DrivingVisionNews.com
Automotive lighting and driver assistance technologies

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Editorial

Get Your DVN Workshop Expo Booth While You Can!

The next DVN Workshop—the 23rd overall, and the sixth in the States—will be held on 21-22 September near Detroit in Novi, Michigan. It will be dedicated to innovative products and ideas to improve roadway safety at night. The topic is nowhere near exhausted; 600,000 traffic-related deaths happen at night every year round the world, of which about 25,000 in the States—including more than three thousand pedestrians and cyclists.

This DVN Workshop will be a grand expo of how new lighting technologies and functions can improve safety at night, with examples including:

- LED, laser, and OLED technologies to improve visibility;
- ADB to give high beam seeing with low beam glare;
- Road marking functions to help the driver and to inform cyclists and pedestrians;
- Driver monitoring against fatigue or lack of attention and help ADAS transitions,

Presentations will cover not just the innovations themselves, but also the nuts and bolts of how to make these technologies and functions possible with contributions from suppliers and researchers. And with new regulations needed to authorise these new functions and technologies, top authorities and regulators will take the stage for a 2-hour regulatory session.

Presentations at the Workshop will represent automakers, suppliers, regulators, research institutes, and more, including Audi, Ford, JLR, Volvo, and almost certainly GM and Stellantis; Hella, Koito,

Marelli-AL, Valeo, Varroc, and potentially Flex-n-Gate; NHTSA, UMTRI, and IIHS, and a variety of light source suppliers and tier-2 companies.

All in all it will be a unique opportunity for a broad cross-section of the lighting and driver assistance world to showcase achievements, innovations, and ideas to the 250 expected attendees. Expo booths are going fast; if you want one, now's the time to pounce while the pouncing's good. We'll see you there!

Sincerely yours

In Depth Lighting Technology

DVN Workshop Docket: How to Improve Safety at Night

On 21-22 September 2021, six months after the Shanghai DVN Workshop, will come the next DVN Workshop near Detroit in Novi, Michigan—a real, live, face-to-face event with acclaimed speakers and a large spread of expo booths.

The rubric of the workshop is *How to Save Lives in Nighttime Driving*,with topics including driver monitoring, ADB, LED, MicroLED, lighting performance assessment, simulation, testing, measurements, and regulation.

Session № 1, Status of Safety Situation will be focus on general information concerning safety, understanding how darkness affects crash risk, and how to improve the figures. We will welcome top experts in this domain, including Michael Flannagan from UMTRI, John Bullough from RPI-LRC, and Matthew Brumbelow from IIHS.

Session № 2, Automakers' Contribution to Safety Improvement, is dedicated to automakers. Presenters from Audi, Ford, JLR, Volvo, and probably GM and Stellantis will talk about their achievements and ideas to improve safety. At the end of the lectures will be a Q&A session, managed live by session chairman Hector Fratty.

Session № 3, Setmakers' Technology Achievements Concerning Safety will cover technologies to improve safety, including HR-ADB and many more. Presentations will be given by speakers from Koito, Magna, Marelli AL, Valeo, and Varroc. At the end of the lectures, session chair Wolfgang Huhn will manage a Q&A session.

Session № 4, Vehicle Interiors,chaired by Philippe Aumont, will look at the contribution of interior technology like driver monitoring systems to heightened safety. Lectures will be given by Grupo Antolin, Ansys, Faurecia, Xperi, and Radiant, with a Q&A session afterward.

Session № 5, **Regulatory Matters**, is dedicated to the harmonisation of technical requirements for adaptive lighting systems. It will address questions of how to meet the needs of type approval, self-certification, and other mandatory standards, and will explore how we can make progress to develop testing requirements for adaptive lighting that can be adopted by all nations irrespective of the regulatory system that they operate.

In this session, chaired by former GTB President and current DVN Senior Regulatory Adisor Geoff Draper, we will have talks by Davide Puglisi, NHTSA representatives, speakers from vehicle manufacturers, and from a government testing facility, and an exchange of views among noted lighting research associate professors John Bullough and Michael Flannagan. There will be a panel discussion with Geoff Draper, Rainer Neumann, Wolfgang Huhn, and Michael Larsen.

