

# INTERIOR LIGHTING UNDER AUTONOMOUS DRIVING

---

## 自动驾驶下的室内照明

Siraj V M  
Design - Interior Lighting  
Mind Opto Electronics  
Baoding , China  
[siraj@mind-ea.cn](mailto:siraj@mind-ea.cn)



## Interior Lighting Here & Now

室内照明现状



## Autonomous Driving & Interior Lighting

自动驾驶及室内照明



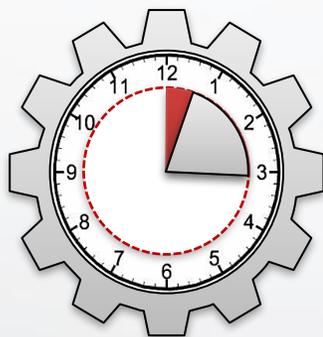
## Future Product & Technologies

未来的产品和技术



## Interior Lighting Here & Now

### 室内照明现状



## Autonomous Driving & Interior Lighting

### 自动驾驶及室内照明



## Future Product & Technologies

### 未来的产品和技术

# MOBILITY EVOLUTION TREND

# 机动性

## 演化趋势



# CURRENT INTERIOR LIGHTING SYSTEMS

## 明系统

# 目前室内照



### APPLICATION 应用

Courtesy	迎宾灯功能
