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Tools and Methods for Model Based Development of Predictive Driver Assistance Systems

Thomas Gockeln

dSPACE GmbH · Rathenaustraße 26 · 33102 Paderborn

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dSPACE – Products and Services

- World‘s leading provider of solutions for developing ECU software and mechatronic controls

- dSPACE worldwide
  - Headquarters in Paderborn, Germany
  - Subsidiaries in the USA, France, the UK, Japan and China
  - Distributors in 9 other countries

- 55% of sales are in exports

- Over 800 employees worldwide

dSPACE in Germany

Location Paderborn – Headquarters

- Development
- Administration
- Engineering
- Sales

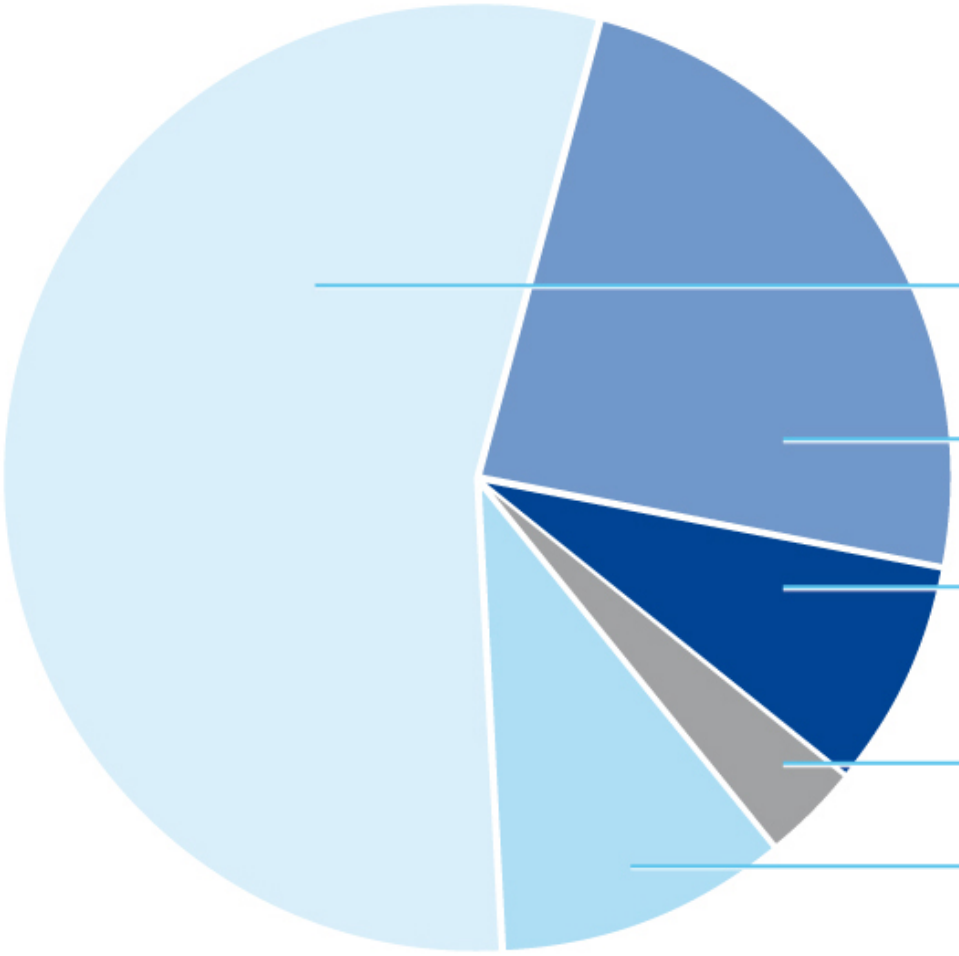
Location Pfaffenhofen/Munich

- Engineering
- Sales

Location Holzgerlingen/Stuttgart

- Engineering
- Sales

Business Fields



Automotive manufacturers

Automotive suppliers

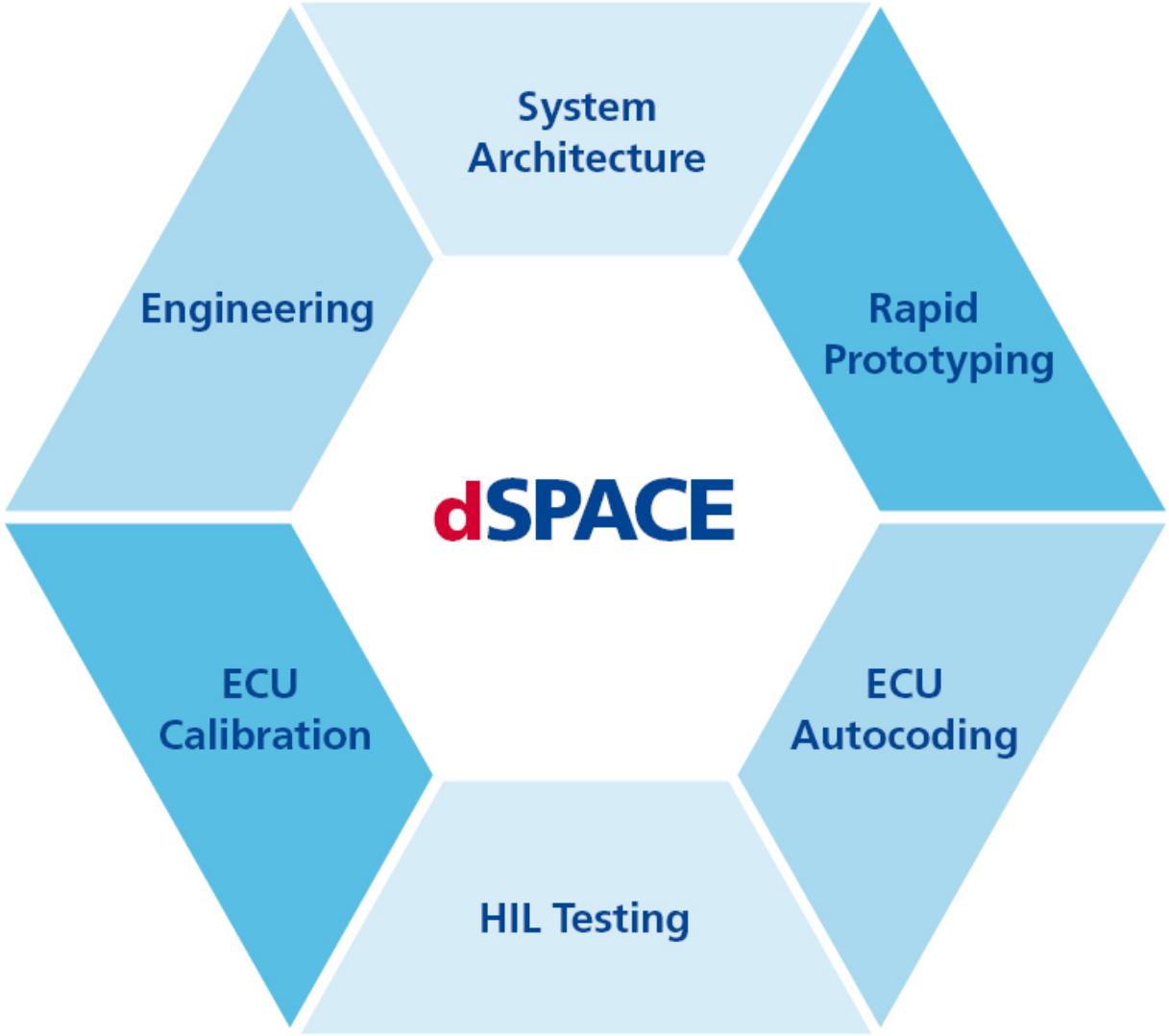
Research and education

Aerospace

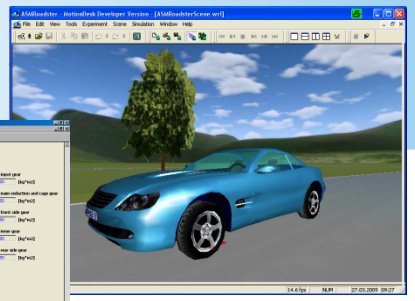
Other industries, engineering, service providers, etc.

