

BASELABS Create Embedded

Data Fusion Development for Automated Driving Functions up to Series Production

What is BASELABS Create Embedded?

BASELABS Create Embedded* is a software solution for the fast and efficient development of data fusion systems for automated driving functions in embedded systems. The tool contains fusion algorithms that combine data from radar, camera and LiDAR sensors. The resulting object fusion provides a uniform object list of the vehicle environment and serves as an input for path planning and decision algorithms. BASELABS Create Embedded makes it possible for the first time to take over the developed sensor data fusion directly for production ECUs.

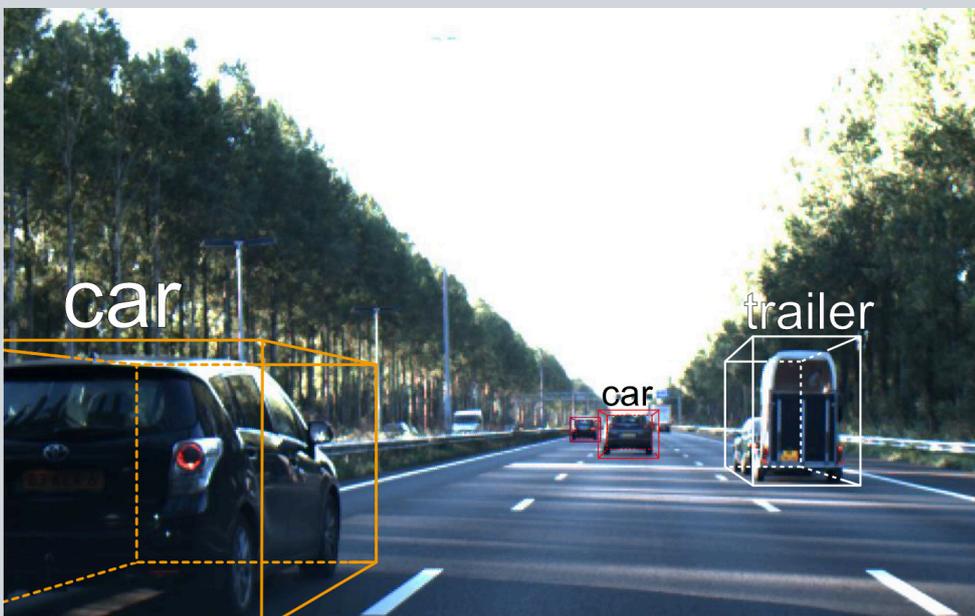
Overview of Advantages

- > Consistent solution for all development stages
- > Ready for series production
- > Generated source code compliant with Automotive SPICE
- > Fully documented development process: consistent, traceable and verified
- > Complete test coverage and code verification
- > Optimized workflow with vADASdeveloper from Vector and the middleware Robot Operating System (ROS)
- > Fully compatible with AUTOSAR Classic and Adaptive

- > Supports all relevant automotive sensors like radar, camera and LiDAR
- > Dynamic object fusion for automated driving functions such as AEB, ACC and Highway Pilot
- > Scalable from radar-camera front fusion up to 360° object fusion using multiple radars, cameras and LiDAR sensors
- > C source code available for all common hardware platforms
- > Graphical configuration
- > Easy adaption of data fusion applications to different sensor setups or types

Application Areas and Driving Functions

- Best support for the development of all autonomy levels:
- > SAE Level 0-3: Autonomous Emergency Braking (AEB), Adaptive Cruise Control (ACC), Forward Collision Warning
 - > SAE Level 3-5: Object fusion as part of a diverse redundant safety architecture, e.g. ASIL D decomposition



The data fusion combines detections and objects from all configured sensors to provide a unified object list of the vehicle's surroundings. For each object, quantities like position, velocity and classification are determined. The data fusion eliminates individual sensor weaknesses like limited lateral or longitudinal accuracy, limited detectability or false positives.

From Pre-Development to Series Production

BASELABS Create Embedded makes implementing data fusion systems much faster and more efficient. The resulting C source code can be used along the entire development chain - from pre-development through embedded prototyping to the ECU for series production. The powerful software enables the safety-compliant development of data fusions, including documentation and testing of safety-related use cases. This drastically reduces the development effort.

Elements of BASELABS Create Embedded

> **Data Fusion Designer and Generator**

With the data fusion designer, radar, camera and LiDAR sensors of a vehicle setup are configured, customized and parameterized. A specific object fusion system is generated from this configuration.

> **Data Fusion Reference Architecture**

The integrated reference architecture for object fusion allows for building data fusion applications ranging from two sensor systems to large 360° setups with many sensors. The architecture can be customized and extended.

> **Full Middleware Compatibility**

The middleware compatibility enables execution on many platforms and in runtime environments such as AUTOSAR Classic/Adaptive as well as vADASdeveloper or ROS.

> **Data Fusion Library for Embedded Systems**

The integrated data fusion library contains algorithms to build custom object fusion systems such as:

- > Numerically stable Kalman filters
- > Data association methods
- > Sensor models
- > Existence probability handling
- > Track management algorithms

The C source code of the library is fully accessible and ready for embedded platforms:

- > Compatible with common embedded platforms such as Aurix 2G, Renesas RH850 and ARM Cortex-R52
- > Low CPU load and memory consumption
- > Customizable and extensible
- > Readable code comparable to manual implementation
- > MISRA-C:2012 compliant
- > No dependencies to external libraries

More information:

www.vector.com/create-embedded

www.baselabs.de/create-embedded

* A product of BASELABS GmbH. Vector distributes the software as part of its ADAS product portfolio.

