Tue, 26 March 2024
Weekly Newsletter

DVN
Lighting & ADAS

NEWSLETTER #848

Editorial

Detroit DVN Workshop Docket V1—Take A Look!

Take a look at the DVN website, and you'll **find** a newly-published preliminary docket for the next DVN event; the US Workshop '24 on 11-12 June. We are back to Michigan, near Detroit, after a change-up last year in California.

We have already confirmed 50 lectures in four sessions: Design, ADB, EE architecture, and Front & Rear Fascia (including lit grilles and grilleboards). 30 companies have already signed up to exhibit their innovations, technologies, products, and services. This will be the first DVN event for a lot of them; we feel this really shows the current-day vitality of the vehicle lighting and driver vision sectors (and we humbly appreciate what it says about the attractiveness of DVN's value proposition!).

We are now focusing on the organization of the three panel discussions—ADB, Regulation (led by GTB) and Design—and of the **first night drive experience** during a DVN event! We will have a closed road starting at 10 pm to try out new lighting technology, including US-spec ADB. You won't want to miss this event; **register** while there's still space.

Paul-Henri Matha
DVN Chief Operating Officer and Lighting General Editor

In Depth Lighting Technology

GTB Winter '24 Intermediate Session

GTB
The International Automotive Lighting and Light Signalling Expert Group

From 19 to 23 February, GTB met in The Hague (Netherlands) for the winter intermediate session. More than 40 experts attended from 12 delegations worldwide. In addition to the dense schedule of working group meetings, an open forum was held.

GTB Open Forum: Environment and Sustainability

GTB decided to organize a dedicated forum due to the increasing relevance of this subject at the WP.29 level, especially in context of the UNECE Inland Transport Committee **climate change mitigation strategy**. GRE, like all the other GRs, has been asked to contribute by proposing the necessary amendments to regulations within the GRE remit.

More than ten lectures were presented by stakeholders, including industry and academia, addressing both the in-use phase and the life cycle assessment (LCA). After each presentation was some time for Q&A and, at the end of all the presentations, a thoughtstorming activity involving all the participants followed by a general discussion and conclusions.

Some of the main takeaways:

- Even if vehicle lighting is not the main contributor to the environmental impact of a vehicle, it has an important effect on CO_2 emission over the life of the vehicle.
- Extending the use of DRL instead of low beam and reducing the luminous intensity of low beam under certain conditions could be concrete solutions for saving energy.
- Improving the optical design of rear lamps may considerably increase their efficiency and reduce power consumption.
- Setting a 'power budget' per lighting function could encourage the design of more energy-efficient solutions.
- LED retrofitment can accelerate the LED transition by targeting vehicles in use. This could allow to anticipate the achievement of important CO_2 and waste reduction objectives.
- Life cycle assessments demonstrate the use-phase as dominant contributor for automotive lighting; saving energy during this phase delivers the most significant environmental impact.

The big challenge for the lighting experts is how to reduce power consumption in vehicle lighting functions without compromising traffic safety. To this end, independent research studies are essential to assess the effective energy saving measures needed to improve the regulations. The role of GTB will be essential.

Main results of the GTB Working Group Meetings

WG Front Lighting was mainly focussed on the finalization of the proposal to amend UN Regulations № 48 and 149 for failure signalization requirements in case of passing-beam produced with multiple / high-resolution light sources.

WG Installation discussed about aligning some of the mounting requirements for lamps (functions), in particular: Removal of the 600-mm requirement for M_1 and N_1, to allow full-width DRLs like front and rear position lamps; Alignment of retro-reflector maximum height requirements whether or not it is grouped with another lamp. The WG also continued the discussion about a revised proposal to introduce driver assistance projection (DAP) of predicted trajectory in R48.

WG Safety and Visual Performance reported on the GTB research studies currently in progress, in particular Fudan University's study on car body lighting focused on the side contour of the vehicle, and TU Darmstadt's study on energy saving. The group also considered how to increase awareness of the HSPR (headlamp safety performance rating) to promote better performing lighting systems, such as ADB, that improve visibility without increasing glare.

WG Signal Lighting reinitiated work on the marker lamp for ADS (Autonomous Driving Signal), in response to a recommendation from the GRE Chairman in the January 2023 GRE autonomous vehicle signalling requirements (AVSR) task force meeting. Prior GTB work from 2018 that had been put on hold pending input from WP.29 and GRVA was reviewed in the context of recent input that had been collected from GRE contracting parties. A discussion document was prepared incorporating the latest information and submitted for review in the March 14 GRE AVSR meeting.

