Technology with Vision

Technology Achievements to increase Safety

Digital Light – A safer way to drive

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DVN Workshop
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DrivingVisionNews.com
Automotive lighting, driver assistance and smart interior

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Motivation Digital Light

AUTOMOTIVE MEGATRENDS

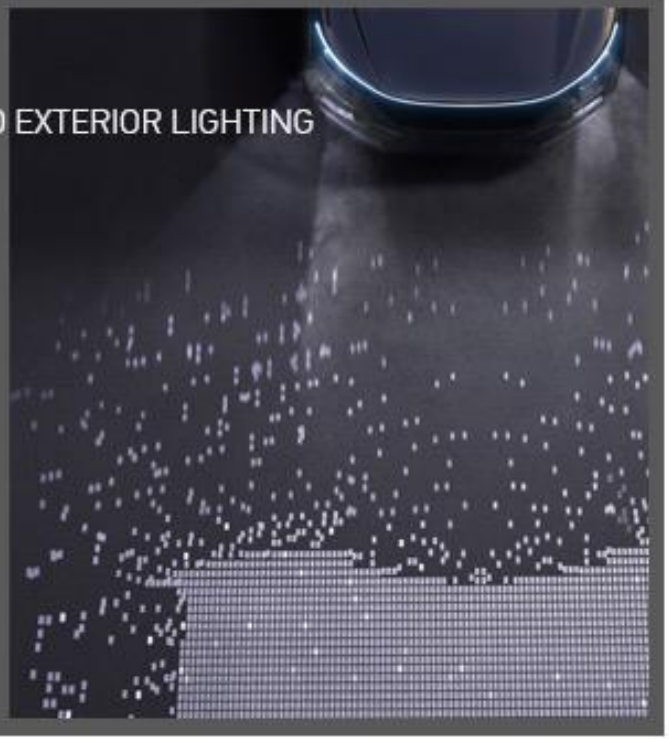
EFFICIENCY & ELECTRIFICATION

CONNECTIVITY & DIGITALIZATION

AUTONOMOUS DRIVING

INDIVIDUALIZATION

TECHNOLOGY CHANGE
FOR VEHICLE INTERIOR AND EXTERIOR LIGHTING



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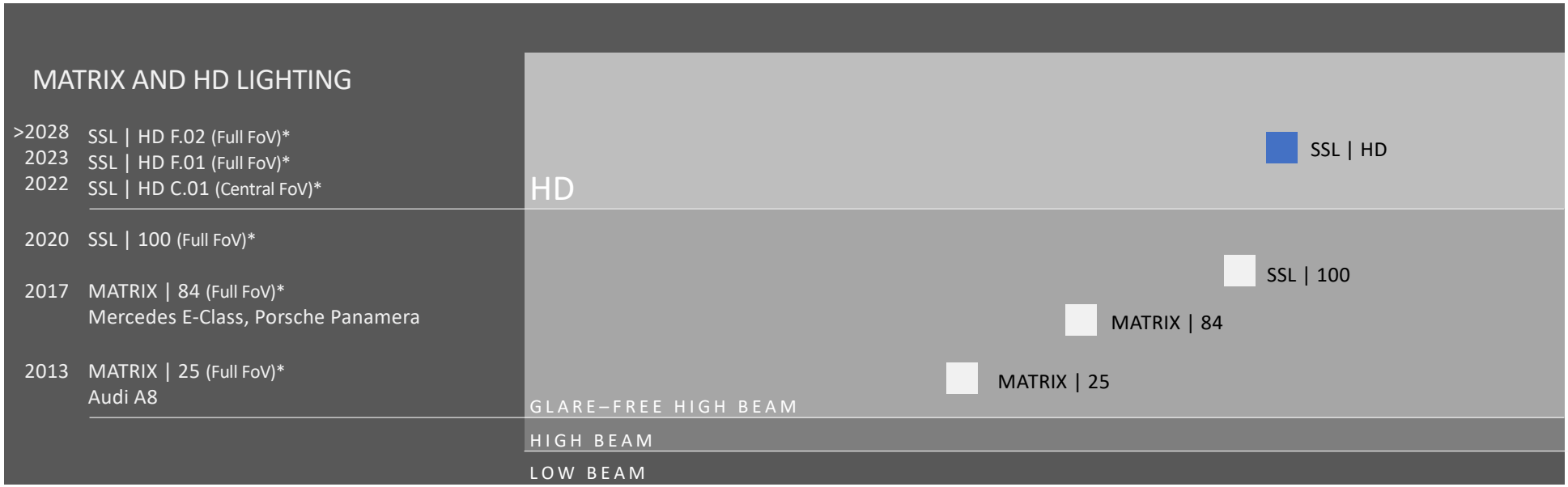
HELLA Technology Steps towards HD Lighting