Ambient	氛围灯功能
Indication	指示性功能



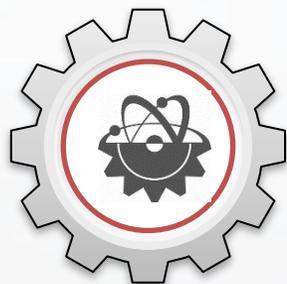
### POSITIONS 位置

Standard Positions	常规位置
Restricted area	受限的区域
Ambient below beltline	腰线以下的氛围灯

# CURRENT INTERIOR LIGHTING SYSTEMS

## 明系统

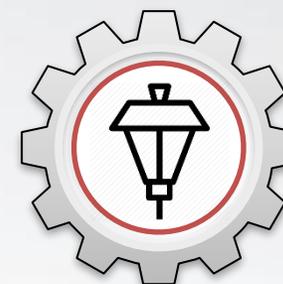
# 目前室内照



### TECHNOLOGY 技术

RGB LED & LIN  
Light Guide  
Translucent Material

RGB LED & LIN 控  
制  
导光条  
半透明材料



### PRODUCTS 产品

Function based  
Standard structure  
Limited Customization

基于功能  
标准结构  
有限的定制化

# TREND DRIVING FACTORS

趋

势驱动因素

Styling & Comfort

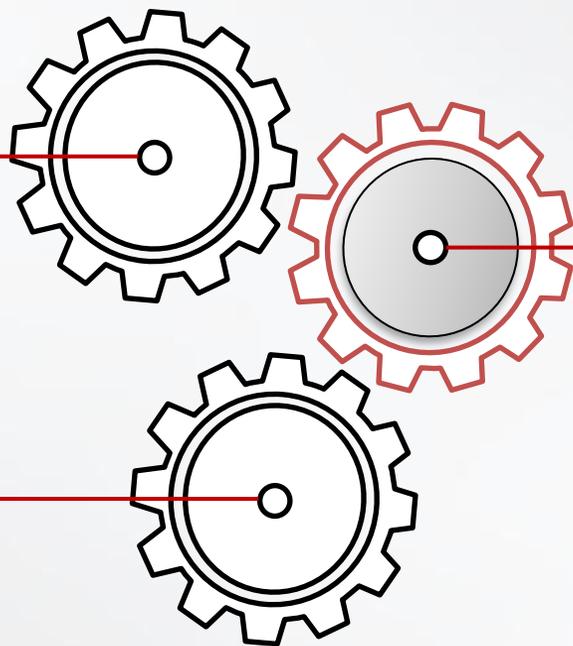
造型和舒适性

Autonomous Driving

自动驾驶