WG Light Sources adopted the proposal for the UN Regulation № 128 LED light source category LW7. The LW7 is a further extension of the R128 family of modular 'LED bulb' light sources with an IEC standardized bayonet interface. The proposal is being forwarded to the GTB Committee of Experts meeting that will be held in Charlotte, North Carolina in June.

Future GTB Sessions

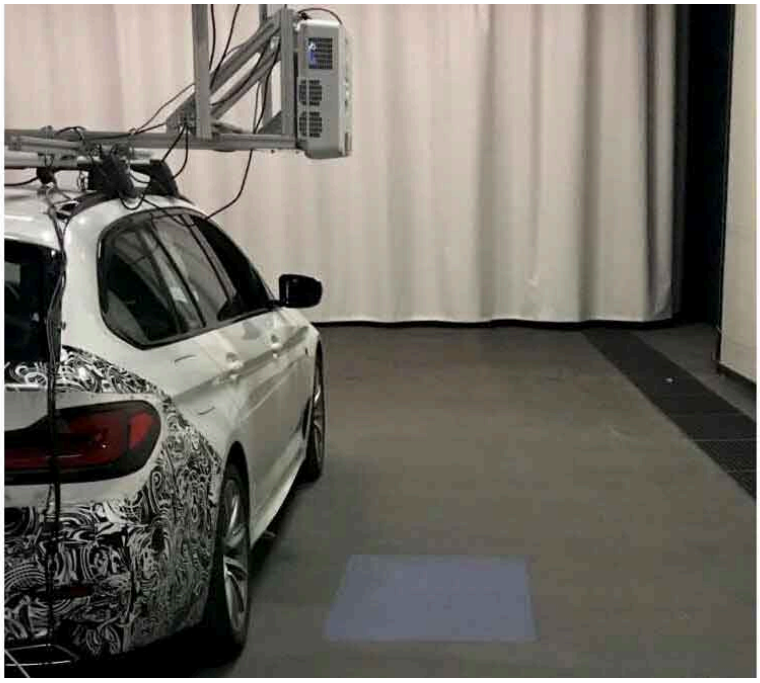
3-7 June 2024 GTB 135th session – Charlotte, North Carolina (USA)
23-27 September 2024 GTB Intermediate WG Meeting session – Torino (Italy)
18-22 November 2024 GTB 136th session – Salzburg (Austria)
February 2025 GTB Intermediate WG Meeting session – Date and venue TBD
Spring 2025 GTB 137th session – Spain, date and venue TBD

For further information, see the **GTB Website**

Lighting News

TUD-BMW Team Publish Ground Projection Analysis

LIGHTING NEWS



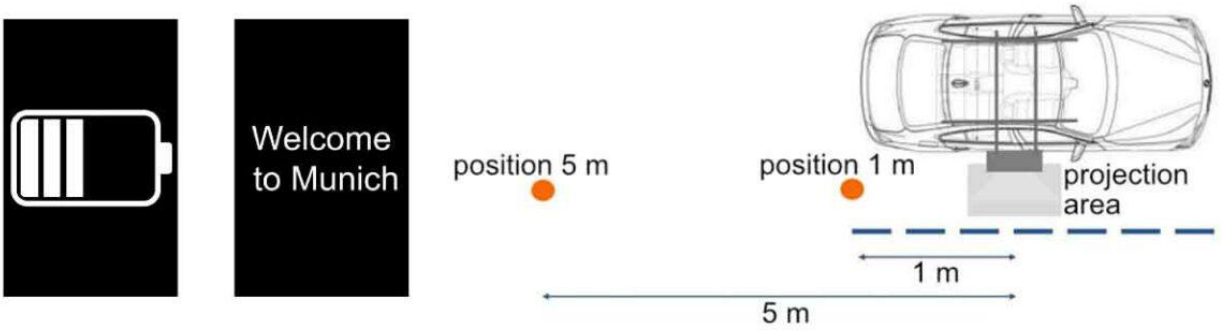
An interesting paper by a coöperative team between BMW and TU Darmstadt was **published** in the January 2024 issue of Applied Science, about the visibility requirements for the near-field projections useful for communication between highly automated vehicles and vulnerable road users.

