Electronic horizon: Flexible implementation of predictive driver assistance features

Jürgen Ludwig
March 18th 2015

Elektrobit

Our solutions for the automotive world

Infotainment software and services

- Connected navigation software
- HMI tools for in-dash, digital instrument clusters and head-up displays
- Global software integration and engineering services

Connected services

- Connected experiences around urbanization and electrification
- Online diagnostics
- Software and content updates

Car Infrastructure software and services

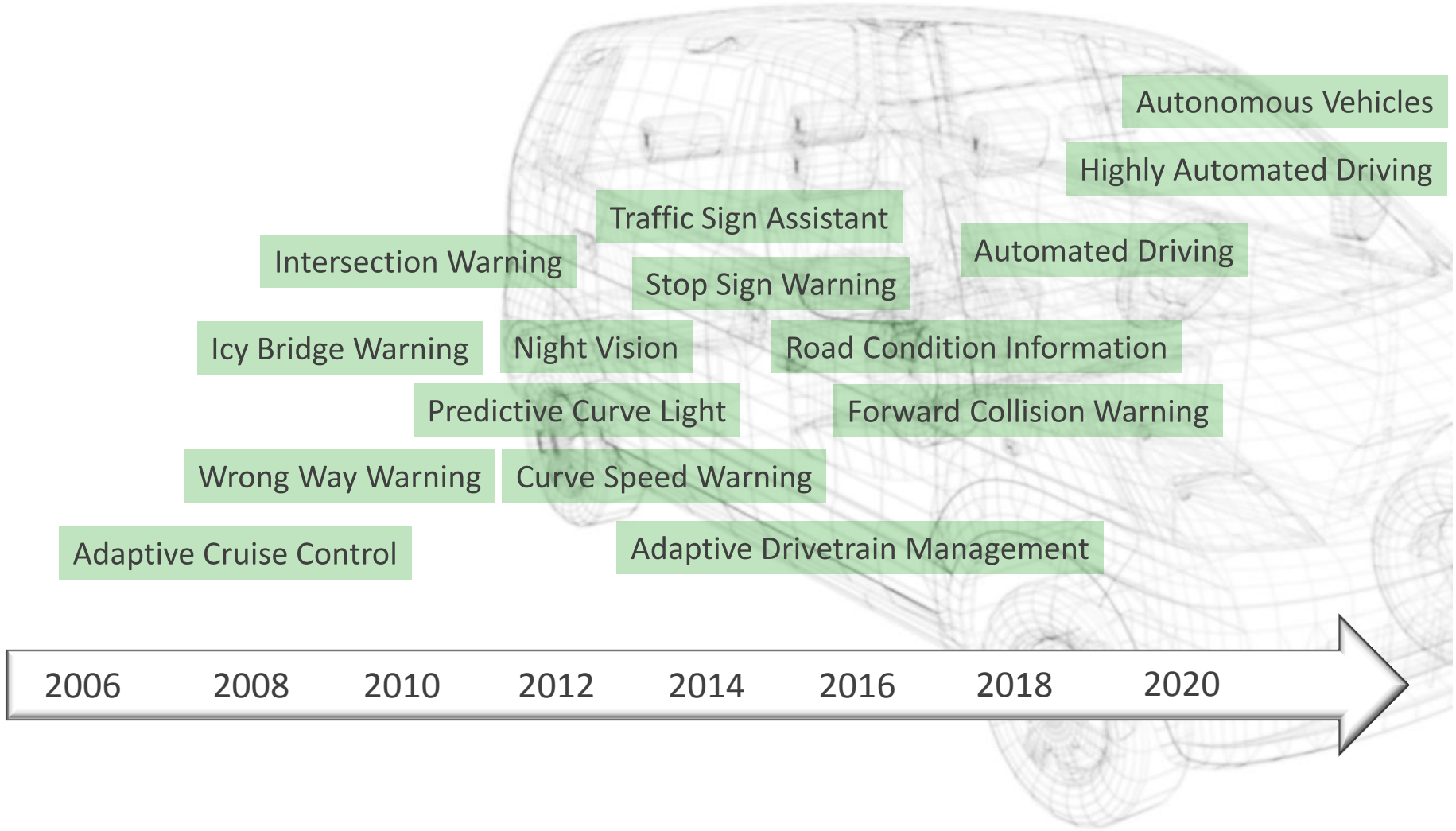
- EB tresos – integrated ECU software and tools, based on AUTOSAR standards
- Complete solutions for: basic software, functional safety, automotive security
- Test & Analyzing solutions
- Functional Safety consulting

