

Trends and Expectations for the future of Micro-Optics in Automotive Lighting

What is DVN ?



DVN is a reference in the world of Lighting, Interior comfort, and Lidar.



15 Years

Founded by Hector Fratty,
former Valeo Lighting
Systems' chief of R&D.



240 Customers worldwide

240 Global Carmakers, Tier1 & Tier2
joined the DVN Community.
3 800 LinkedIn followers.
500 WeChat members.



25 Experts

DVN experts are former
R&D Directors from Audi,
BMW, Stellantis, Valeo,
Marelli, Forvia, Lumileds.



180 Monthly reports

Over 7,500 articles news published on DVN
Newsletters focused on the last automotive
technologies and innovation.
1 Technological Study published per year since 2018.



28 Workshops

DVN organize 5 workshops per year:

- 4 DVN Lighting Workshops across the world,
- 1 DVN Interior Workshop,
- 1 LIDAR Conference.

What is DVN ?


Weekly Newsletter

Editorial
Indepth

Lighting
Community
- News

Editorial

Pixel Style: Fad? Or Trend?



In Depth Lighting Technology

Gamechanger Lighting?




by Sascha Klapper, S&P Global Mobility Research & Analysis Manager

The automotive lighting industry always excites me these days. It has evolved from a simple car lamp provider to a confident and very dynamic industry that is innovative and design driven. It is not just about seeing and being seen better; vehicle lighting is going far beyond. Lighting has become a clear overall brand differentiator with new lighting signatures and advanced lighting functions. New technologies are being incorporated into headlamps, tail lamps, cabin illumination and the overall vehicle. Carbide lamps, as well as halogen or xenon lamps, are things of the past. The LED has become the state-of-the-art light source across all sales segments. And yet, we are already discussing the adoption of mini- and microLED technologies, with lasers making their debut.

IN DEPTH... LIGHTING

DVN Field Trip: Lynk & Co Design

OCTOBER 1, 2024 · 4 MINUTE READ



in

X

I had the pleasure to visit the West Coast of Sweden—Gothenburg, Northern Europe's automotive hub. I was visiting Lynk & Co Design as a sort of distant cousin (Volvo Cars employee when I was working in Gothenburg). Lynk & Co is a mobility provider committed to flexibility as a core principle. With a diverse range...

Light Channel Opening, driving simulator test and two-day Lighting Tech-day at EDAG Wolfsburg

By Gerd Bahn Müller, DVN Senior Adviser



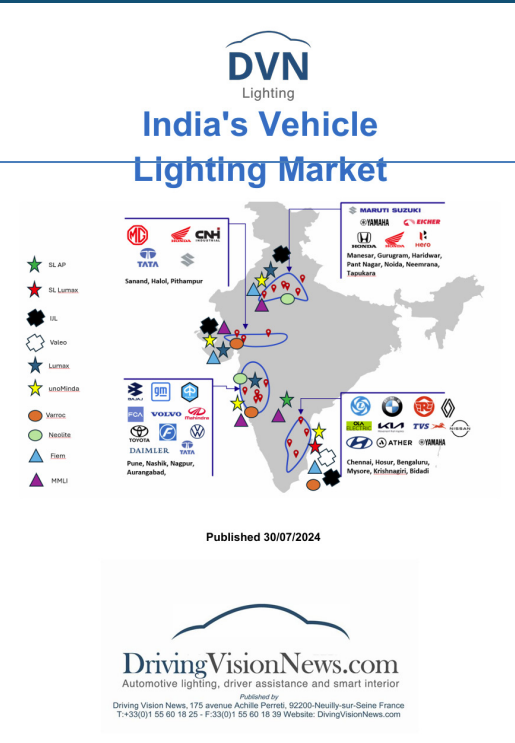
DVN was invited to the opening of the new light tunnel at the Warmenau site near Wolfsburg on 17 September 2024. In Warmenau, EDAG has brought together all of its 1,150 employees, who were previously scattered across various locations in and around Wolfsburg, in the development centre it moved into in 2016.

The lighting technology group, which was founded at EDAG in 2022 and has since grown to over 70 employees at various EDAG locations, now has a brand new 25-metre-long lighting channel at its headquarters in Wolfsburg. Team leader Tibor Giesen and Jannes Buthmann proudly presented the new LMT goniometer, which, thanks to its newly designed mechanics and robotics, can also hold and accurately measure large components such as 2 metre long front and rear panels.

What is DVN ?

Monthly reports

Event summary
Company profile
Technology insight



Annual Studies

Hot Topics
analyzed by DVN Experts



What is DVN ?

Workshops

04 / 05
DEC. 2024
SHANGHAI

DVN
Lighting

DVN SHANGHAI WORKSHOP

SOCIAL COCKTAIL • MEET & GREET DINNER • CONFERENCE • EXPO

33RD DVN
WORKSHOP

HYATT REGENCY
SHANGHAI JIADING

INTERACTIVE LIGHTING &
COMMUNICATION

DESIGN / TECHNOLOGY / EE ARCHITECTURE / SAFETY / REGULATION



Valeo ZKW MIND 旭升车灯 HASCO Anrui WIPAC

synopsys 欧司朗 AML LESS FOCUSLIGHT 欧司朗 POWER 欧司朗 SMS 思索技术 欧司朗

ASYSY 欧司朗 LMT amul OSRAM elmos DELO TOSHIBA KEBOODA 欧司朗

19 / 20
FEB. 2025
MUNICH

DVN
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DVN MUNICH WORKSHOP

SOCIAL COCKTAIL • MEET & GREET DINNER • CONFERENCE • EXPO

34TH DVN
WORKSHOP

NEXT CHALLENGES :
SUSTAINABILITY, DEVELOPMENT
SPEED ACCELERATION AND SW



Lecture Structure

1. The Enabler: ADB Glare Free High Beam
2. Market Analysis New Lighting Elements,
 - 2.1 Front Grille
 - 2.2 Ground Projection
3. New Applications
4. Software and Lighting
5. Business Chances Car Lighting