The paper, An Analysis of Visibility Requirements and Reaction Times of Near-Field Projections, is by Tabea Schlürscheid, Alexander Stuckert, Anil Erkan, and Tran Quoc Khanh.

Previous studies have investigated the technical requirements for near-field projections and demonstrated that a good contrast and a high level of illumination reduce the reaction time. However, the impact of the text- or symbol-based presentation content was still unclear. This psychophysical study brings some answers about the necessary detection probability for symbol- and text-based projection in the near field of a vehicle.

Although displays mounted on AVs are a possible solution for communication and prevention of accidents, ground projections have advantages to prevent accidents or conflicts with vulnerable road users by illustrating a projection directly in their field of view.

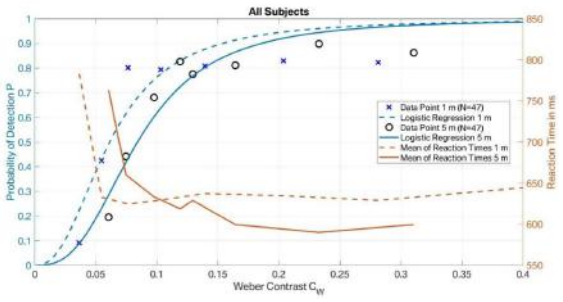
The study was done in a light tunnel with 47 subjects and a 3D LCD laser projector under an ambient light of 20 lux. Two images were projected: a battery symbol and a welcome message in English, while the subjects were at one or five metres from a projection area varying with eight greyscale levels.



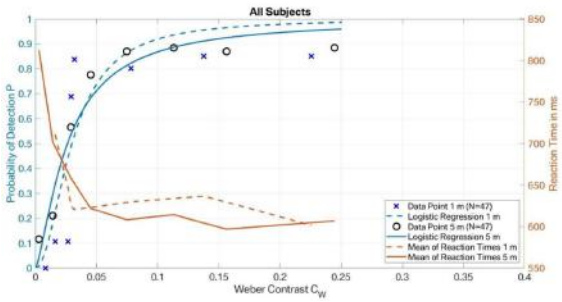
The researchers first measured the contrast level in relation to light projection intensity varying from 23 to 46.5 lux in the environment of 20 lux. The contrast is nearly linear with the intensity over a large range, especially at a distance of 5 m. Naturally, the contrasts at a distance of 5 m are lower than at a distance of 1 m for the same intensity settings, which shows the distance dependency of the Weber contrast. For example, the symbol indicates a maximum contrast of 60.24 at a distance of 1 m and a maximum contrast of 57.99 at 5 m. For the text, the maximum contrast is 73.06 at a 1 m distance and 53.59 at a distance of 5 m.

Then they compared the detection contrasts needed for a 90-per-cent detection probability for the text and symbol, at the same 1- and 5-metre distances. For the symbol, a contrast of 0.089 is needed at 1 m, and 0.1253 at 5 m, so the longer viewing distance requires 40 per cent greater contrast.

For the text, a contrast of 0.111 is required at 1 m, and 0.154 at 5 m, so a 38-per-cent increase in the detection contrast with increasing distance. The needed contrast is also significantly higher for text than for symbols at both distances; there is an increase of 24 per cent at 1 m and 23 per cent at 5 m.



Curves for text



Curves for symbols

These curves show dashed 1-metre and solid 5-metre blue logistic regression curves of detection probability and corresponding blue-cross/black-circle mean data points, as well as orange mean reaction time curves over Weber contrast—averaged over all subjects.

The illuminance required for detection is significantly higher at 5 metres than at 1 metre for both text and symbols.

When looking at the different contents, there is a significant difference at 5 m: The text requires significantly higher illuminance levels for detection than the symbol. At 1 m, the illuminance levels of the content text are higher than those of the symbol, but the difference is not significant.

This study finds that for a near-field projection, for a given detection probability, the needed Weber contrast of a symbol-based message is approximately 25 per cent lower than that of a text-based content, independent of the observation distance, though the reaction times saturate for both types of content in the 600- to 650-ms range. This preference for symbol-based content has an advantage over text-based content worldwide, not only because of the lower contrast and greater universality of comprehension but also because, for example, Chinese characters are more complex than English characters and could require even greater contrast.