Digitalization

数字化





Interior Lighting Here & Now

室内照明现状



**Autonomous driving & Interior Lighting**

**自动驾驶及室内照明**

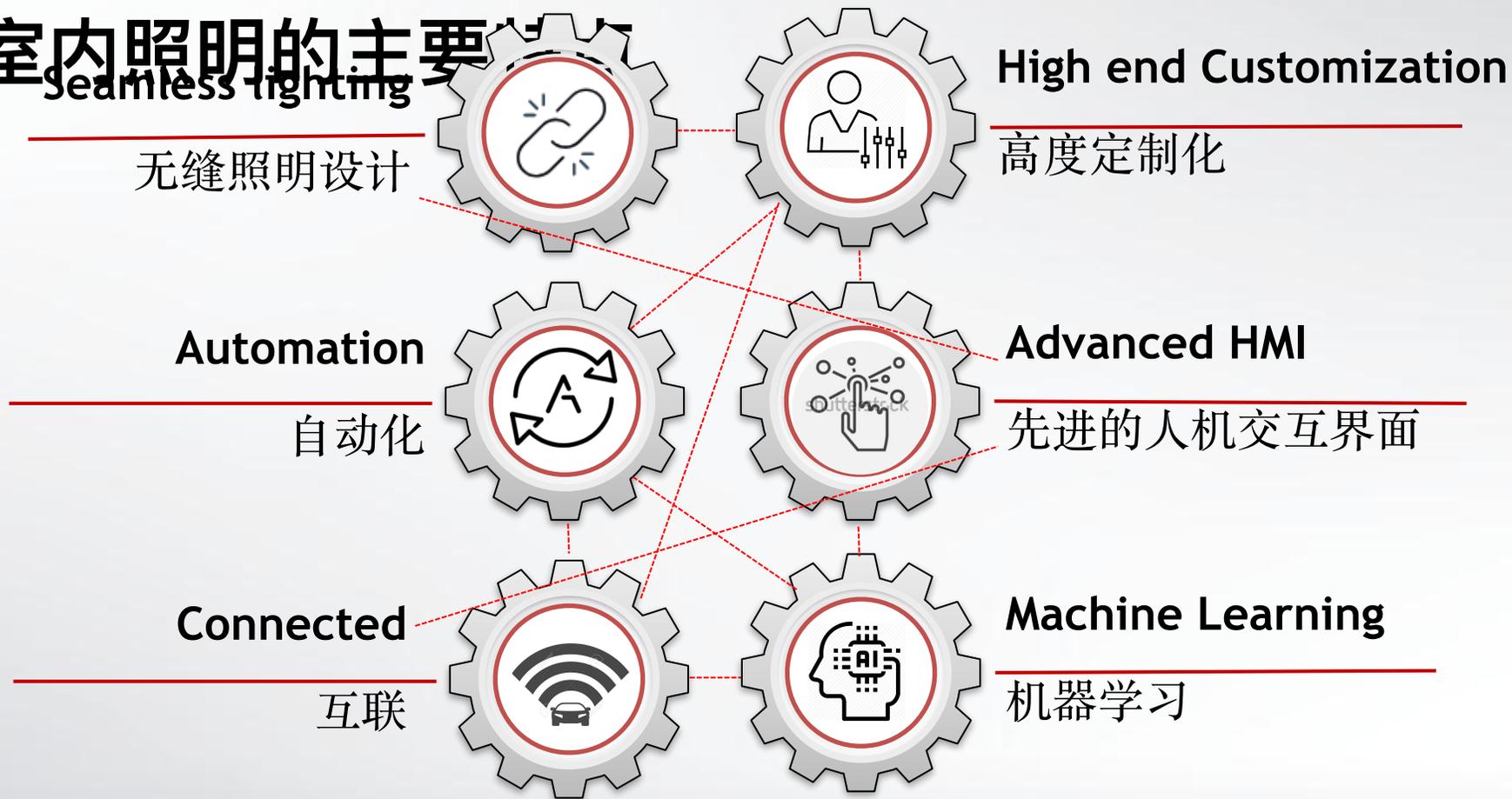


Future Product & Technologies

未来的产品和技术

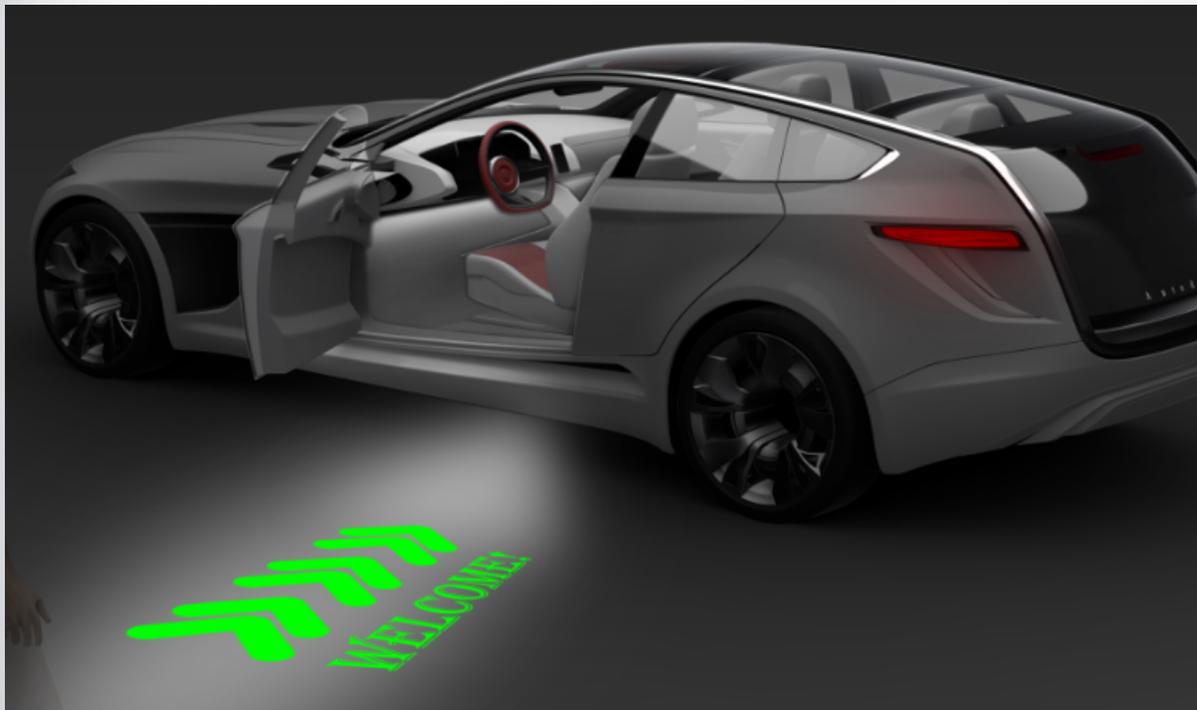
# CHARACTERISTICS OF INTERIOR LIGHTING IN AUTONOMOUS DRIVING

## 自动驾驶下室内照明的主要特征



# SEAMLESS LIGHTING DESIGN

# 无缝照明设计



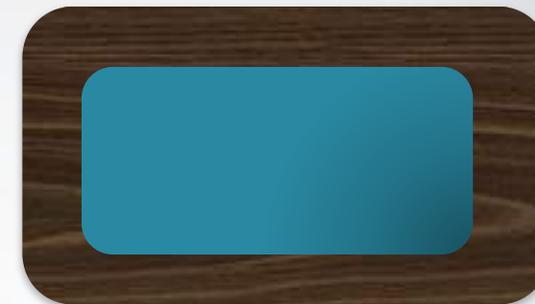
- ☀ Connecting exterior to interior (Transition zone)
- ☀ Merging of courtesy and ambient module
- ☀ New positions and area of lighting (roof, window glass)
- ☀ Complete passenger compartment coverage
- ☀ Lighting at any given area