1. The Enabler: ADB Glare Free High Beam

Low Beam



Explanation picture

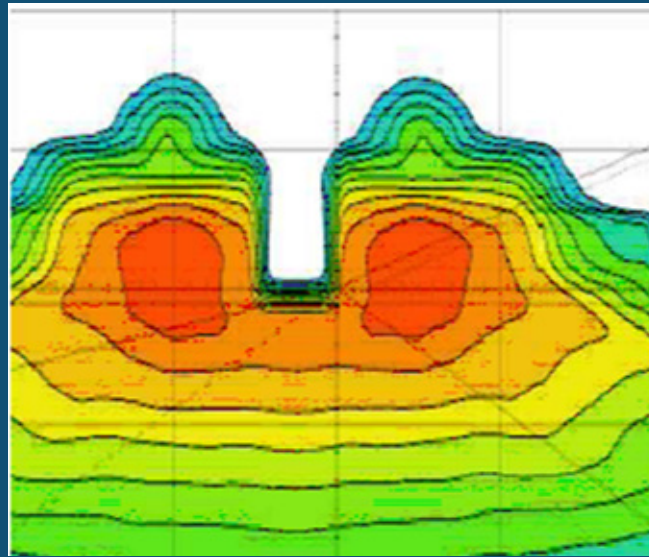
1. The Enabler: ADB Glare Free High Beam

Low Beam + Matrix ADB

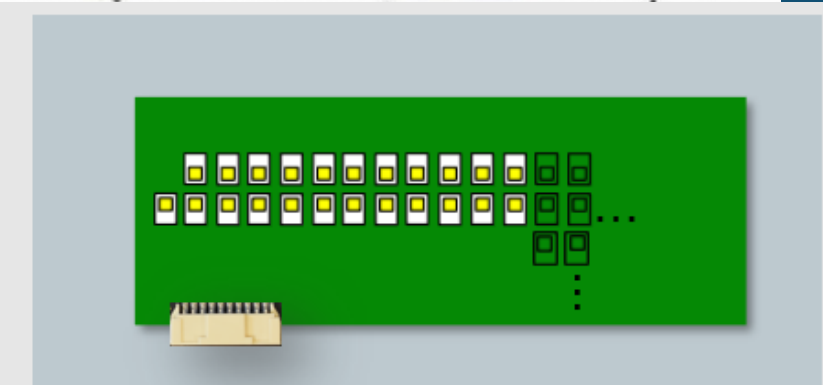
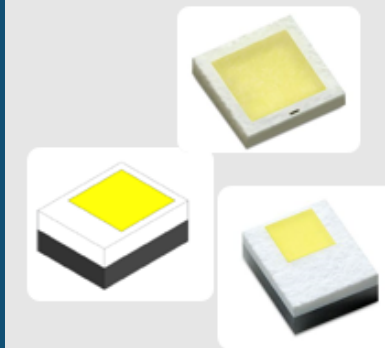
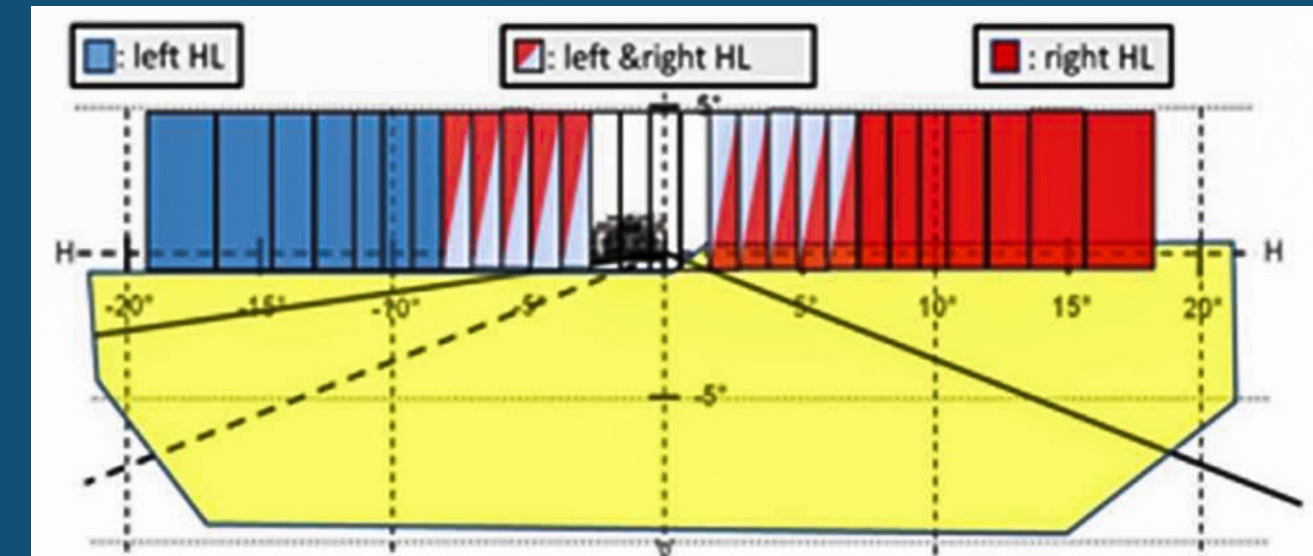


Explanation picture

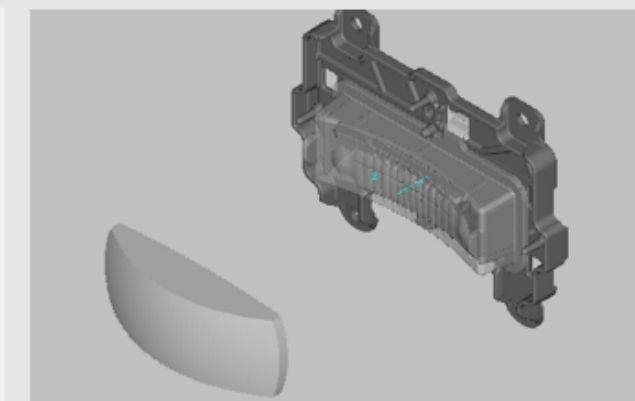
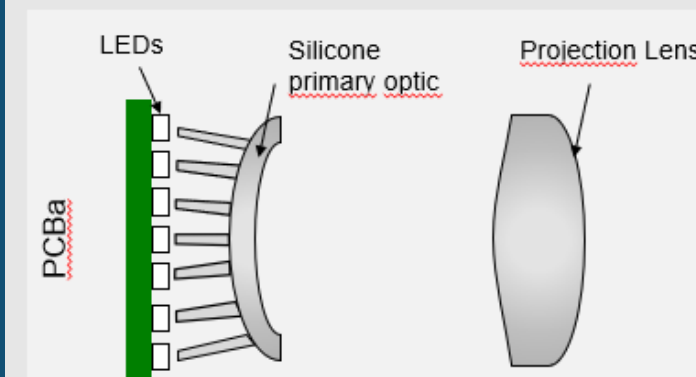
ADB Solutions #1: ADB with Segments



