Tue, 24 May 2022
Weekly Newsletter

DVN
Lighting & ADAS

NEWSLETTER #752

Editorial

New Audi Lighting Is New Best Of Best

Audi hosted a special event in Ingolstadt to introduce their new A8 with a focus on the lighting system. All of us attending enjoyed this real, live event. It was a very special day for me, as I was still with the supplier—Automotive Lighting—in 2018 at the start of development of the A8 headlamps. I can still remember how difficult it was to find the necessary installation space for all the many functions and their modules without jeopardising the beautiful design. In the end, we succeeded, and the result is a beautiful symbiosis of cutting-edge technology and design.

Audi put on a magic show in their large light tunnel, showcasing the functions and highlights of the A8 and giving a glimpse into the future of how design and technology can be combined. Higher segmentation in OLEDS, among other things, are the path to further digitalisation, which will find its completion in fully illuminated, interactive car bodies.

The 1.3-megapixel DMD module is the central functional component in the A8 headlamps, after that module's marque premiere in the e-tron. This module enhances safety when driving at night with its effective ADB and with new functions like the orientation light on country roads, the lane light, and direction indicator lights. At the same time, the driver has the option of individually setting their personal arrival or departure scenario. This module is framed by the other headlight functions, which successfully complement and support the projected animations through their segmentation. In this way, the car becomes an eye-catcher even before driving off.

In the rear lighting, Audi and setmaker Valeo have put together a successful composition of functional and emotional light in an appealing design. 24 OLED segments per side—standard equipment on the A8—form the core of the rear lighting, and there are additional personalisation and safety features.

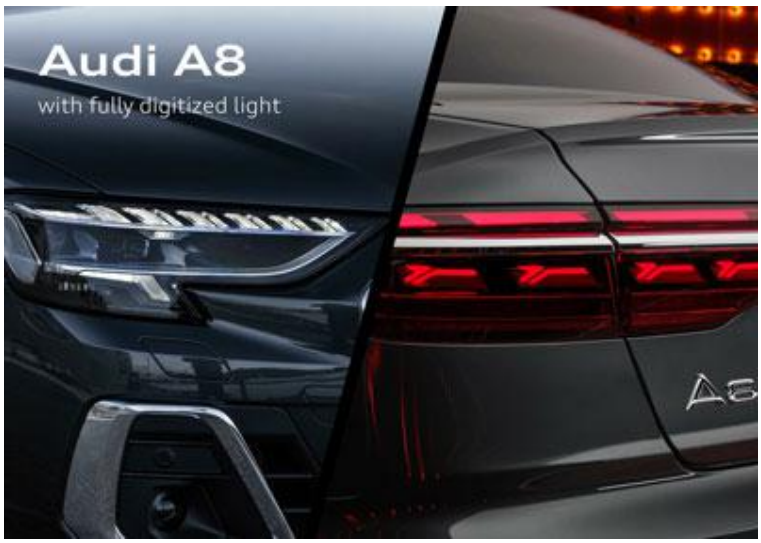
Audi have undoubtedly invested heavily in the lighting technology on their new A8, enhancing its safety, recognisability and grace. This week's in-depth article brings you the details.