Sessions № 6 on light source innovations and **№ 7 on Technology Enablers for Safety at Night** will see lectures on topics including status and trends of LED, OLED, matrix, and µLED from AMS Osram, Kyocera SLD Laser, Lumileds, Everlight, Samsung, AML Systems, Docter Optics, Covestro, LMT, and ISOQA.

Lighting News

DVN US Workshop - Regulatory Session

LIGHTING NEWS

First introduction by Geoff Draper

I continue to be gratified at the interest in the DVN Workshopregulatory sessions over the last ten years. I am starting to plan the 19th session and we still have much to discuss! As this 23rd workshop will be in the States, I have decided to dedicate the two-hour regulatory session to the harmonisation of technical requirements for adaptive lighting systems with the question of **how to merge the needs of type-approval, self-certification and other mandatory standards.** I believe this is particularly relevant because the current US federal requirements are not up to date and have special needs because of the self-certification approach.

The agenda shown below is a first draft and it will change as I work to find the best internationally-recognised speakers for the presentations and the panel sessions. I will keep you informed as the planning progresses.

Background

Since 2010, DVN Workshop regulatory sessions have been focussed on the need for harmonised technical requirements and how true harmonisation and synchronisation of the various national safety legislation can be achieved.

The UN Lighting and Signalling Working Party (GRE), supported strongly by GTB, has made huge efforts to simplify the technical requirements of the UN Regulations and this simplified structure is now in force in the 59 nations signatory to the UN 1958 Agreement. The first step on the GRE simplification plan was to reduce the number of regulations and also align the technical requirements. Now the second step is underway to make the requirements technology-neutral and performance-based, with objective testing requirements suitable for both type-approval and self-certification systems.

The requirement for objective testing requirements is easily understood in the case of conventional standalone lighting and signalling devices, but it is less easily understood how this can be achieved in the case of adaptive technologies that involve the use of sensors, cameras, image processing, and software control. These require assessment of the performance in the real-world situation of the whole vehicle in the context of safety in traffic.

The UN Regulations require an assessment of adaptive driving beam systems conducted by the type-approval authority. This is carried out by a test engineer, in real traffic conditions specified in the regulation. NHTSA is proposing a photometric test to assess glare to other road users, conducted on a vehicle driven around a defined test-track.

In this Workshop session, we will explore how we can make progress to develop testing requirements for adaptive lighting and light-signalling systems that can be adopted by all nations irrespective of the regulatory system that they operate (type-approval, self-certification, mandatory national standards). This session will not become involved in the politics of different regulatory legislation and will not address the current attempts by NHTSA to introduce objective test requirements for ADB systems.

First Draft of the Agenda (2 hours' duration)

Review of the GRE Simplification of the UN Regulations (GRE IWG SLR) – Stage 2	Davide Puglisi (Secretary of GRE IWG-SLR)	10 min
What do US Regulators want in terms of harmonised requirements for adaptive systems?	Representative of NHTSA Crash Avoidance (tbc)	15 min
What do the vehicle manufacturers want in terms of harmonised requirements for adaptive systems?	Representative of vehicle makers (tbc)	10 min
How to assess real-world performance of adaptive systems	Representative of a government Testing Facility (tbc)	15 min
Is a subjective assessment of real-world performance such a bad thing? Exchange of views between lighting research professors.	John Bullough, Michael Flannagan (tbc)	20 min
Experience of following the practical test for ADB (assessment by an inspector on public roads) as defined in the UN Regulations.	(Written Contributions) Germany, Korea and China (tbc)	10 min
Panel Session: "How to merge the needs of type approval, self-certification and other mandatory standards?"	The presenters + Rainer Neumann, Wolfgang Huhn, Michael Larsen + others (tbc)	40 min

I believe that this question of how the real world active performance of the adaptive systems, such as ADB, can be specified and assessed for compliance is crucial to world-wide implementation.