First Mechanical ADB, Xenon based

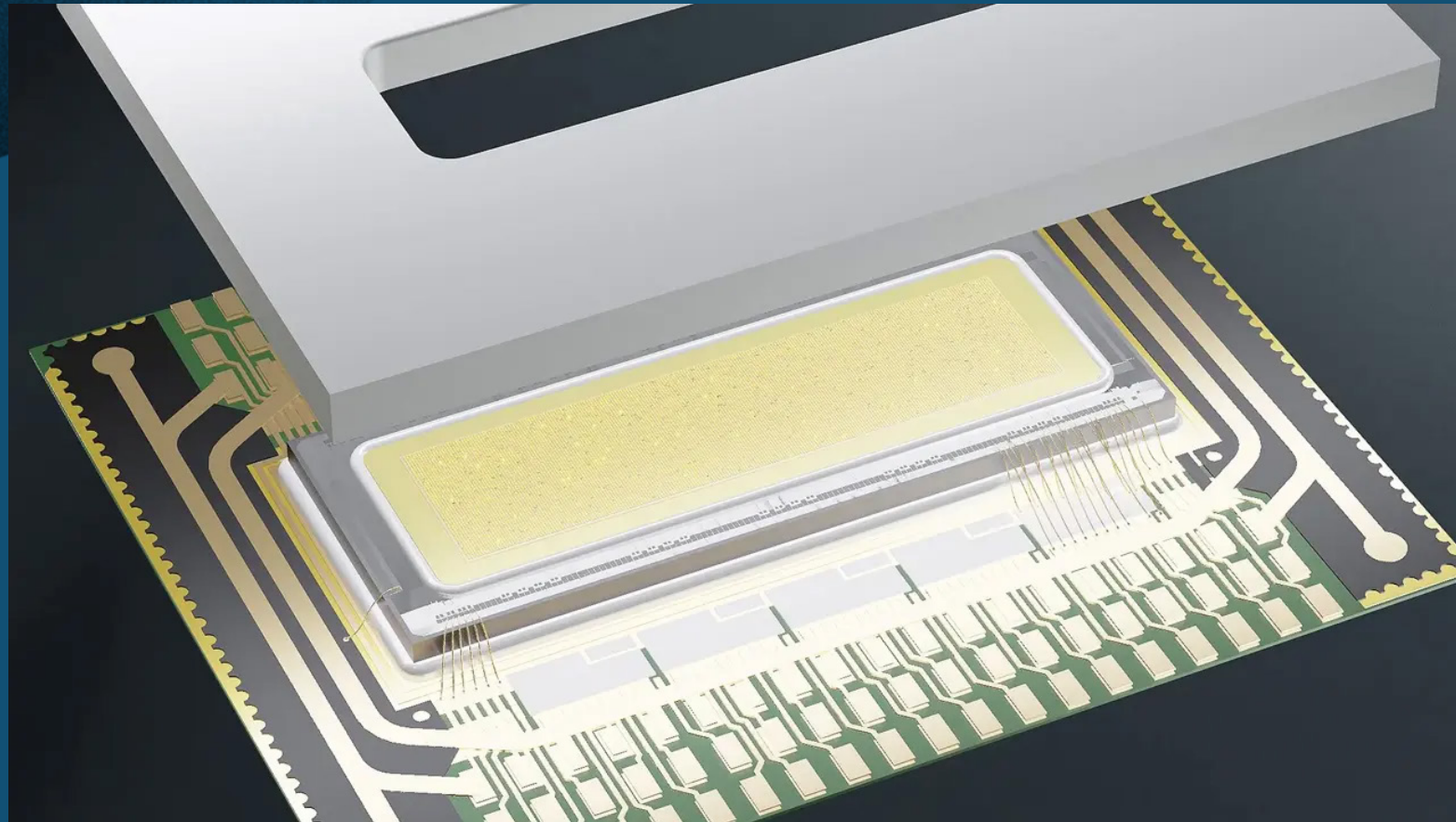


Schematics of optical system



LED Matrix ADB 24 Pixel

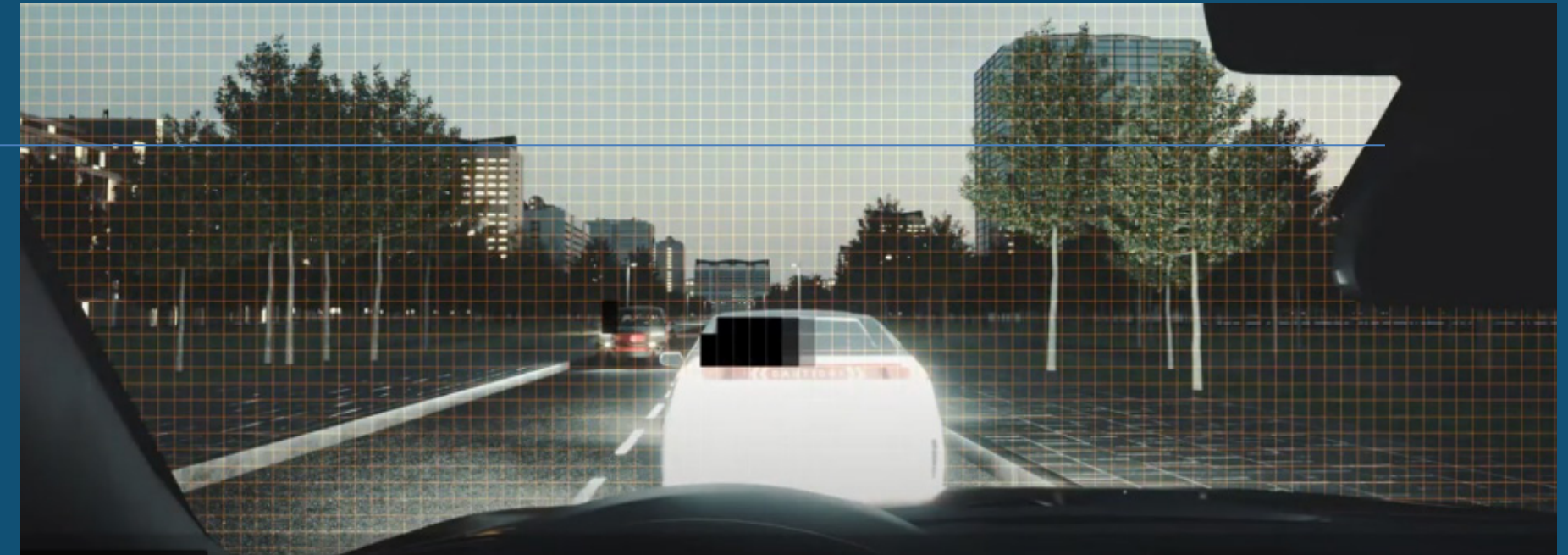
ADB Solutions #2: Micro LED



Osram Eviyos 25600 LED with 40µm size

Technique	Micro-LED	DLP
Beam width	± 45°	± 18°
Resolution	>10 kilopixel	>1 megapixel