- ☀ 连接室外和室内氛围灯（过渡区域）
- ☀ 迎宾灯和氛围灯模块的融合
- ☀ 新的照明位置和区域（顶棚、车窗）
- ☀ 涵盖整个客舱
- ☀ 特定区域照明

## HIGH END CUSTOMIZATION



## 高度定制化



- ⚙ Concept of Individual space customization
- ⚙ Interior experience customization -
- ⚙ User defined themes for different uses
- ⚙ Never ending wow effects - change interior theme at will

- ⚙ 独特空间定制化方案
- ⚙ 内饰颜色也可进行定制
- ⚙ 用户可定义主题，用于不同使用目的
- ⚙ 无尽的惊艳效果—随意改变内饰主题

# ADVANCED HMI

# 先进的人机交互界面

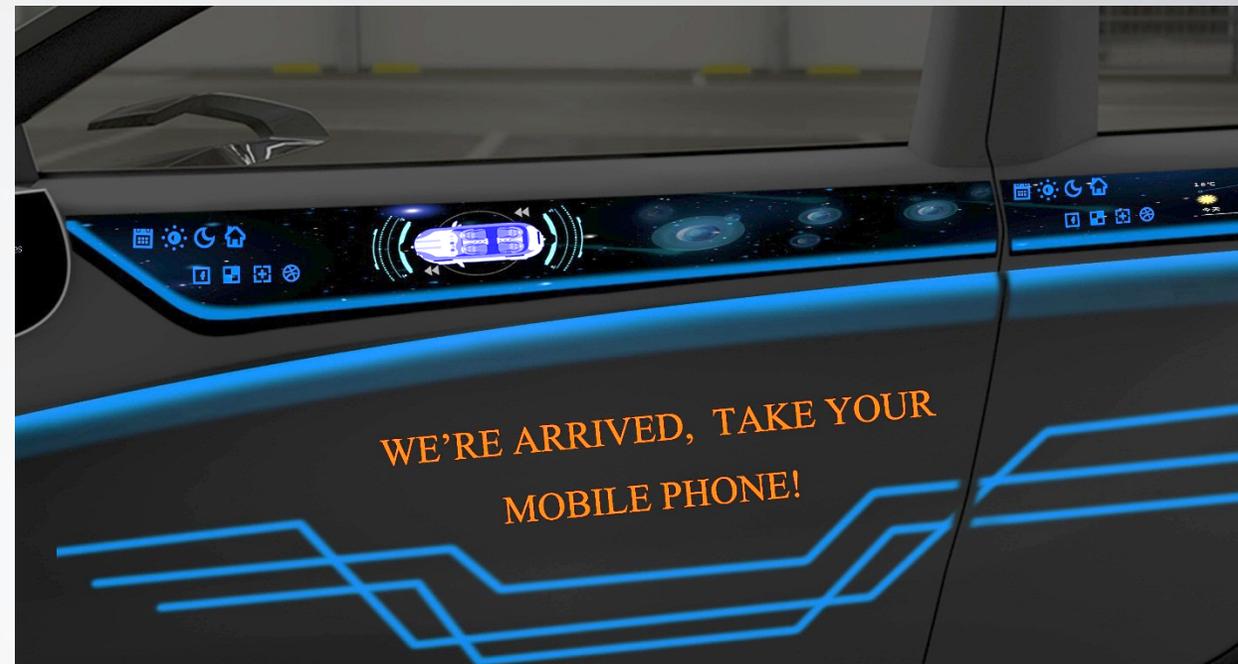


- ⚙ Digital Smart Trim Panel
- ⚙ Haptic feed back
- ⚙ Smartphone sync - car as an extended display
- ⚙ Gesture, Voice controls
- ⚙ Picture/Text projection feedbacks
- ⚙ Interactive interface - like Alexa

- ⚙ 数字智能饰板
- ⚙ 触觉反馈
- ⚙ 智能手机同步—车辆作为扩展的显示屏
- ⚙ 姿势/声音控制
- ⚙ 图片/文本投影反馈
- ⚙ 互动界面—如Alexa (亚马逊智能语音助手)