The researchers say further research should focus on the clarity and comprehensibility of these symbols because this subject study only investigated detection, not recognition.

BMW's Neue Klasse X

LIGHTING NEWS

The Vision Neue Klasse X is the SUV version of BMW's Vision Neue Klasse sedan released last fall. This concept could eventually morph into an iX3 model. We can consider this concept car between the Vision Neue Klasse sedan and a mass production vehicle. A lot of details are put into the lamps' 3-dimensional design.

The kidney grille and the rear BMW logo light up as the driver approaches the vehicle.

Driver Assistance News

Stellantis Ventures Invests in Breakthrough, Cost-effective LiDAR Technology for Advanced Driver Assistance Systems

DRIVER ASSISTANCE NEWS

Stellantis Ventures, the corporate venture fund of Stellantis N.V., today announced it has invested in SteerLight, the developer of a new generation of high-performance LiDAR (Light Detection and Ranging) sensing technology. Employing silicon photonics technology, which combines a universal semiconductor material with the speed of photos, the SteerLight LiDAR senses the surrounding environment in three dimensions with higher resolution and precision, and at a lower volume production cost, than currently available LiDAR systems. The technology has the potential to give drivers of future Stellantis brand vehicles better performance in a variety of advanced driver assistance systems (ADAS), including automated driving.

“A central aspect of our Dare Forward 2030 initiatives is identifying groundbreaking technologies that deliver substantial value to our customers on a large scale,” said Ned Curic, Stellantis Chief Engineering & Technology Officer. “Automated driving enhancements remain a top priority at Stellantis. The game changing work at SteerLight can enable enhanced and widespread ADAS applications.”

“We see a great benefit from having Stellantis’ corporate venture fund recognize our innovation so we can unlock large-scale adoption of LiDAR for industrial and mobility applications,” said François Simoens, co-founder and CEO of SteerLight. “Our new LiDAR technology is key to support new services in the automotive industry, and we are looking forward to working together to advance the next generation of vehicles.”

SteerLight, a spinoff of the French CEA-Leti technology center, employs Frequency Modulated Continuous Wave (FMCW) LiDAR based on silicon photonics technology that puts the system on a microchip. The system is robust (no moving parts) and compact, maximizing flexibility for vehicle engineers. It overcomes challenges of today’s LiDAR technology for vehicles – component size and high cost. The FMCW technology provides highly accurate depth and velocity data while resisting interference from the surrounding environment and other users.

Volkswagen moves to production of self-driving ID.Buzz

DRIVER ASSISTANCE NEWS

Volkswagen is the first vehicle manufacturer to develop an autonomous Level 4 service vehicle for large-scale production, initially using technology from Mobileye in Israel.

The aim is to use the self-driving ID-Buzz AD in the commercial sector for robo-taxi and transport services in Europe and the US.

The vehicle has been tested in Germany and the USA by Volkswagen ADMT (Autonomous Driving Mobility & Transport) over the last year. Mobileye will develop and supply software, hardware components and digital maps for the self-driving vehicle using its SuperVision and Chauffeur platforms. This will be supplied by Mobileye and has been under development for autonomous driving since 2021.

In the long term, the Volkswagen Group says it aims to rely on its own complete in-house system. It has a partnerships with Bosch and Qualcomm, as well as with Horizon Robotics in China, and all the driver assistance systems are to be based on the software architectures developed by Volkswagen's Cariad company.

The SDS module supports Level 4 operation where the autonomous vehicle operates self-driving in a defined area such as a city. The SDS has two independent high-performance computers for redundancy as well as 13 cameras, nine lidar and five radar units, and each system is capable of producing 360-degree surroundings.

A constant online connection provides the autonomous vehicles with swarm data from other road users about the traffic situation while updating the three-dimensional maps for safe, reliable, and efficient vehicle control.

"Bringing autonomous shuttles on the road in large quantities requires cooperation from strong partners," says Christian Senger, member of the Board of Management at Volkswagen Commercial Vehicles, responsible for ADMT: "We are developing the first fully autonomous large-scale production vehicle, using Mobileye's digital driver."

General News

Chery Exceed Exlantic

GENERAL NEWS

Chery's Exeed Exlantix ET electric SUV will start pre-sales on 15 April in China. Based on Chery's E0X high-end electric platform, the car has a closed front face, full-width signal lamps, and headlamps hidden in the bumper along with an intelligent signal display just below the headlamp on each side.