Product Areas

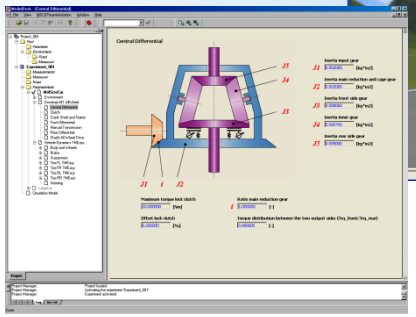
dSPACE



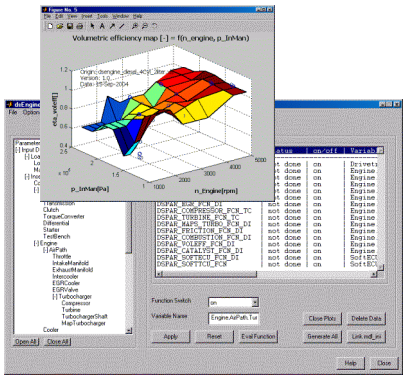
ASM Tool Suite



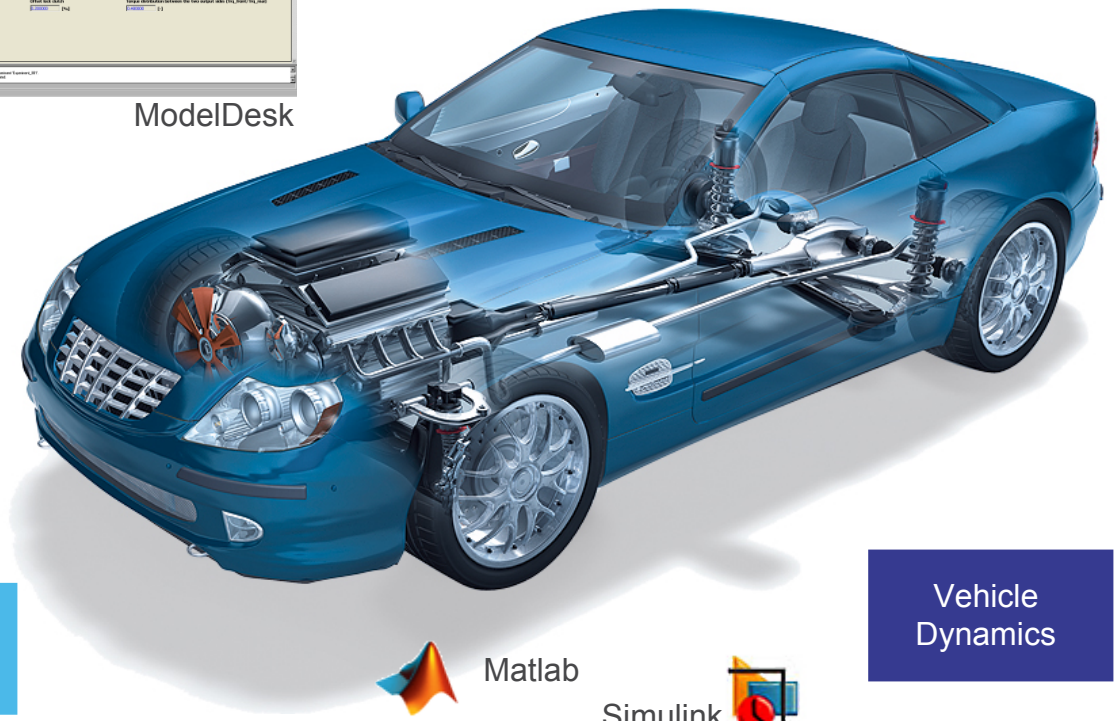
MotionDesk



ModelDesk



ASMPara



Truck

Trailer

BrakeHydraulics

Traffic

Vehicle Dynamics

Matlab

Simulink

Engine Gasoline Basic

TurboCharger

DrivetrainBasic

DieselExhaust

Engine Gasoline

Engine Diesel

Engine Gasoline In-Cylinder