Driver Assistance software and services

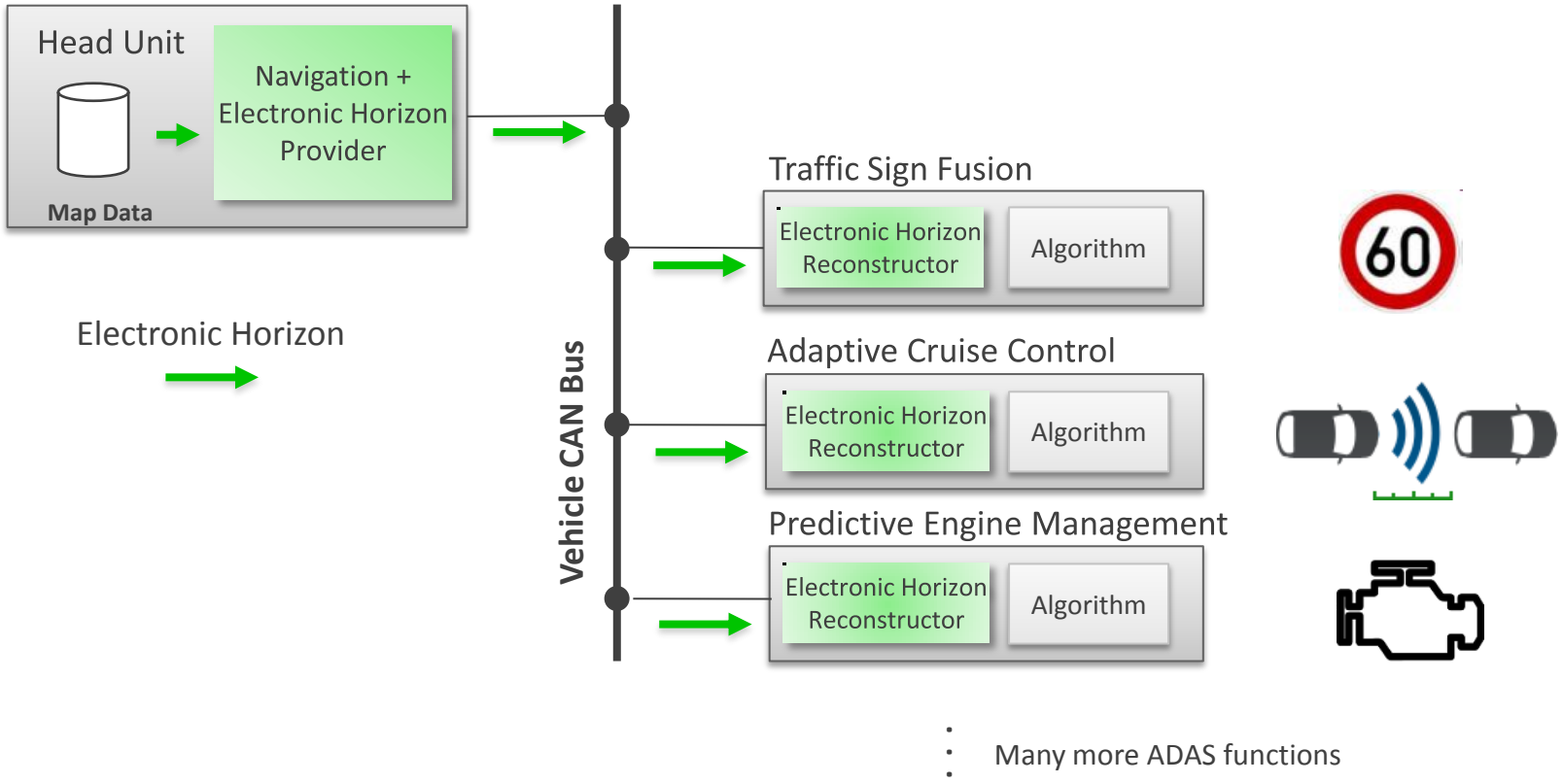
- Software development for driver assistance functions
- Electronic horizon and test drive recording solutions
- Driver Assistance modules and algorithms