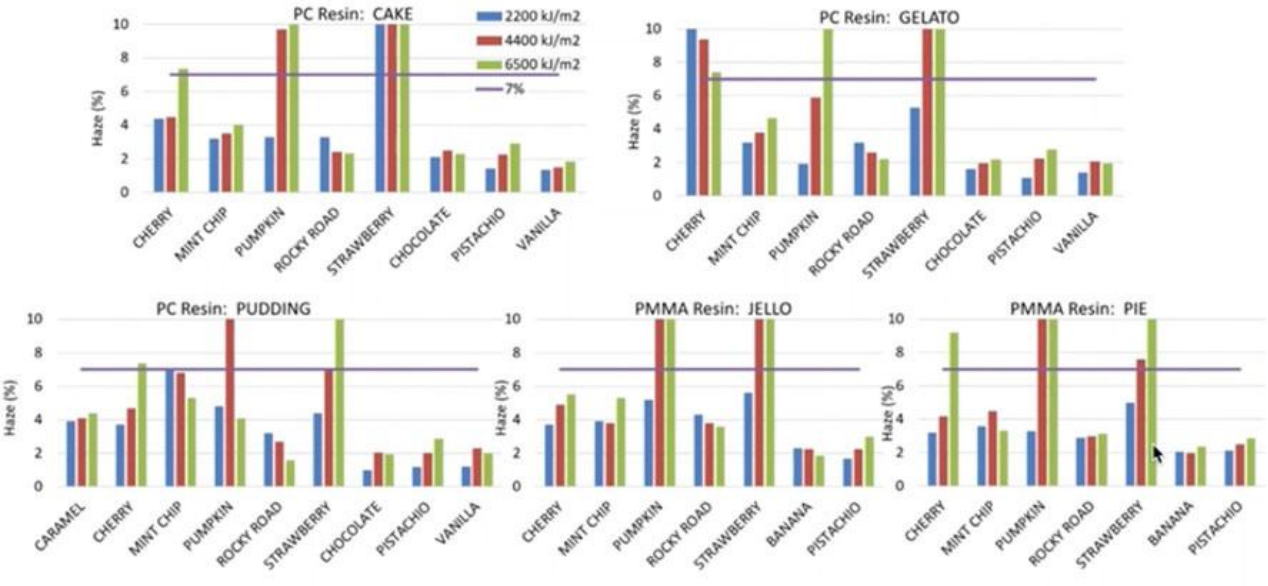
It is clear that ADB systems, consisting of the lighting device, the cameras and other sensors, the image processing and control software, offer major benefits for road safety. But the question is how their performance can be objectively assessed.

My target for this session is to identify the ideas and concerns of the US regulators and industry to enable the next steps for my new initative to encourage true worldwide harmonisation and synchronisation of technical requirements and their adoption into national legislation.

My expectation is that we will have a very interesting regulatory session that will help all stakeholders to understand the issues to be resolved, if we are to succeed in removing regulatory barriers to innovation, for the sake of road safety.

Toward More Durable Plastic Headlamp Lenses

LIGHTING NEWS



At the SAE Lighting Systems Group telemeeting, a progress report was presented on ongoing lens material and coating tests. The overall goals are to get a clear understanding of how well or poorly the real-world durability of diverse coated plastic headlamp lenses aligns with the results of various accelerated weathering test protocols, and to devise up-to-date performance and test standards.