Maximum luminous flux	4000 lm	400 lm
Propagation loss	0%	47%
Ca. volume projector unit	200ml	1000 ml

Suppliers:



Micro-LED Array 4,000 to 25,000 Pixel. Introduction 2023

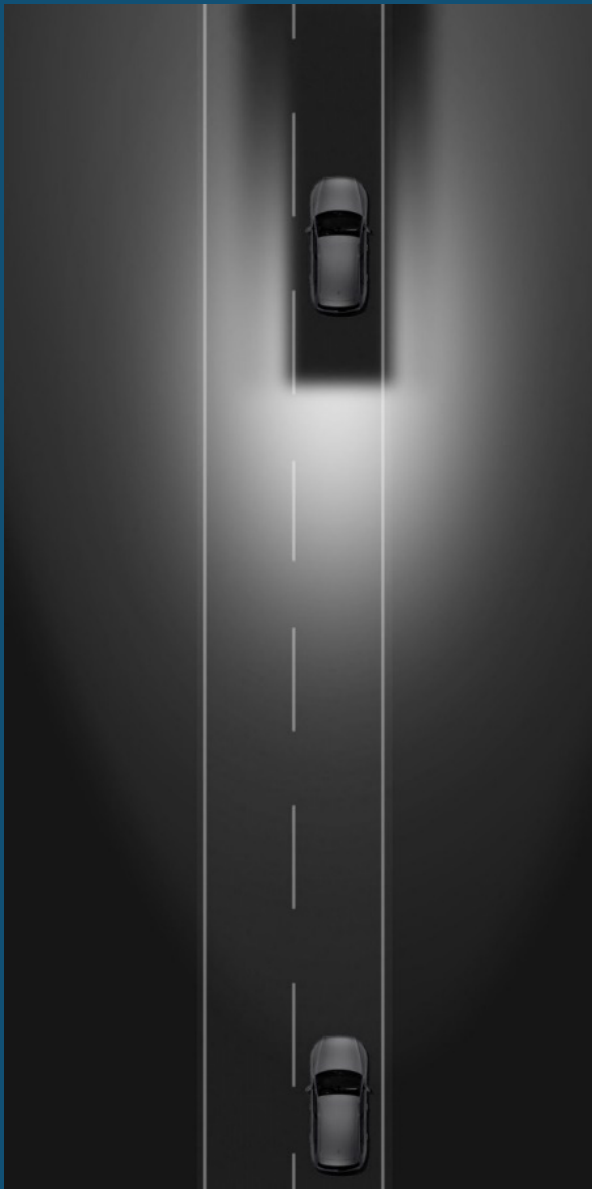


AMS Osram: Winner of the „Deutscher Zukunftspreis 2024“
(German Future Award, Bundespräsident Frank-Walter Steinmeier)