Elektrobit

ADAS using map data



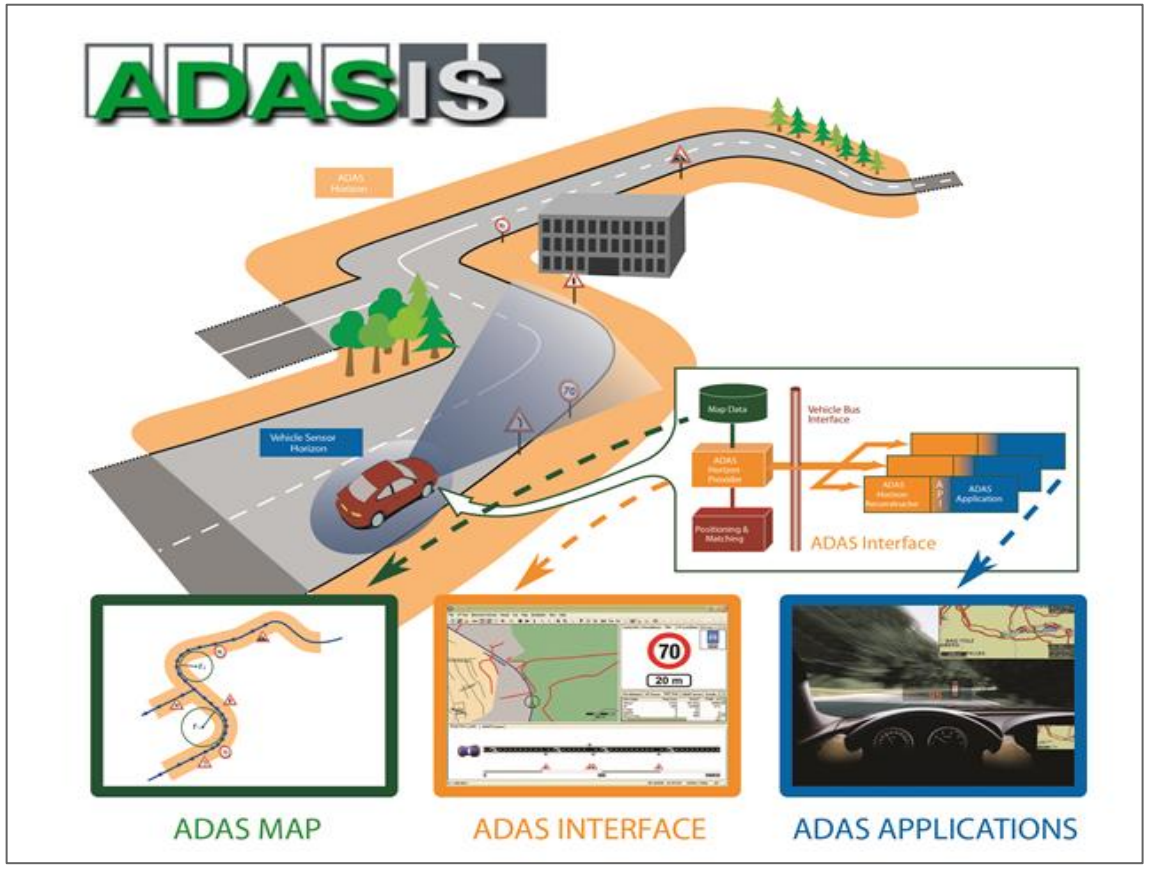
Navigation & Driver Assistance



ADAS Interface Specification

Forum Members

AISIN AW, Alpine, Autonavi, BMW, CTAG, Continental Automotive, Daimler, Denso, dSpace, Elektrobit Automotive, FORD, Garmin, HERE, Honda, Hyundai Motor Company, Honda, Ibeo Automotive Systems, Intermap Technologies, IPG Automotive, Jaguar Land Rover, MA-COM Technology Solutions, Mitsubishi Electric Automotive Europe, Navinfo, NNG, Opel, Panasonic, Renault, Robert Bosch Car Multimedia, TeleNav, Tom Tom, Toyota Motor Corporation, TRW, Valeo, Volkswagen, Volvo Car Corporation, VTEC, Zenrin.



Source: adasis.ertico.com

Elektrobit

Curve Speed Warning (CSW) - Project timeline

Project Start

3 months

Prototype for test driving