Engine Diesel In-Cylinder

Electric Components

Electronic Horizon for Predictive Driver Assistance Systems

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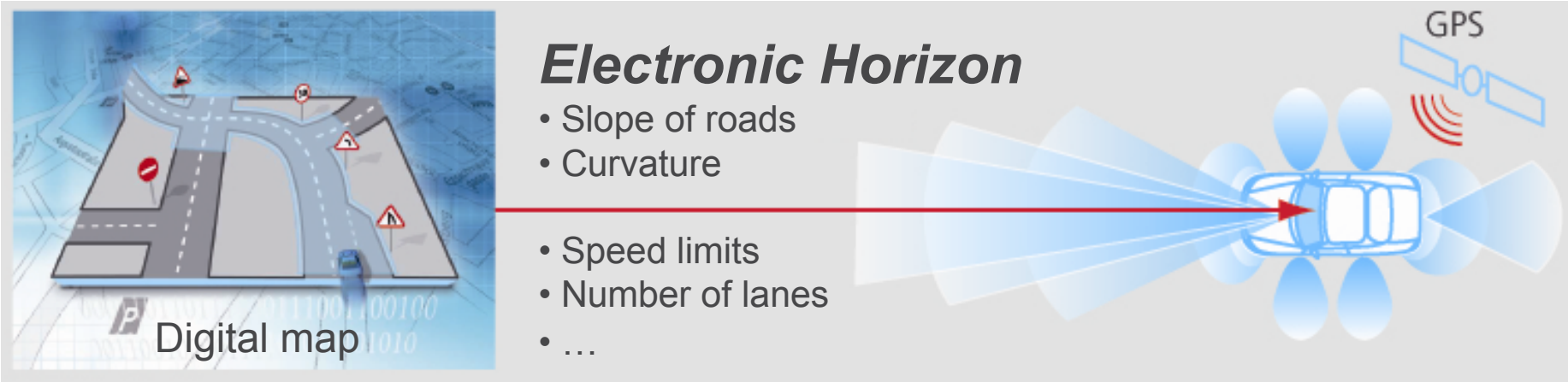
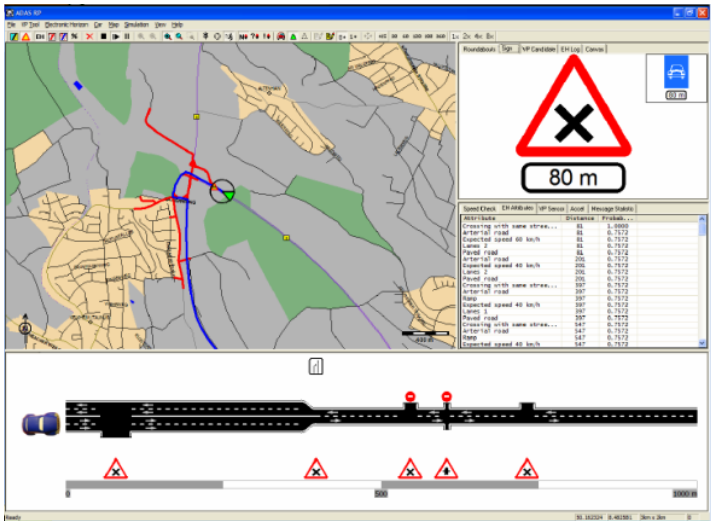


- Cooperation with NAVTEQ
- Interface to ADAS RP from NAVTEQ
  - Automotive Simulation Models (ASM)
  - MicroAutoBox and AutoBox
  - Hardware-on-the-loop simulator