# AUTOMATION

# 自动化

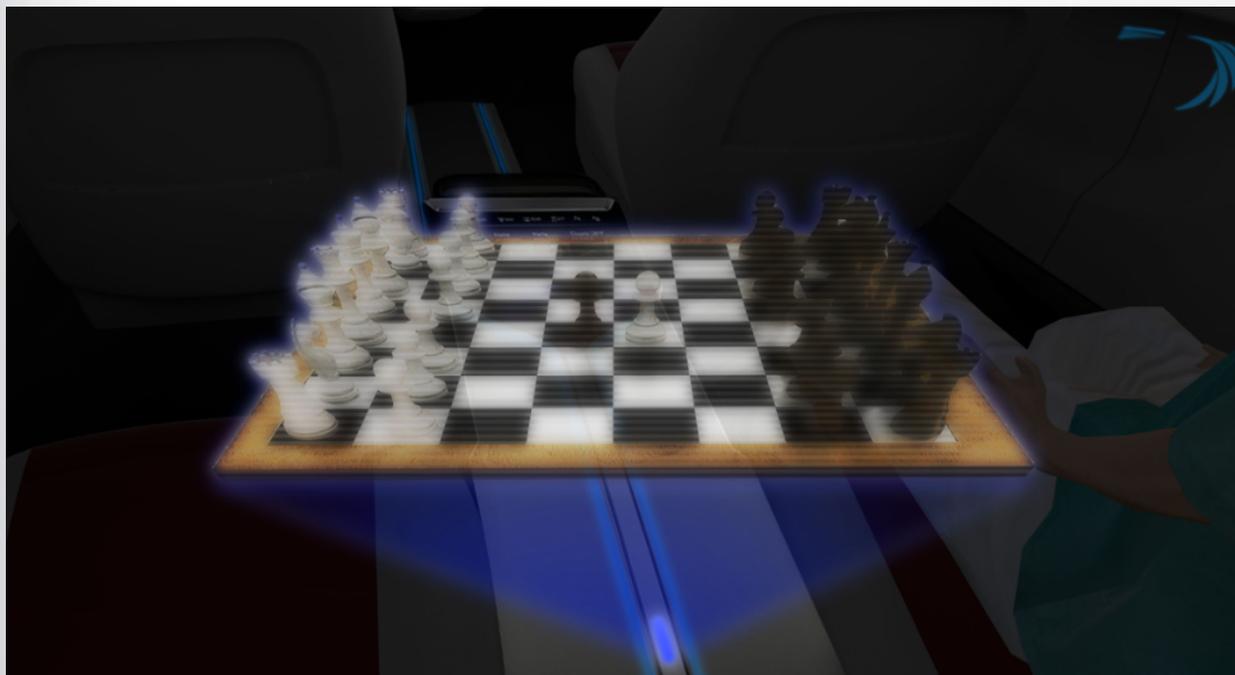


- ⚙ Automated brightness and colour controls
- ⚙ Auto detection of passenger entry and exit
- ⚙ Ingress and Egress warnings (interior & Exterior)
- ⚙ Fatigue detection and Alertness
- ⚙ Work light Automation