*FOV = Field-of-View

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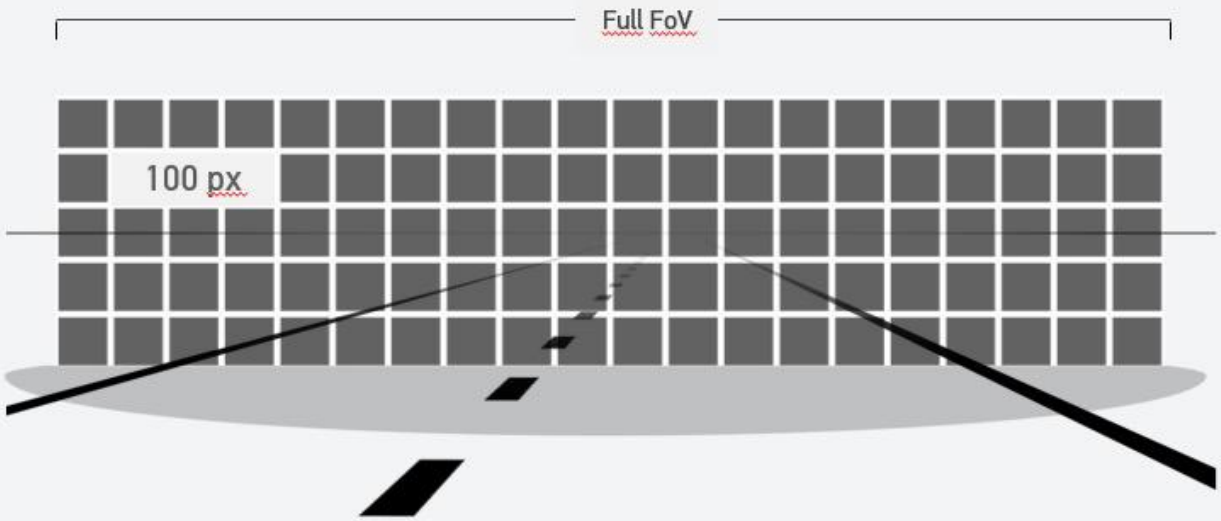
Full Field-of-View, 1st Generation

eco F.01

SSL | 100 F.01

2020

Resolution	**100 px** per light source
Light Source(s)	1 LED Array Chips
Appearance	1 Lens - 1 Pre-Field
Misc	Economic solid state lighting



MATRIX vs. HD

MATRIX | 84 as todays state of the art lighting technology still shows opportunities
for further improvements of nighttime driving solved by higher pixilation.

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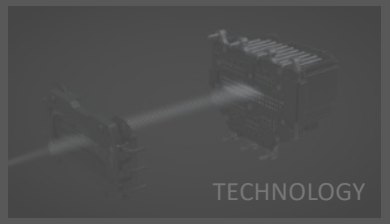
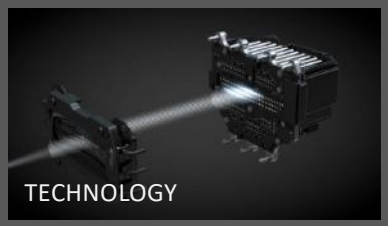
Use Case Thinking as Base for HD System Development



TECHNOLOGY THINKING
WHAT CAN WE DO WITH IT?

USE CASES DEFINED BY TECHNOLOGY



USE CASE THINKING
WHICH TECHNOLOGY ENABLES US?

TECHNOLOGY DEFINED BY USE CASES

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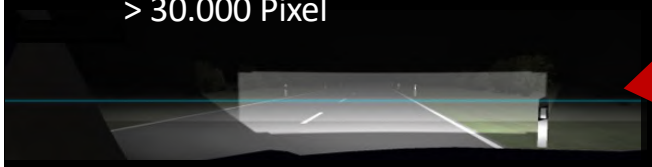
Possible HD Technologies

SSL | HD
Solid State Lighting

> 30.000 Pixel



Full Field-of-View

HELLA: SSL | HD -Technology is fitting best for „high resolution“, area of coverage and energy efficiency.