The rear also has full-width lighting.
The Exlantix ET as 30 sensors and two Orin-X chips to realize advanced driving assistance capabilities for urban and highway driving.

Wuling Mini EV for 6,400 USD

GENERAL NEWS

SAIC GM Wuling's Mini EV is aimed at young people with its trendy attributes and low price. The latest version, the 'Eggy Party' edition, was released on 23 March. As of last month, the Wuling Mini EV family has sold over 1.2 million units, securing the top spot in the micro pure electric vehicle market and leading the segment’s development.

Like its predecessor, the car retains its cute, round shape and has five colour options. It's a four-seater with an 8-inch touchscreen, oval steering wheel, and driver and passenger airbags. It is powered by a 30-kW motor and 17.3 kWh battery, providing a range of 215 km. The car supports both fast and slow charging, and is priced at C¥46,800 (USD $6,400).

Zeekr Mix Minivan Revealed

GENERAL NEWS

On 22 March, Zeekr released official images of their upcoming Mix minivan. The official unveiling is expected to be at the Beijing Auto Show, which will start on 25 April.

The round design is similar to that of the Volkswagen ID.Buzz, with dimensions of 4,688L × 1,995W × 1,755H mm and a 3,008-mm wheelbase. Its design is said to be inspired by the Tiangong Station, China's operational space station located in the low Earth orbit.

The Mix inherits the Hidden Energy design language and the Zeekr Stargate LED light panel on the front face. For reference, the Zeekr 007 model has an all-in-one 90-inch-long light screen comprising 1,711 high-power LED beads, with a maximum brightness of 10,000 nits.

On the rear, we can see all lamps on the hatchback meaning that hidden lamps have to be fitted inside the car for when the gate is open.

Cupra Brand Is Coming to the United States

GENERAL NEWS

The Cupra brand, established in 2018, is to enter North America by the end of the decade. The plan is to introduce an electric version of the Formentor, although likely based on the next generation. The current crossover is already four years old, so it would be severely outdated by 2030 (SEAT say a facelift for the existing model is set for the coming weeks in the European market).

A larger electric SUV bound for the US market is going to be assembled in North America. SEAT say the unnamed model will be built in Mexico and sold in some East- and West-Coast states as well as some sun belt states.

Volkswagen ID.Unyx in China

GENERAL NEWS

Details of Volkswagen's upcoming ID.Unyx electric crossover have been leaked through the Chinese Ministry of Industry and Information Technology (MIIT) logs, revealing the automaker's plans for a sleek and sporty electric SUV designed for the Chinese market.

Developed by the Volkswagen-Anhui joint venture with JAC, the ID.Unyx has sharp lines and a bold exterior design including a distinctive hood, darkened light units, black wheel arches, and black cladding on the doors and A-pillar.

Marelli's New Interior Innovation Centre in Japan

GENERAL NEWS

Marelli have unveiled their new Interior Innovation Centre (IIC) in Yoshimi, Saitama Prefecture, Japan, picking up the experience of the previous Miyahara location. This integrated facility will be strategic in fostering design-led innovation at speed for the creation of new vehicle interiors solutions aimed at present and next-generation vehicles.

The IIC has established a hybrid team structure, integrating interior engineering, electrical engineering, material engineering, and interior design: experts from different fields collaborate, and inspire each other to generate new ideas and solutions.

The Centre is an environment focusing specifically on innovation: it is independent from the development and production units, while cooperating effectively with them to enhance creativity.

It applies manufacturing based on '3 Reals' theory, a method to determine everything based on three realities: place, product and situation. It is equipped with clay modeling facilities, prototype workspaces, and virtual reality technology to create realistic innovation, taking into account the realization at the actual production lines.

The aim of the IIC is to create next-generation cockpit solutions through the combination of innovative ideas and technologies. To realize this vision, it promotes a series of strategic initiatives.

In addition, it promotes open innovation and active collaboration with automakers and other industries, aiming to create new value through the fusion of inter-industry technologies and ideas. It integrates the latest electronic technologies with sustainable material engineering to promote eco-friendly innovation.

Finally, the IIC fosters a culture that encourages creative thinking and experimental challenges, providing an environment where members can freely propose ideas and fearlessly explore new solutions.