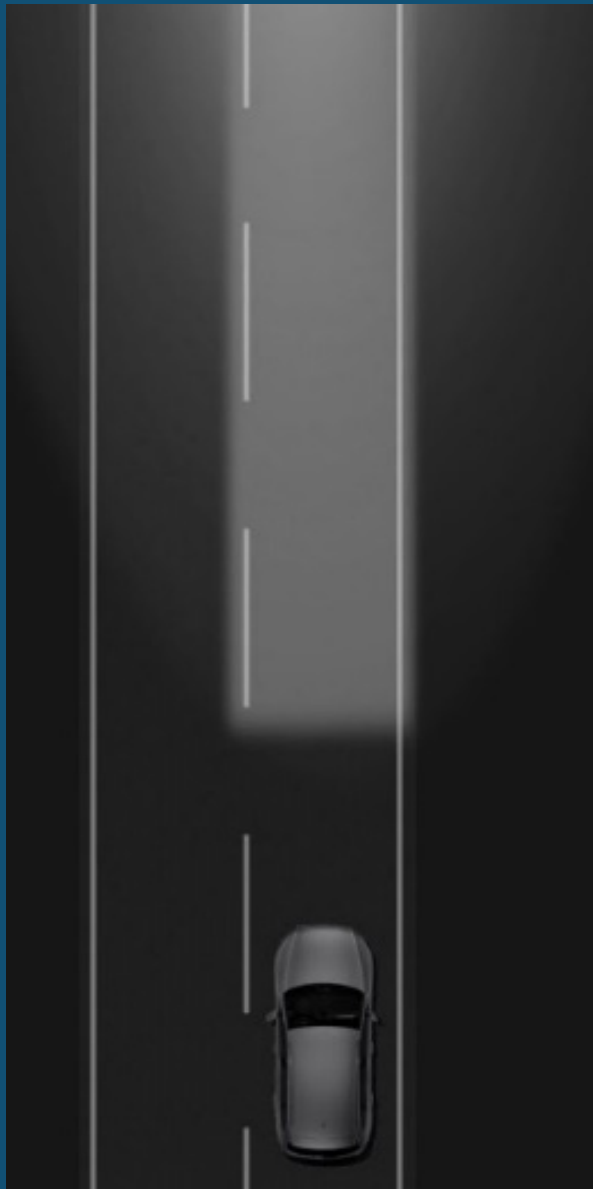
Digital Matrix LED headlight Functions



Advanced Coming / Leaving Home



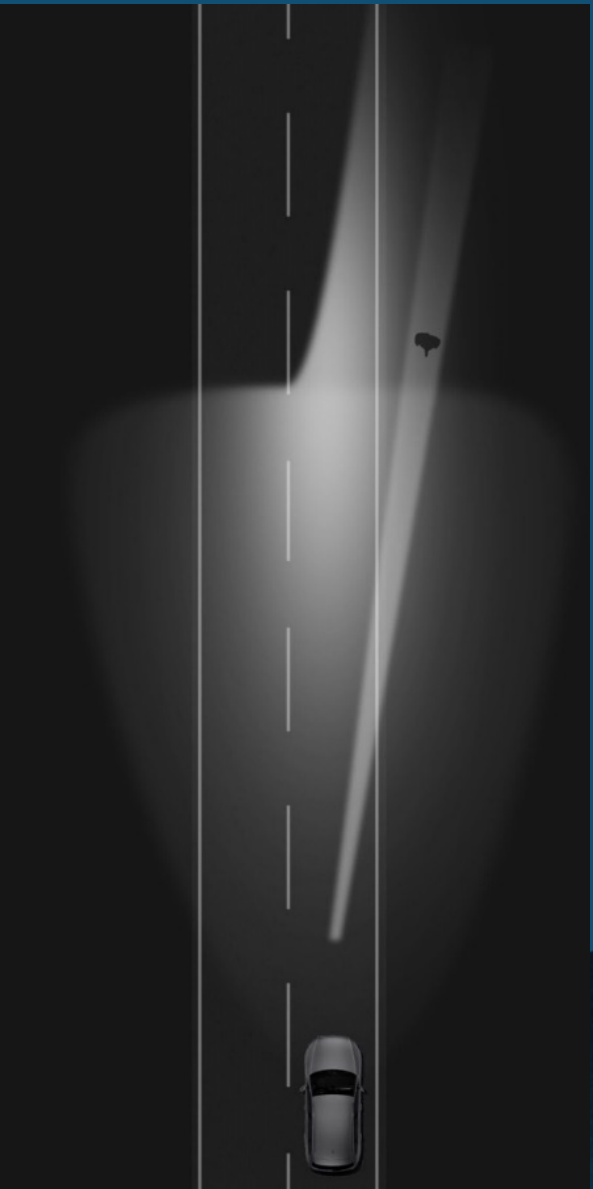
Glarefree high beam



Lane light



Orientation light



Marking light

2.1 New Lighting Elements: Front Grille

As one of the first OEM, BMW has started the illumination of the bars in the Front Grille. High cost are more than compensated by profit through option sales. Many OEMs show concept cars with lit front grille with dynamic Animations.



- Lit Front Grille will become a part of the Front Lighting System. 4 to 4000 single addressable LEDs have to be handled.
- Headlamp Supplier needs JV or own qualification, to supply full front lighting system if wants to continue to be system supplier Tier 1.
- New Front End Lighting Concepts may need :
 - Printed LEDs and Electronics
 - Flex Board
 - Rigid-Flex Mix
 - Light Guides
 - Micro Optics... (!!!)
 - ...

2.1 Market Analysis

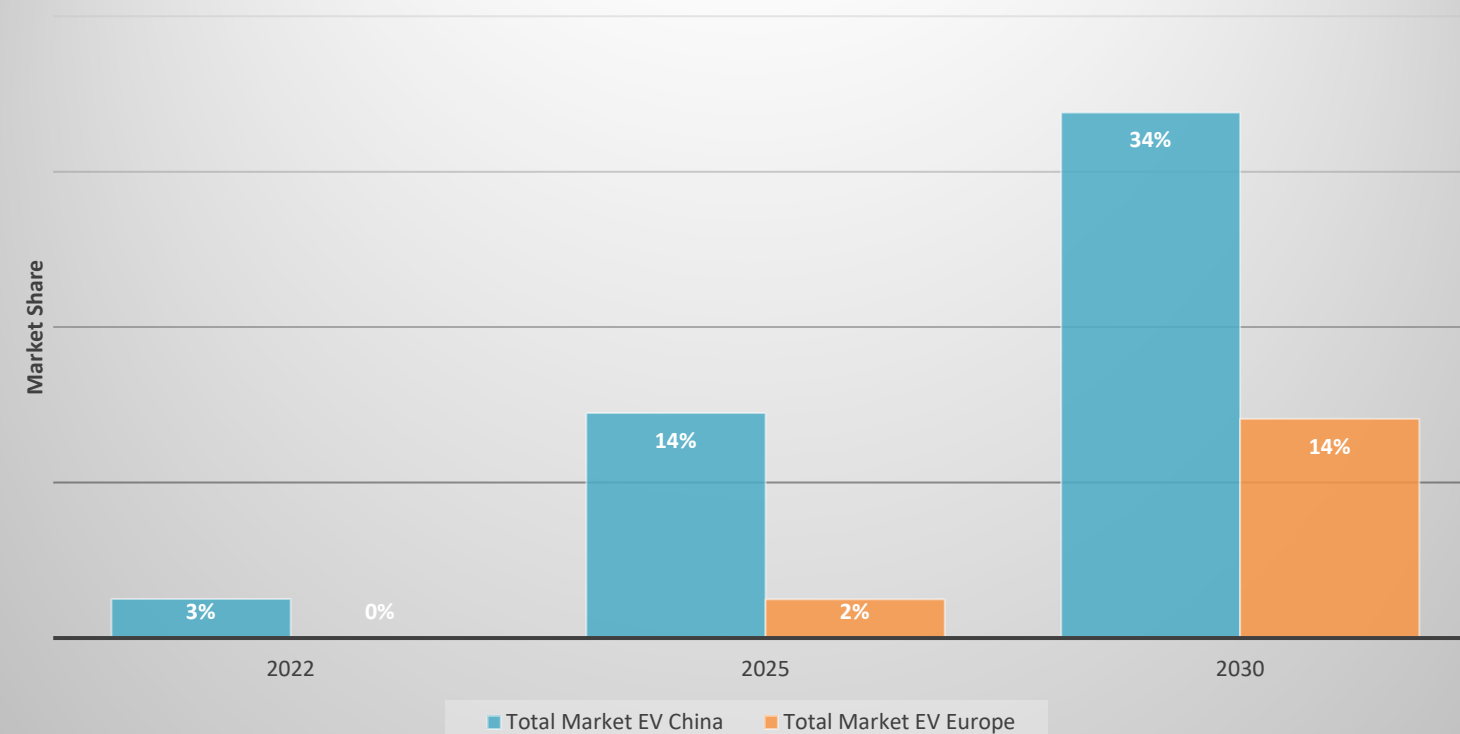


LED Illuminated Emblem
(on i-Land concept model)