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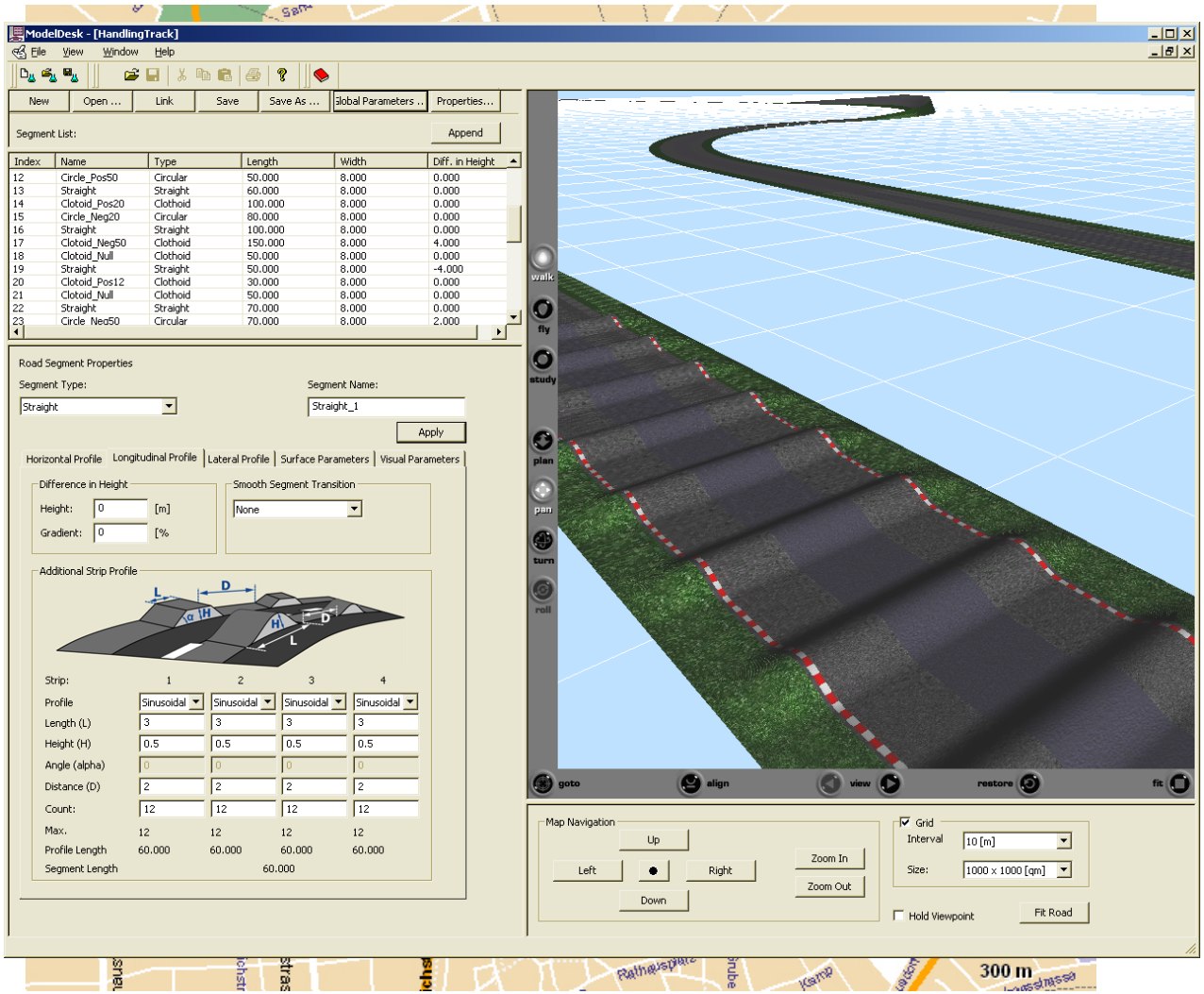
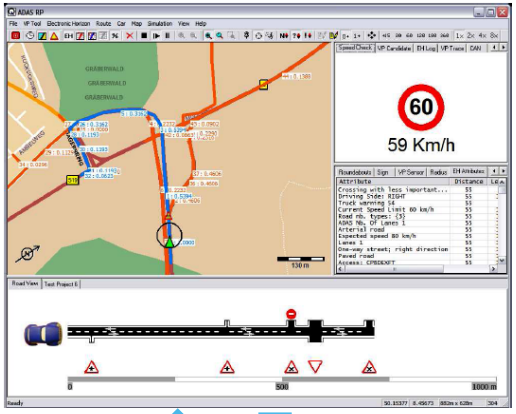
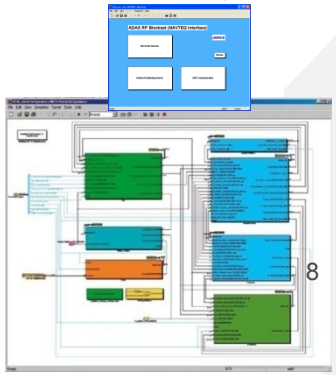
ADAS RP Route to export

