汽车照明安全创新 – 高适应性- 高分辨率 - 高性能

Innovations for Safety in Automotive Lighting

High Adaptation - High Resolution - High Performance

DVN Workshop Shanghai, April 24 & 25, 2019

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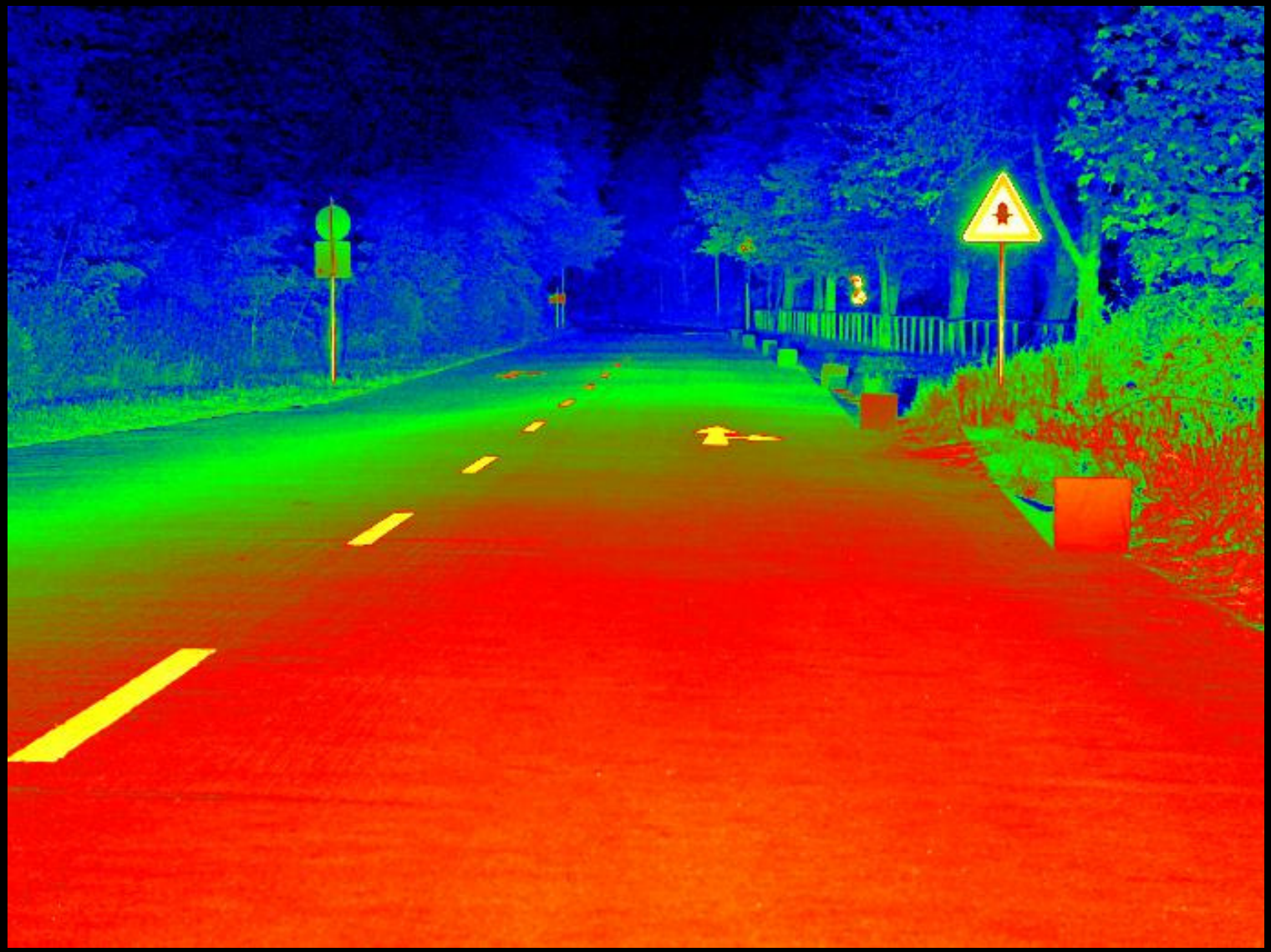
Shanghai

24th ,25th Apr. 2019

测试路面：亮度分析 / Test Ground: Luminance Analysis



近光光分布 / Low Beam Light Distribution

远光光分布 / High Beam Light Distribution

局部远光光分布 / Partial High Beam Light Distribution

- 自适应远光
- 局部远光
- 分段式远光
- 防炫目远光
- 永恒远光

… 以及其他名称

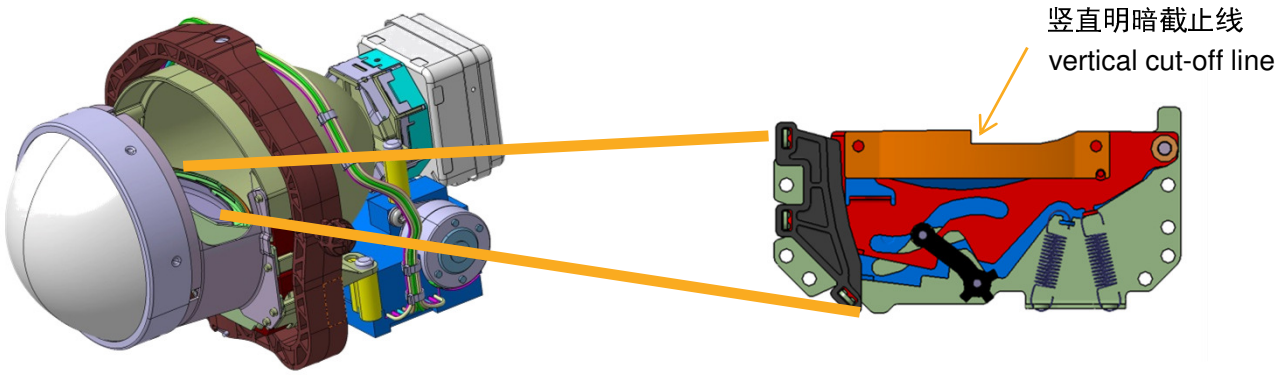
- ADB
- Partial High Beam
- Segmented High Beam
- Glare-free High Beam
- Permanent High Beam

… and some other names for the same feature

防炫目远光 / Glare-free High Beam

防炫目远光首次在氙气灯系统使用

The glarefree high beam systems started with Xenon systems:



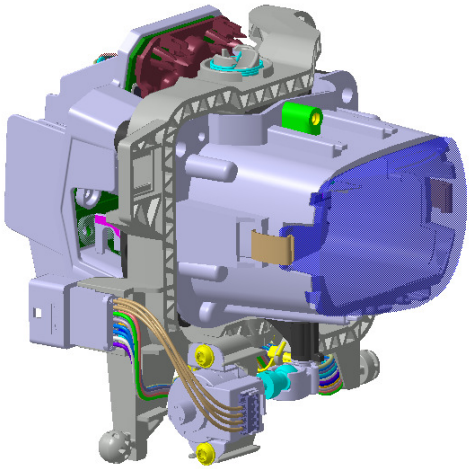
大众途安 SOP 2012
AFX-Xenon ADB 系统

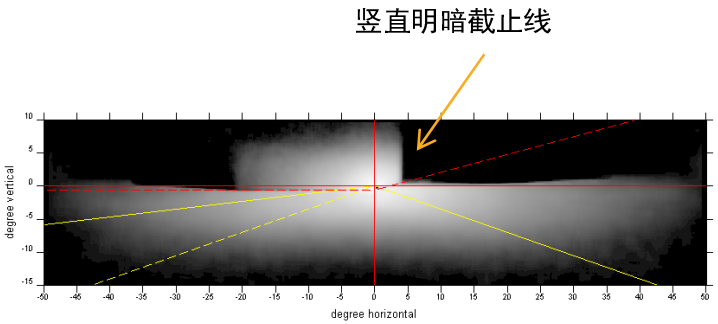
Volkswagen Touran SOP 2012
AFX-Xenon ADB System