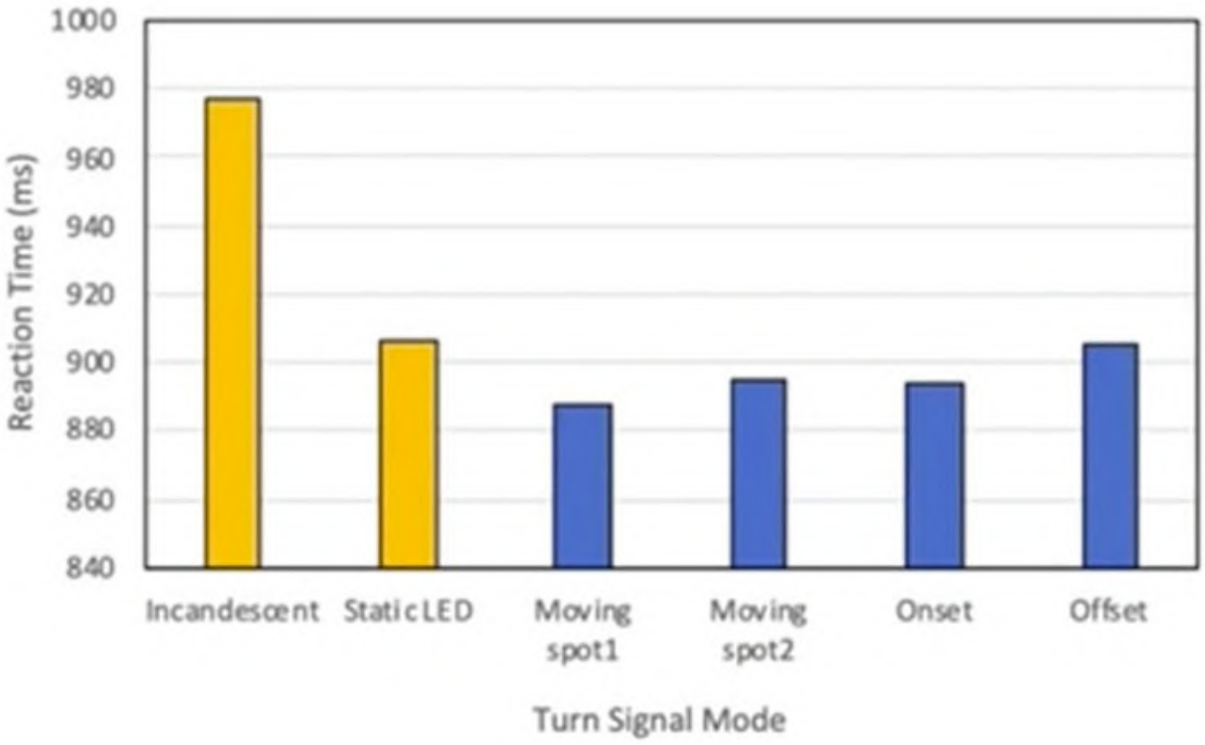
New rounds of data were presented. In service to the ideal that SAE work is non-commercial so as to avoid bias and conflict of interest, the plastic materials and coatings were anonymised—instead of being identified by maker and product name, they were grouped as dessert types and flavours.

Some materials and coatings performed much better than others, but there was no single material or coating that won out overall. Several different coating and substrate degradation and failure modes were identified and are under detailed scrutiny.

The research is ongoing, and calls for weathered (deteriorated) headlamp lenses or complete lamps—as many different, reasonably recent ones as possible, from as wide a variety of locations as possible. Anyone who can provide such items is asked to please **contact NAL's Tom Poorman**.

UMTRI Scrutinises Sequential Turn Signals

LIGHTING NEWS



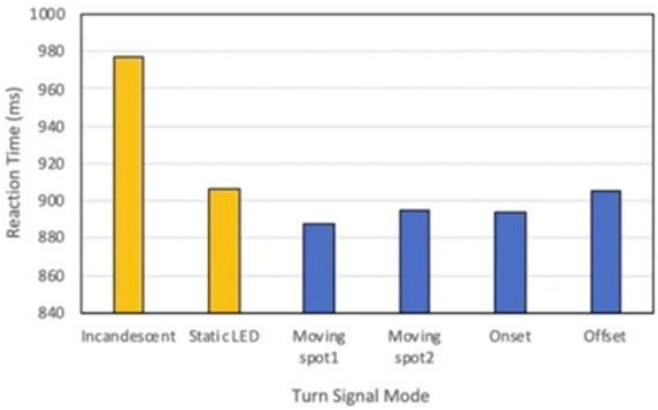
Sequential turn signals are a trendy, there's no doubt about that. Automaker experiments have suggested they might be be more attention-grabbing, but how much more? And are certain kinds of sequential signal better than others? The renowned human-factors researchers at UMTRI, led by Michael Flannagan, have been studying that constellation of questions.

