



Lighting Technologies for Human – Vehicle communication

基于灯光技术的人车信息交互

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Agenda

目录

1. „What's new in exterior lighting?“ – New night appearance of SAIC Volkswagen
“外部灯光新在何处？” – 营造了全新的上汽大众车型之夜间灯光效果
2. „What's new in interior lighting?“ – The ID.Light communication
“内部灯光新在何处？” – 智能灯光的交互
3. „What's next?“ – an outlook on upcoming light communication
“接下来什么是新的？” – 让我们一起展望一下即将到来的光语交互

New Night Appearance of SAIC Volkswagen 上汽大众车型新夜间灯光效果

Recent projects and lit appearances 当下项目的新灯光效果

2020 Phideon



2021 ID.4 X



2021 Teramont (internet images – not official)



ID.6 (internet images – not official)



SAIC Volkswagen introduces illuminated logos and light lines for a new night appearance
上汽大众首发应用了发光的Logo灯和贯穿灯效果

New Night Appearance of SAIC Volkswagen

上汽大众车型新夜间灯光效果

Welcome Animation

动态迎宾效果

2023
ID.3 EU

The Welcome Animation starts when approaching the car – activated by the “kessy” key, or manual
功能在无线钥匙接近车辆时或者手动接闭锁车辆时启动

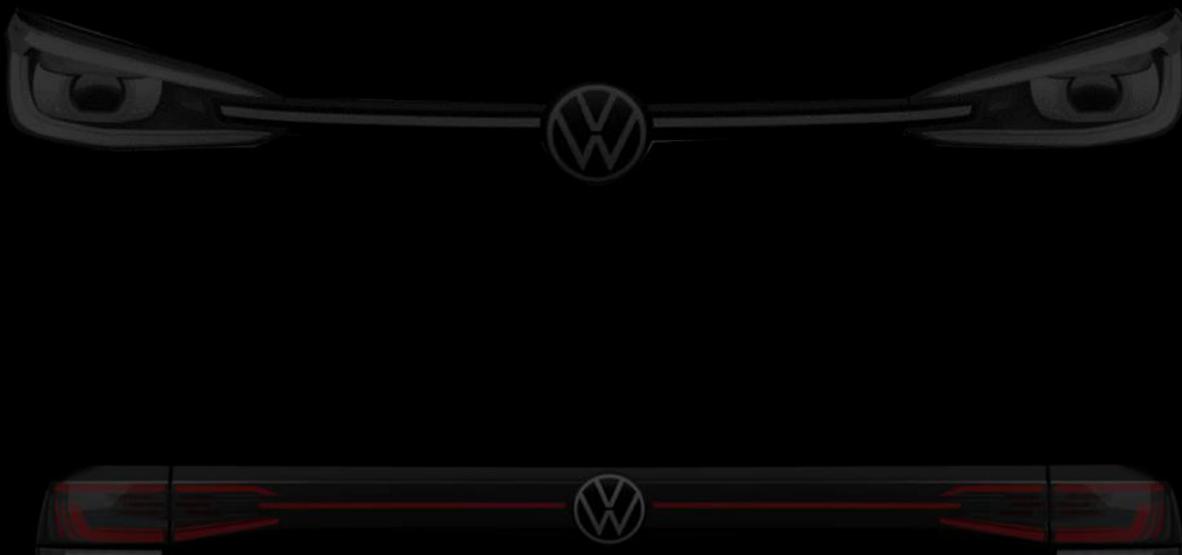
New Night Appearance of SAIC Volkswagen

上汽大众车型新夜间灯光效果

Welcome Animation

动态迎宾效果 – MEB车型

2021
ID.4 X



The VW sequence starts with the Logo. It spreads over the light line to the lamp elements
动画起始于Logo的点亮，延申至各个灯光单元相互呼应联动

New Night Appearance of SAIC Volkswagen

上汽大众车型新夜间灯光效果

Welcome Animation

动态迎宾效果 – MEB车型

2021
ID.4 X

Alternative
A



The VW sequence has alternatives which can be chosen by the client for personalization
尾部动画提供多种模式，用户可以根据自己喜好进行选择

