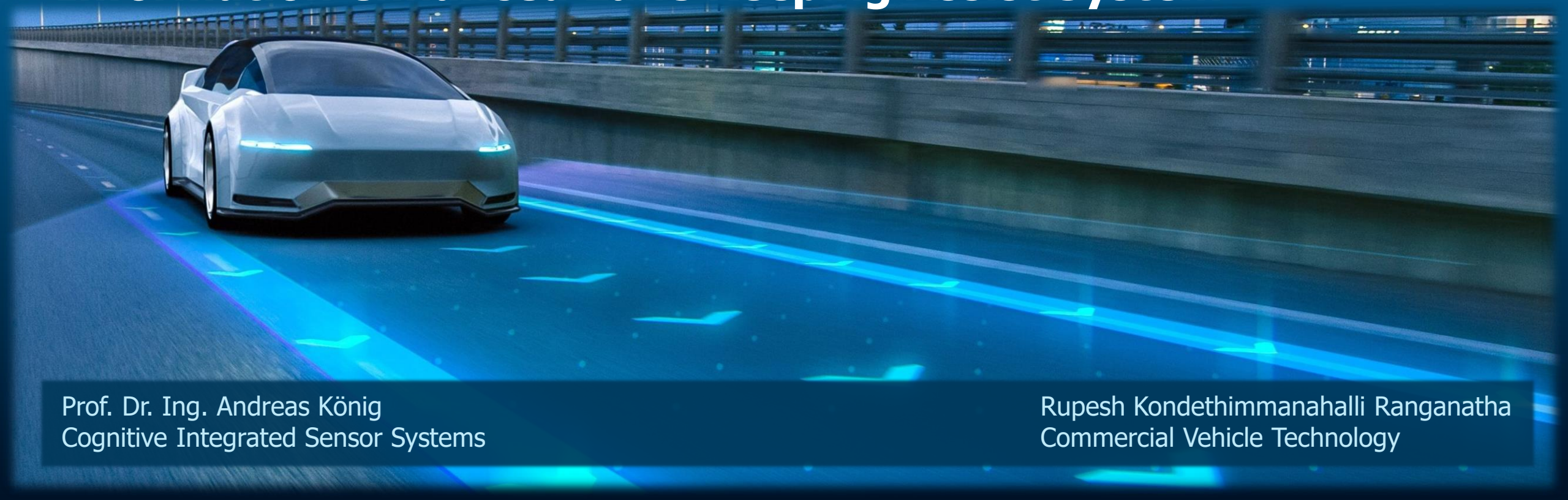
Master Thesis:
Potential and Effectiveness Assessment of a Driver State Information enhanced Lane Keeping Assist System



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Motivation

Lane Keeping Assist (LKA) gives steering support to assist the driver in preventing the vehicle from departing the lane

Limitations

- Unnecessary interventions
- Driver's trust lowest among ADAS (IIHS)

Driver Monitoring System (DMS)

- 35 % accidents due to distraction (NHTSA)

Research Question:

How can driver acceptance and road safety be improved by combining a Lane Keeping Assist with Driver Status Monitoring?

Approach

MATLAB SimpleSpec/ SimpleSim

MATLAB Twainor

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Naturalistic Driving Studies

Real-world driving database:

- Potential scenarios?
- Lane change scenarios
- Intention
- Distraction

Scenario Modelling

Scenario resimulation (open loop):

- Driving dynamics
- Extract driver state information

Simulation (closed loop)

Simulation of **original scenario**: no lane keeping interventions

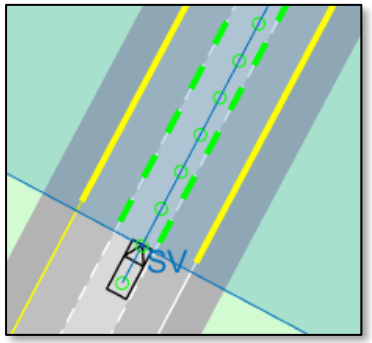
Simulation with **state-of-the-art LKA** system