The U.N. Regulations are fairly narrow on what a sequential turn signal may be: it may only sequentially illuminate, and must do so in a procession from inboard to outboard within 200 milliseconds. American regulations, as usual, are quite different: the uniquely American EPLLA lit-area requirements must be met right from the start of the lit phase of the turn signal cycle, and sequential-off is allowed as well as sequential-on.

The UMTRI research involved participants in a vehicle stopped at a mock-up of a road junction, with three stimulus vehicles across the junction showing different kinds of turn signals. None of the vehicles ever actually moved during the experiment. One or more of the stimulus vehicles activated turn signals, and participants were asked whether any vehicle intended to turn across the participant's path. Their reaction speed and accuracy was measured.

Six different turn signals were presented by the stimulus vehicles:

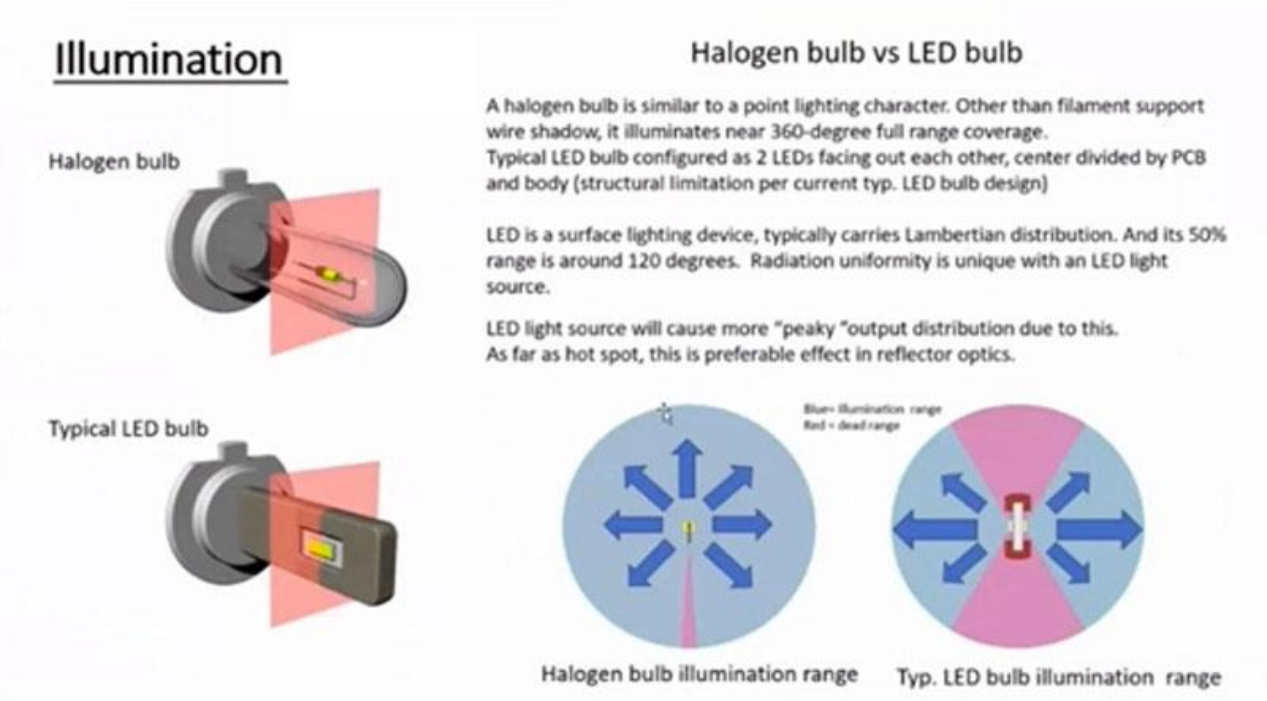
- Static LED (instant on/off)
- Static simulated incandescent (fade on/off)
- Dynamic sequential-on
- Dynamic sequential-off
- Dynamic "moving spot" (whole signal lights up; brighter spot moves inboard-outboard), variant 1
- Dynamic "moving spot" (whole signal lights up; brighter spot moves inboard-outboard), variant 2