DLP / DMD
Digital Mirror Device

~ 1.300.000 Pixel

Limited Field-of-View

- ++ High resolution
- + Full field-of-view
- ++ Energy efficiency

- ++ Very high resolution
- − Limited field-of-view, additional high beam module necessary
- − Energy efficiency

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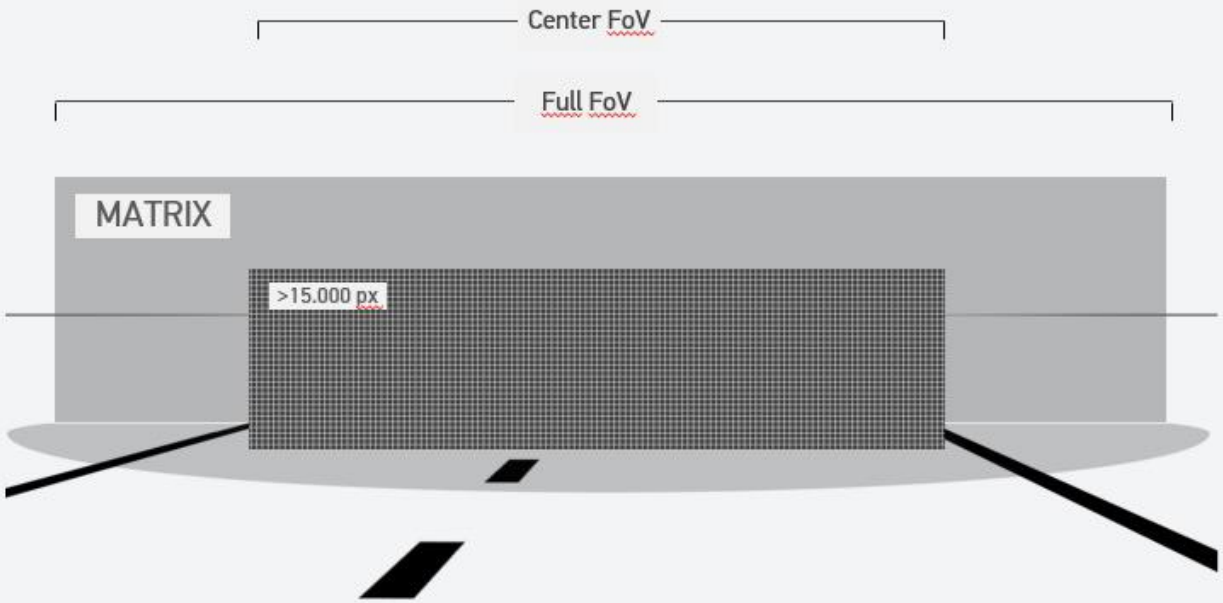
Center Field-of-View, 1st Generation for Symbol Projection and ADB Support

HD C.01

SSL | HD C.01
2022

Resolution	**>15.000 px** per light source
Light Source(s)	1 LED Array Chips
Appearance	1 Lens 1 MATRIX 1 Pre-Field
Misc	HD resolution only in center FoV (similar to DMD technology)