3 months

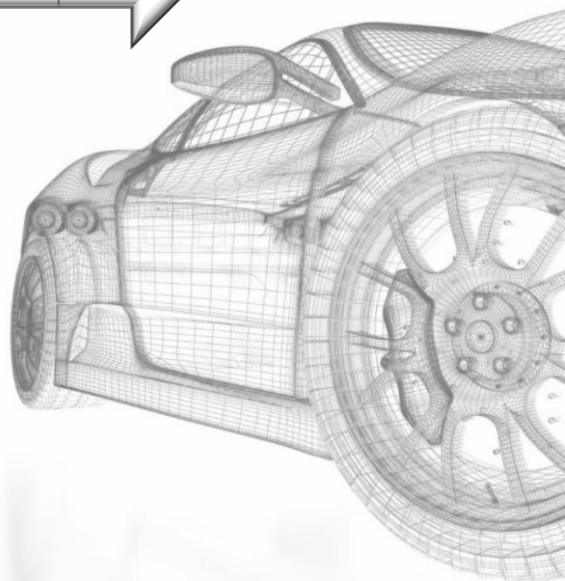
Feature complete

3 months

Release and start of production

Curve Speed Warning

- warns the driver when approaching a turn too fast
- uses ADASISv2 electronic horizon data
- sends warnings to infotainment system and/or cluster instrument



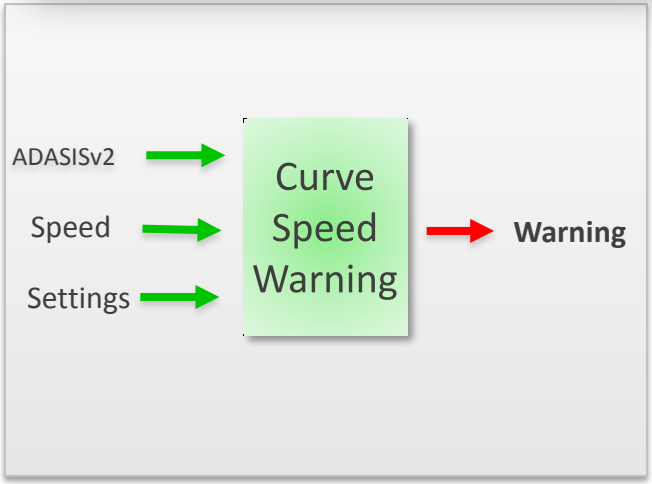
Curve Speed Warning (CSW) - Concept

General Concept

- Find locations with tight curvature along the path
- Calculate safe speed for the locations
- Track actual speed and distance to locations
- Throw warning and/or recommended speed

Development Concept

- Write CSW function in MISRA C
- Wrap function in EB Assist ADTF filter for simulation and rapid prototyping
- Communication via CAN bus
- Record test drives to generate test cases