防炫目远光 / Glare-free High Beam

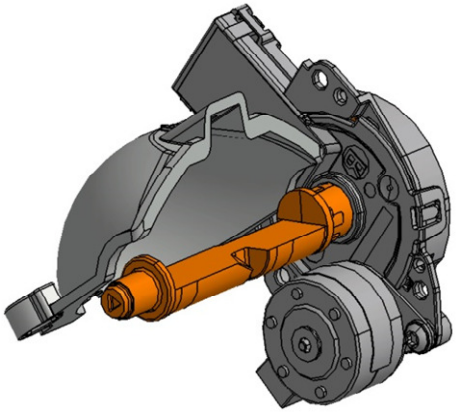
LED光源在防炫目远光上的使用

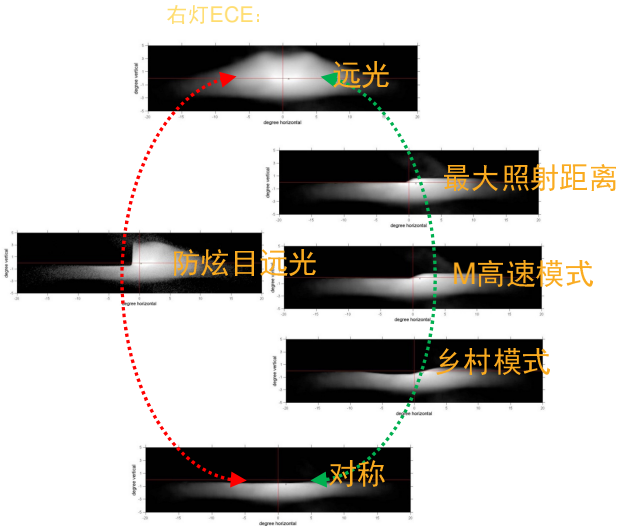
The glarefree high beam systems switched to LEDs:





大众途安SOP2015
LED ADB 系统



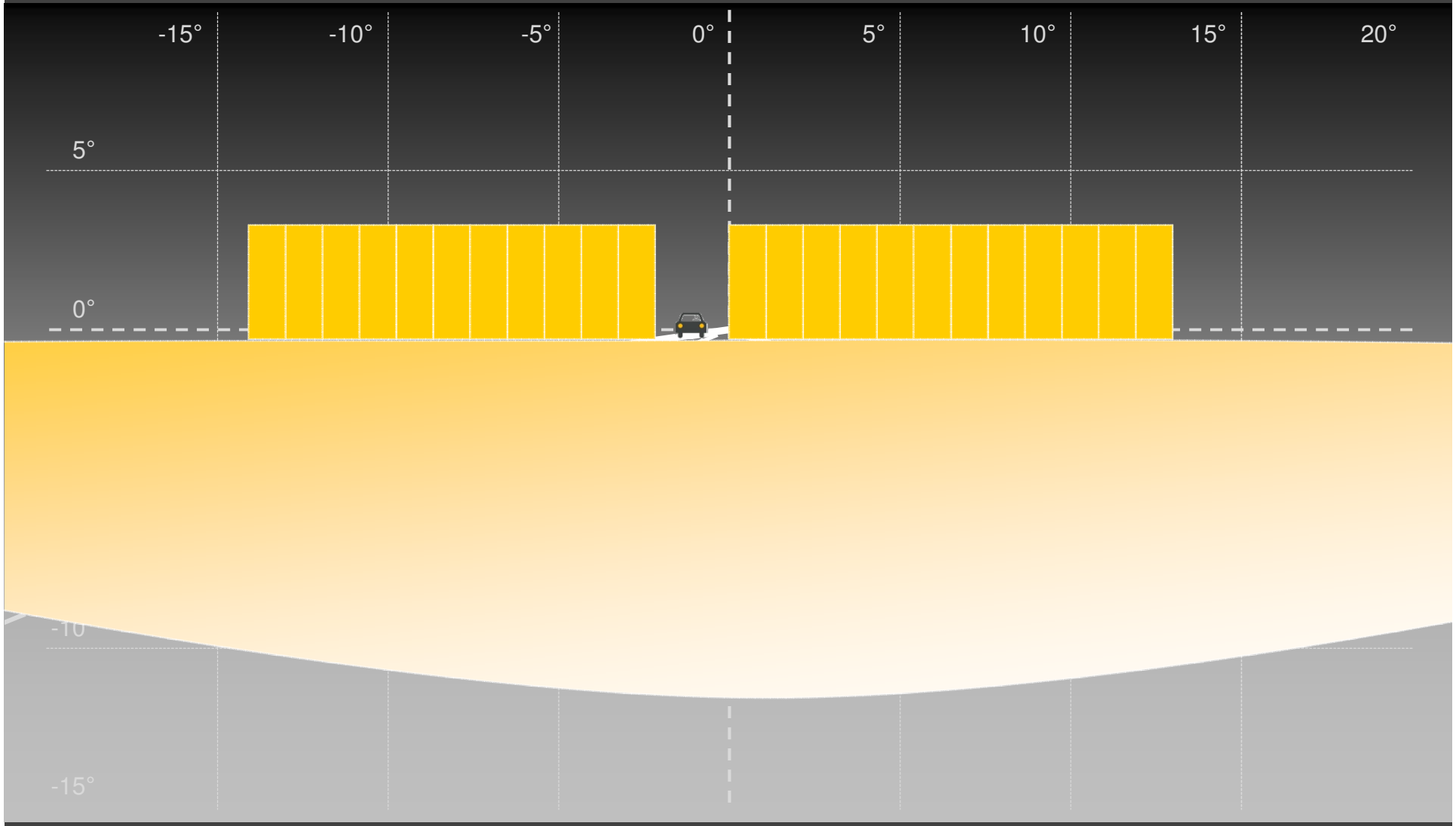


奔驰S级
LFX ADB System

LED矩阵式 / MATRIX LIGHT WITH LEDS

AUTOMOTIVE LIGHTING

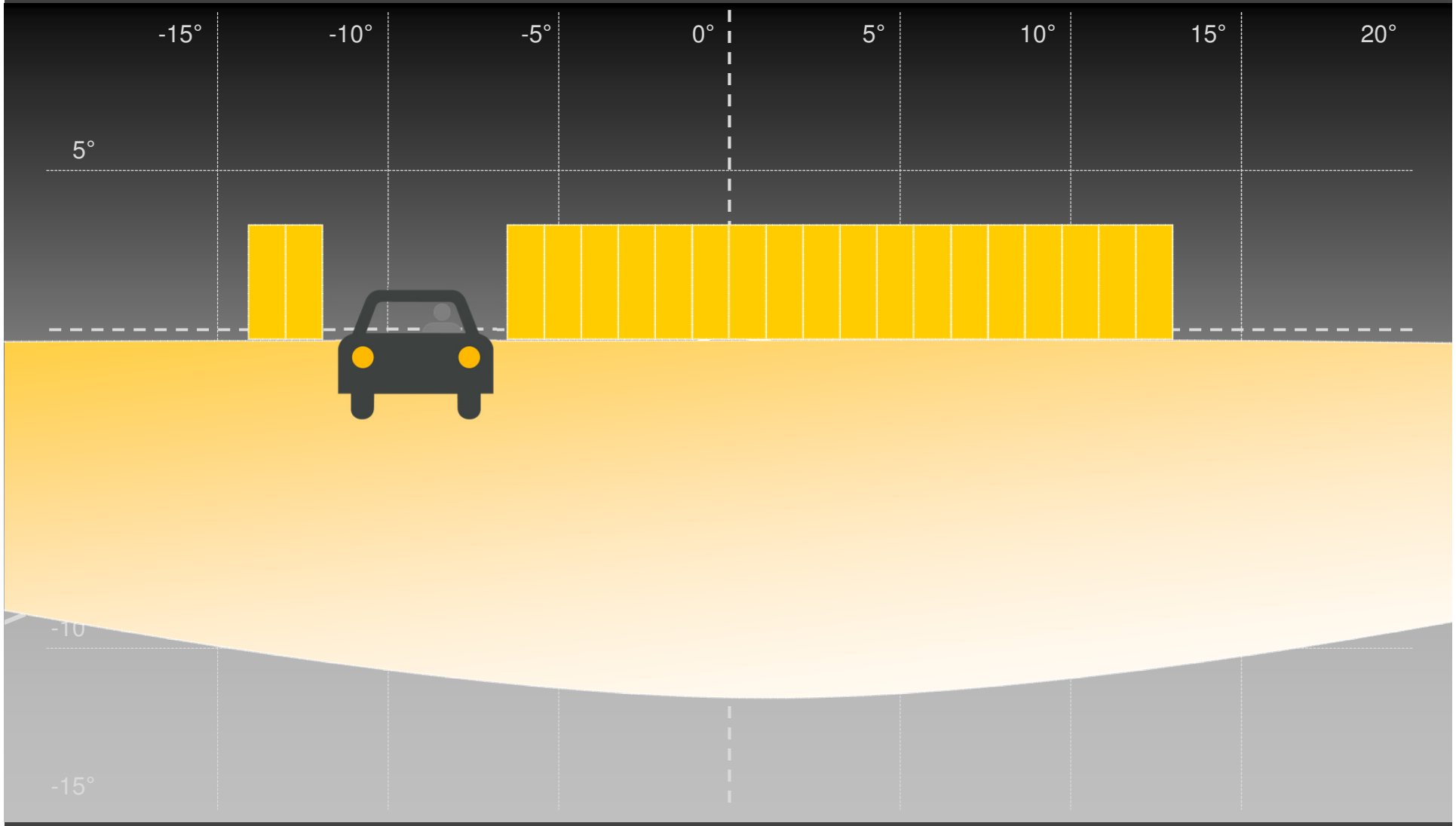
24 hours daylight.