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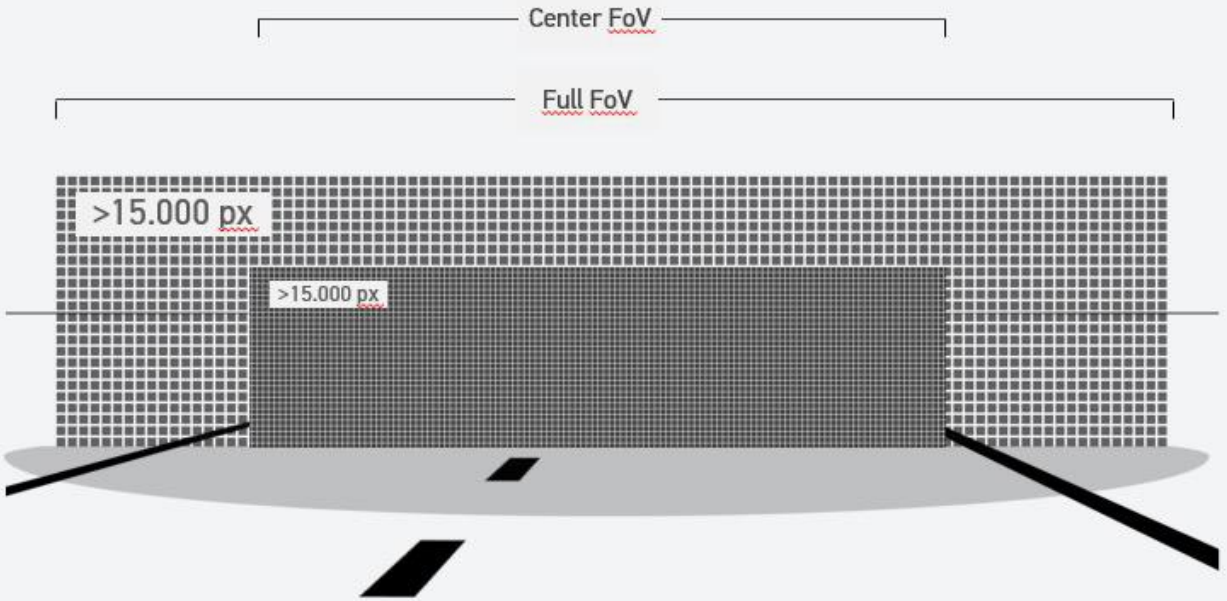
HD F.01

Full Field-of-View, 1st Generation for Symbol Projection and precise ADB functionality

SSL | HD F.01

2023

Resolution	**>15.000 px** per light source
Light Source(s)	2 LED Array Chips
Appearance	2 Lenses - 1 Pre-Field
Misc	FoV separation in 2 areas: - Medium resolution and luminance - HD resolution and high luminance



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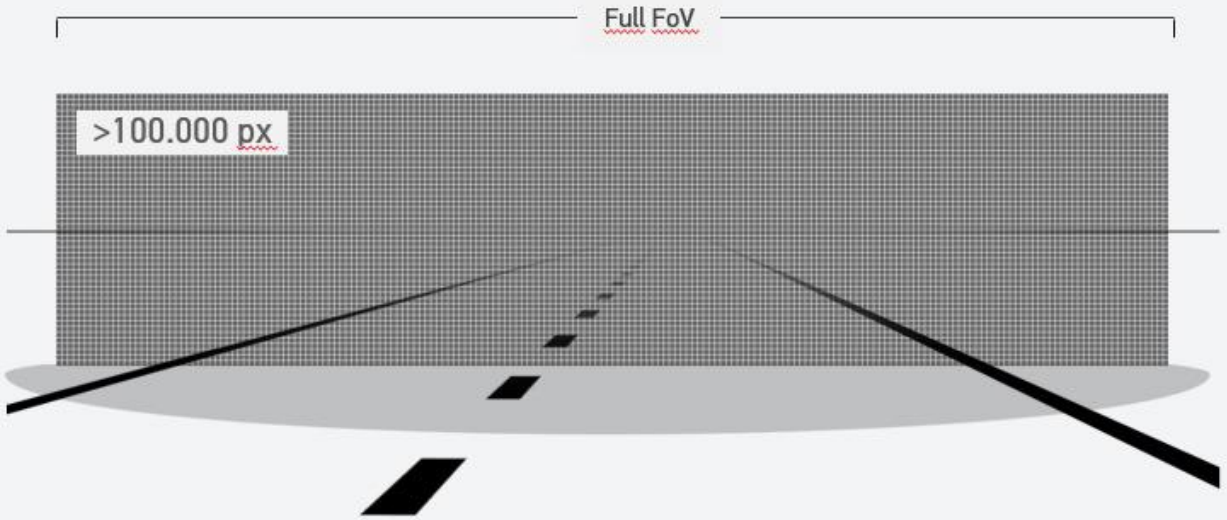
HD F.02

Full Field-of-View, 2nd Generation as Optimum technically and Use Case-wise

SSL | HD F.02

>2028

Resolution	**>100.000 px** per light source
Light Source(s)	1 LED Array Chips
Appearance	1 Lens - 1 Pre-Field
Misc	HD resolution in the complete Field-of-View area



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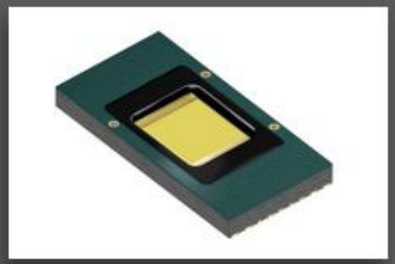
Intensive Know-How Build-Up at HELLA since 2014