Gerd Bahnmueller, DVN advisor

In Depth Lighting Technology

Audi's A8 Sparkles Ahead and Behind

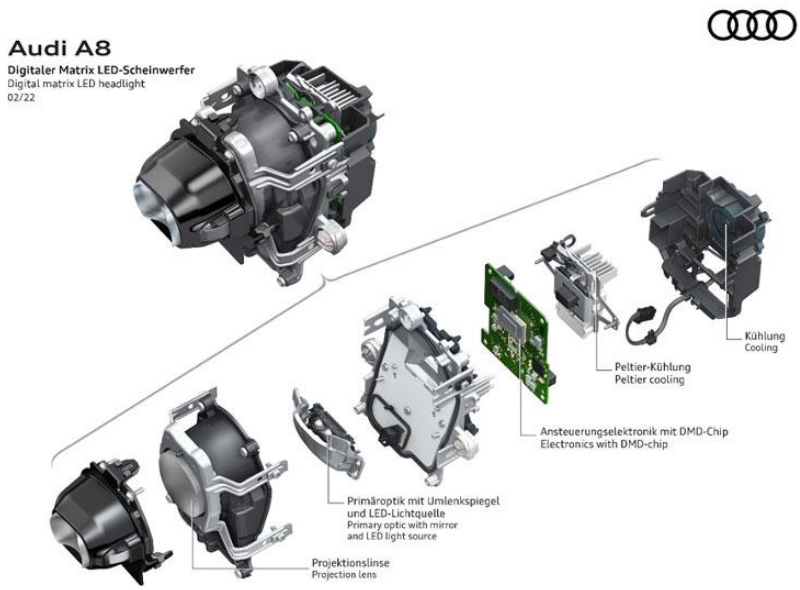
L TO R: GERD BAHNMÜLLER (DVN); DR.THOMAS (OLED PROJECT MANAGER); DR. KRUPPA (HEAD OF LIGHTING DEVELOPMENT INNOVATIONS)



Audi unveiled the lighting technology of the new Audi A8 in an impressive show. The presentation in the large Audi light tunnel showed off the A8's lighting technology and design and gave a look into the future as Audi's lighting department see it. The highlight of the day was an individual night drive: everyone got to drive the A8 for more than an hour and experience the light functions for themselves.

On your approach, the A8 greets you with the animation you've pre-selected from five options. The individually-addressable segments of the daytime running/position light and the turn signal lights are coupled with the digital projection out of the DMD module. The vehicle recognises independently whether it is in front of a wall or a free surface. Individual lighting effects function as an expression of personal preferences.

The central element of the headlamp is the 1.3-megapixel DMD module—already used in Audi's own
e-tron, and its function has been further developed in the A8 application. It is most impressive, in every driving situation—city, country road, and highway—exactly the light is provided to optimally light the driver's way. Safe driving at night is supported by a big list of additional functions, about which more information below. Safety of the driver and other road users is increased through timely detection of hazards, and the driver is continually given positive feedback that they are driving correctly and safely.

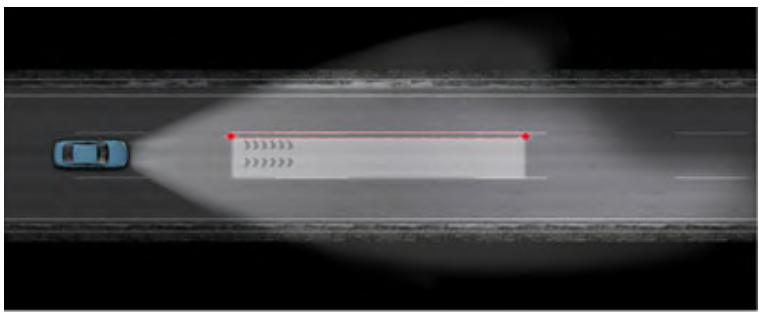


The lane light illuminates the car’s own lane, helping the driver focus on driving events. The integrated position marking from the orientation light—darkened arrows in a kind of light carpet—predictively indicates the car's position between the lane markers, encouraging safe

driving in the centre of the lane. With its focus on the car’s own lane markers, the lane light with the orientation light on the highway helps, for example, in narrow lanes around construction sites: the illumination is deliberately restricted to the car’s lane and not the lanes of the construction site in order to optimally centre the driver's focus on the road.

Now the headlamp has been digitised, this orientation light is also available independently of the lane light on country roads, which is a new feature; the first new function made possible in additional driving situations due to digital light technology. The night drive dramatically proved the worth of this sophisticated system: it gives a safe feeling on country roads, especially in combination with the lane departure warning system. And this despite the fact that the markings are not too pronounced in the light distribution, for homologation reasons.