LED矩阵式 / MATRIX LIGHT WITH LEDS

AUTOMOTIVE LIGHTING

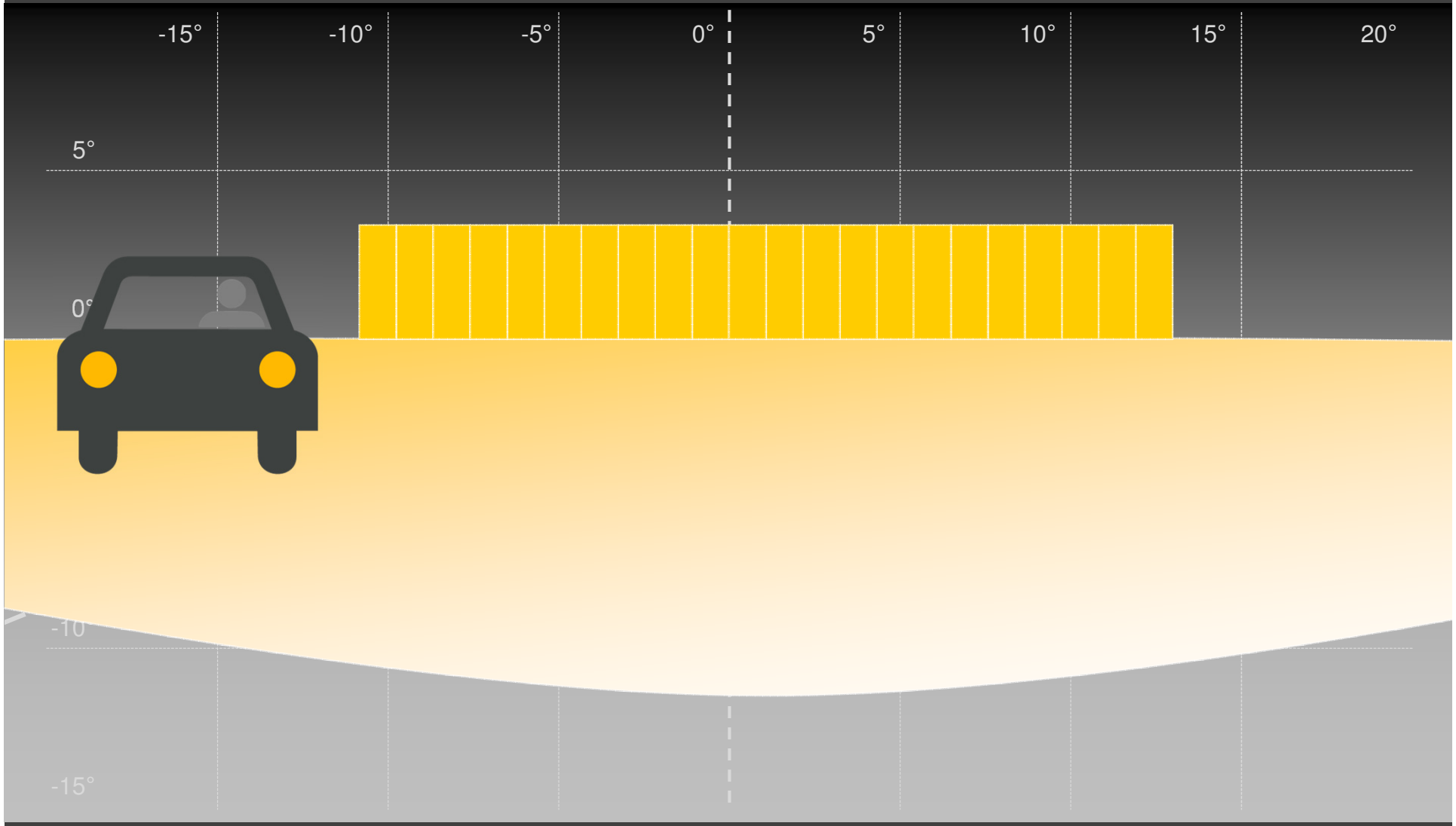
24 hours daylight.