2014-2016

Funded Project µ-AFS
First Prototype
1.024 px

2019

OSRAM Eviyos
Light Source
1.024 px



2022

HELLA SSL | HD F.01
Lighting Modules
2x 15.000 px / 2 light sources

~ 2028

HELLA SSL | HD F.02
Lighting Modules
100.000 px / 1 light source

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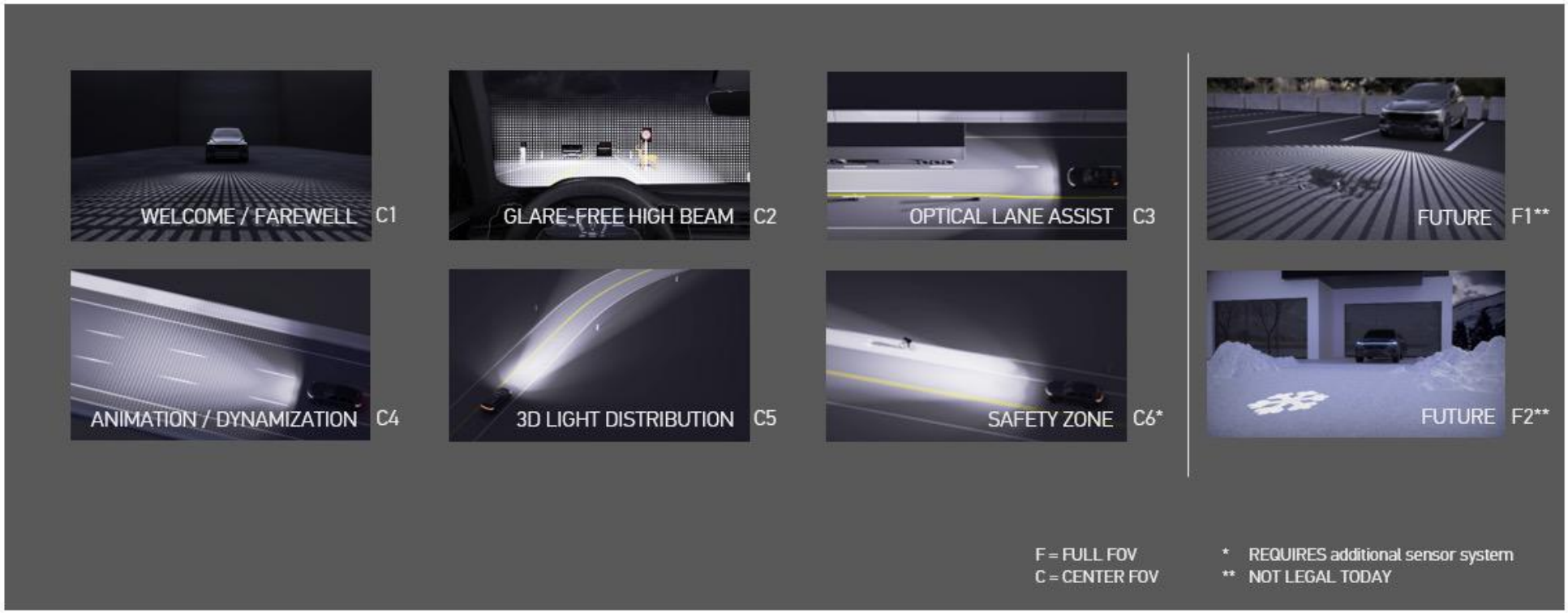
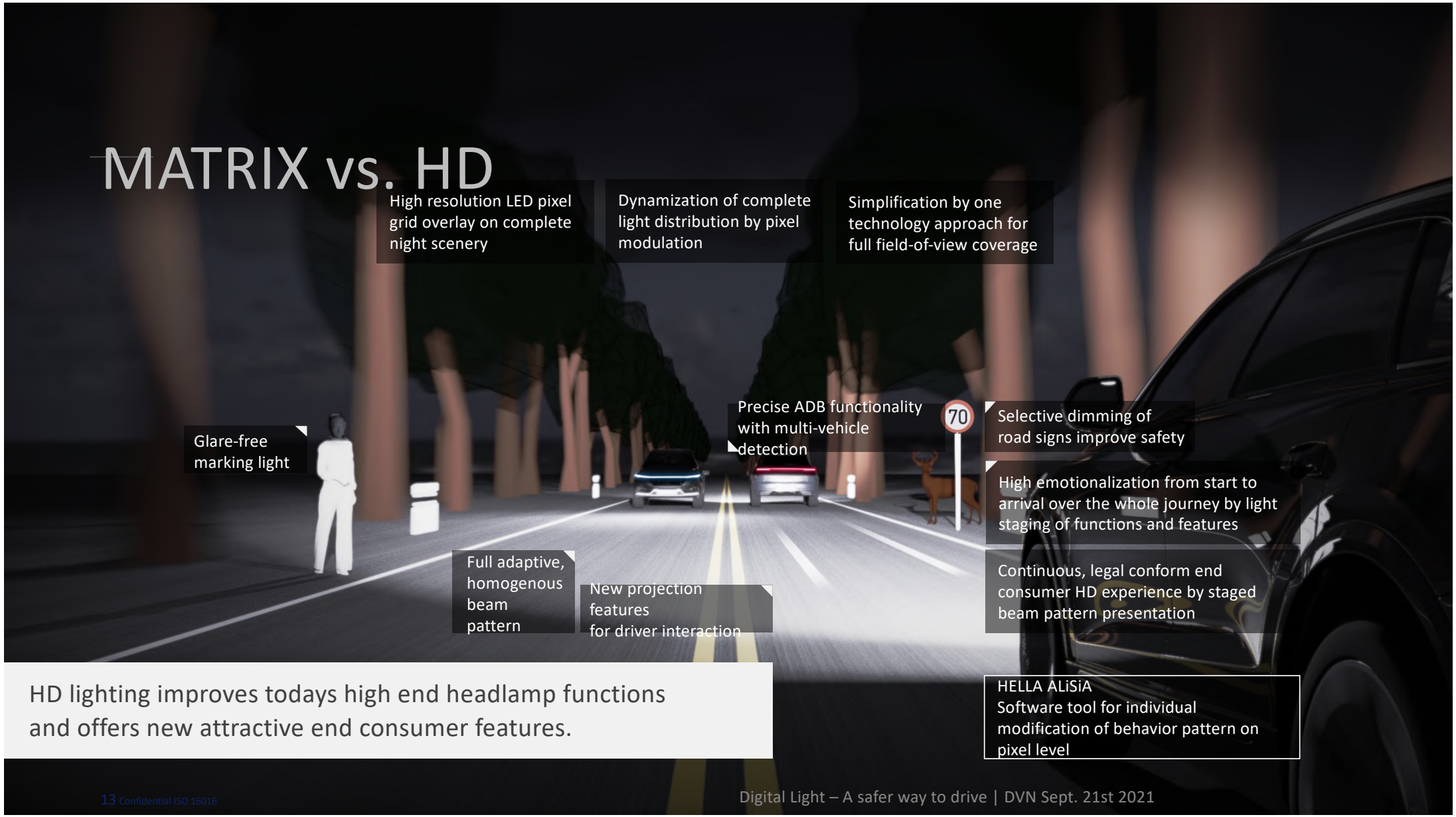
Possibility of attractive Today and Future Endcustomer Use Cases



MATRIX vs. HD



HD lighting improves todays high end headlamp functions and offers new attractive end consumer features.


HELLA SSL | HD High Definition Solid State Lighting
Use Case 1: Glare-free High Beam
REACH
CONSUMPTION
72
E
345km
+20km
02:04
13°c
HELLA


HELLA SSL | HD High Definition Solid State Lighting
Use Case 2: Optical Lane Assist
REACH
CONSUMPTION
67
E
345km
+20km
02:04
345km
13°c
HELLA


HELLA SSL | HD High Definition Solid State Lighting
Use Case 3: 3D Light Distribution
HELLA


HELLA SSL | HD High Definition Solid State Lighting
Use Case 5: Welcome / Farewell
HELLA

HELLA SSL | HD High Definition Solid State Lighting
Use Case 6: Animation / Dynamization of Light, e.g. Low Beam > High Beam


HELLA SSL | HD High Definition Solid State Lighting
Use Case 7: Optical Sensor Support
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HELLA SSL | HD High Definition Solid State Lighting
Use Case 8: Icon Projection

Technology with Vision

Thank you for your attention

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