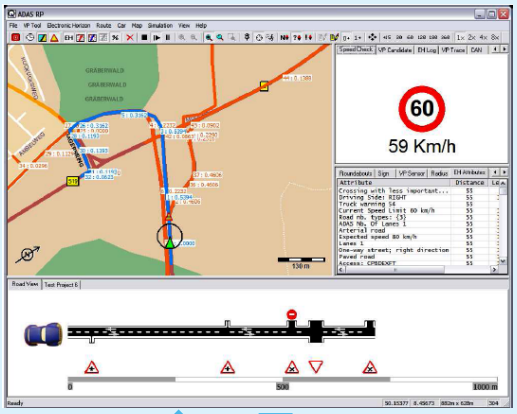




UDP/IP



Electronic Horizon – Function Development with ASM



ADAS RP from NAVTEQ

Export road for simulation in ASM

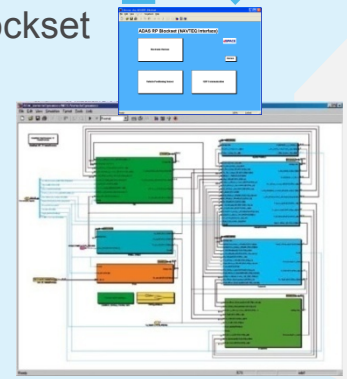
GPS position

Electronic Horizon

UDP/IP

Prototype and test ADAS application offline on PC

ADAS RP blockset



ASM from dSPACE

Vehicle model

Road/Traffic model

ADAS algorithm and ASM plant model in Matlab®/Simulink®

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Electronic Horizon – Function Prototyping with RCP systems

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ADAS RP from NAVTEQ

GPS, gyroscope sensor

Electronic Horizon

Optional:
GPS positio
from vehicle or
RCP system

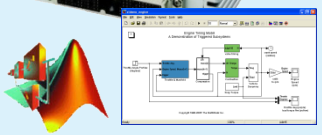
Ethernet UDP/IP

Prototype and test
ADAS application
in the vehicle

- CAN
- FlexRay
- LIN
- I/O

ADAS RP blockset

MicroAutobox/AutoBox from dSPACE



ADAS algorithm in
Matlab®/Simulink®

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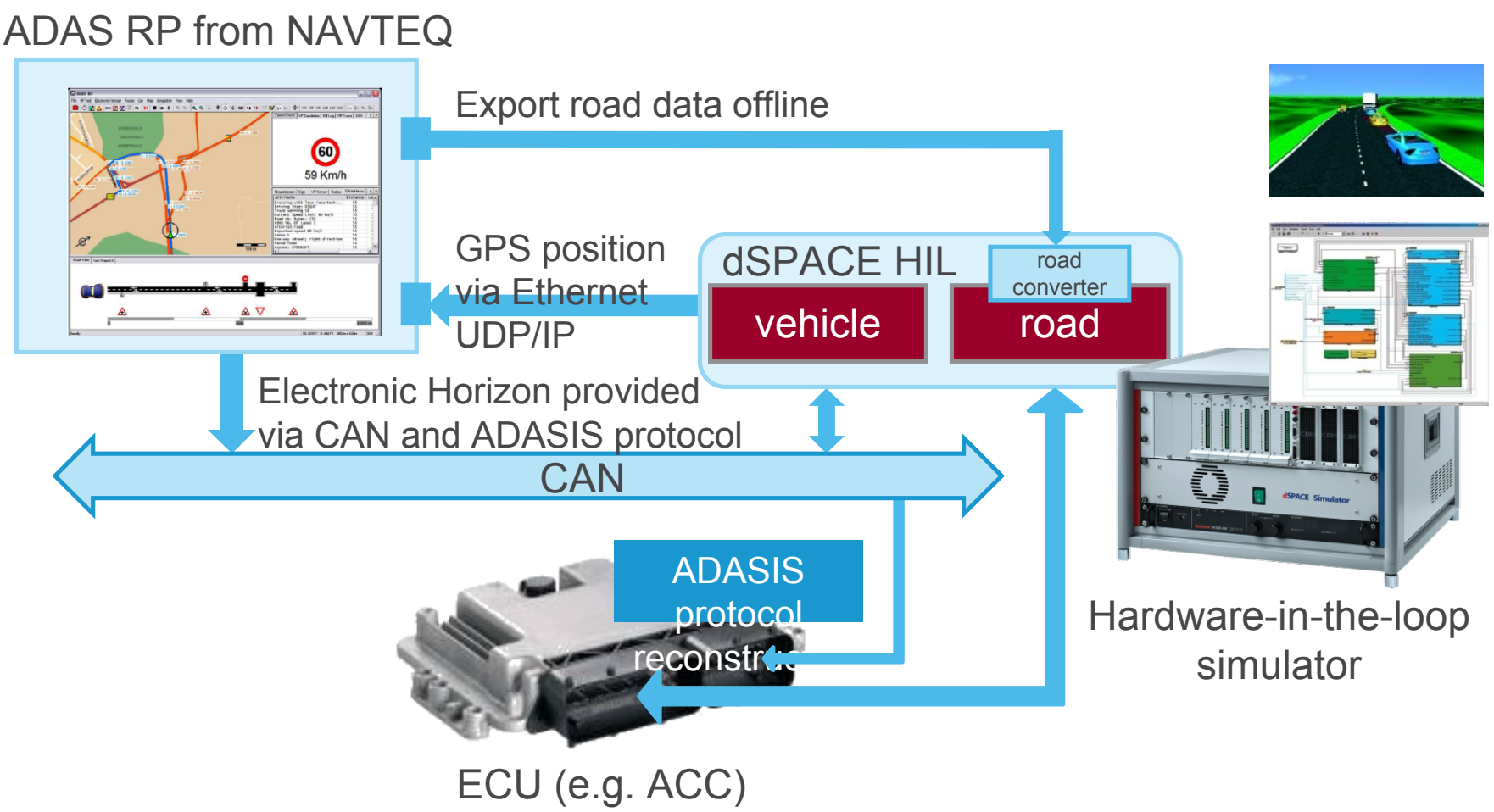
Electronic Horizon – Real time HIL testing with ASM