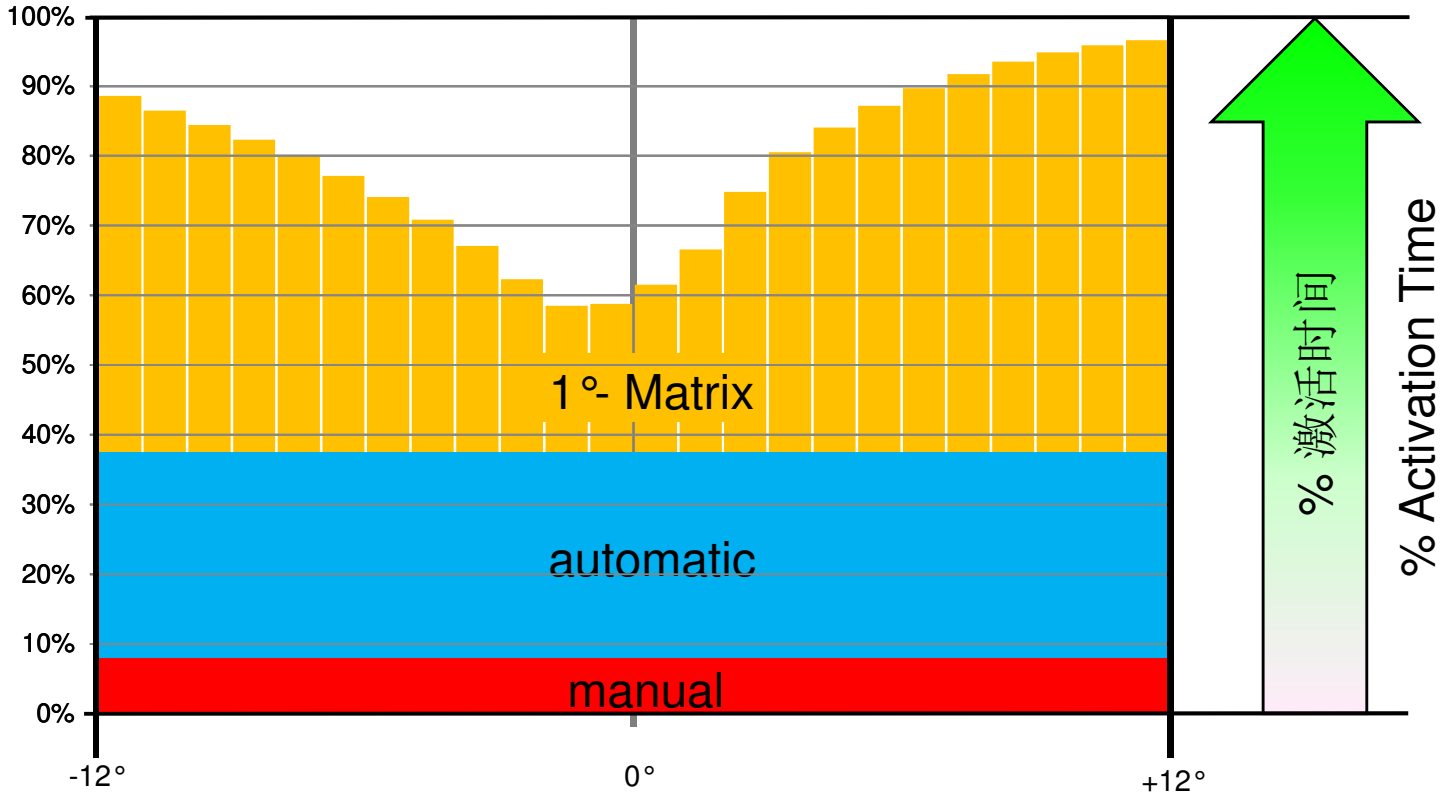
LED矩阵式 /MATRIX LIGHT WITH LEDS

AUTOMOTIVE LIGHTING

24 hours daylight.



矩阵式系统：分段激活时间



Audi TT3: 全LED “矩阵式”, MY 2014 / All-LED „Matrix“

反射式矩阵
5+5+1个分段

„Matrix“ reflectors
5 + 5 + 1 segments

奔驰 CLS: 全LED “多种光型”/ Mercedes-Benz CLS: All-LED “Multibeam”, MY 2014

矩阵式模组：

- 24颗LED实现16个分段
- 硅基初级光学元件

Matrix module:

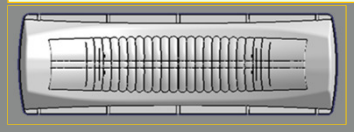
- 24 LEDs arranged in 16 segments
- Silicon primary optic

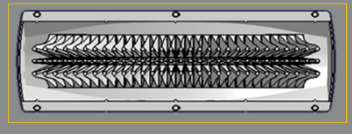
奔驰 S Class: 84个像素 “多种光型” MY 2017
Mercedes-Benz S Class: 84 Pixel “Multibeam” MY 2017

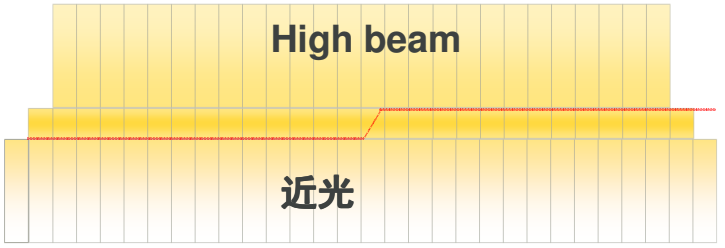
矩阵式模组:

- 三排共使用84颗LED
- 硅基初级光学元件

84像素 | 近光 + 远光 | 3 排
84 Pixel | Low Beam + High Beam | 3 pixel lines







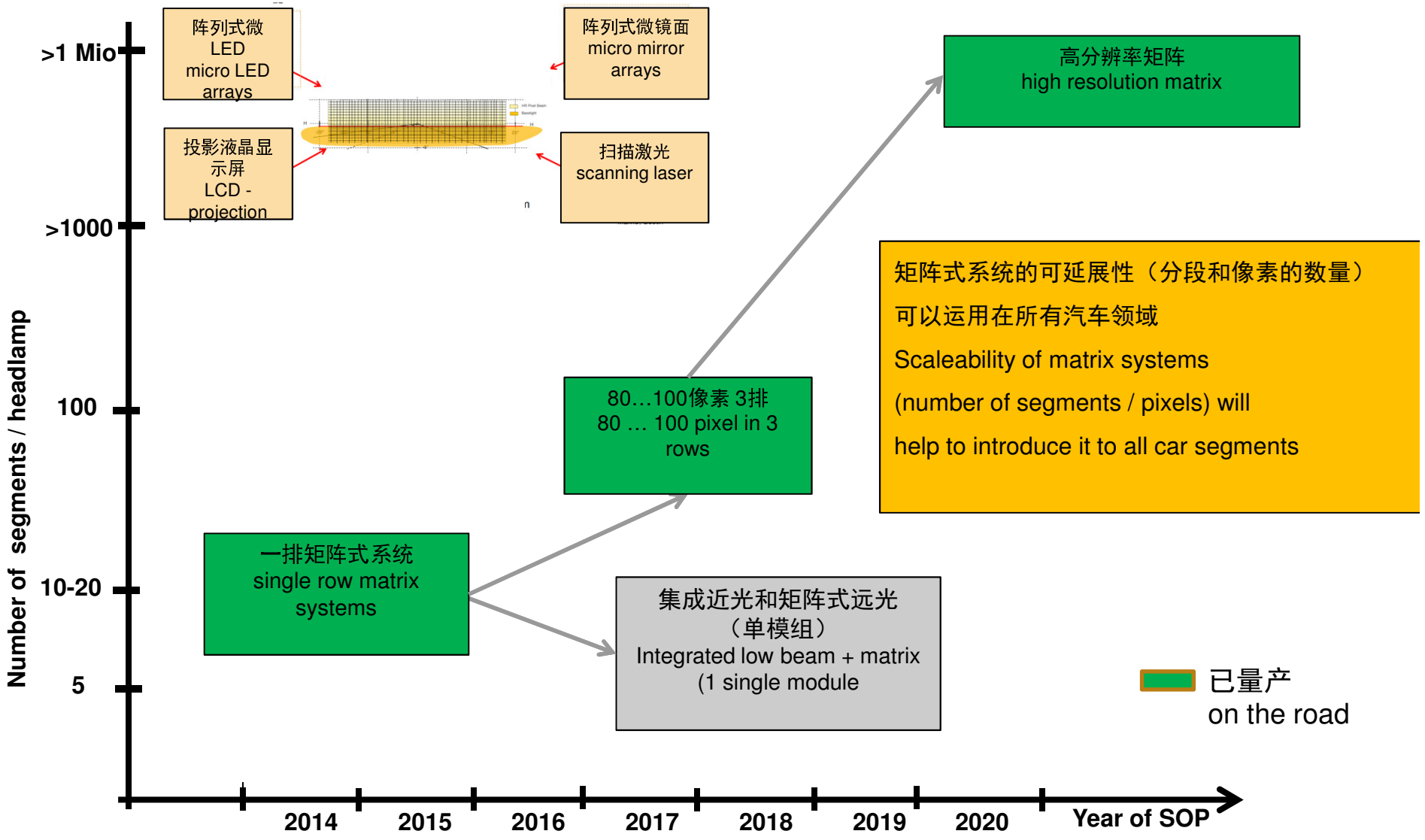
Matrix module:

- 84 LEDs arranged in 3 pixel rows
- Silicon primary optic

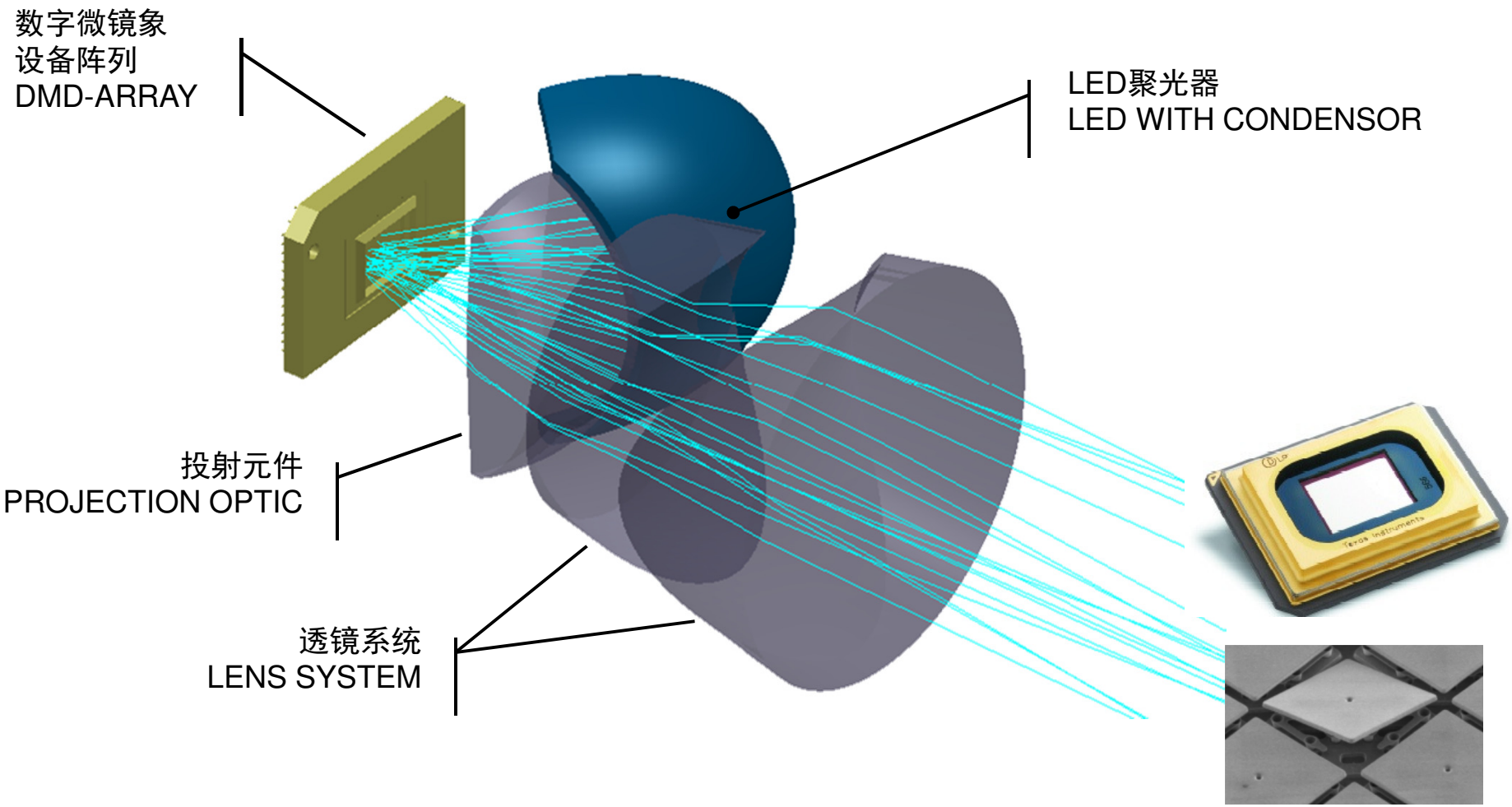
矩阵式前灯研发历程 R&D Matrix Headlamp Innovation Roadmap