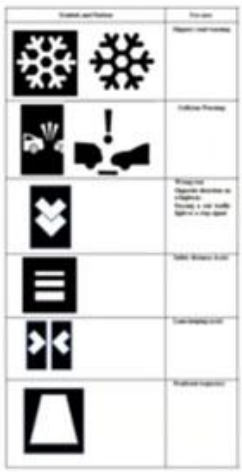


The results: Better (faster) reaction times to static on/off LED turn signals than to static incandescent signals, and even slightly better reaction times to most dynamic turn signals. Interestingly, the moving-spot dynamic signals—which are not presently recognised by UN Regulations or SAE standards—garnered the fastest reaction times, faster than the sequential-on dynamic signals. Sequential-off signals spurred reaction times very similar to static on/off LED signals, suggesting that the onset of the signal (the transition from off to on) is the primary driver of reaction times, rather than the transition from on to off.

SAE Looks at Road Projections, Welcome-Farewell, LED Bulbs

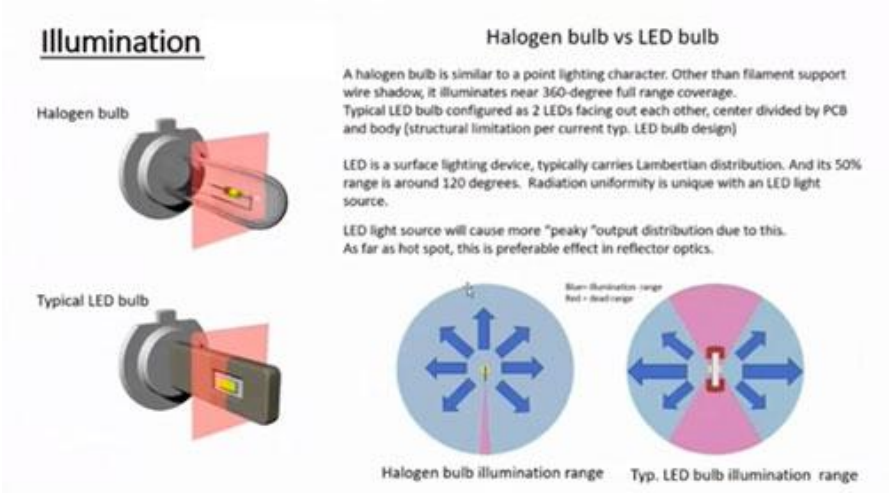
LIGHTING NEWS





The one-day SAE lighting systems group teleconference held last week included a discussion about road projections. As regulatory research and development is under way in the ECE world, the question arose as to whether parallel research should take place on the North American regulatory island, with an eye toward identifying and describing best practices in an SAE standard. The discussion proceeded along lines similar to those in the wider world, but in the American regulatory philosophical context of *whatever isn't specifically prohibited is allowed, with responsibility on the maker* in the self-certification system. This, obviously, is a different situation than the *whatever isn't specifically allowed is prohibited* ECE philosophy, with a degree of impunity conferred on the maker once a type-approval has been granted. One of the interesting questions that came up: is a blanket ban on commercial messages and advertisements the right way to go, or should they be allowed as long as any objectionable elements of them that might be identified are excluded?

Another session in the teleconference took a similar approach to the matter of animated welcome/farewell lighting displays: should a guard rail fence be put up in the form of an SAE document identifying the best practices and excluding problematic ones? Should certain lights be disallowed from participating in the welcome/farewell displays—and if so, should it necessarily be the same list of excluded lights as that in the recent ECE proposal from Japan? Should there be a duration limit on the displays? These and other questions are on the docket for SAE lighting systems group to consider.



