



Future Light Performance Requirements - Visibility, Comfort, Information

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AGENDA

- Introduction
- Potential Future Lighting Technology
 - Priorities and Needs
 - Summary and Outlook



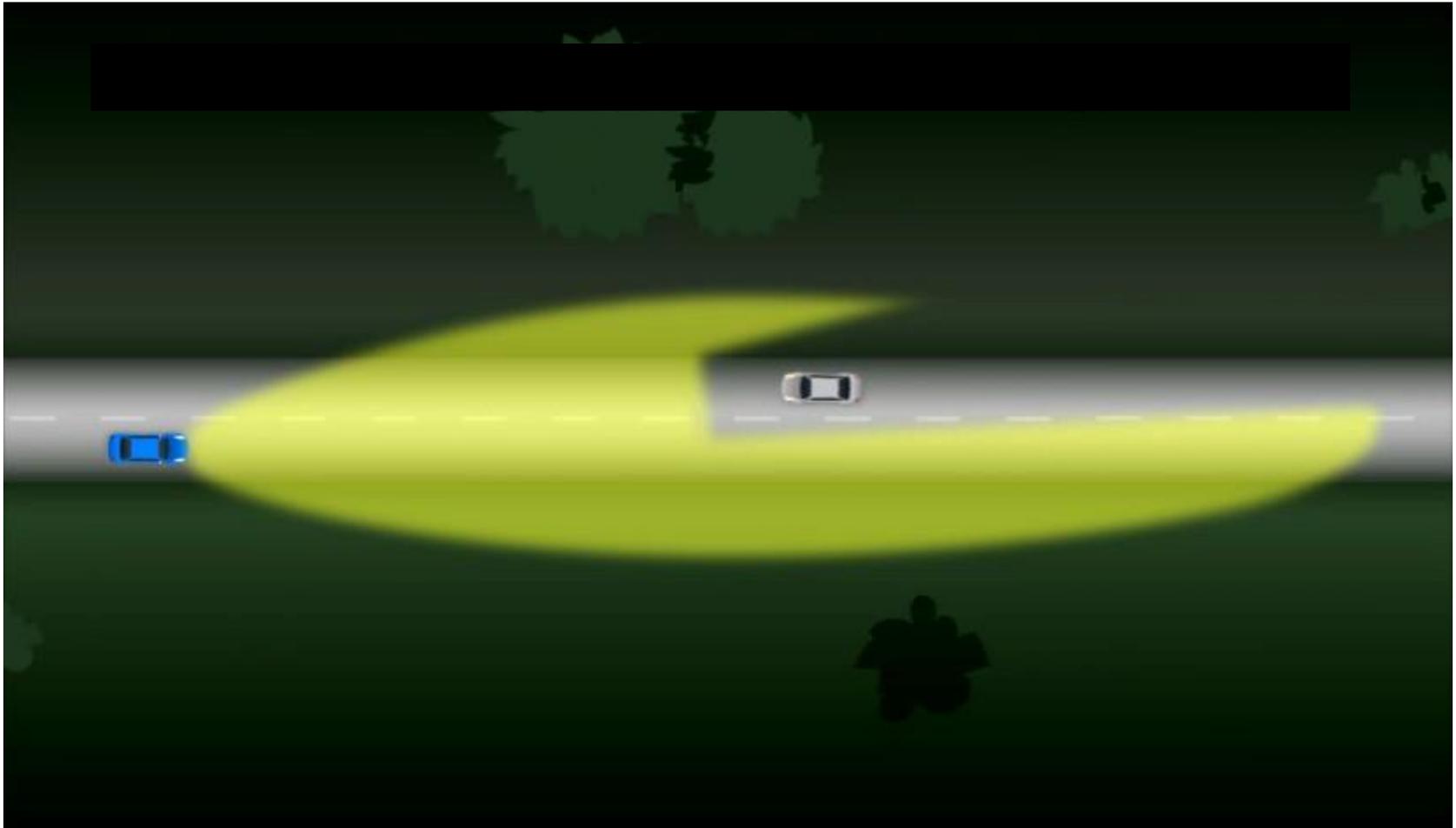
Comparison: H4 light distributions



Comparison: balanced OPTI-LED light distribution



Adaptive Driving Beam (ADB)



Safety Benefit (+30m Visibility Improvement)