Elektrobit

Step 1: Simulation

EB Assist ADTF

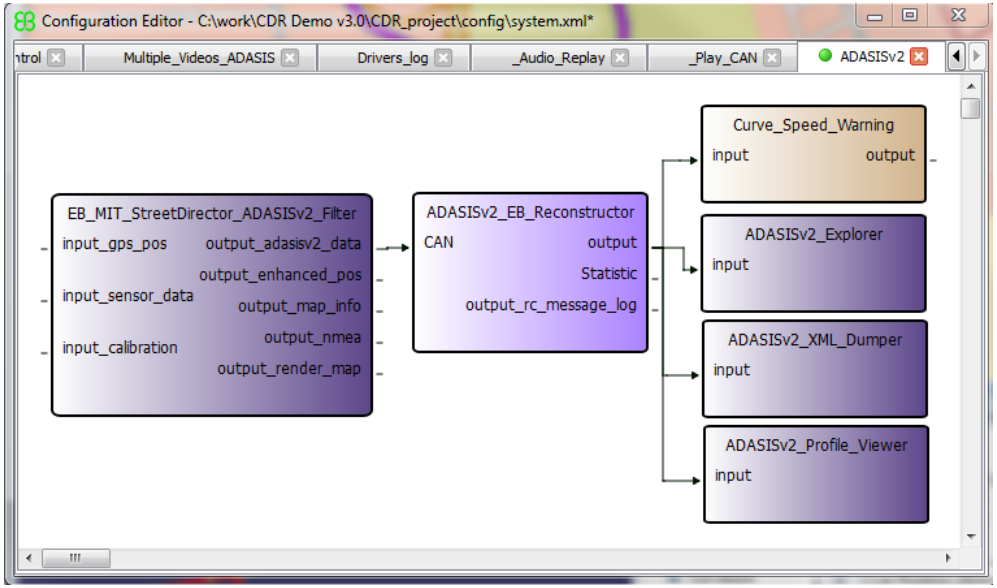
- Map Information Toolbox with Provider
- ADASISv2 Reconstructor Toolbox
- Curve Speed Warning written in C / C++

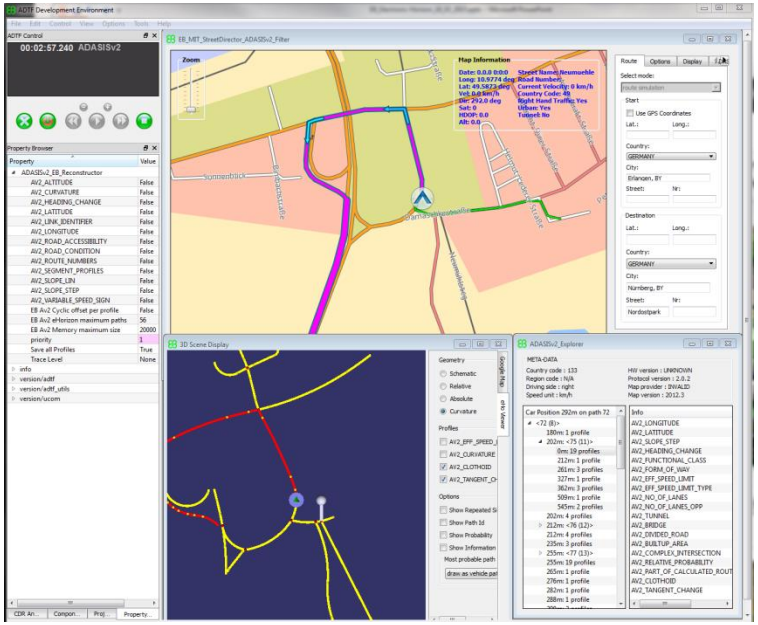
Simulation Mode

- Enter start and destination
- Navigation uses default speed per street type
- Or: Replay recorded or generated GPS trace

