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Editorial

The Last ADB Holdout Falls—But What Kind Of ADB?

ADB is finally legal in the United States! Even though NHTSA's rule is disappointing and puzzling in many ways—see this week's in-depth—we can still celebrate that ADB, at least in name, is finally authorised in the USA. An important SAE visio conference will be held this Thursday and DVN will communicate on it at the next newsletter.

IHS-Markit foresee around 36 million cars equipped with ADB in 2026, and we could consider that half of the worldwide production in the next 5-6 years will be equipped with ADB. The most important information presented in the IHS-Markit report is the proliferation of ADB into lower-priced vehicle segments for European and Japanese automakers. So ADB, the greatest innovation in lighting, is going to have a great future, and as a logical next step we ought to look at building a basis for mandatory ADB if we can prove that the function decreases the number of fatalities in driving at night. For our part, we at DVN are working to quantify the safety benefits of ADB with LAB, an accidentology laboratory whose mission is to improve road safety.

But the main questions today for automakers and suppliers as they decide whether, when, and how much to invest are: what kind of ADB systems to improve safety with the best cost-efficacy? How many segments in the beam to improve safety at an affordable cost? How many pixels—tens, hundreds, thousands…millions?

With the priority on EV and AV, with the priority of software and communication, with lit grilles and other new light functions around the car, there is not enough money left to have everything we want, all the time. Automakers want to optimise their lighting spend, and suppliers have to help and guide them in making prudent decisions along that line. This is the main challenge for automakers and suppliers alike. The DVN team are involved in this challenge with our lighting experts, Wolfgang Huhn, Gerd Bahnmüller, Jean-Paul Ravier, Ralf Schäfer, Hector Fratty, and more experts both now and in the future. We're in it for the long haul, and we're glad you're here with us.

Sincerely yours

In Depth Lighting Technology

Finally! A First Look at NHTSA's ADB Final Rule

Analysis by Daniel Stern, DVN Chief Editor

At great long last, NHTSA are publishing a Final Rule amending Federal Motor Vehicle Safety Standard № 108 to permit ADB. The agency, ordered by the U.S. Congress to get a move-on about it, chose a 2013 Toyota petition as the nominal basis for the amendment; the final rule can be downloaded directly from NHTSA **here**. It is a 327-page document, the first 272 pages of which are discussion of NHTSA's decisions regarding what to permit, what to require, what to forbid, and generally how to configure the ADB regulation.

There was reason for optimism when the infrastructure bill (now law) **instructed NHTSA**, in plain language, to allow ADB in accord with SAE J3069. Nevertheless, in the final rule NHTSA have gone to great length (pages 22-27) to assert that this black-letter directive from the U.S. Congress didn't actually mean NHTSA had to permit ADB in accord with SAE J3069. Instead, they have issued a rule of their own making. It incorporates some elements of J3069, but with many departures, and some of NHTSA's seemingly self-contradictory decisions will likely inspire a great deal of discussion amongst the community of engineers who now must live with the new regulation.

NHTSA's specifications appear to deliberately maintain the century-old constraints of the seeing-versus-glare tradeoffs that ADB technology is intended to resolve. The NHTSA rule requires that the de-glared zones must comply with low beam minimum intensity requirements; for example, if an ADB-equipped vehicle headed up a hill detects a vehicle ahead at (1.5°D, 2°R) relative to the ADB-equipped vehicle, the ADB system must still direct at least 15,000 candela toward that vehicle ahead—thus offering no glare relief relative to static low beams. NHTSA states (page 80, footnote) that they "*decided not to require additional glare protection performance from ADB systems beyond that currently produced by lower beams*", yet on page 241 they state "*in the absence of empirical evidence to the contrary, the agency still believes that glare poses a non-trivial safety risk*".