- ⚙ 自动亮度和颜色控制
- ⚙ 自动探测乘员上下车
- ⚙ 上下车警示（室内及室外）
- ⚙ 疲劳探测及警示
- ⚙ 工作灯光的自动化

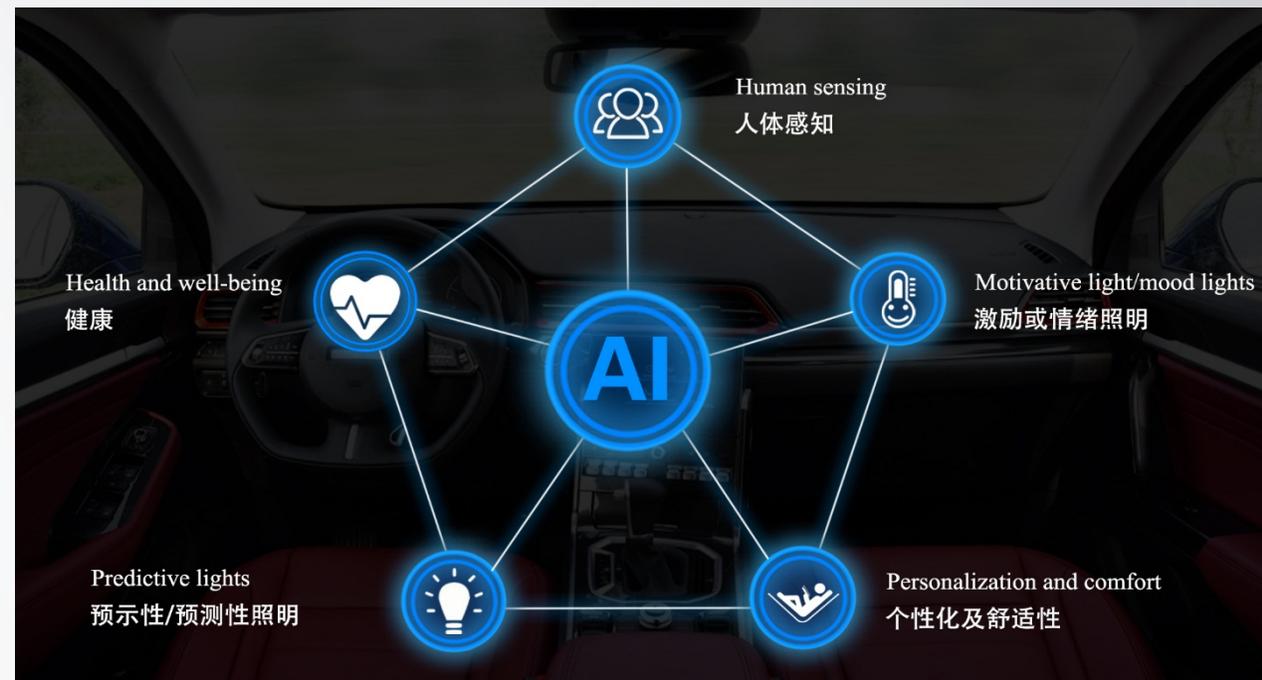
# CONNECTED

# 互联



- ⚙ Integration of V2X and V2V systems
- ⚙ Traffic Safety - E call, Hazard warning
- ⚙ Infotainment - In car entertainment Gaming, Projection
- ⚙ Vehicle Interactions - Service calls, IOT

- ⚙ 集成V2X和V2V系统
- ⚙ 交通安全—E-call, 危险警告
- ⚙ 信息娱乐—车内游戏, 投影
- ⚙ 车辆互动—服务电话, 物联网



- ⊗ Learn usage pattern of each user at different situation
- ⊗ Predictive Interior Lighting (Entering to tunnel)
- ⊗ Auto contrast and colour set up based on the target Surface
- ⊗ Human sensing and alertness (Kids, Animal alertness)
- ⊗ Predictive alertness with lighting - Accident

- ⊗ 学习不同使用者在不同环境下的使用类型
- ⊗ 预测性室内照明（进入隧道前）
- ⊗ 基于目标表面进行对比度及颜色的设定
- ⊗ 对人的感知和警示（幼儿、动物警示）
- ⊗ 通过灯光进行预警—事故

# APPLICATION OF INTERIOR LIGHTING IN AUTONOMOUS DRIVING

## 自动驾驶下的室内照明应用



### HMI 人机交互界面

Digital touch trim panels 数字触摸内饰板  
 Interactive light projections 互动投影灯光  
 3d hologram 3D全息影像



### SAFETY & SECURITY 安全

Sensor integration combined with light warning, both exterior and interior 室内室外集成传感器，结合灯光警示功能  
 Transition zone (windows) 过渡带警示 (车窗)