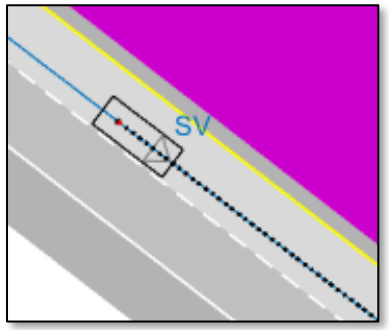
Simulation with driver state **enhanced LKA system**

Effectiveness Assessment

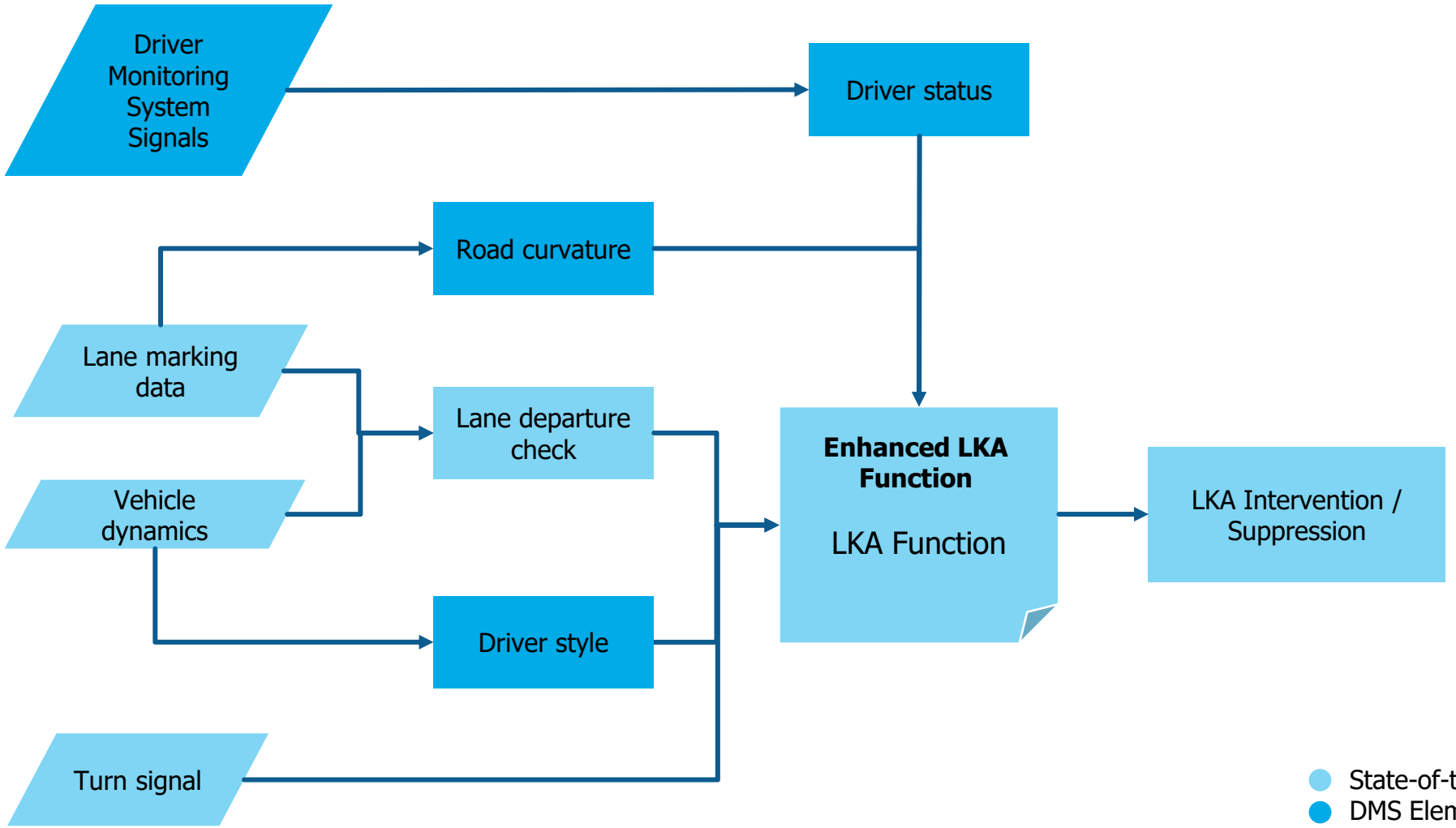
Comparison of two simulation paths:

- Lane keeping
- False interventions
- False suppressions



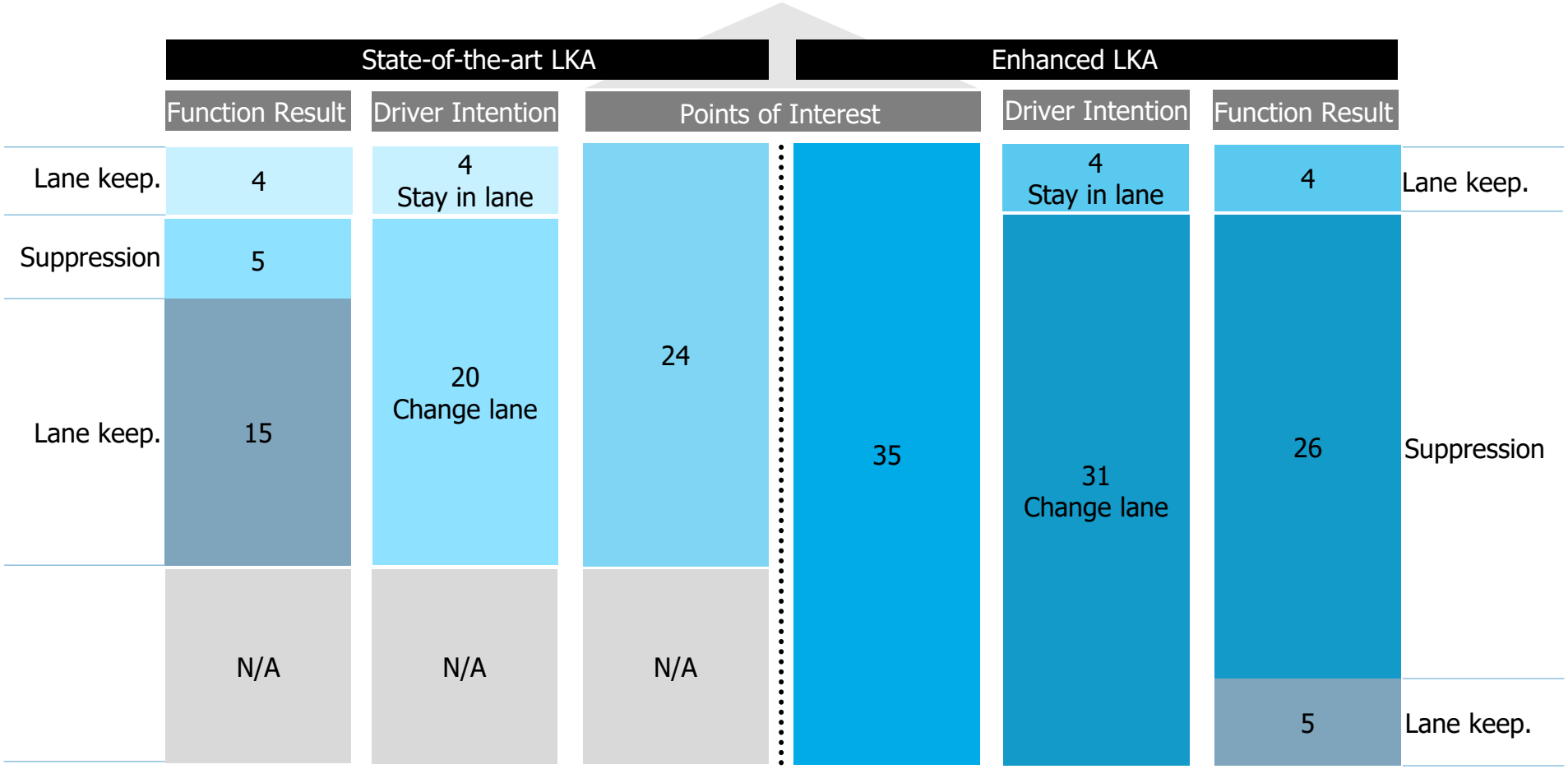


Function Development

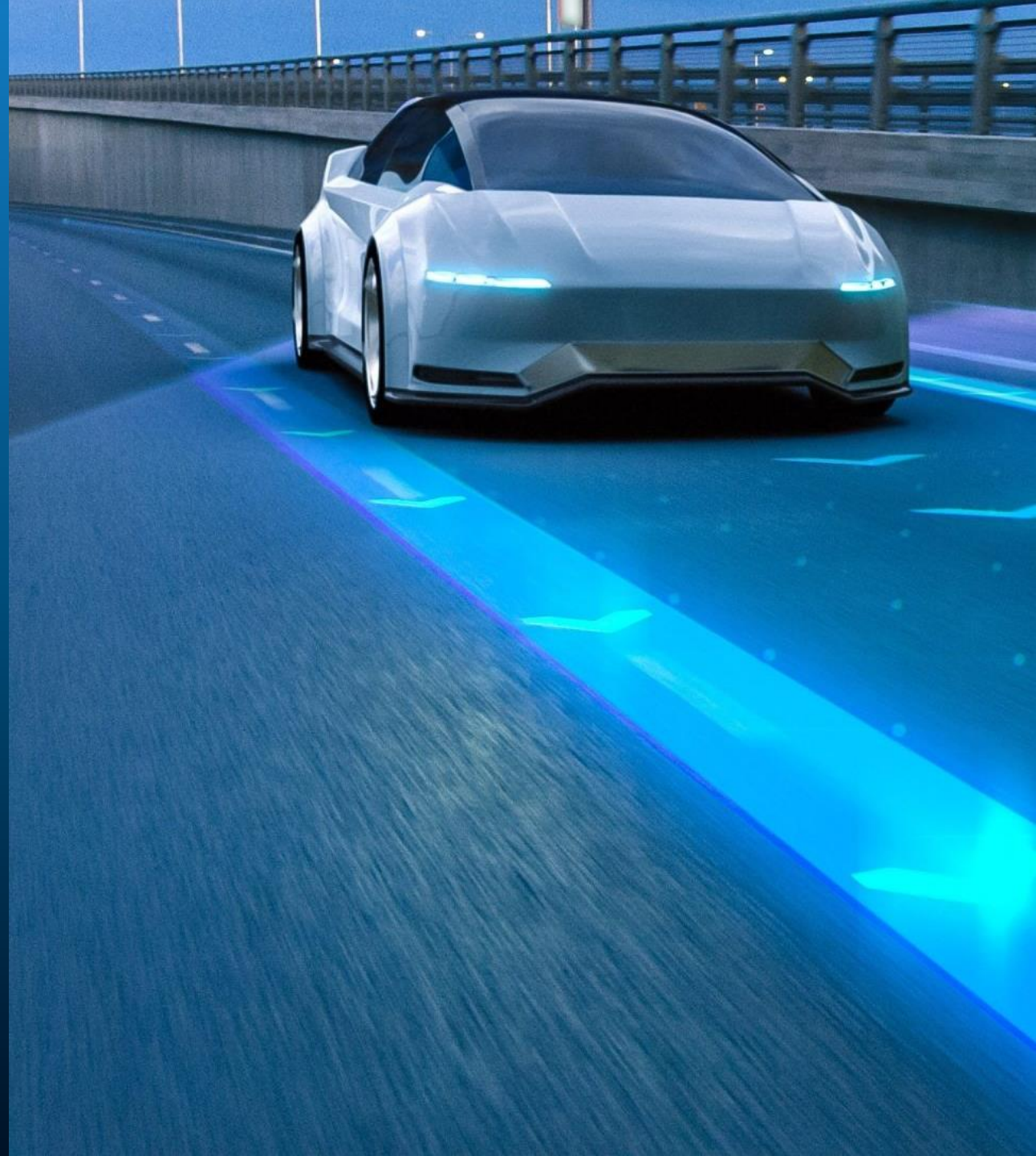


Simulation Results

Total Partner Database cases: 20



Potential of enhanced LKA to improve driver acceptance can be shown. Low false intervention rate.



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