Proven by Various Studies

ADB – proper aiming



ADB – vertical aim +0.2 degree up



ADB – vertical aim -0.2 degree down



Target: demonstrating the major advantage for the driver:

automatic controlled,

improved visibility at night with oncoming and preceding vehicles

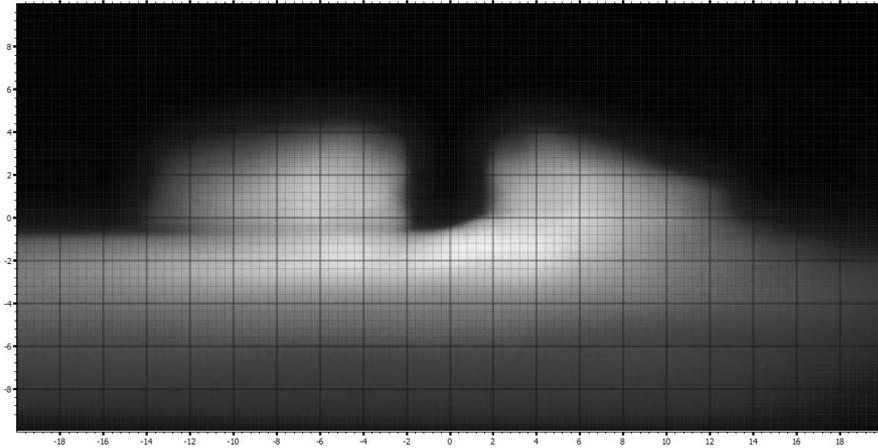
affordable cost

small dimensions and packaging

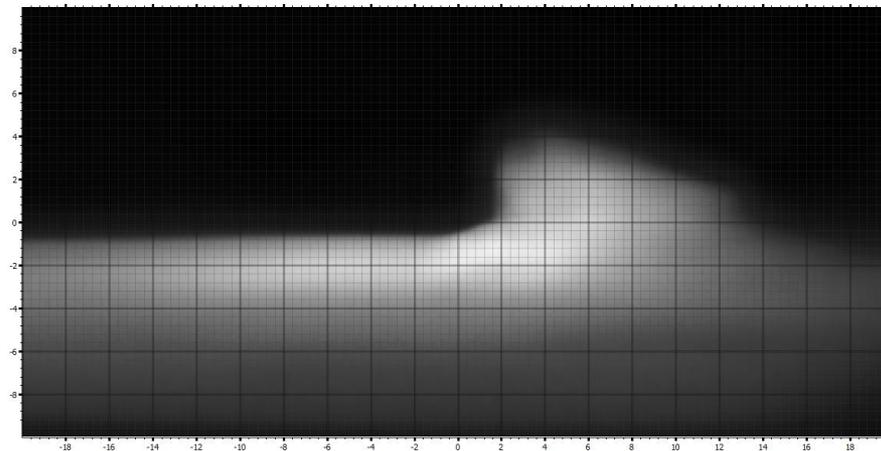
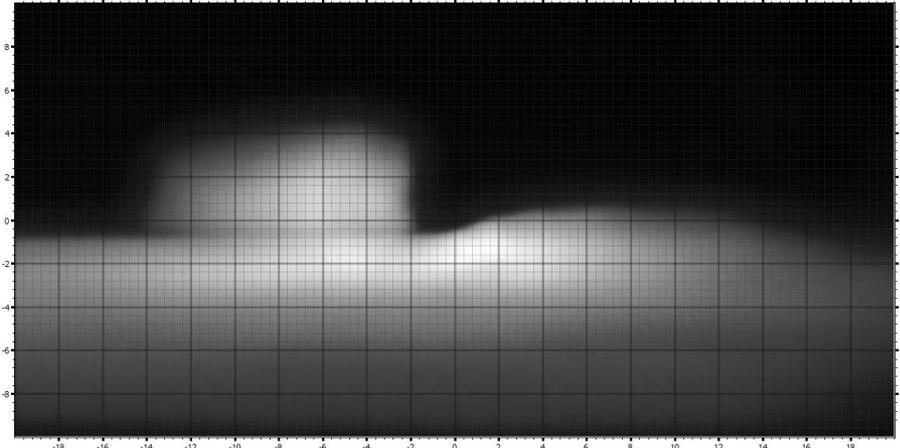
low power consumption (CO₂)

Mini-AFS HeadLamp – ADB + Low Beam

Preceding vehicle
(1 reflector off)