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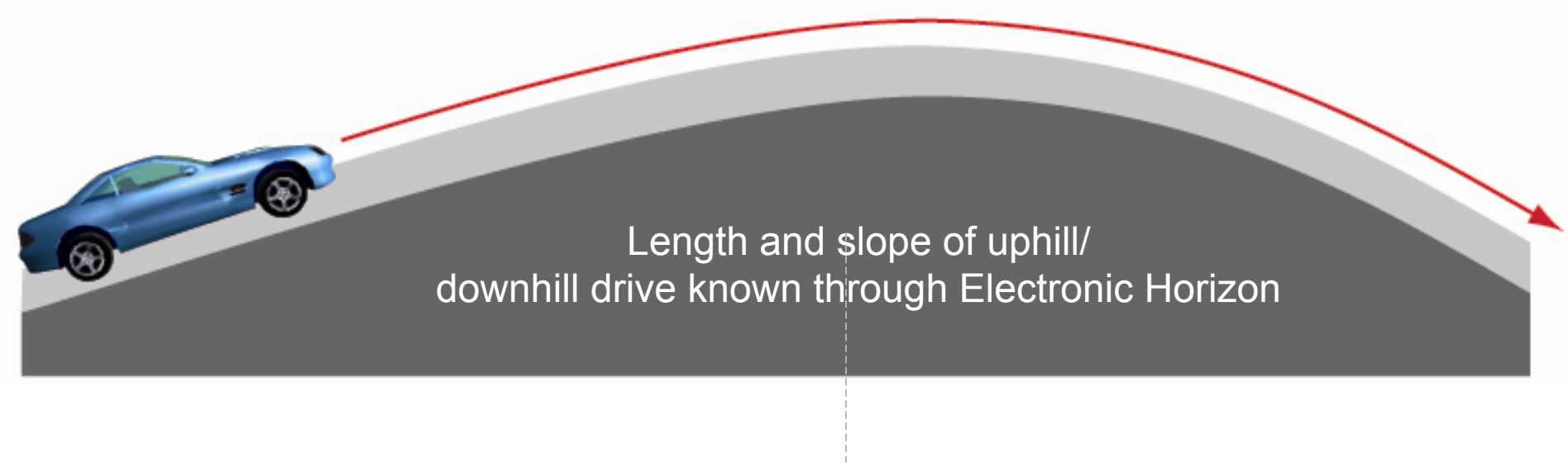
Electronic Horizon examples – See over the hill