Back to the highway: during lane changes, the lane light brightly illuminates both lane markers, while the orientation light indicates the car’s exact position in the lane to give the driver the most support. That is where the second new function comes into play: the direction indicator lights in the lane light. With the blinkers activated, the digital matrix LED headlamps create a dynamic blinking area on the appropriate side of the lane light. That way, the lane light reiterates and intensifies the signal from the direction indicator lights on the road ahead.



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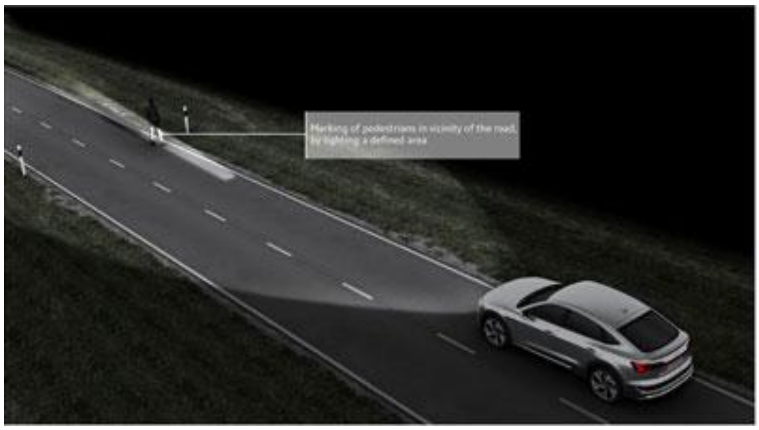
New function number three is the advanced traffic information. Warnings about accidents or breakdowns are already available as images on the MMI (multimedia interface) via data provided by HERE maps, and the headlamps augment that with a warning indicator projected on the road in front of the car for about three seconds. A triangle with an exclamation mark inside it is projected from the steering wheel. This means that the driver can keep looking forward on the road and it enables the fastest response time possible in the event of an accident or breakdown in upcoming traffic.



The marking light helps drivers see pedestrians near the road in the dark. If they are located in front of the car, the night vision assistant recognises the situation and the marking light highlights the person with targeted illumination, so the car becomes as safe as possible for everyone involved.

Audi obtained type-approval for all these functions, so they are available to Audi A8 buyers and to increase safety for all road users (except on the North American regulatory island). These high-functioning headlamps, though, available only as an option in most countries; list price in Germany is €1,890, rather than being standard equipment like the OLED rear lights.

Speaking of which, the A8's rear lighting is also digital with 48 OLED segments. Audi have pushed the state of the OLED taillight art quite successfully since their introduction in 2016 on the TT RS, and this has created more freedom and opportunities to design dynamic lighting scenarios.

Digitalisation brings the possibility of changing the taillight signature individually. These features are based on OLED properties: high contrast; the capacity for segmentation; great homogeneity, and the smallest possible gaps between segments. Audi light design conceptualises a specific selection of digital OLED rear light signatures for each model, and digitalisation allows the driver to customise their car by picking which of three tail light signature they want (four on the S8).

Heckleuchten-Signaturen im MMI auswählbar
Rear light signatures can be selected in the MMI