Preceding vehicle
(2 reflectors off)



Oncoming vehicle
(2 reflectors off)

Low Beam + High Beam



LB + ADB – PRECEDING VEHICLE



LB + ADB – ONCOMING VEHICLE



Mini-AFS HeadLamp – ADB SUMMARY



	Parameters
Number of segments	3
Segment width	Left&right = 12° Central = 8°
Segment overlapping	2°
Tunnel width	4°
Segment rising time	0.26s
Segment falling time	5s

Identification signal for Vehicles running in Autonomous Mode

**Examples of lights indicating
when a vehicle is in automated
driving mode**



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1. Is there an identifier of vehicles running in autonomous mode necessary ?
2. New functionalities : what features make sense and contribute to safety in road traffic conditions ? (Comfort)
3. What kind of communication (symbols) seems to be appropriate in traffic conditions with AV vehicles ? (Information)

New Functionalities - Approval Process: Targets for Research Studies

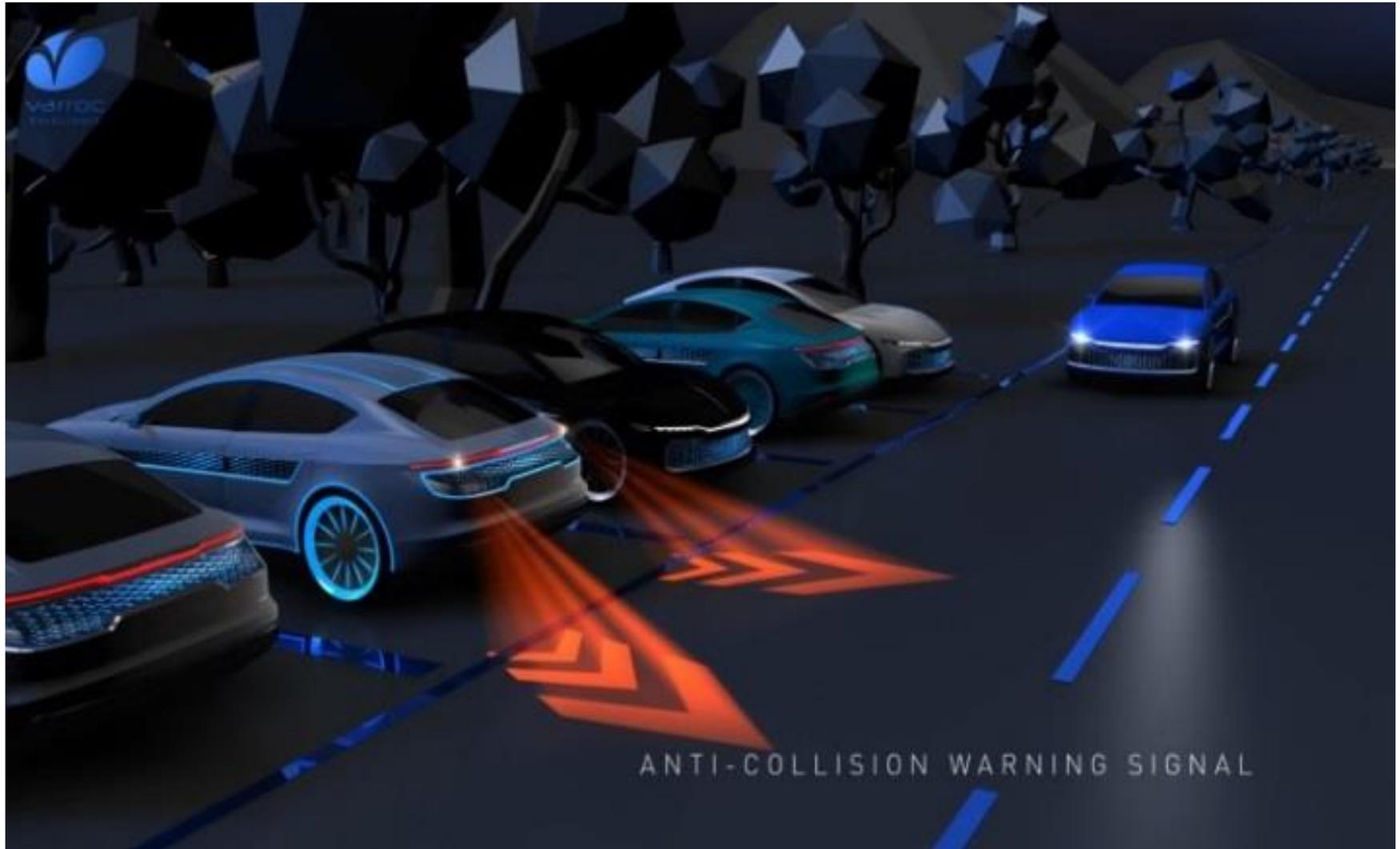


Is there a benefit , safety benefit, comfort for the driver ?