This looks like a cancellation of one of ADB's two principal advantages over static beams, and it's puzzling in at least two ways: on the one hand, it is a decision made by the agency on the receiving end of headlight glare complaints that have been steadily increasing for many years. On the other hand, it is an explicit statement that NHTSA does not regard low-beam glare as problematic—which becomes even more baffling in context of their decision to continue imposing the high beam axial intensity limit of 75,000 candela per side of the car, which is just under 34 per cent of the intensity allowed in the rest of the world.

By sticking with this high beam intensity limit set in 1978, most of half a century ago, they've passed up the opportunity to give drivers much-needed increased light. On pages 194 to 197, NHTSA acknowledge more light would likely address the increasing numbers of pedestrians hit in traffic, but the risk of glare from higher intensity, they say, is unacceptable. Research on the matter has consistently concluded safety would best be served if the US high beam intensity limit were raised. Yet NHTSA have consistently swatted away petitions seeking an intensity rise, on grounds that the US limit, set in 1978 based on research carried out with sealed beam headlamps, is best even though it "*may not be as intense as some manufacturers might think that their customers might desire*". This current final rule again fails to raise the high beam intensity limit ostensibly on glare concerns, despite the fact that the whole point of an ADB system is to automatically, dependably, and dynamically keep

glare out of other road users' eyes, thus removing the busy, sometimes careless, sometimes malicious human driver from that process.

In sum, then, NHTSA—having declared that glare is a safety threat—have ruled that low beam glare is not an issue worth addressing with ADB technology that can reduce it without affecting seeing, but high beam glare is a dangerous risk that must be avoided by hobbling ADB technology that has demonstrated, over 16 years and uncountable millions of vehicle-kilometres travelled, its ability to safely control high intensity even in glare-averse Europe. This looks like a cancellation of the other of ADB's two principal advantages over static beams. It will have to suffice, NHTSA says on page 197, that ADB systems will "*increase upper beam use, which will help prevent crashes*". Effectively, then, the NHTSA rule permits ADB as long as it is constrained by the limits imposed by the old seeing-versus-glare tradeoffs of old-fashioned static low and high beams.

Moreover, the ruling leaves the problems of headlamp aim unaddressed, and imposes new costs. ADB really requires that headlamps be horizontally aimable—find previous DVN discussion of that matter **here** and **here**—yet NHTSA contend that visual/optical horizontal aim of a low beam is unacceptable because it is impossible to provide a suitable kink or other beam feature without "damaging" the beam pattern. The ruling also refuses to accept a special aim mode, providing a visual/optical reference (a vertical line, for example) not provided during normal operation of the lamps.

Instead, a horizontal VHAD will be required. For those who don't remember them, VHADs were devices briefly used in the early 1990s. They were scale-and-pointer arrangements meant to indicate when the headlamp—the physical hardware itself—was pointed straight ahead, without any direct reference to the light beam. VHADs were quickly and uniformly found to be unreliable, problematic, and expensive, and they drove the push toward visual/optical aiming in the mid-1990s. NHTSA's new ADB ruling flatly says "are too!" to the fact that VHADs are not reliable (page 143).

And on page 144, a claim is made that allowing horizontal aimability without a VHAD, in accord with rest-of-world practice, could "*limit the potential for innovative safety solutions generally afforded by this final rule*". That's an assertion likely to raise eyebrows and hackles among those who have been watching, from front-row seats (not to mention driver's seats) as ADB systems in the rest of the world have been providing well-demonstrated safety benefits for 16 years and millions of vehicle-kilometres —all without VHADs. On pages 231-232 of the ruling, NHTSA present a large list of commenters to the long-ago NPRM, who described how and why the agency's proposed in-house rule, by its disharmony with UN and SAE standards, would drive up costs and slow down ADB in the U.S. market. And on pages 234-236, NHTSA dismisses these comments—"*NHTSA is not persuaded…NHTSA believes… NHTSA concludes*"—then, on pages 240-241, NHTSA acknowledge their rule will cost more to comply with than SAE J3069.