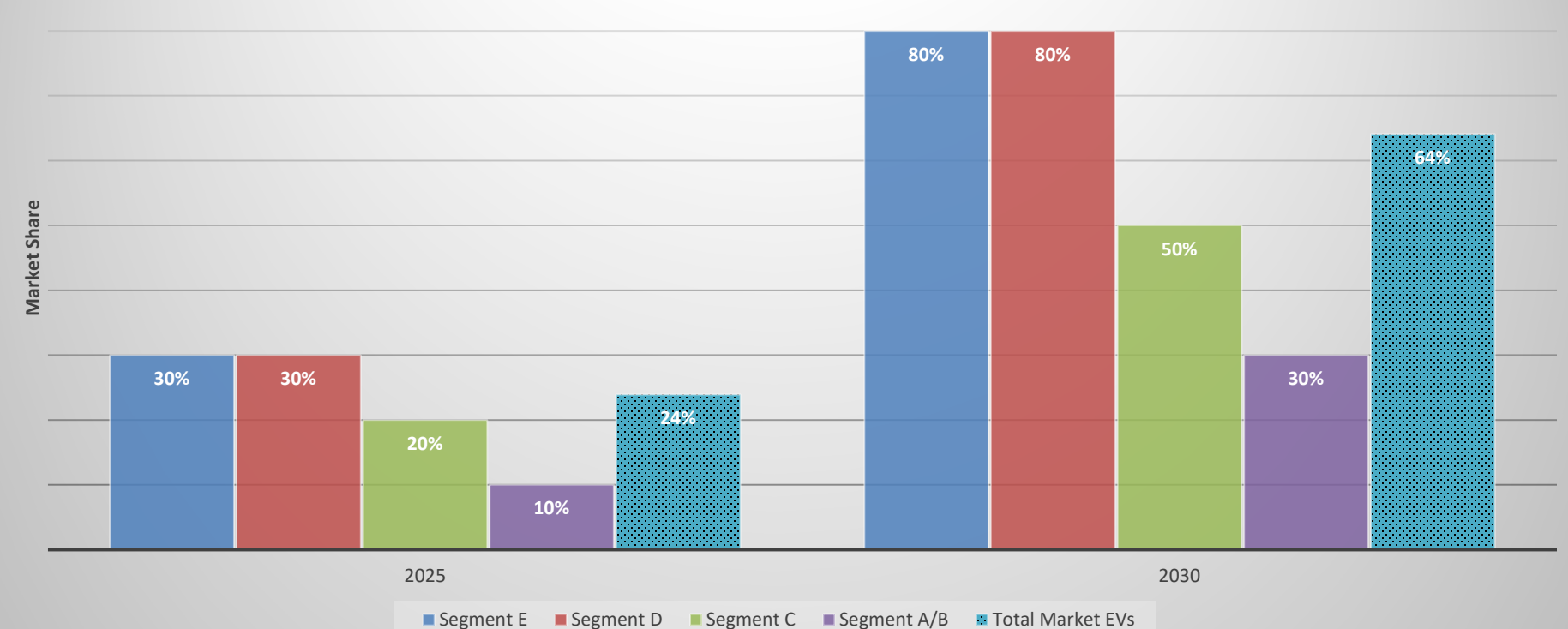


2.1 Market Forecast Illuminated Grille

High-end illuminated EV grille market share in China and Europe



Illuminated EV logo market share in China



3.2 New Lighting Elements – Ground Projection

Danger: Crossings and Turning by Cars / Trucks : **TOO MANY FATAL ACCIDENTS**



New Lighting Elements – Ground Projection

Danger: Crossings and Turning by Cars / Trucks : **TOO MANY FATAL ACCIDENTS**



New Lighting Elements – Ground Projection