AUTOMOTIVE LIGHTING

高分辨率矩阵式—可行的技术 / Matrix High Resolution – Possible Technologies



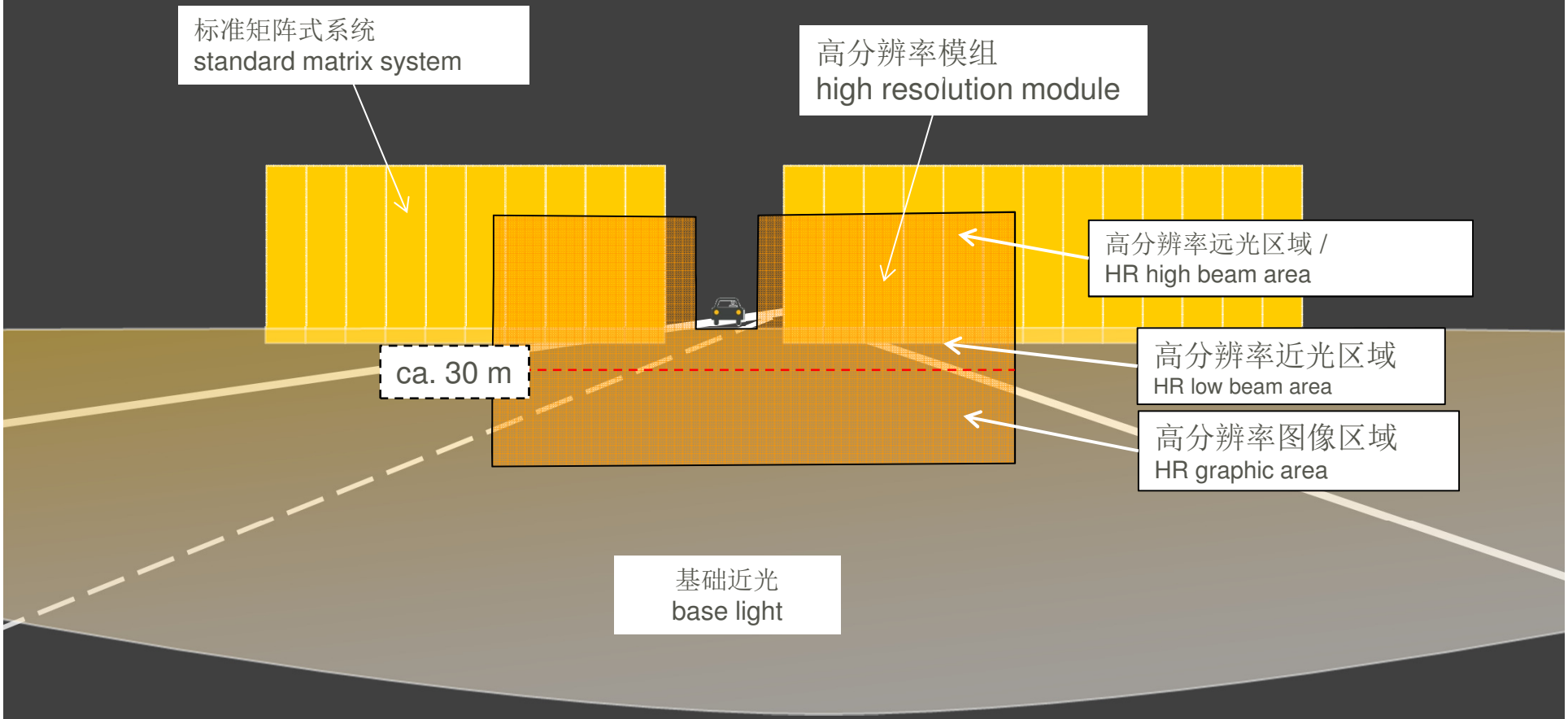
DMD前灯概念 / DMD Headlamp Concept



高分辨率DMD / High Resolution DMD

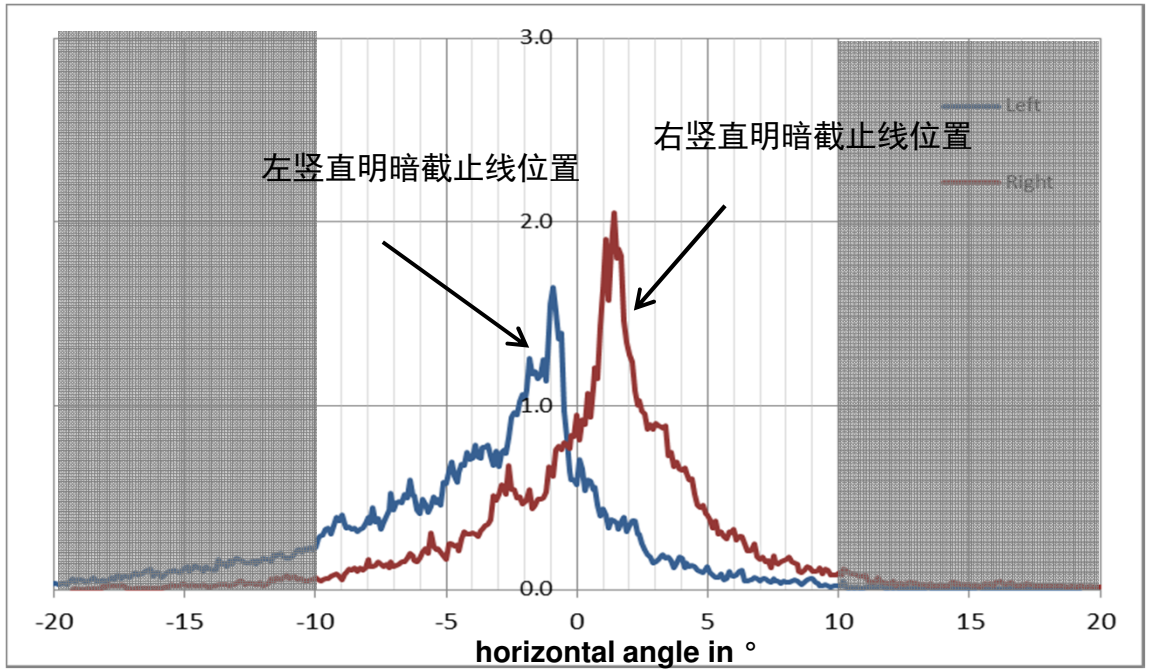
24 hours daylight.

防炫目远光

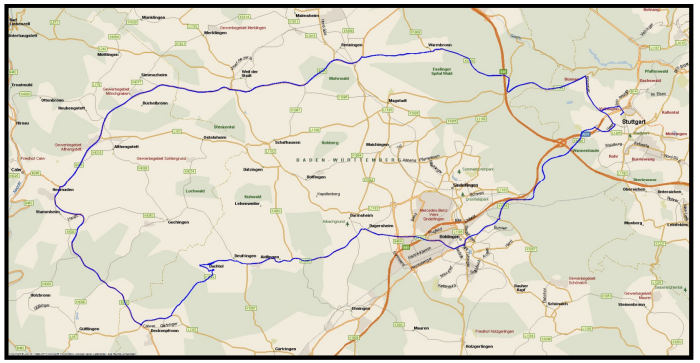


跟踪数据概述 / Overview Tracking Data

竖直明暗截止线位置 / Distribution of vertical Cut-Off Line Positions



Test Track:测试跑道



角度范围 Range of angle / °	竖直明暗截止线位置 / Vertical Cut-off line: H position
±10°	> 91%
±8°	> 86 %
±6°	> 78 %

高分辨率灯具的革新 /
Innovative Lighting Functions with High Resolution

1. 根据高分辨率提高性能：

- 防炫目远光（阴影区域精度）
- 动态弯道照明（精度基于高分辨率）
- 可变截止线形状 （乡村-高速-城镇）

1. Improved Performance based on high resolution:

- Glarefree HB (precision of the shadows)
- Dynamic bending light (precision based on high resolution)
- Flexible cut-off line shaping (Country – motorway - town)

2. 基于高分辨率的新照明功能：

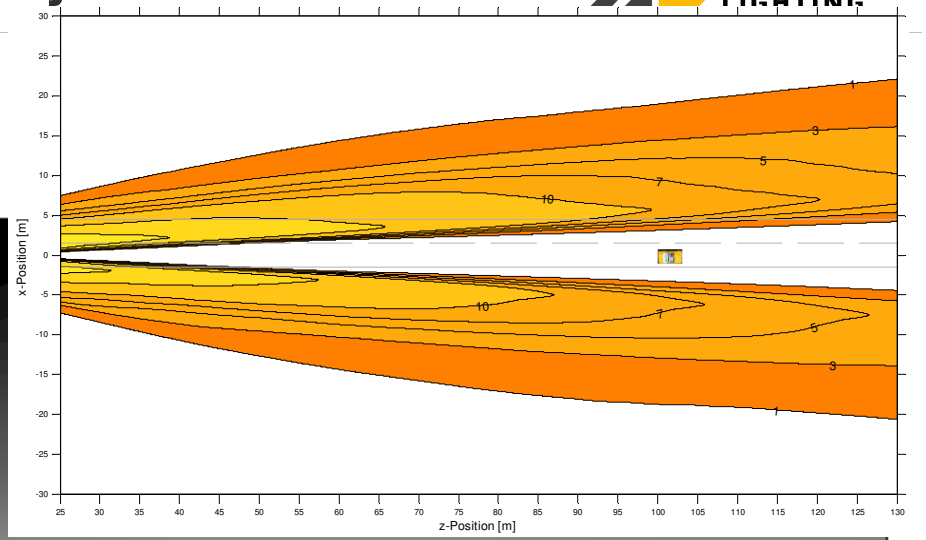
- 指引路线
- 车道偏离警告
- 距离警告
- 标志（冰，速度）
- 光通信

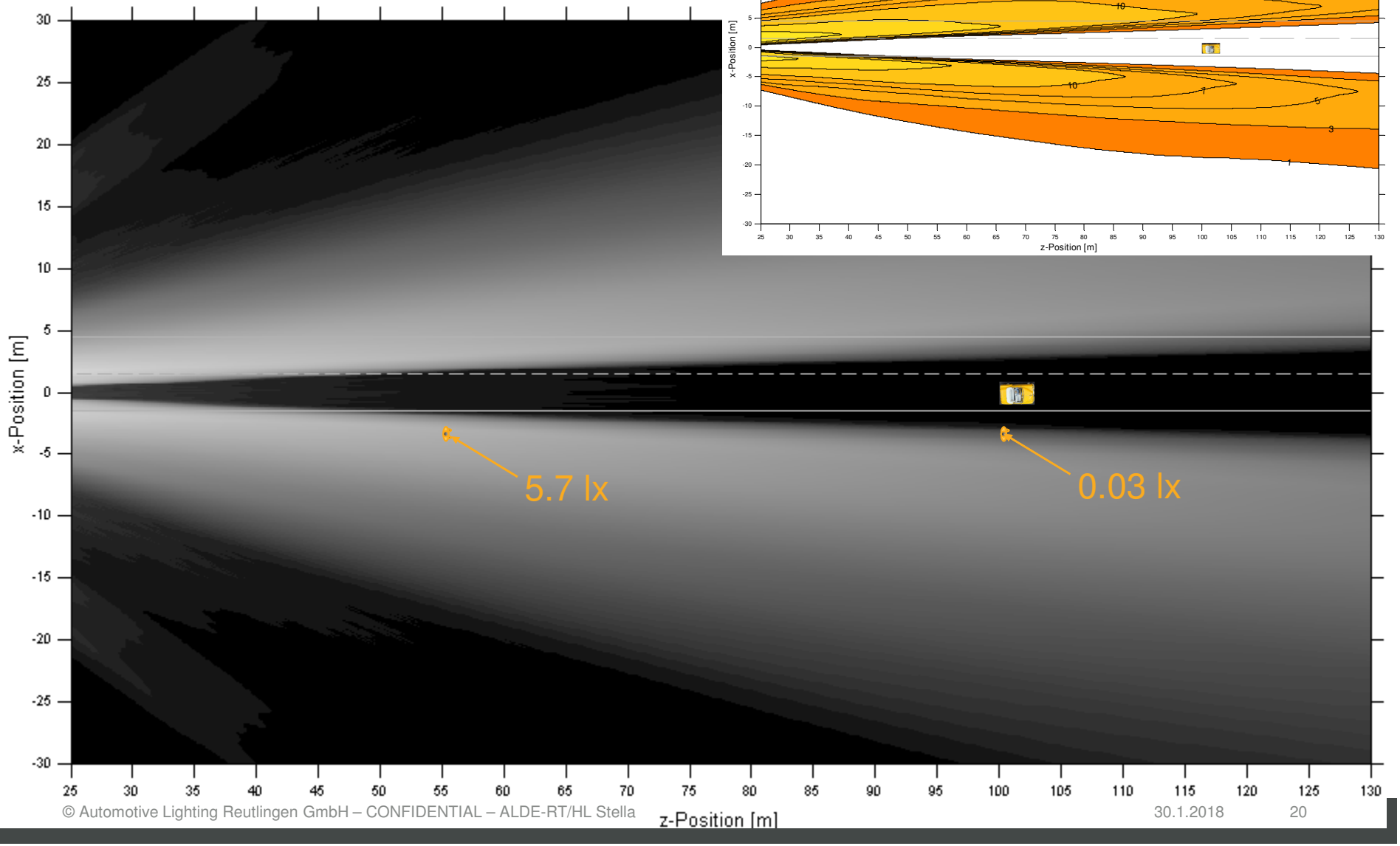
2. New lighting functions enabled by high resolution:

- Guidelines
- Lane Departure Warning (LDW)
- Distance warning
- Symbols (ice, speed, …..)
- Communication by light

标准矩阵式系统 Standard Matrix System

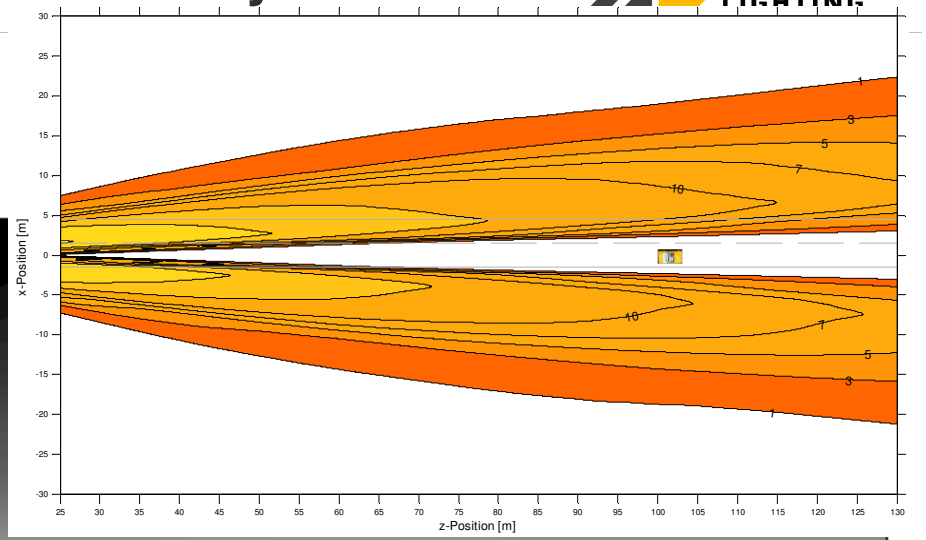
跟车 @离地一米
Preceding traffic @1m over road surface

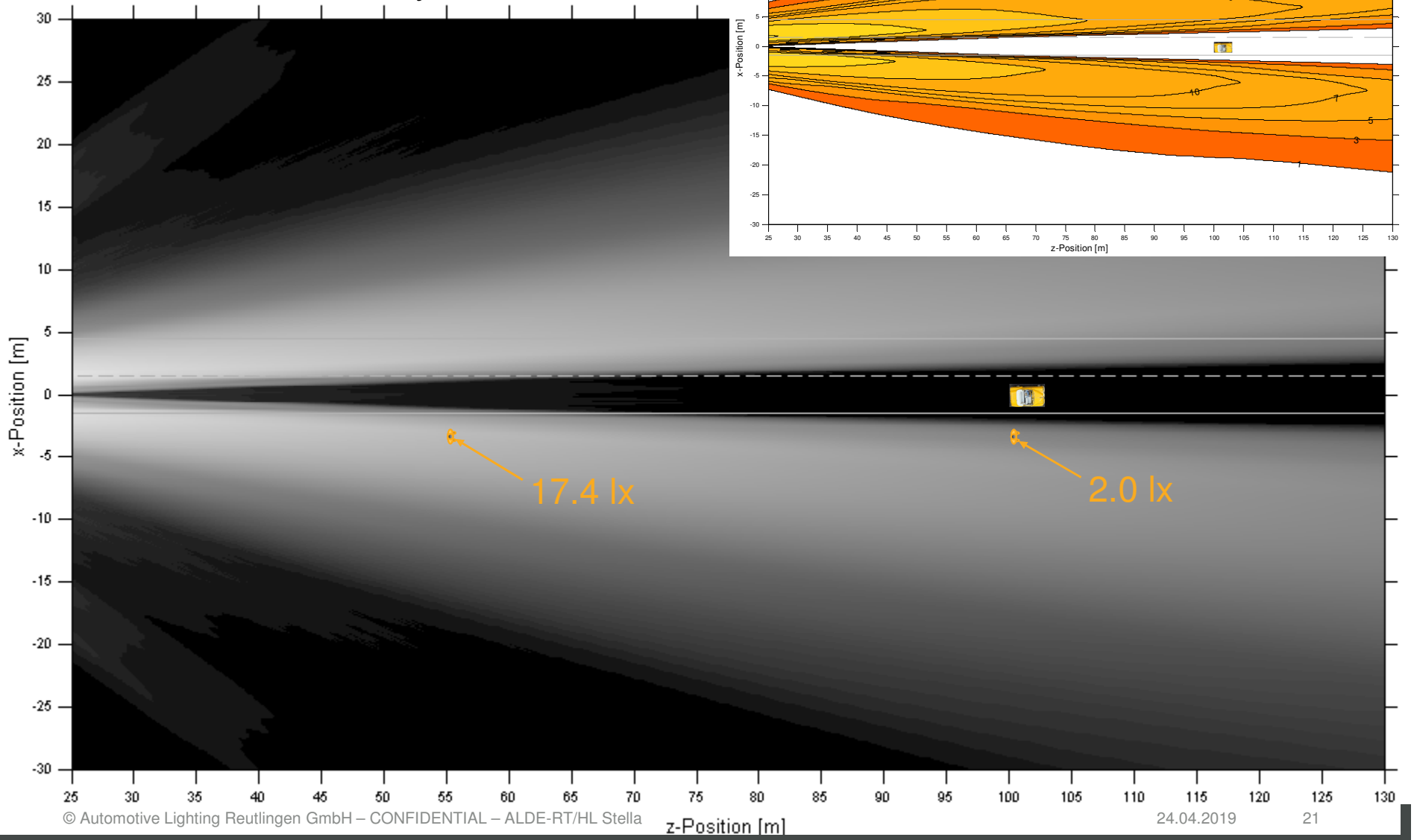




标准矩阵式系统+DMD / Standard Matrix System + DMD

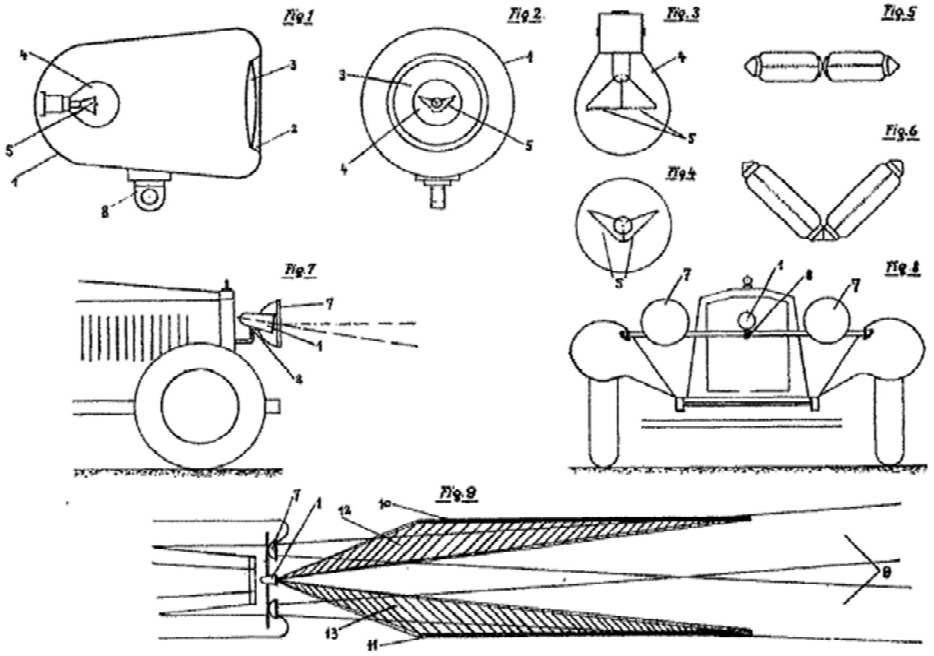
跟车，@离地一米 →暗区减小25%
Preceding traffic @1m over road surface → shadow width reduced by 25%





指引路线– DMD / Guidelines - DMD

投射指导方针 / Projection of Guidelines



Nr. 169206 Klasse 126 b

SCHWEIZERISCHE EIDGENOSSENSCHAFT

EIDGEN. AMT FÜR GEISTIGES EIGENTUM

PATENTSCHRIFT

Veröffentlicht am 1. August 1934

Gesuch eingereicht: 19. November 1932, 13 Uhr. — Patent eingetragen: 15. Mai 1934.