Heckleuchten-Signatur 1
Rear light signature 1

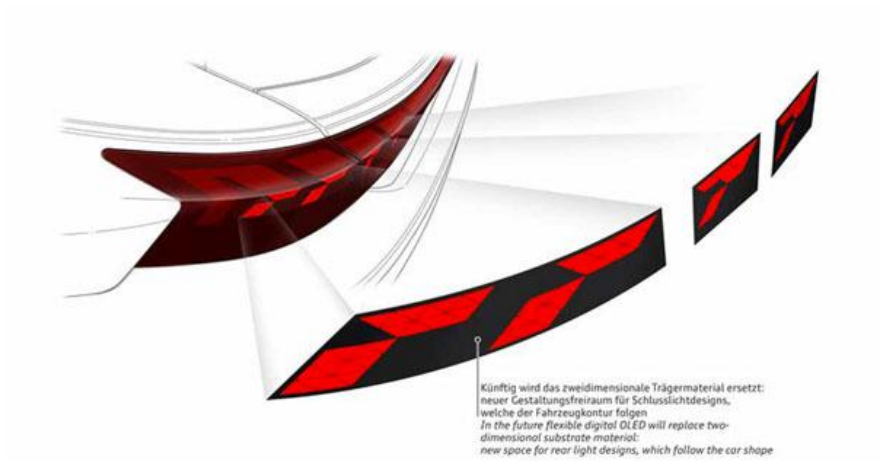

Heckleuchten-Signatur 2
Rear light signature 2


Heckleuchten-Signatur 3
Rear light signature 3

And there's more: the digital OLED rear lights use a proximity indication to grab the attention of other road users. When a car; bicycle, or scooter gets critically close to a stationary A8, the parking sensors detect it and all the OLED segments are lit, so the additional brightness and larger surface area make the car as conspicuous as possible. When the proximity alert ends (the A8 pulls away), the rear lights revert to the selected signature.

That's a lot of highlights, but there's more to come; Audi are actively developing more ideas; digitalization, animation, communication, and personalization are setting the tone. Here are a few examples of what Audi are working on for future vehicles:

Flexible digital OLED


Künftig wird das zweidimensionale Trägermaterial ersetzt:
neuer Gestaltungsfreiraum für Schlusslichtdesigns,
welche der Fahrzeugkontur folgen
In the future flexible digital OLED will replace two-dimensional substrate material:
new space for rear light designs, which follow the car shape

Digital OLEDS with up to 100 segments per panel

Ground projection of warnings and turn signals

Check out **this online video** for further demonstration of the new A8's amazing lighting system. The DVN team heartily thank and congratulate the entire Audi team for a really successful afternoon and evening!

Lighting News

Dr. Wilhelm Steger is New ZKW CEO

LIGHTING NEWS

Last week, Dr. Wilhelm Steger (photo, left) stepped into position as CEO of the ZKW Group. The renowned manager most recently worked as a top management consultant in the automotive industry and in the private equity sphere. He has more than 25 years' management experience in the automotive industry, including companies such as Siemens VDO; Continental Automotive; Delphi; Panasonic Automotive Europe, and Nidec AMEC Europe.

Steger replaces Oliver Schubert, who successfully led the company for six years and has decided to take up new professional challenges. Dr. Steger offered heartfelt thanks to Schubert (photo, right) and said his goal is to "secure a future-proof and stable development of the ZKW Group as a system supplier for premium lighting systems on the international market".

Dr. Steger possesses extensive expertise in many areas of vehicle supply, including those crucial to ZKW such as mechatronics and electronics; sensor technology; ADAS; LED and semiconductor technology, and software development. He also has many years' experience in managing globally-positioned companies with Asian owners, and was able to spend some time in Seoul himself during his career. He is looking forward to working with the Korean management and generating the best possible synergies between LG Electronics and ZKW.

Should AVs Be Marked As Such?