### AESTHETICS 美感

Embedded graphics, Projected pattern, Painting with light 嵌入式图案  
 图案投影  
 使用灯光实现不同喷涂效果

# APPLICATION OF INTERIOR LIGHTING IN AUTONOMOUS DRIVING

## 自动驾驶下的室内照明应用



### COMFORT 舒适性

Living room lighting, 起居室照明  
3D graphic ecosystems, 3D图像生态系统  
Gaming 游戏

### HEALTH 健康

Circadian lighting 生理照明  
UV cleansing 紫外线净化  
Fatigue detection 疲劳探测  
(Iris movement & (虹膜移动和  
body 体温)  
temperature

### V2X

IOT, Pictorial 物联网、图像照  
illumination 明  
text projections 文本投影  
infotainment 信息娱乐  
integrated E 集成E-call和B-  
and B calls call



Interior Lighting Here & Now

室内照明现状



Autonomous Driving & Interior Lighting

自动驾驶及室内照明



Future Product & Technologies

未来的产品和技术

# FUTURE INTERIOR LIGHTING SYSTEMS

## 明系统

# 未来室内照

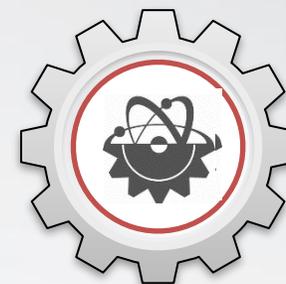


### POSITIONS 位置

New Transition zone (window, Sunroof and Carpets) 新的过渡区域 (车窗、顶棚和地毯)

Courtesy and Ambient at any given point 任何指定区域的迎宾灯和氛围灯

Integrated with Trim, Infotainment and HMI 集成到内饰、信息娱乐系统和人机交互界面



### TECHNOLOGY 技术

RGB Projection System RGB投影系统

Smart Materials 智能材料

Printed Circuits 印刷电路

Dynamic Projection 动态投影

Laser Hologram 激光全息影像

OLED OLED

Smart LED 智能LED

# FUTURE INTERIOR LIGHTING SYSTEMS

# 统

# 未来室内照明系



## PRODUCTS

## 产品

Dynamic welcome  
Carpet  
Customizable text  
projection.  
Embedded Digital  
Control in Panels  
3D Graphics on Panel  
Gaming Projection

动态欢迎地毯  
定制化文本投影  
面板嵌入式数字  
控制  
面板上3D图案  
游戏投影

## INTEGRATION

## 集成

New Gen Styling  
Tech From Consumer  
electronics  
Internet Of Things  
Artificial Intelligence

新一代造型  
消费电子技术  
物联网  
人工智能

# OUR WAY FORWARD

## 努力的方向

我们

Interior lighting systems are not just satisfying lighting function

室内照明不在只是满足照明功能的需求

Exterior & Interiors are connected through transition zone lighting

通过过渡带照明，将室内及室外照明联系起来

Smart use of Interior lighting will enhance cost effective customization

室内照明的巧妙应用会增强定制化下的成本效益

The advancement which AD demand, in comfort, aesthetics and HMI functionalities can be achieved by lighting

自动驾驶所需的在舒适性、美感及人机交互功能可通过照明来实现。

Set makers and OEM need to build an ecosystem of HMI, AI, IOT and lighting team to develop future products

模组制造商和OEM需要建立人机交互界面、人工智能、物联网及照明团队组成的生态系统来开发未来产

品

# THANK YOU

# 谢谢

*‘Exterior brings the customer to showroom  
But Interior closes the deal’ 😊*

**Mind Electronics Appliance Company  
Limited Optoelectronics Division**

No. 75, Dong Sheng Road, Lianchi

District, Baoding, Hebei

Postcode: 071000

Tel: +86 (0) 312 219 6896

Email: info@mind-ea.cn



**曼德电子电器有限公司光电分公司**

地址：河北省保定市莲池区东盛路75号

邮编：071000

电话：+86 (0) 312 219 6896

邮箱：info@mind-ea.cn