The teleconference also included a session on the SAE J3145 standard under development for LED replacement bulbs for halogen headlamps. Progress was described in defining the relevant parameters for LED bulbs of various architecture. Although a technical report submitted by one of the participants presented developmental information about replacements for both single-filament (e.g., H11) and dual-filament (e.g., H4) bulbs, the SAE group—in the interest of not biting off more than can be chewed in one go—is presently limiting the standard development's scope to single-filament bulbs only. It was also decided that "indexable" LED bulbs (which can be rotated or "clocked" to a variety of positions within the headlamp) are not a best practice and should not be accommodated or recommended. This consensus is based on the great likelihood of consumers lacking the expertise and judgement to select a rotative position to achieve an optimal beam pattern.

NHTSA Mandates Prompt AD, ADAS Crash Reporting

LIGHTING NEWS

NHTSA last week issued a Standing General Order requiring manufacturers and operators of vehicles equipped with L^2 ADAS or L^3 to L^5 automated driving systems to report crashes.

Acting NHTSA Administrator Dr. Steven Cliff says “NHTSA’s core mission is safety. By mandating crash reporting, the agency will have access to critical data that will help quickly identify safety issues that could emerge in these automated systems…gathering data will help instill public confidence that the federal government is closely overseeing the safety of automated vehicles.”

NHTSA’s order requires the reporting of crashes that occur on public roads in the United States as follows:

- Within one day of learning of a crash, companies must report crashes involving an L^2- to L^5-equipped vehicle that involve a hospital-treated injury, a fatality, a vehicle tow-away, an airbag deployment, or a vulnerable road user such as a pedestrian or bicyclist. An updated report is due 10 days after learning of the crash.
- Every month, companies must report all other crashes involving an ADS-equipped vehicle that involve an injury or property damage.
- Reports must be updated monthly with new or additional information.
- Reports must be submitted for any reportable crash a company receives notice of, beginning ten days after the company is served with the order.
- Reports must be submitted to NHTSA electronically using a form that requires important information regarding the crash. NHTSA will use this information to identify crashes for followup.

The order requires vehicle and equipment (including software) manufacturers of L^2 to L^5 systems and vehicles, and operators of ADS-equipped vehicles, to report crashes where the ADAS or ADS system was engaged during or immediately before the crash. These data will help the agency identify potential safety issues and impacts resulting from the operation of advanced technologies on public roads, and increase transparency. Access to ADS data may show whether there are common patterns in driverless vehicle crashes or systematic problems in operation.

International Forum on Automotive Lighting № 9

LIGHTING NEWS

The 9th International Forum on Automotive Lighting (IFAL) took place on 17-18 June, simultaneously live in Shanghai and online. The forum followed the industry technology hotspots combined with the current situation of the industry, discussing and analysing from the three dimensions of innovative scientific research, industrial technology and standards and regulations.

This event provided a forum for exchange of ideas on the theme of seeing and sensing. More than 410 guests attended, including 150 company representatives.

The founder of IFAL, Fudan University Professor Lin Yandan, led the opening ceremony that started with a welcoming video reviewing IFAL's nine-year development history. It conveyed IFAL's unchanged mission and vision: to promote the academic research and technology in the field of automotive lighting and to build a Chinese international exchange platform for automotive lighting academic progress and technology in Asia.

The forum commenced with Keynote speeches: Bart Terburg, former chairman of the SAE Lighting Systems Group and that group's current chariman Joe Jaklic; Chinese National Technical Committee of Auto Standardization Secretary General Bu WeiLi, former GTB President and current DVN Senior Regulatory Advisor Geoff Draper.

The agenda consisted of six sessions:

- High Resolution Headlamps and Digital Light
- Light Distribution, Human Factors and Optical Design
- Power Consumption in Automotive Lighting
- Projection and Display Technology for Driving
- Road Illumination Devices and Systems Relative with IoT in Driving
- Quality Control in Automotive Lighting

Outside the venue, the IFAL Organising Committee set up a guest interview session and invited industry experts and scholars to discuss industry issues and technological development. Professor Lin concluded the event by reporting on the outcome of the strategy meeting of the IFAL International Organising Committee (IOC) that met prior to the start of the forum.