HAUPTPATENT

Ottmar RALL, Zürich (Schweiz).

Spurlichtprojektor an Kraftfahrzeugen.

标志—DMD / Symbols - DMD

标志—DMD / Symbols - DMD

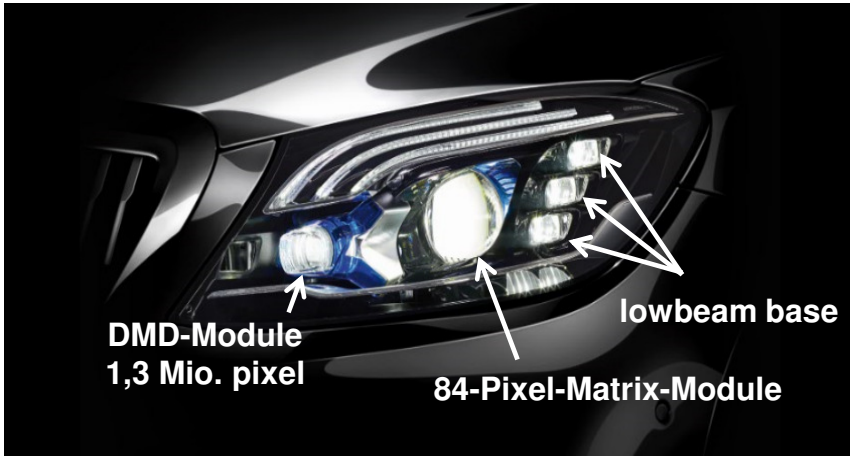
标志—DMD / Symbols - DMD

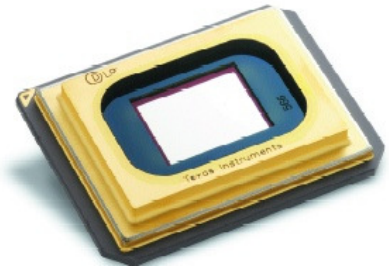
World First High Resolution Series Headlamp

AUTOMOTIVE LIGHTING

24 hours daylight.

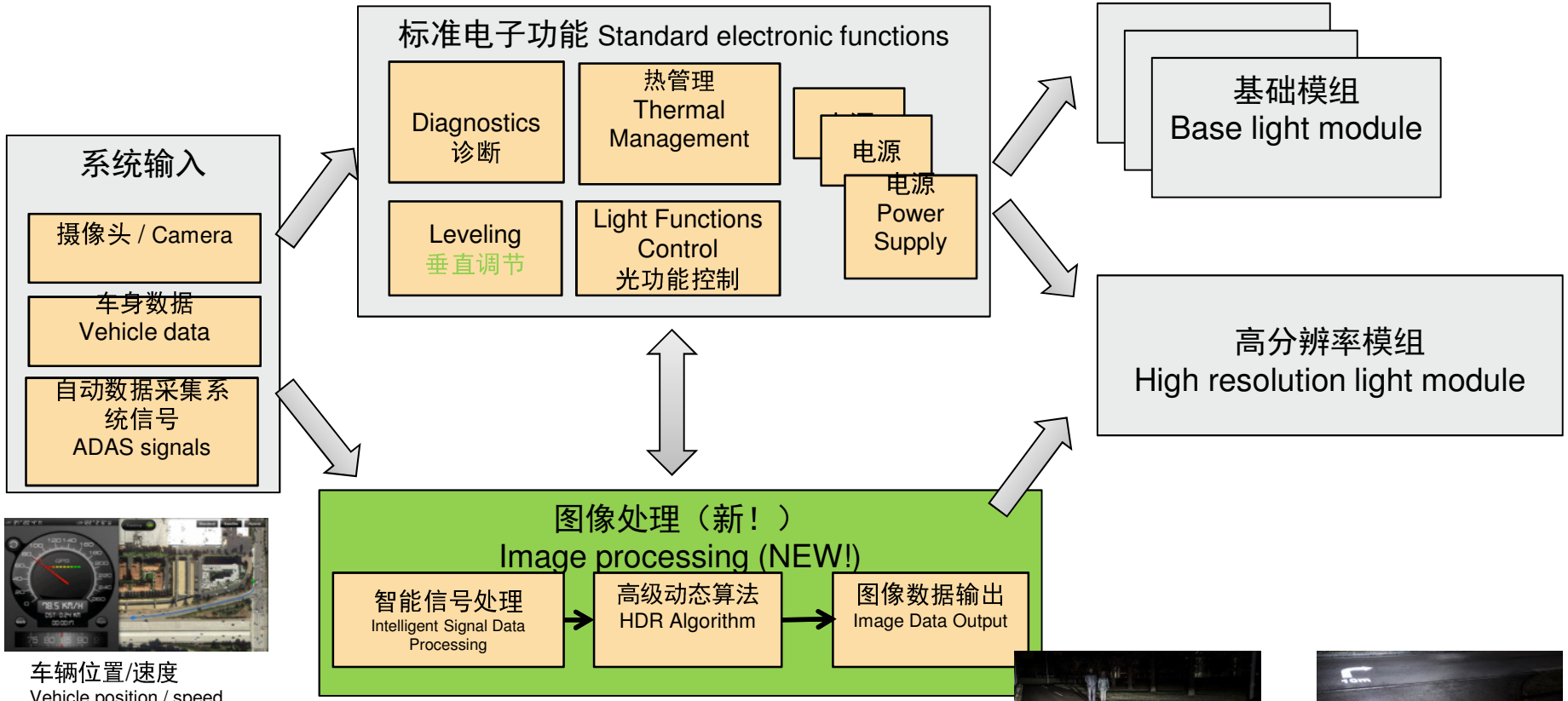
GENEVA INTERNATIONAL MOTOR SHOW
8-18 MARCH 2018





高清晰度的自适应功能综述 / HD ADB Functional Overview

电子控制系统功能综述 / HD ADB Functional Overview

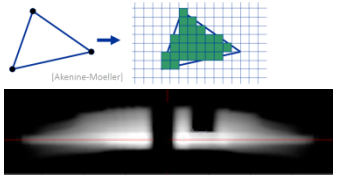


车辆位置/速度
Vehicle position / speed environment

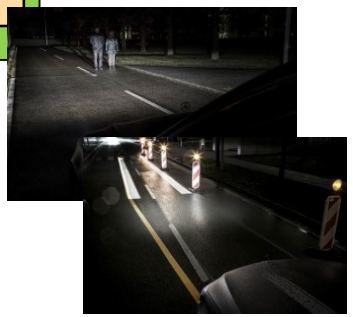
物体探测
Object detection

- 建模：
- 光分布的类型/方向
- 符号清单
- 阴影区域清单

Light object modelling:
- Type/orientation of light distribution
- List of symbols
- List of shadow areas



- 设计光分布
- 渲染光分布



- **Construction** of light distribution
- Rendering of light distribution

DMD 模组投射