New Night Appearance of SAIC Volkswagen

上汽大众车型新夜间灯光效果

Welcome Animation

动态迎宾效果 – MEB车型

2021
ID.4 X

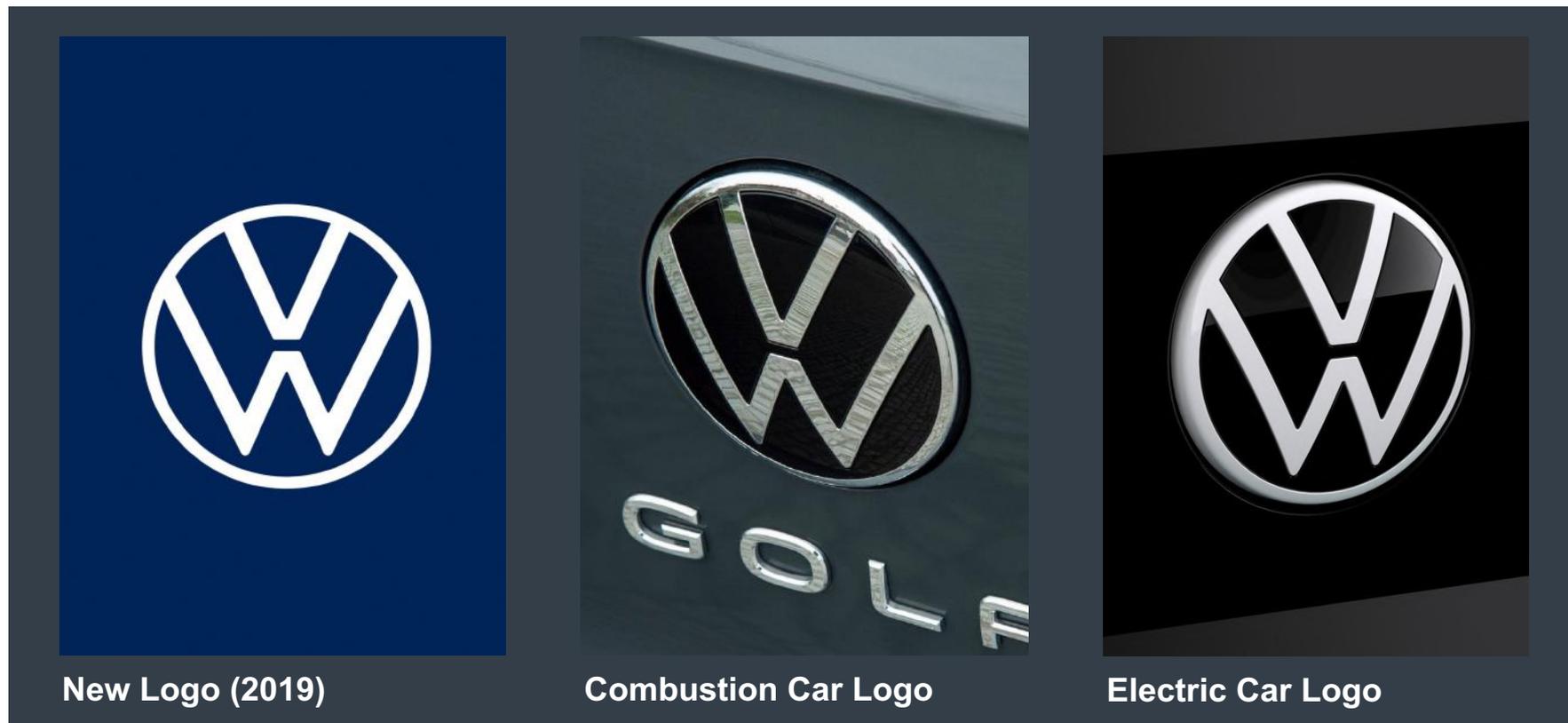
Alternative
B



The VW sequence has alternatives which can be chosen by the client for personalization
尾部动画提供多种模式，用户可以根据自己喜好进行选择

