of the grille is changing to become a design element.



In this trend, the grille lamp announced by Mobis applies a lenticular film to implement various stereoscopic images even with a thin module thickness.
The image of the lenticular film is superior to the existing optical system in that it can be changed at the request of the designer.
It is also an advantage that different images can be seen depending on the location.

Odelo Win Plaudit for Audi Taillight

LIGHTING NEWS

Odelo, for their taillight on the Audi A6, have been awarded the GKV/TecPart Award. It's presented by the Verband Technische Kunststoff-Produkte e.V. industry association to honor outstanding and innovative technical products; modules, and component groups made from plastic. The simultaneous Branson laser welding process allows graduated components made from PMMA (polymethyl methacrylate, "acrylic", such as Plexiglas™) to be joined without visible seams.

The two-part taillight of the Audi A6 is assembled from two bonded, graduated components. An arrow-shaped signature light guide reinforces the dynamic form. This light guide is made from light-scattering Plexiglas Satinice, which provides homogeneous light diffusion without any hot spots. The cover is manufactured from signal red Plexiglas.

Branson's simultaneous laser welding process, introduced in 2016, joins the outer edges of the components via laser beams directly and without any vibrating relative movement. This allows the external edges of the component to be joined directly and without vibrating relative movement by means of laser radiation, thus allowing the interior design

of the combination rearlight to be connected directly to the weld seam. These weld connections provide considerable visual and mechanical quality.

During the development phase, Odelo used comprehensive optical simulations to determine how a homogeneous transfer of laser output could be achieved while avoiding localized overheating or non-welded spots at the same time. This also requires maximum precision in the injection molding of individual taillight components to ensure that the parts are highly accurate at the joining zone.

Forvia's Commercial-Vehicle Solutions at IAA Transportation 2022

LIGHTING NEWS

Faurecia and Hella will appear together for the first time under their umbrella brand Forvia at this year's IAA Transportation in Hanover. The trade show is the world's premier platform for the commercial vehicle industry, and it's being held this coming 20-25 September. Forvia, the world's № 7 automotive supplier with around 150,000 employees, will showcase their expertise and broad product range for advanced; safe, and sustainable mobility in the commercial vehicle business.

The central highlight of Forvia's presence at the trade fair is a demo truck wherein booth visitors can experience Forvia's innovations; the truck model is equipped with around 30 lighting and electronics products from Hella, as well as a complete hydrogen storage system from Faurecia. Furthermore, it boasts a world premiere: a seat platform jointly developed by Faurecia and Sears Seating.

At the joint trade fair stand, Hella will present a brand-new, modular full-LED rear combination lamp for 24-volt trucks and trailers. The patented LED light curtain, a full-LED rear combination lamp, can be customised according to vehicle makers own design specifications with printed graphic structures such as dots; stripes, and shapes.

Hella will also be showing their new modular LEDayFlex III light system, which features DRL, position light, and turn signal functions and is built with innovative EdgeLight technology.

Driver Assistance News

How to Win the AV Race

from Automotive News Europe - Ricky Hudi, Guest columnist

DRIVER ASSISTANCE NEWS

RICKY HUDI, CHAIRMAN OF THE AUTONOMOUS

As the autonomous vehicle industry finds its way toward full autonomy, it will need to work more collaboratively on some of the most safety-critical aspects of these vehicles to avoid chaos.
In order to ease a transition in the industry and enable the delivery of the safest possible autonomous mobility safety in a productive manner, we must first define a common set of principles and standards globally. This not only will reduce the time and financial investment required of individual companies, but also will reduce risk.

What slams the brakes on L^4 autonomy?

We are at a crossroads in the development of the key software and hardware underpinning safe electronic vehicle architectures, artificial intelligence, lidar sensors and similar technologies as well as the regulations that will oversee the industry. The secretive, siloed development practices that served the autonomous vehicle industry well on innovation now threaten to slam the brakes on future advances as we approach L^4 autonomy. While individual contributions can come to market quickly, they prevent standardisation and best practices from forming. Many companies are duplicating efforts to develop the security platforms that will keep these vehicles protected from hackers, malware and other threats to software that could cause an auto to malfunction, crash or worse. Collaborating as an industry on such important foundational technologies will not only help the industry align on standards and practices but also can distribute

development costs among multiple companies and bring the industry as a whole, rather than individual players, forward.