Is there any confusion, discomfort, disturbance or distraction for other road users generated ?

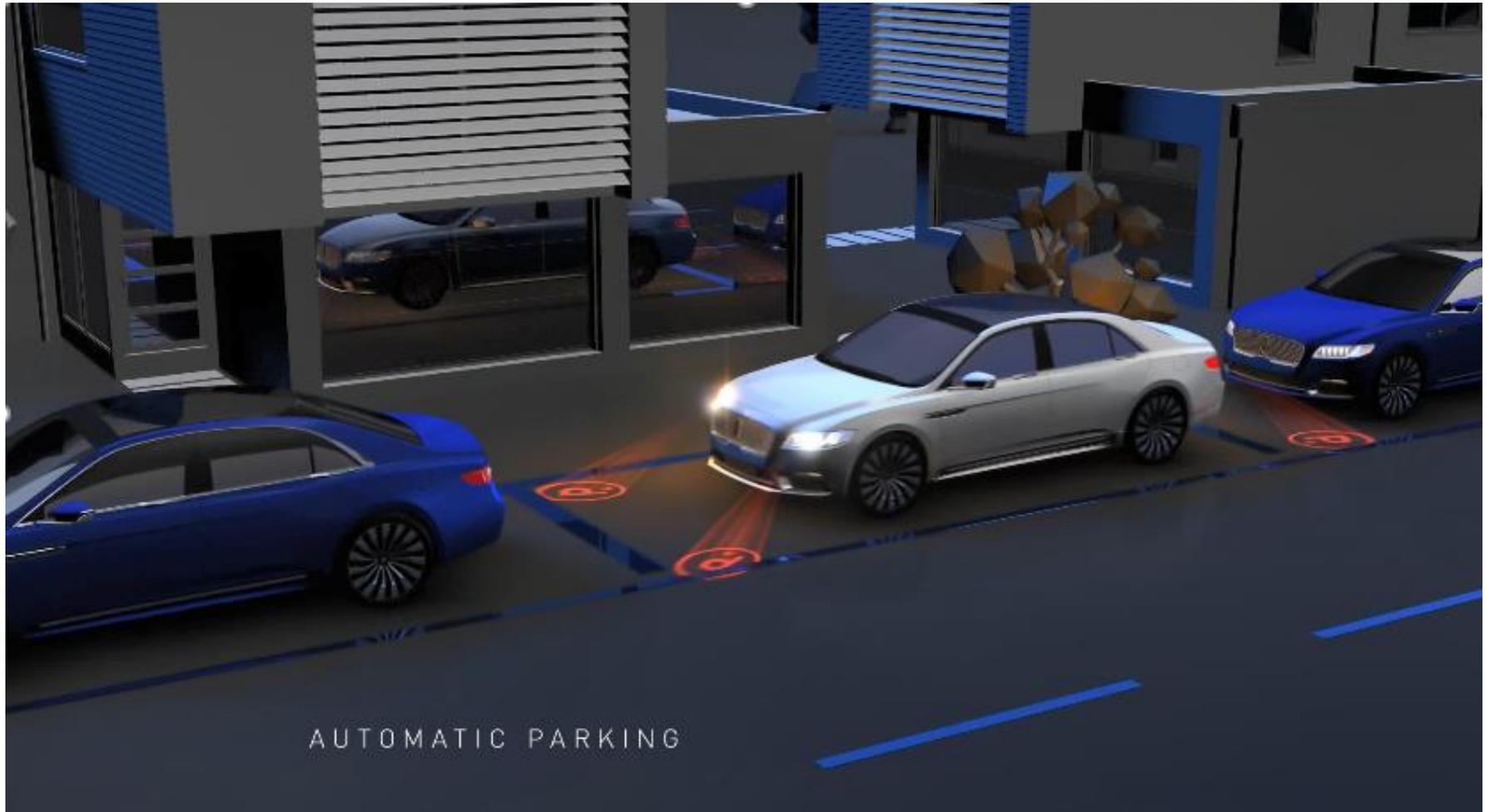
Need of having objective and clear conclusions !!!