New Night Appearance of SAIC Volkswagen 上汽大众车型新夜间灯光效果

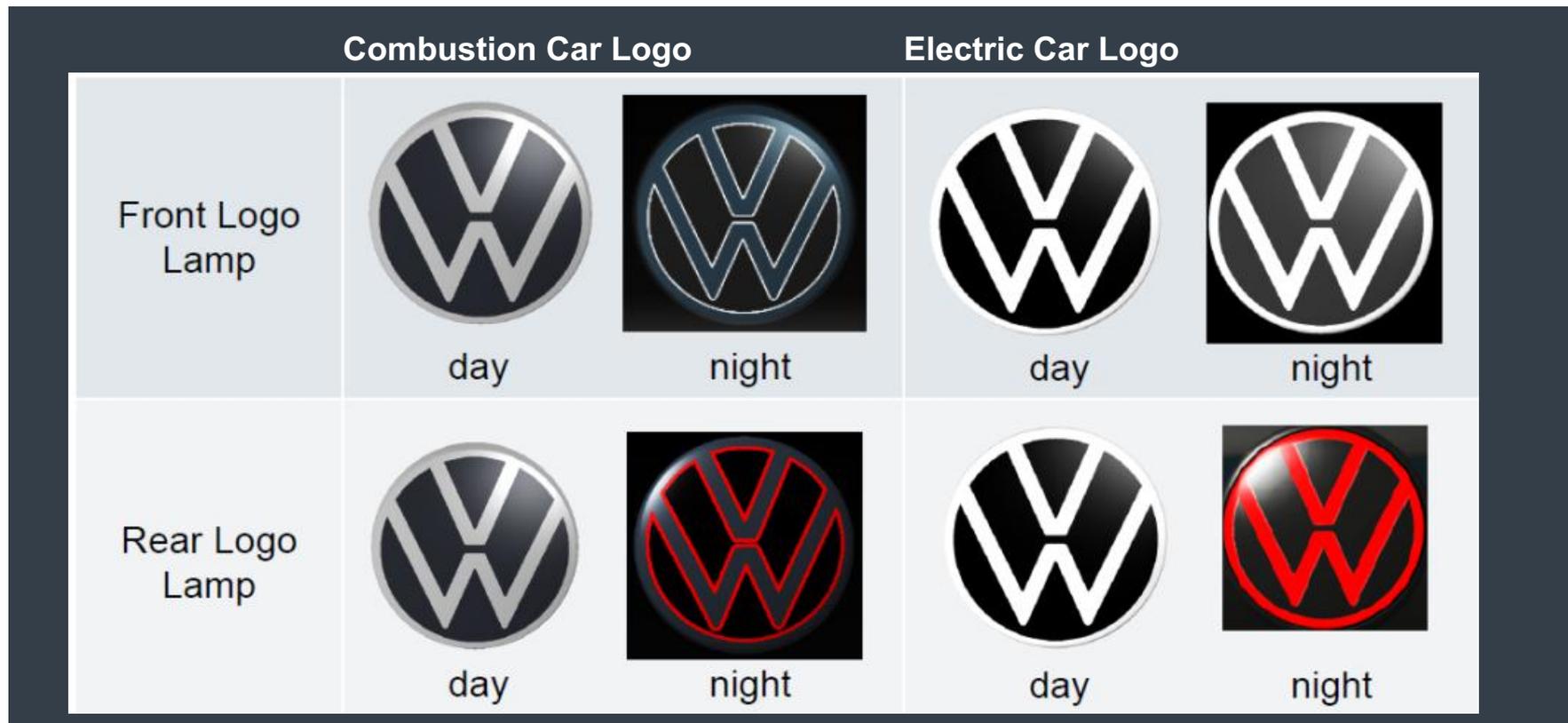
The new Volkswagen Logo and its lit appearance
VW新Logo以及其点亮效果



The Volkswagen Logo for Combustion and Electric cars are different and have different optical concepts
燃油车和电动车Logo进行了差异化，同时，点亮方式也有所不同

New Night Appearance of SAIC Volkswagen 上汽大众车型新夜间灯光效果

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New Night Appearance of SAIC Volkswagen