A sea change in automotive development

Such collaboration would represent a sea change in the automotive industry's approach to development in which an automaker and its suppliers cooperate to put competitive and differentiated solutions to market. To reach L^4 autonomy, as it is programmed to stop itself should any system fail, will require collaboration across the wide ecosystem of vehicle manufacturers, standards bodies, government and regulatory organisations, as well as industry organisations. This type of wide industry collaboration on safety technology will open new business models and support the extension of the autonomous vehicle's life cycle through methods such as over-the-air software updates. Showing solidarity and a willingness to work together to advance AV technology would also demonstrate to consumers that the industry is working in the best interest of society. Working together will ensure that the industry arrives at its ultimate destination—fully autonomous vehicles—safely.

Ricky Hudi is chairman of The Autonomous, which seeks to bring together the world's major mobility stakeholders to shape the future of AVs

Ibeo's Small, Sharp Lidar Sensor

DRIVER ASSISTANCE NEWS

The IbeoNEXT lidar unit uses multiple sensors and combines their data with a perception-software package running on the ECU to offer 360° detection of the space around the vehicle—perfect for AVs. This product can be used in a number of applications designed for the automotive industry from traffic jam assistants to autonomous driving.

It's a solid-state lidar sensor without moving parts; instead, it is entirely based on semiconductor technology. Because of its compact design and light weight, it can also be integrated easily into a multitude of vehicle platforms and design. The sensor generates a 3D point cloud and an intensity image similar to a photo taken by a black-and-white camera—this is what provides the fourth dimension. The solid-state technology inside the lidar sensor gives an impressively long range of 250 metres, and high spatial resolution of just 0.05 degrees.

The IbeoNEXT consists of three major parts: Ibeo’s solid-state lidar sensors; lidar domain ECU (LDE), and proprietary perception software. The sensors generate an integrated point cloud and intensity image of the environment. These provide essential information on the position of every object in the sensors' field of view and are directly transferred to the LDE. The perception software running on the LDE continually processes the raw sensor data to classify all surrounding objects as vehicles, infrastructure, or lane markings, and determine free space. The compiled results are then transferred to the vehicle’s software, enabling a host of Level 3 automated driving functions and beyond.

Ibeo’s production site in Brest, France, was set up in collaboration with partner ZF Autocruise. Their combined efforts mean that the sensor is now ready for serial production.

Innoviz Lidar for All VW Group Cars With AD Capabilities

DRIVER ASSISTANCE NEWS

Israeli lidar startup Innoviz will supply lidar sensors and perception software to all vehicles with automated driving capabilities within Volkswagen group brands. Innoviz will work directly with Cariad SE, VW's automotive software company, to integrate Innoviz technology into upcoming VW vehicles.

VW haven't yet revealed which models will first be built with Innoviz lidar, but have been actively boosting their ADAS and AD capabilities. Earlier this year, Cariad and Bosch teamed up to develop software for automated driving for use in VW's cars.

Innoviz say the VW program, which kicks off with a forward-looking order book of USD $4bn, takes the startup's total estimated sales up to $6.6bn.

Innoviz say they can affordably provide up to 300 m of visual range using a 905-nm laser. Rival lidar supplier Velodyne also use a 905-nm laser, and likewise say they can reach up to 300 m of range, but Velodyne's most performant lidar is 128 lines; Innoviz's best has 600 lines—both figures at up to 20 frames per second.

New EU Rules to Improve Safety, Enable Fully Driverless Vehicles

DRIVER ASSISTANCE NEWS

The new GSR (General Safety Regulation) takes force this month. It introduces a range of mandatory advanced driver assistant systems to improve road safety and establishes the legal framework for the approval of automated and fully driverless vehicles in the EU. The new safety measures will help to better protect passengers, pedestrians and cyclists across the EU, expectedly saving over 25,000 lives and avoid at least 140,000 serious injuries by 2038.