Danger: Crossings and Turning by Cars / Trucks : **TOO MANY FATAL ACCIDENTS**



New Lighting Elements – Ground Projection

Danger: Crossings and Turning by Cars / Trucks : **TOO MANY FATAL ACCIDENTS**



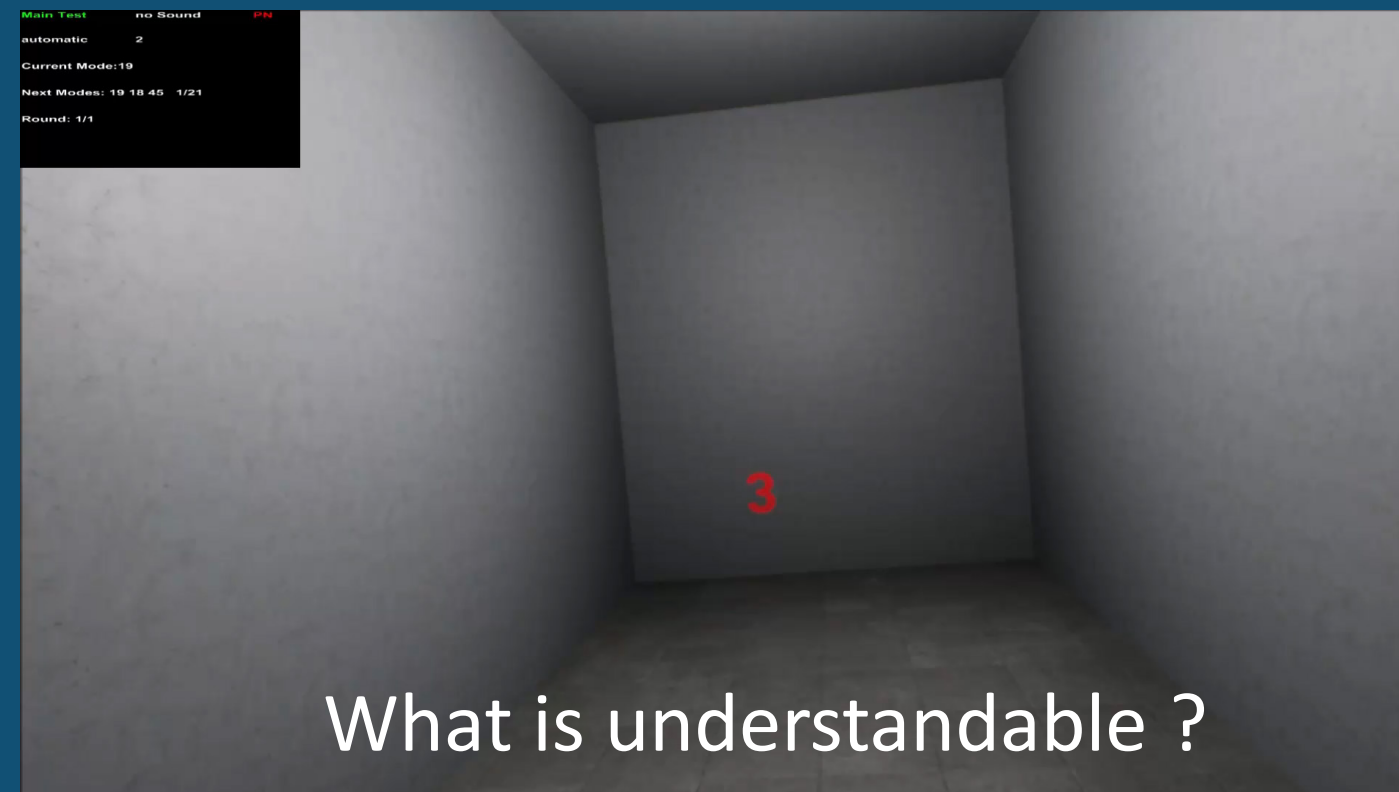
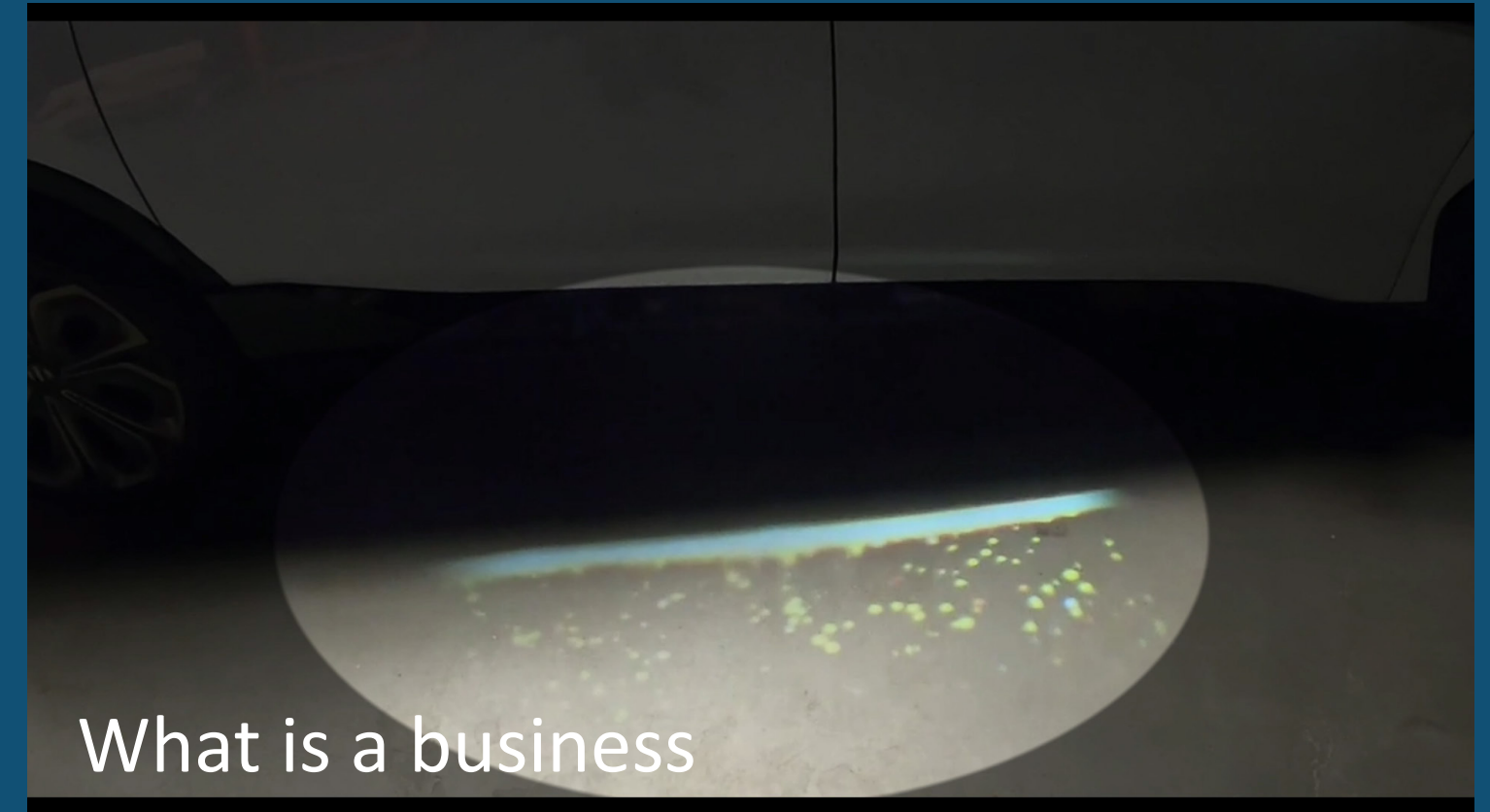
New Lighting Elements – Ground Projection

Danger: Crossings and Turning by Cars / Trucks : **TOO MANY FATAL ACCIDENTS**



4. New Fun Applications ??

- No Application without legal framework please help GTB by data and safety arguments.....