上汽大众车型新夜间灯光效果

The new Volkswagen Logo and its lit appearance

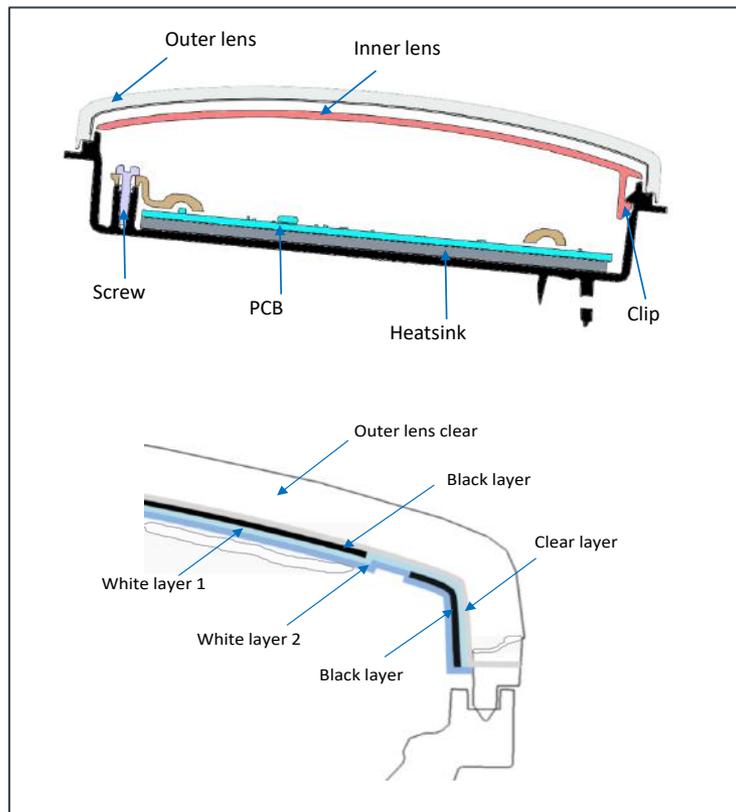
VW新Logo以及其点亮效果

Challenges:

- day appearance color CI “pure white” conform in L*a*b* (D65)
- night appearance color equal to light line and headlamp in color temperature / Kelvin
- “Perfect” homogeneity in wide angles
- Illuminated area different than white area

Tasks:

- better precision in IML positioning
- material color stability



The Volkswagen Logo for Electric cars is challenging for color conformity

电动车Logo灯由于采用面发光效果而给颜色一致性带来了一定挑战

New Night Appearance of SAIC Volkswagen

上汽大众车型新夜间灯光效果

The new Volkswagen light lines and its lit appearance

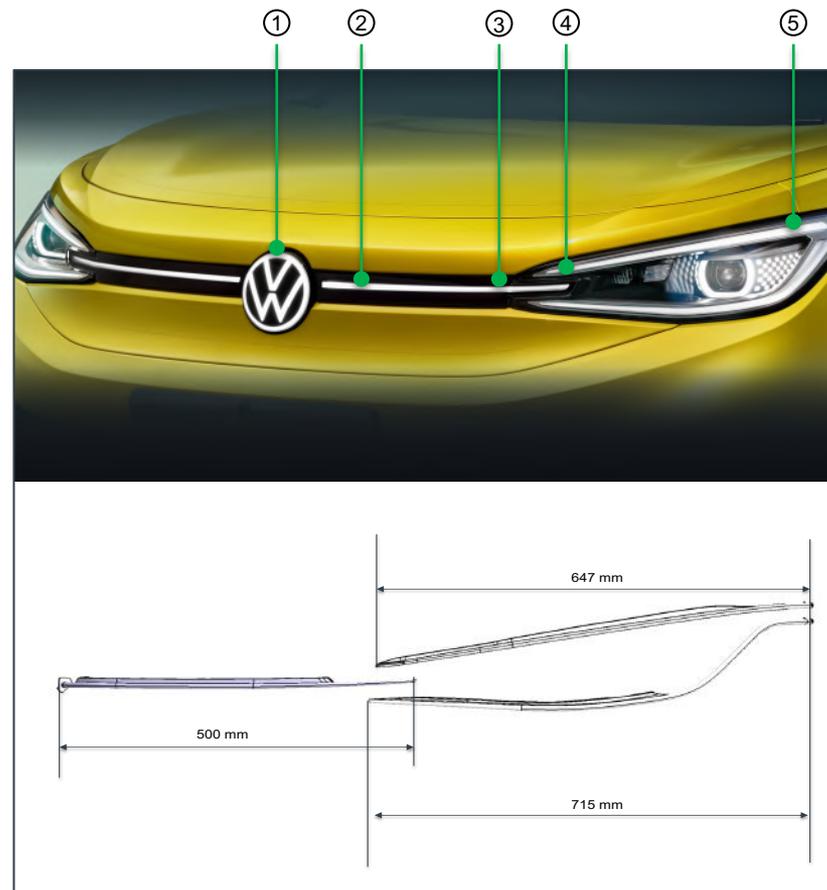
上汽大众贯穿灯带及其光学效果

Challenges:

- Color conformity in white color and high sensitivity of human perception (McAdams Ellipse tolerance)
- Lamps mixed with different light technology
- Long light guides with tendency for yellowing if PC is applied

Task:

- PC Material improvements on yellowing stability
- Process improvement on molding parameters, like temperature management, mold timing management in various process steps, pretreatment, ...



The Volkswagen light lines are challenging for color conformity
VW贯穿灯带的颜色一致性也是另一个挑战

New Night Appearance of SAIC Volkswagen 上汽大众车型新夜间灯光效果

The new Volkswagen 3D LED light 全新VW 3D效果LED灯光

Challenges:

- New Volkswagen tail lamp concept: flat standalone light elements
- high homogeneity requirements in a thin package
- SAIC VW special task: large areas to be illuminated

Tasks:

- Multi Layer Technology was needed
- Local optimization methods were needed to cover different areas with single line of incoupling
- Design guidelines for limited shaping freedom were needed
- Color management of lit and unlit red appearance



The 3D light guide technology for SAIC Volkswagen stylings has special challenges
3D效果光导片技术在VW的灯光造型上带来了创新，同时也迎来特殊的挑战

New Night Appearance of SAIC Volkswagen 上汽大众车型新夜间灯光效果

The new Volkswagen 3D LED light 全新VW 3D效果LED灯光

Challenges:

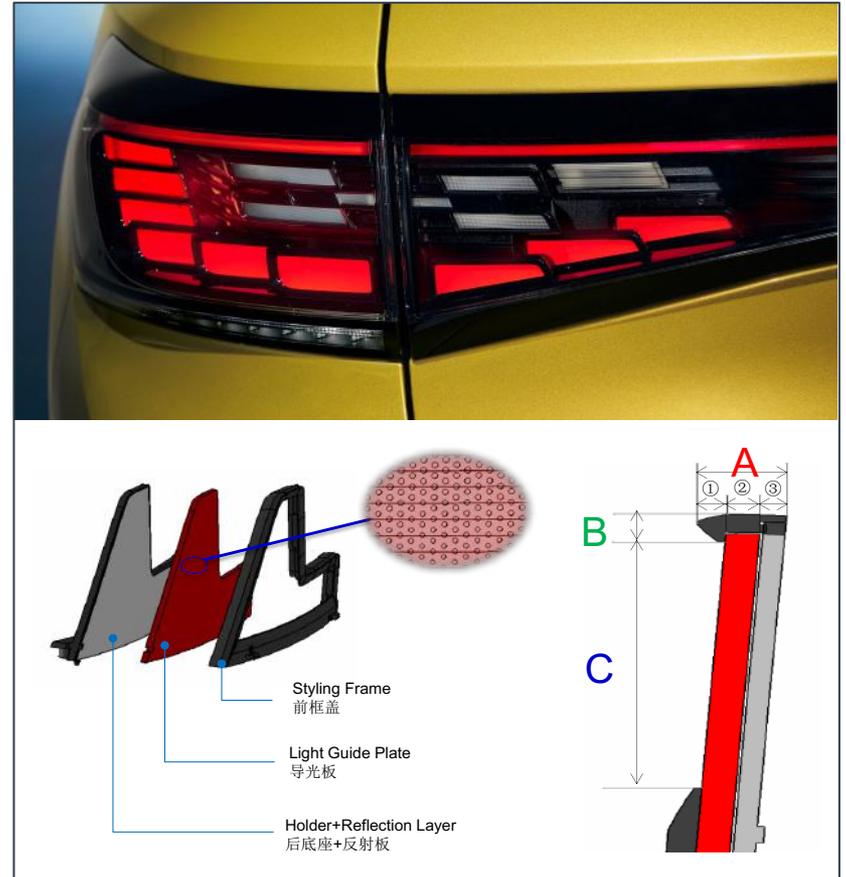
- New Volkswagen tail lamp concept: flat standalone light elements
- Very high homogeneity requirements in a thin package