Driver Assistance News

Automakers to showcase automated parking advances at Munich show

DRIVER ASSISTANCE NEWS

The latest development in autonomous parking will be showcased at the IAA Munich auto show in September. The show's organizers, the VDA industry group, said autonomous parking demonstrations will show that the technology "will soon become part of everyday life."
The public unveiling will showcase the technical interaction required between autonomous driving systems of various automakers and the sensor technology in the parking garage, which takes over control of the vehicle to manage the parking.

In theory, smart parking garage infrastructure would detect the vehicle's position when in Autonomous Valet Parking (AVP) mode and maneuver the vehicle through the garage without a driver, all while avoiding potential collisions.

BMW, Mercedes-Benz, Ford and Volkswagen Group's CARIAD automotive software-subsidiary are among the project's partners. Robert Bosch, Continental and Valeo will also be participating in the demonstrations, which will take place in a car park at the Munich trade fair grounds during the show, which lasts from Sept. 7 to Sept. 12.

Automated parking relies on smart infrastructure in the parking garage, including the sensor systems and cloud-based IT. Secure communication between the garage infrastructure and the vehicle is required to maneuver in and out of the parking spot.

The International Organization for Standardization (ISO) is preparing an international standard, ISO 23374, to define the standards for automated parking and the technological requirements for both automakers and equipment suppliers.
For effective interaction with the sensors in the infrastructure, the vehicles must have automatic transmission, electronic stability program ESP, an electric parking brake, assisted steering and a smart communication unit for Automated Valet Parking.

Fewer Miles Driven, But More Pedestrians Hit in USA

DRIVER ASSISTANCE NEWS

Roadways were less safe even though fewer people were driving in 2020, and pedestrians fared the worst of all.

During 2020, when much of the country was under shelter-in-place restrictions due to Covid-19,Pedestrian deaths increased at a record rate, according to estimates projected by the Governors Highway Safety Association (GHSA). Specifically, pedestrian deaths were up 48 per cent in 2019 versus 2010, while all other traffic-related deaths were up by 5 per cent over the same timeframe.

There were 6,721 pedestrian deaths in 2020, a further 5% increase from 2019. Because the total amount of vehicle miles traveled (VMT) decreased dramatically (13 per cent) due to the pandemic, the pedestrian death *rate* increased 21 per cent in 2020, representing the largest annual increase on record.

"We need to treat pedestrian safety like the public health emergency that it is," GHSA Executive Director Jonathan Adkins said in a statement. "We must strengthen our efforts to protect those on foot from traffic violence".

The GHSA also said that people of color made up a larger share of pedestrian fatalities based on their respective share of the population, and most pedestrian deaths occurred at night on local roads away from intersections.

ADB remains illegal in the United States, where a decade's worth of millions of kilometres of experience around the world is not recognised despite demonstrating large increases in effective lighting performance, including illumination of pedestrians.

General News

Volvo aims for an IPO by the end of 2021

GENERAL NEWS

Volvo Cars is "making good progress" toward a potential initial public stock offering by the end of this year, CEO Hakan Samuelsson told Reuters.
"We are looking at the possibility of doing an IPO before the end of the year," listing shares on the Nasdaq Stockholm exchange, Samuelsson said in an interview on Wednesday.

Volvo earlier this year scrapped a proposed merger with the company's Chinese parent, Hong Kong-listed Geely Automobile. In March, Geely said Volvo would explore capital market options, including an IPO and stock market listing.

A number of startups have gone public in the U.S. and China over the past two years, following EV market leader Tesla in taking advantage of investor enthusiasm to raise cheap capital to compete with established brands such as Volvo.

Samuelsson said Volvo and Geely will continue to share vehicle architectures, combustion powertrains and other components. But the companies will do so at "an arm's length distance," consistent with the way independent companies do business, he said.

Volvo also said it plans to equip many of its future vehicles with self-driving technology, including standard lidar sensors from Luminar Technologies and computers from Nvidia. "Our goal is to build the safest cars possible, using all available technology," Samuelsson said.