Outlook: New Lighting Elements

- Small projectors for dynamic ground illumination starting to enter the car
- Lit Logos at Front / Rear / Side are trending. Legislation still difficult.
- All Lighting Functions are dynamic in future

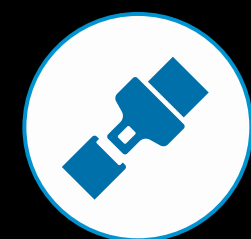



BUT THERE ARE A LOT OF CHANCES 😊



4. No Light without Software..... Future Software Defined Vehicles (SDV)

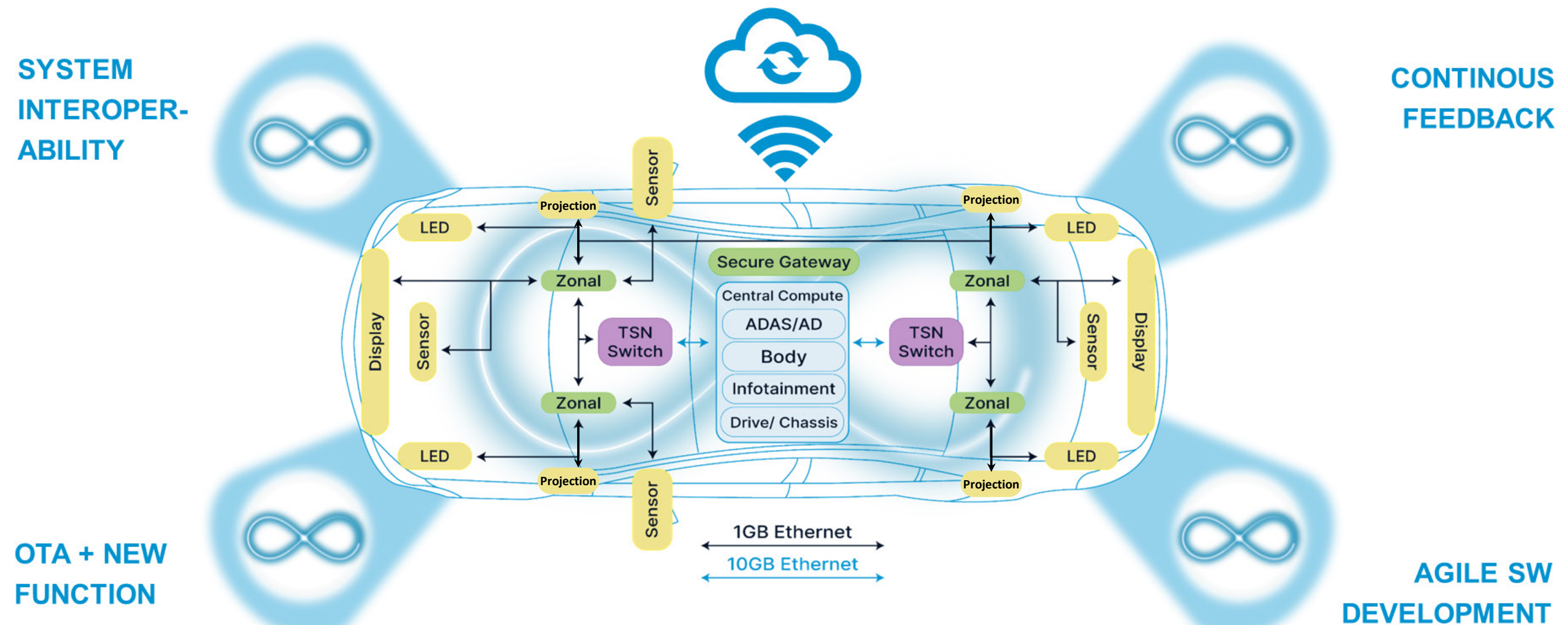


End-User Innovation Focus Area

-  SAFETY
-  COMFORT
-  INDIVIDUALITY
-  UPGRADEABLE

4. Software and Lighting: Software-Defined-Vehicle (SDV)

SDV Lighting System



OTA – Over-The-Air Update, **TSN** – Time Sensitive Networks, **SW** - Software

Disclaimer: Above figure is not an actual representation of vehicle architecture

Dirk Linzmeier, CEO TTTechAuto
DVN Workshop Munich, Feb. 2024



4. Software and Lighting

Recognition



4. Software and Lighting

Interaction



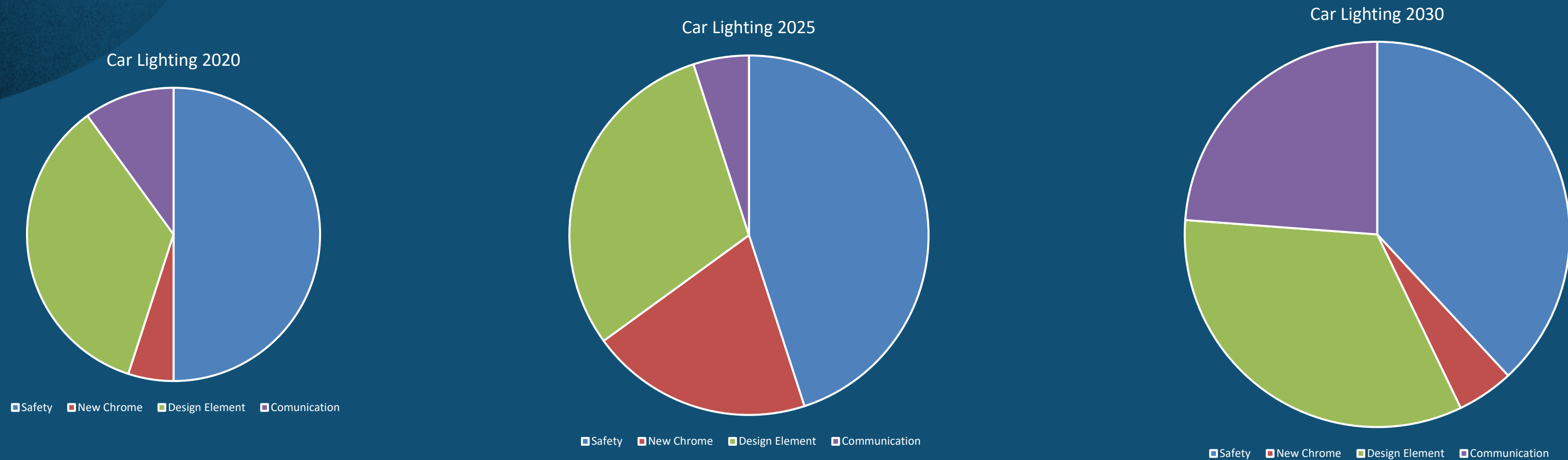
4. Software and Lighting

Communication



Business Chances Car Lighting

Source: DVN 2022 Study „DVN Market Forecast on new Lighting Systems“



The Future Budget for the Car Lighting increases.

No Software – No Function

But Lighting, however it may come – has a future.

Thank you