LIGHTING NEWS

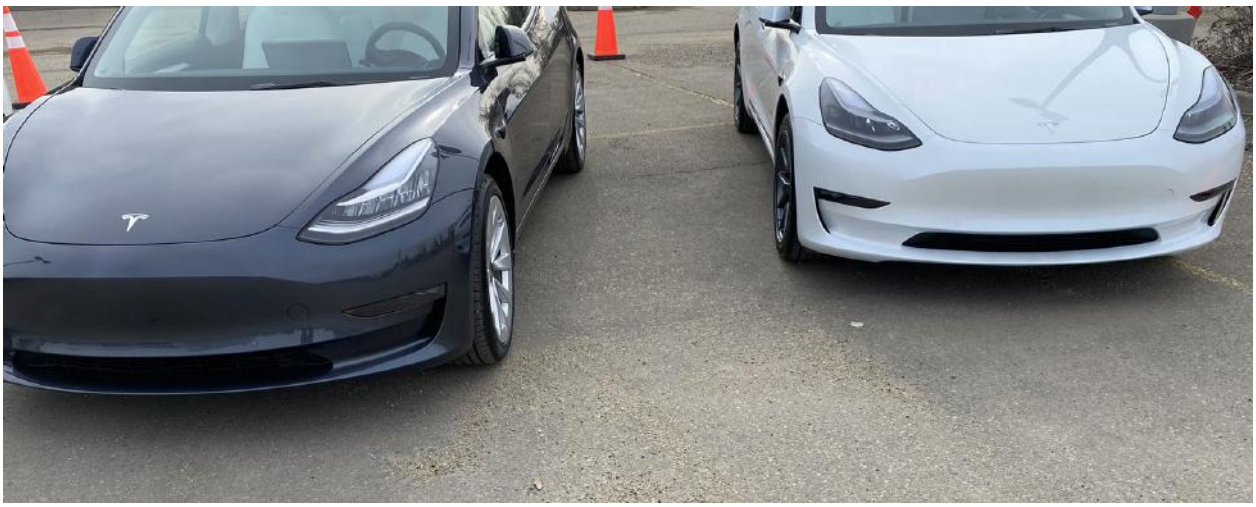
Autonomous-drive indicator lamps are a hot topic of debate in various sectors of the vehicle lighting world. What should they look like; how should they behave?
Parts of that question have already been answered; UN and SAE colour standards have made room for a new colour, a turquoise, specifically for use in AD/AV lights.

But a bigger, overarching question is still raging: should lights like this be deployed at all?
Jack Stilgoe is a professor of science and technology policy at University College London. He's taken a look at that question and its implications for traffic safety and AV development.
Under the rubric of his department's "Driverless Futures?" project, Stilgoe and his team **surveyed** the UK and US public as well as a group of subject matter experts. A giant majority—87 per cent—of the UK public respondents affirmed that it ought to be clear to an observer that a vehicle is driving autonomously; the expert respondents were less vociferous, but 44 per cent still came down on the "Yes" side.

In a worthwhile **opinion piece** in the MIT Technology Review, Stilgoe lays out the arguments, pro and con. Spoiler alert: his own conclusion is that the aye-voters are right; even though there are sturdy arguments against marking AVs *as* AVs, there are better ones in favour of doing so—some practical; some philosophical, and some approach the matter from a regulatory standpoint.

Tesla Headlamps Quietly Downgraded; Ram Downgrade Optional

LIGHTING NEWS



Tesla have apparently deleted the matrix headlamps and gone back to the pre-2020 reflector LEDs on all but the most expensive trim level of the Model 3 sedan in the US and Canada.

The Tesla website's car configurator still shows the matrix headlamps on all 3s, but buyers have begun receiving the old headlamps on their new cars. Tesla groupies ogling cars newly delivered to Tesla lots discovered later-build cars, such as the dark grey car shown here built on 24 April, with the lower-tech headlamps instead of the matrix headlamps as seen here on the white car, built on 22 April, offloaded in the same batch of deliveries to the same lot.
Tesla have not acknowledged or commented on the change. A Canada-based website for Tesla fans says the old-headlamp resurrection first showed up for U.S. buyers, but now has spread to Canada as well—where full rest-of-world ADB could be activated with an OTA upgrade on cars with the matrix lights.

Meanwhile, Stellantis have made LED headlamps a delete-option on the Laramie trim level of their popular Ram 1500 truck, adding a "Front Lighting Value Package".
Ticking that box knocks USD $495 off the price of the truck and replaces the LED headlamps and fog lamps with halogen ones like those on lower-trim versions of the truck—the LED taillamps aren't swapped to bulb-type units, however.
IIHS ratings for the 2022 Ram 1500 give a Marginal grade to the halogen and LED headlamps alike, with the technical measurements showing mixed benefits and drawbacks but no clear advantage to either set of lamps.