- Energy management strategies with hybrid electric vehicles (HEVs)

Extended use of E-motor to support combustion engine -> Discharge battery

Charge battery
Energy recuperation



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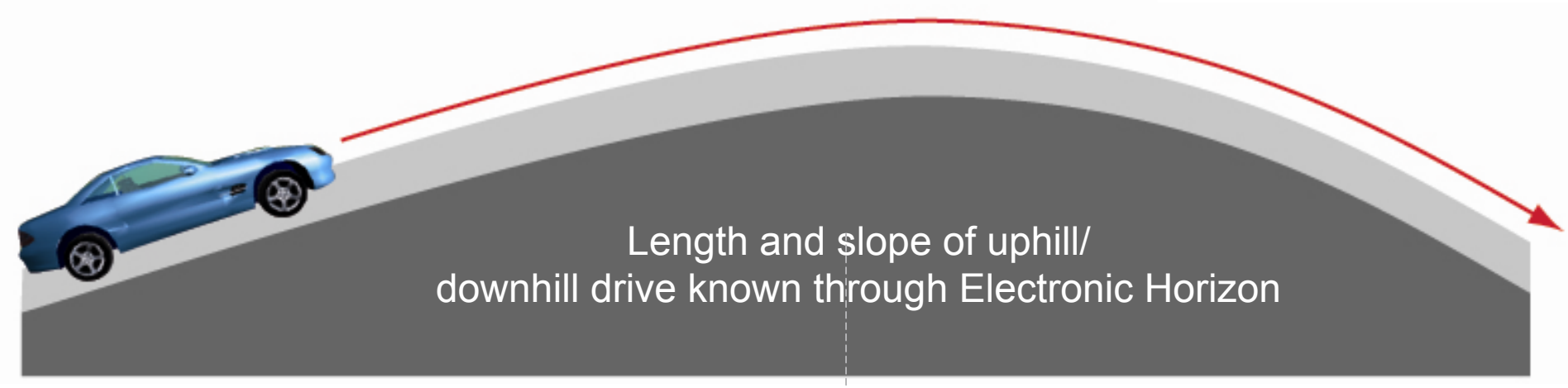
Electronic Horizon examples – See over the hill

- Efficient concepts for engine cooling

Reduce cooling capacity before reaching the top of the hill

Use air flow to cool down the engine



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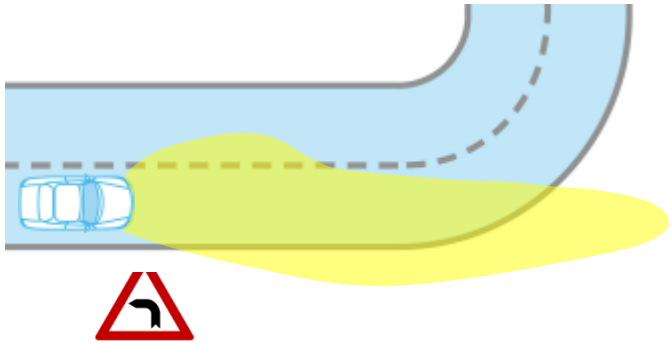
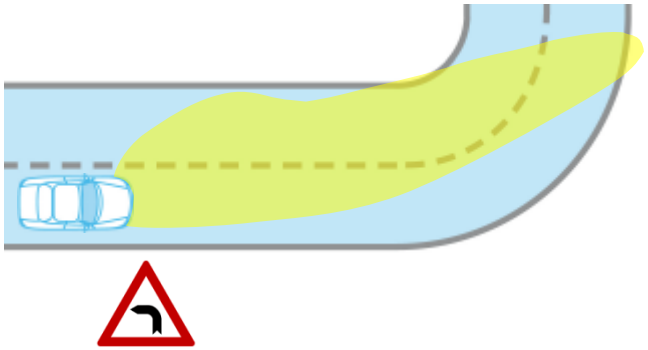
Electronic Horizon example: See around the bend

- Predictive headlights
  - Use curvature information from Electronic Horizon to provide enhanced road visibility
  - Light curve before actually turning into the bend





- Curve speed warning
  - Use curvature information from Electronic Horizon to alert driver of hazardous and dangerous situations

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