Information during deparking process



Advanced Safety Functionality

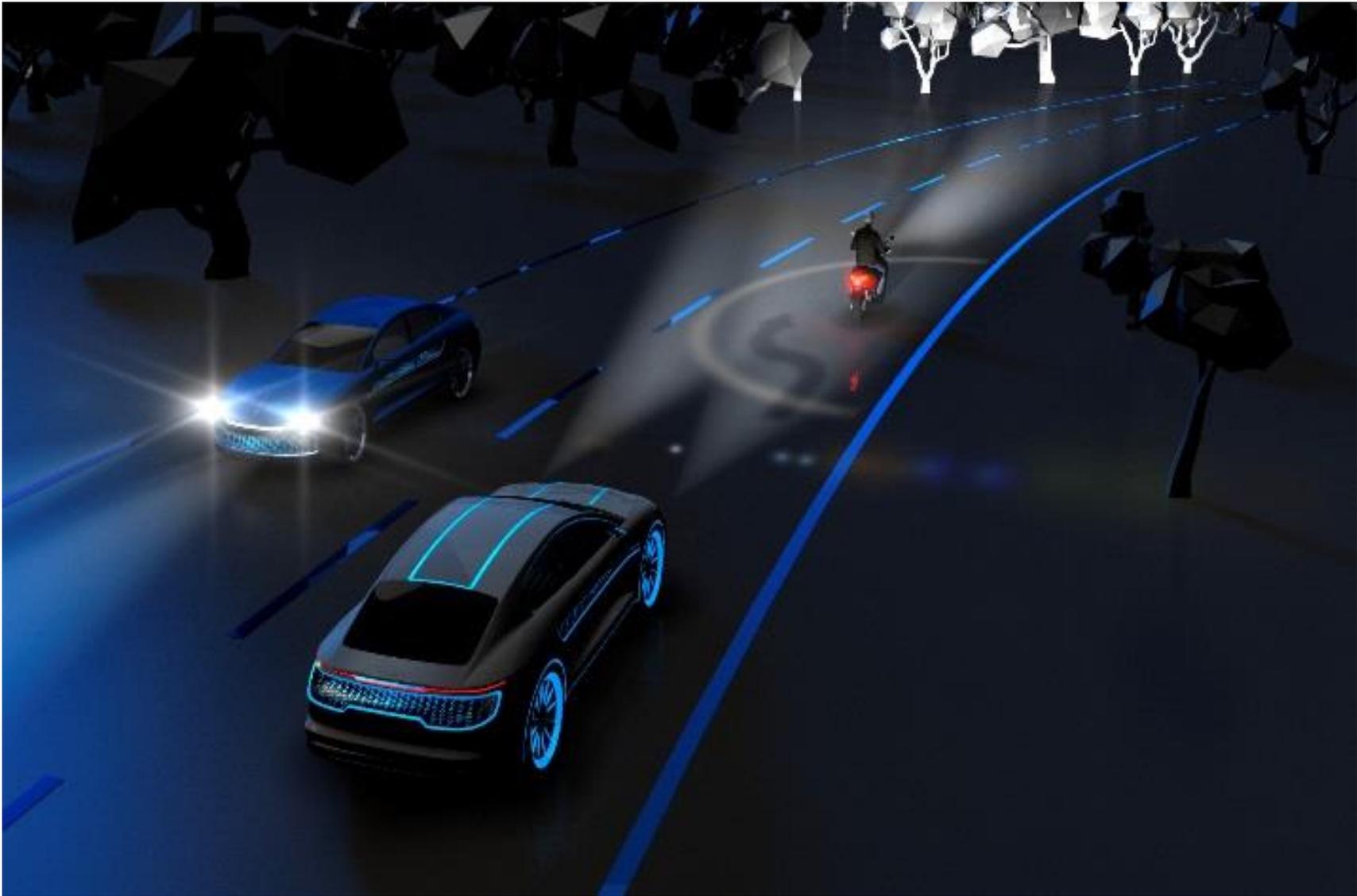
Parking Indicator Projection



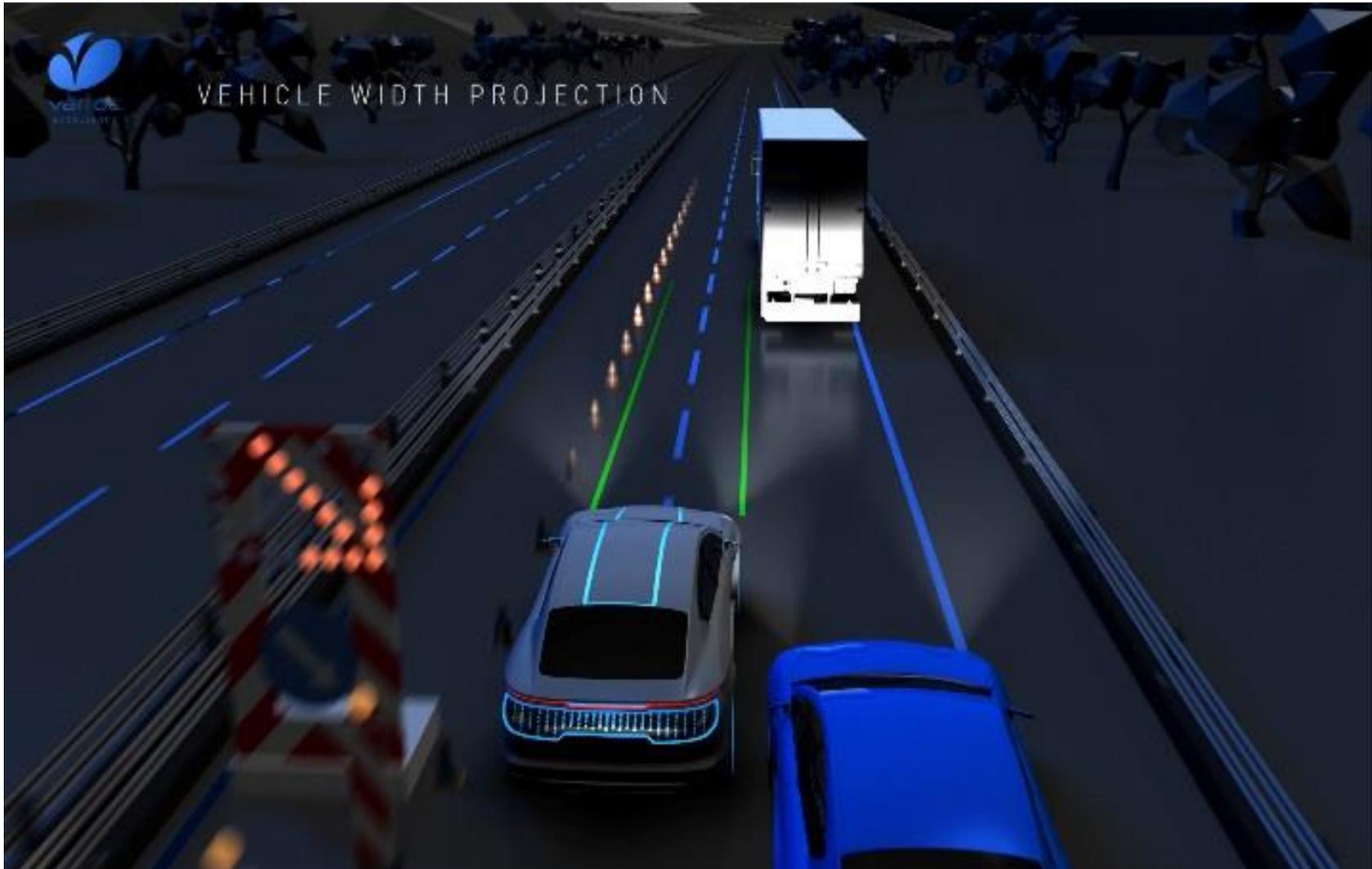
Case 1: Vehicle with High Resolution headlights projects symbols while overtaking other vehicles



Safety zone indication during passing process



Support in construction zone



Snow Flake

Over taking

Distance control

Parking operation warning

Parking spot departure warning

Road construction hints

Accident warning

Direction change indication

Zebra indication

Front stop lamp / indication

and others ...

Collection of Ideas for Future Solutions



Let's discover attractive and safety relevant features in Lighting !