The test protocol for ADB, as specified in the ruling, requires specific headlamps and taillights on the test fixtures: 2018 Ford F-150 and 2018 Toyota Camry headlamp and taillight, and 2018 Harley-Davidson motorcycle headlamp and taillight. These, like all other car lights, will eventually go out of production—in fact, the Harley-Davidson headlamp originally specified already went out of production while NHTSA were writing this rule. NHTSA assert (page 96) they imagine later-year headlamps will be substituted by some future amendment to the regulation, but the agency's **track record** suggests this could well turn into a problematically outdated aspect of FMVSS № 108.

For many decades, philosophical differences drove divergence between U.S. headlamps and European (at first; eventually rest-of-world) headlamps: in Europe, glare was not tolerated and so European low beams minimised glare at the cost of short seeing distance. In the U.S., the opposite approach held: seeing distance was maximised at the cost of glare. These were not right or wrong answers; they were different points on a continuum of trade-offs and constraints imposed by the limitations of static beam patterns. By artificially retaining these obsolete constraints, though, NHTSA's ruling appears to guarantee that U.S. drivers will continue to be deprived of the seeing improvements and glare reductions available in every other country on the planet, as ADB systems in the rest of the world can reduce glare and increase seeing to a much greater degree than what NHTSA have just specified.

Lighting News

ADB OK On New Vehicles: NHTSA

LIGHTING NEWS

NHTSA have finalised a rule allowing automakers to install ADB (of sorts) on new vehicles, nominally in response to a 2013 Toyota petition. NHTSA say the rule, signed by Deputy Administrator Steven Cliff, satisfies a requirement in the infrastructure law passed by Congress last year, which directed NHTSA to allow ADB as defined and specified by SAE standard J3069.

The A.D.B. systems allowed by NHTSA will not be like those used in the rest of the world. While the infrastructure law called for NHTSA to enact the standard devised by the Society of Automotive Engineers, which more or less adapts specifications used in most other countries so they're compatible with the U.S. legal system, NHTSA claims a U.S. Supreme Court decision gives the agency to do otherwise.

In a statement, Cliff said "NHTSA prioritises the safety of everyone on our nation's roads, whether they are inside or outside a vehicle. New technologies can help advance that mission. NHTSA is issuing this final rule to help improve safety and protect vulnerable road users". But not everyone is clapping and cheering. Michael Brooks, acting executive director of the Center for Auto Safety, says "While it is encouraging to see NHTSA issuing a regulation allowing advanced driving beam, it should be pointed out that the U.S. has lagged far behind other countries in the introduction of this technology; NHTSA needs to move faster to update safety standards, particularly those with universal support in and outside the industry".

Hella + Faurecia to Cooperate in Aftermarket Biz

LIGHTING NEWS

Hella and Faurecia, now joined under the Forvia umbrella, will be operating jointly side-by-side in the aftermarket soon: Faurecia products will also be available through Hella's robust aftermarket organisation. By bundling activities, customers benefit not only from a comprehensive range of services, but above all from a significantly expanded product spectrum. Hella are renowned for their OE-level expertise in lighting and electronics, while Faurecia have great competence in exhaust systems, for example.

At the start of the joint activities, Faurecia's Easy2Fit exhaust system kits will become available in Hella's aftermarket program. With around 3,300 different exhaust system kits, over 26,000 OE application references can be covered. This reduces space and storage costs, and streamlines logistics. The significantly simplified ordering and logistics process not only ensures fast and cost-effective repairs, but also allows the exhaust systems to be replaced efficiently by just one automotive mechanic.

Both companies will continue to operate as independent, listed entities and will retain their legal names as Faurecia and Hella. The product brands Hella, Hella Gutmann, Hella Pagid, and Hella ValueFit will also remain in the independent aftermarket.

Marelli in Talks on Debt Restructure

LIGHTING NEWS

Mizuho Financial Group and other lenders are in talks to renegotiate debt and offer financing to keep KKR-owned parts supplier Marelli Holdings operational. Marelli had around USD $10bn in debt as of last September.