Alternative:

- EU / CN design uses smaller elements
- Small elements allow a one layer technology

Outlook:

- Frameless 3D light elements



The 3D light guide technology has potential for further improvements
3D效果光导片技术还有可以继续提升的空间和可能

New Night Appearance of SAIC Volkswagen

全新VW 3D效果LED尾灯

The new Volkswagen 3D LED light

全新VW 3D效果LED灯光

Challenges:

- New Volkswagen tail lamp concept: flat standalone light elements
- Very high homogeneity requirements in a thin package

Alternative:

- EU / CN design uses smaller elements
- Small elements allow a one layer technology

Outlook:

- Frameless 3D light elements



The 3D light guide technology allows attractive styling and animation for low costs
3D效果光导片技术在带来全新造型和灯光动画效果的同时，成本也较低

New Interior Light of SAIC Volkswagen 上汽大众新型内部灯

The new Volkswagen ID.Light 大众新型极智灯光

Idea:

- New light element for information
- Positioned below the windshield in direct view area, 1,3m, 54 Elements, RGB
- Improves comfort and safety

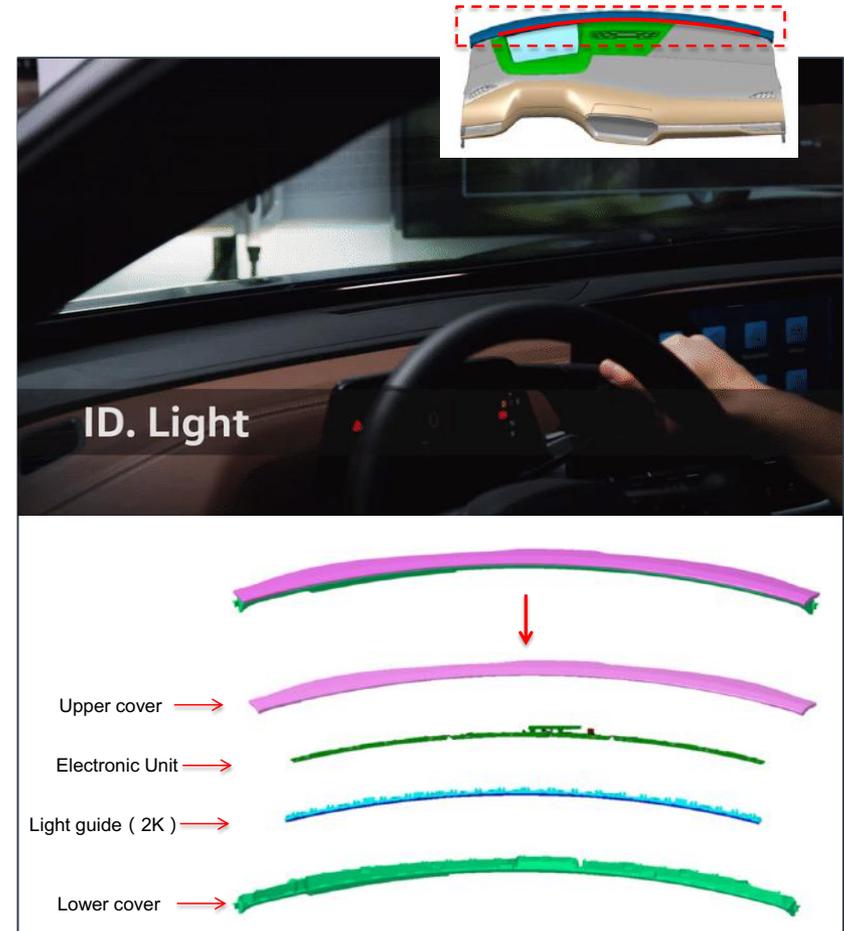
Challenge:

- “How to express many different information with only one line and colors?”
- Obtain the right reaction of the client
- Prevent wrong reactions, misuse, distraction

Approach:

- Combine existing and known information with the new ones. Therefore, fast learning can be archived

The ID.Light is a new light element which provides information for comfort and safety functions
极智灯光是一种全新灯具，可以提供便捷舒适和功能安全等交互信息



New Interior Light of SAIC Volkswagen 上汽大众新型内部灯

The new Volkswagen ID.Light
大众新型极智灯光

How the Volkswagen ID.4

The ID.Light is a new light element which provides information for comfort and safety functions
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New Interior Light of SAIC Volkswagen

上汽大众新型内部灯

The new Volkswagen ID.Light

大众新型极智灯光

Voice Assistant

Voice assistant Driver side		<ul style="list-style-type: none"> - Signals Speaker Position - Gives feedback to action
Voice assistant Co-Driver side		<ul style="list-style-type: none"> - Signals Speaker Position - Gives feedback to action

Navigation support

Lane Suggestion		<ul style="list-style-type: none"> - Leads attention - Soft signal
Lane Change		<ul style="list-style-type: none"> - Leads attention - Mild signal
Error lane		<ul style="list-style-type: none"> - Picks up and leads attention - stronger signal

The ID.Light can support existing functions by giving light signals in a suitable position
极智灯光可以在合适的位置为现有功能提供灯光辅助信号。

New Interior Light of SAIC Volkswagen 上汽大众新型内部灯

The new Volkswagen ID.Light 大众新型极智灯光

Interaction and separation with other display elements, like AR HUD (Augmented Reality Head Up Display), Main Display, Center Display...



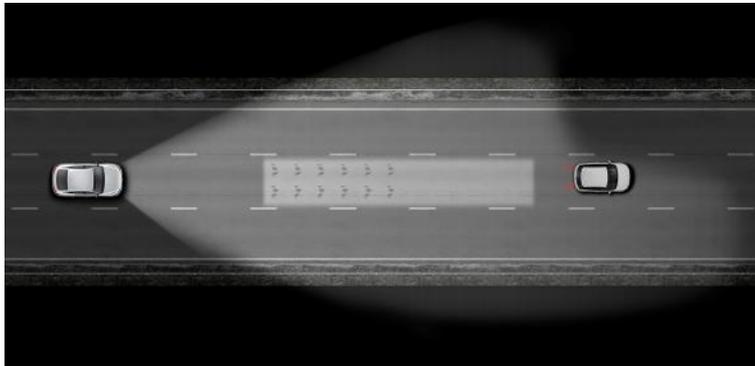
Approach:

- Information in a defined sequence and logic
- Support in the suitable viewing direction

The ID.Light shall make the user react correctly using a logical sequence and informing in the right direction
机智灯光提供可顺序点亮的灯光序列，用以指示正确的方向，从而帮助驾驶员做出正确的反应。

Outlook in Light function for communication at of SAIC Volkswagen 上汽大众对于灯光交互功能的展望

Upcoming light communication 灯光交互的展望



Lane guidance projected by headlamp
由大灯投影出来的车道引导功能



Turn signal projection concept
投影转向信号



Front display concept
前显示屏概念



Rear projection and display concept
尾部投影及显示屏

Exterior light information should be known or combined with something known for passerby's and road users
外部灯光的信息交互需要基于客户和道路参与者所公知的相关提示符等信标信息

Outlook in Light function for communication at of SAIC Volkswagen

上汽大众对于灯光交互功能的展望

Take Away messages:

- SAIC Volkswagens new night appearance allows personalized welcome communication
- The new interior light element “ID.Light” provides comfort and safety with various additional light functions – embedded in the logic of existing information
- Future exterior light elements can add comfort and safety in a similar way, using known and easy symbols and the combination with known information

上汽大众
SAIC VOLKSWAGEN