As the coming into force of the GSR empowers the European Commission to complete the legal framework for automated and connected vehicles, this Summer the EC will deliver technical rules for the approval of fully driverless vehicles, making the EU a pioneer in the field. These will help to increase public trust; boost innovation and improve the competitivity of Europe's car industry.

The new measures introducing safety features to assist the driver include:

- For all road vehicles: intelligent speed assistance, reversing detection with camera or sensors, attention warning in case of driver drowsiness or distraction, event data recorders as well as an emergency stop signal;
- For cars and vans: Additional features such as lane keeping systems and automated braking;
- For buses and trucks: technologies for better recognising possible blind spots, warnings to prevent collisions with pedestrians or cyclists and tyre pressure monitoring systems.

The rules will first apply to new vehicle types starting on 7 July 2022. Two years later on 7 July 2024, all new vehicles will be covered (even models introduced before the advent of the new rules). Some of the new measures will be expanded gradually through 2029 to cover different kinds of road vehicles.

Actasys, Webasto in Sensor-Cleaning Pact

DRIVER ASSISTANCE NEWS

Sensor-cleaning specialists Actasys have signed a MoU with Webasto. It's the first step in a partnership to ensure the functionality of Webasto's RSM (roof sensor module) under all weather and environmental conditions through the integration of Actasys' cleaning system.

Webasto is advancing innovation of roof systems with their RSM, using the roof as an ideal location for sensors such as lidars; cameras, and radars for highly automated and autonomous driving.

Actasys CEO Miles Flamembaum says "Maintaining the visual clarity of sensors when they are exposed to adverse weather conditions is essential to enabling safe and optimal operation of every vehicle with an assisted driving system. Sensor cleaning is a relatively new field with rapidly growing demand due to increasing reliance on sensors. Actasys have a deep understanding of sensor cleaning, with tools and data to develop industry standards, and provides ActaJet as a unique solution. As a result of this exciting partnership, we will implement our vision for sensor cleaning with Webasto's RSM to solve critical problems" faced by automakers.

The ActaJet cleans and maintains the visual clarity of optical sensors with an electronically-controlled array of small actuator cartridges that provide strong jets of air to clean the surface of sensors during vehicle operation. ActaJet is unique as it is not a centralized system, but distributed and scalable, integrating actuators with each sensor. The system is controlled by software developed by Actasys and embedded into a vehicle ECU. As opposed to other solutions, ActaJet uses air-based cleaning. This approach significantly reduces power and liquid consumption in the cleaning process, while also alleviating space and mass concerns associated with large cleaning fluid tanks.

Actasys' mission is to enable vision sensors to function optimally under all weather, environmental, and operating conditions. To maintain high fidelity data and reduce maintenance costs, Actasys provide innovative hardware for sensor cooling and cleaning combined with proprietary software to solve three critical sensor needs. Actasys work with automakers and tier-1s to enable the safe and optimal operation of ADAS and autonomous vehicle systems.

General News

Musk's Dream: 2 Million Unit Run Rate by End of '22

GENERAL NEWS

MUSK CLAIMS THE CYBERTRUCK WILL START PRODUCTION NEXT YEAR IN TEXAS

Tesla CEO Elon Musk told shareholders that the much-scrutinised EV maker will have an annual run rate of 2 million vehicles by the end of this year and will continue to build new factories. Tesla are targeting an annual output of 20 million vehicles a year, which Musk said would require 10 or 12 “gigafactories” with capacity of 1.5 to 2 million vehicles each.

Total Tesla production in 2021 was just over 1 million vehicles, but Musk said that the current run rate was 1.5 million vehicles from four factories: Fremont, Shanghai, Berlin-Brandenburg, and Austin, Texas.
“If all goes as planned, we will be exiting 2022 at a 2 million annual run rate,” Musk said, adding that production in Tesla’s two newest factories, in Germany and Texas, was facing “10,000” small problems that were being solved “one at a time.”

Tesla’s Cybertruck, Musk claimed, is scheduled for start of production in Texas in the middle of next year, and its pricing and specifications have changed since reservations opened in 2019.