Infineon's New Front Light Controller

LIGHTING NEWS

Infineon are expanding their Litix Power product range with the new TLD6098-2ES dual-channel DC-DC controller—the first that can operate an LED spotlight without an additional microcontroller. It also controls four standard functions of LED front lights—high and low beams; DRLs, and turn signals—and can be used as a power source for animated LED exterior lighting.

The new controller enables boost, buck, SEPIC and flyback topologies. The integrated PMOS gate drivers provide high-side load shutdown to dim LED brightness and achieve adequate system reliability. Furthermore, an integrated spread spectrum modulator improves EMC performance and facilitates system qualification at the customer site. Each channel provides both analog and PWM dimming for precise LED brightness control. Furthermore, with the wide input voltage range of 4.5 to 60 volts, even 24v commercial-vehicle applications are supported.

Teased: New '23 Lexus RX Lights

LIGHTING NEWS

Lexus have released a teaser picture of the 2023 RX SUV, centred around the front lights. Instantly visible is a prominent, trim rendition of the brand's signature checkmark-shaped DRL/position light (which probably also provides the turn signal, but we'll have to wait and see).

Less visible in the shadowy picture are two or perhaps three ultra-slim rectangular headlamp ice cubes above the checkmark. We'll have to wait and see just what features and functions are hidden for now in those shadows, but the fact that the lighting system is featured in a sneak preview like this gives reason for good hope.

Driver Assistance News

Next-Gen Lidar Can Enable L4: Valeo

DRIVER ASSISTANCE NEWS

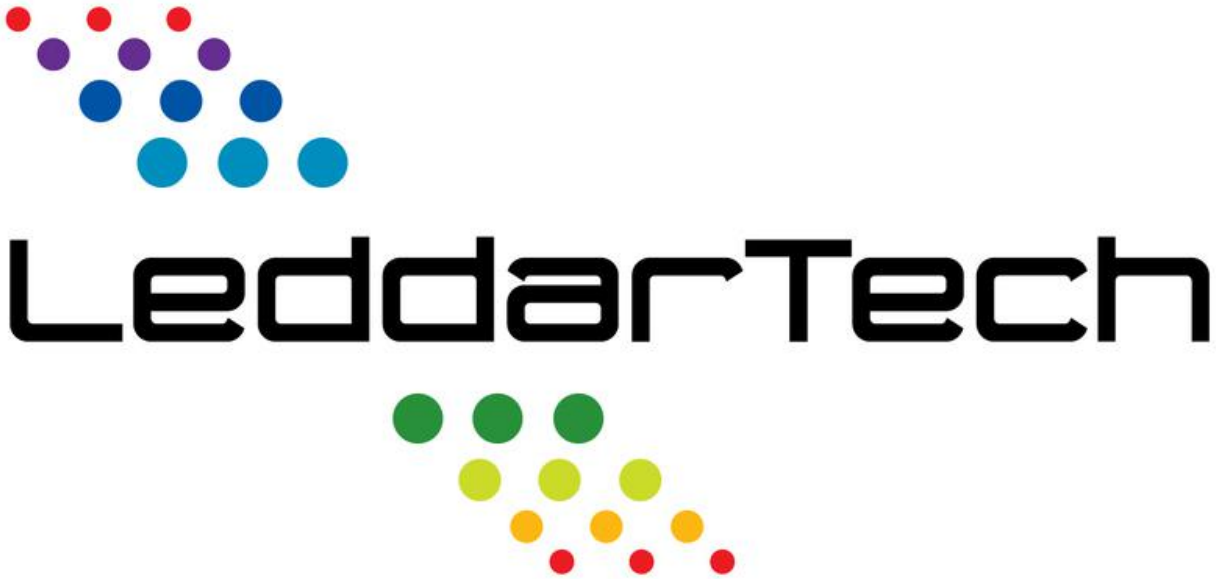
Valeo forecast about 30 per cent of all new premium vehicles will be capable of L^3 automated driving by 2030, with the global lidar market topping USD $50bn. So, they're developing a more advanced version of their Scala lidar system, for launch in 2024, which they say will offer twelve times greater resolution; triple the range, and a considerably wider field of view. A recent in-vehicle demonstration in Tokyo demonstrated how Scala lidars and a front camera, combined with vehicle-to-infrastructure communication, could autonomously steer through crowded streets while avoiding pedestrians. The system is actually L^4-capable, but operates in L^2 during public-roads testing, with a Valeo engineer in the driver's seat to take control immediately if needed.