If successful, Marelli will secure financing to keep operating while they renegotiate bank loans. If they fail to agree on the alternative dispute resolution-based restructuring plan, Marelli could face a court-led debt-resolution procedure, which could force the lenders to write off all or part of their loans to the supplier. A restructuring plan will be implemented within six months thereafter.

Marelli had informed some of the banks they had posted a net loss for 2021, and warned their debts would likely exceed assets. In a note outlining Marelli's challenges to employees last year, Marelli executive chairman and KKR partner Dinesh Paliwal said the company will seek a turnaround while seeking to recapitalise this year: "we will continue to engage and negotiate with Marelli's lenders to make sure that we receive support on the best of terms". Paliwal also said Marelli aim to become one of the world's five largest automotive suppliers based on revenue.

The coronavirus pandemic has caused deep challenges for Marelli, including shortages in components and raw materials. Just three months after rolling out a restructuring program in September, Marelli planned job cuts to more than 3,000 and shut down some locations. In the note to employees last year, Paliwal said the company have "the highest fixed cost among our competitors". Each dollar of gross margin costs Marelli $2.72, compared with nine to 66 cents at their rivals. "This is not economically acceptable," he wrote in the note. "Unfortunately, there is no alternative—decisive measures are needed to make our company fit for the future."

Audi A8 Facelift brings DMD in the front and digital OLEDs in the rear

LIGHTING NEWS

Audi's flagship sedan is getting a nip and tuck out front and in the back as part of a 2022 freshening. The A8, redesigned for the 2019 model year, now has a wider grille while the rear features new taillamps. All taillamps are equipped with digital OLEDs with changeable signature and proximity function. If a car approach very close e. g. at a traffic light, the OLEDs light up to full size as an indication of a tight distance.

The new headlamps have ADB as a standard and DMD HD matrix with road projection functions as an extra.

The S8 performance sedan also has a wider grille and four flow-optimized tailpipes.

The S Line exterior package now comes standard on the A8. An optional Black Optic Plus package is available for both the A8 and S8. It includes black mirrors, black badges and black 21-inch wheels.

The interiors of both models remain largely unchanged.

Driver Assistance News

NHTSA Eye 416,000 Teslas For Sudden Braking

DRIVER ASSISTANCE NEWS

U.S. auto safety regulators have opened an investigation to assess potential safety issues in certain Tesla vehicles after reports describing "phantom braking." NHTSA's Office of Defects Investigation has received over 354 complaints in the past nine months for unexpected brake activation.

The complaints are that while using Autopilot's features such as adaptive cruise control, "the vehicle unexpectedly applies its brakes while driving at highway speeds (…) complainants report that the rapid deceleration can occur without warning, at random and often repeatedly in a single drive cycle," the report says.

After the evaluation, NHTSA will either close the investigation or move it into a next phase. If a safety-related defect exists, according to NHTSA, the agency may ask Tesla to recall and fix the vehicles.

Notoriously self-assured Tesla CEO Elon Musk recently derided NHTSA as the "fun police" after the agency informed him that yes, even Tesla EVs must make the prescribed amount and type of noise at low speeds so vision-impaired pedestrians can detect them and keep from getting hit—and no, farting sound effects are not an acceptable substitute. He has also recently tweeted that the US Government are stifling his freedom of speech.

Commsignia Announces V2x Solution for Bicycles

DRIVER ASSISTANCE NEWS

V2X connectivity provider Commsignia are cooperating with VRU (vulnerable road user) safety experts Spoke to provide automotive-grade C-V2x (cellular V2x) software for cyclists, motorcyclists, and e-scooter riders.

Commsignia's product range includes V2x hardware equipment for all types of vehicles; integration of roadside sensors to provide non-connected users access to the benefits of the V2X ecosystem, and tools to manage V2x devices and collect anonymised data. With data from V2x, cities and fleet operators can gain valuable insights to improve road safety and traffic efficiency.

By integrating Commsignia’s V2x stack and safety application suite into a new hardware solution, Spoke plans to offer contextual awareness and V2x warning messages for bicyclists and other light mobility users. Low-latency direct communication between road users is essential for V2x safety applications.