Analyze ADASISv2

- Viewer -> Geometry
- Explorer -> Detailed data
- Dumper -> Data snapshot for comparison

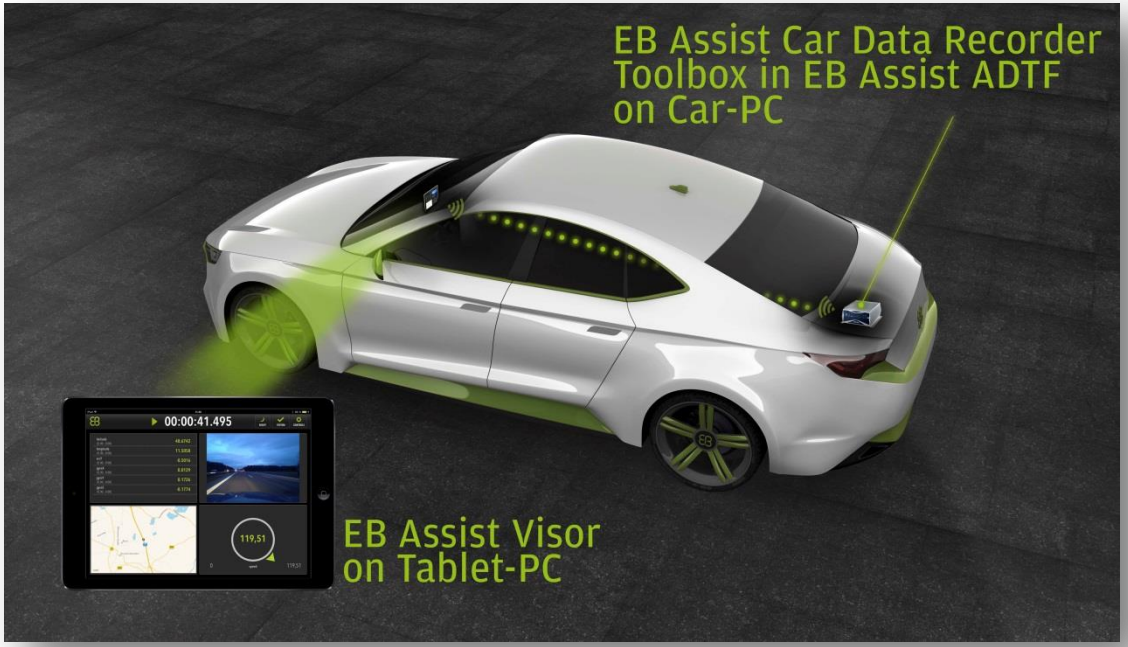




Step 2: Test drive using a Car-PC

Latest technology and flexible architecture

- Run everything in one box
  - ADTF development environment
  - ADASISv2 Horizon Provider
  - ADASISv2 Reconstructor
  - Curve Speed Warning
  - Warning interface prototype
  - Test drive recording



Elektrobit

Step 2: Test drive using a Car-PC

ADASISv2 toolchain
and Curve Speed Warning
in action

Step 3: Rapid prototyping using MicroAutoBox

Visualization
on iPad tablet

dSPACE MicroAutoBox running CSW

Integrated PC running EB Assist ADTF

Step 4: Testing function on ECU

Visualization
on iPad tablet

Curve Speed Warning
running on embedded hardware

Test drive recording with Car-PC
and EB Assist ADTF

Elektrobit

Step 5: Testing ECU on HiL

Replay test drive with Lab-PC and EB Assist ADTF

HiL system

Curve Speed Warning running on embedded hardware

Elektrobit

EB Assist ADTF and the ADASISv2 Toolboxes for flexible implementation of predictive driver assistance features

Quick and flexible setup let you focus on developing your function

All electronic horizon software modules are available for **target ECUs**

One toolchain covers the complete development cycle

Thank you!

Elektrobit

Contact us:
automotive.elektrobit.com
Juergen.Ludwig@elektrobit.com