The first Scala launched in the Honda Legend released in Japan last year. The second-generation Scala system hits the market in the new Mercedes-Benz S-Class as part of that car's Drive Pilot system, now available in Germany. Valeo say their 3rd-generation setup, the new one planned for 2024, will facilitate autonomous emergency maneuvers at road speeds up to 130 km/h, and will be able to "see" objects about 200 metres ahead. It will also be able to track vehicles not within human seeing distance, and track raindrop density to calculate proper braking distance.

Valeo make Scala hardware and software in their plant at Wemding, Germany, where they've got some 300 engineers working on it.
Bosch, Velodyne, Veoneer, Mobileye and Innoviz are also competing in the automotive lidar space, and Continental supply a system of their own for that Honda Legend, wherein it works in tandem with Valeo's as backups to each other.

LeddarSteer: Digital Beam Steer Tech

DRIVER ASSISTANCE NEWS



LeddarTech's new LeddarSteer™ is a digital beam steering (DBS) technology. LeddarTech say it's an ideal solution for lidar manufacturers aiming to build their next generation of sensors with true, reliable solid-state beam steering and agile field of view reconfiguration capability.

Digital beam steering refers to changing the direction of laser pulses in a lidar. A stack of alternating liquid crystal cells and polarisation gratings steers light at different angles at a specific wavelength, to augment a lidar's field of view while maximising its performance. LeddarSteer divides the FoV into discrete tiles that can be assembled to create the complete frame, with or without a specific region of interest. These FoV configurations can be changed on the fly, based on the vehicle's speed or environment, to fulfill multiple ADAS and AD use cases from a single lidar design.

LeddarSteer's benefits to lidar sensor developers and tier-1 and -2 customers include **software-controlled on-the-fly adjustment; multiple lidar applications,** and **automotive-grade solid-state technology**, resulting in an outstandingly long, reliable lifespan rating.

LeddarSteer can be seamlessly integrated into an existing lidar to expand the field of view or integrated into new lidar development. It improves the signal:noise ratio by concentrating laser power on a small region of interest while reducing the size, cost, and complexity of lidar components while maintaining or increasing the pixel count and resolution.

*LeddarTech, founded in 2007, are a comprehensive end-to-end environmental sensing company providing perception solutions scalable from L**2** ADAS to L**5** full autonomy with LeddarVision™, a raw-data sensor fusion and perception platform that generates a comprehensive 3D environmental model from a variety of sensor types and configurations.*

General News

U.S. Traffic Deaths are Highest Since '05

GENERAL NEWS

U.S. traffic deaths jumped more than 10% in 2021, to 42,915—the greatest number killed on American roads in a single year since 2005, according to what NHTSA are calling a preliminary estimate.

The yearly increase is the highest reported since NHTSA began using their present traffic fatality tracking system in 1975. Transportation Secretary Pete Buttigieg said "We need to assess which important innovations will develop on their own and which require federal support for basic research. We must consider when a technology should be given as much room as possible to develop on an experimental basis and when it's reached the point when it raises concerns that require regulation to keep people safe".

ADB has been saving lives around the world for years, but NHTSA recently defied a congressional directive to allow ADB according to a well-developed SAE technical standard, instead substituting a deeply problematic rule of their own devising. Automakers, SAE, and others have made a last-ditch petition to the agency for reconsideration of one or two of the new rule's most serious flaws.