Spoke are working with stakeholders including Qualcomm; Amazon World Services; and vehicle, bicycle, scooter, and motorcycle makers for maximum scale, adoption, and safety benefit. The Spoke portfolio is slated to launch with bicycle-, motorcycle-, and scooter-maker partners this year.

General News

Herbert Diess is Cariad Chair; Software in First Line

GENERAL NEWS

Dr. Herbert Diess has been appointed as a new member of the Cariad Supervisory Board. The Chairman of the Board of Management of Volkswagen takes over from Markus Duesmann, and therefore also becomes Chairman of the Supervisory Board of Cariad.

Within the Board of Management of the Volkswagen Group, Herbert Diess had already taken over responsibility for software and Cariad from Markus Duesmann at the start of 2022.

The new software platform will first be deployed at the end of 2025. In addition, Cariad are working on outstanding digital automotive features, including ADAS; an infotainment platform; software functions for linking powertrains; and chassis and charging technology, as well as new ecosystems and digital business models in and around the vehicle. Cariad operate in software competence centres in Wolfsburg; Ingolstadt; the Stuttgart vicinity; Berlin, and Munich, and are closely cooperating with international development teams in the Volkswagen Group in the US and China.

Cariad are an automotive software company in the VW Group, consolidating and expanding the group's software competencies to transform automotive mobility. The company are developing the leading tech stack for the automotive industry with the mission to make the automotive experience safer, more sustainable and more comfortable in a new way for everyone, everywhere. Around 4,500 engineers and developers around the world are now working at Cariad to build a uniform software platform for all brands of Volkswagen Group, which includes a unified and scalable architecture, an operating system and automotive cloud.

Stellantis Take 2021 European Sales Lead

GENERAL NEWS

Europe's two largest automakers had a close match for the № 1 sales title in 2021, with Stellantis taking the title from VW Group by around 700 vehicles, according to figures from analytics provider Dataforce.

	2019	2020	2021
Stellantis	4,122,000 (PSA + FCA)	3,121,000	3,161,600
Volkswagen	4,260,000	3,259,000	3,160,900

Stellantis sold 3,161,600 passenger cars and vans in the region, while VW sold 3,160,900. Dataforce based the result on sales from 31 countries, including the 27 EU nations, the UK, Switzerland, Norway, and Iceland.

In 2021, Stellantis relied on their strength in light-commercial vehicles to claim the title. VW sold 2,950,256 passenger cars, compared with 2,438,891 for Stellantis. But the French-Italian group sold 722,702 LCVs, while VW Group sold 210,583.

Renault-Nissan-Mitsubishi remained in third place, with 1,789,000 passenger car and LCV sales in Europe, followed by Hyundai-Kia, with 1,020,000 sales.

VW Group have been hit harder than most automakers by the global semiconductor shortages that have restricted production and reduced vehicle supplies to dealerships. Globally the group's deliveries in 2021 fell to the lowest level in 10 years, according to company sales data released in January.

Audi-FAW EV Venture Approved by China

GENERAL NEWS

Audi and the FAW Group have received permission from the Chinese Government to start construction on their USD $3.3bn electric vehicle joint venture plant, according to a government notice. The planning regulator of China's northeastern province of Jilin said work on the factory, which will be based in the provincial capital of Changchun city, is planned to start in April.

The plant will start production in December 2024 and have the capacity to manufacture 150,000 cars a year—including three electric models, such as Audi's e-tron SUV.

"The Audi FAW NEV project is an important cornerstone of Audi's electrification strategy in China," a VW Group spokesperson said, confirming the approval. Construction of the plant is planned to start in the second quarter of this year.

Audi have a longstanding partnership with FAW to make combustion-engine cars in Changchun and the southern city of Foshan. Audi also plans to make vehicles with Shanghai-based automaker SAIC Motor, with a goal for electrified vehicles to account for a third of Chinese sales by 2025.