

VIRTUAL SIMULATION FRAMEWORK FOR RADAR-CENTRIC PERCEPTION

About Aptiv

We believe that mobility has the power to change the world and Aptiv has the power to change mobility. We were the first to deploy radar on a vehicle in 1999 for Adaptive Cruise Control. Since then, we've had many other industry firsts, which are helping the industry realize safer and more convenient mobility solutions.

AI/ML Gets the Most From Radar

Today, we can take automotive radar even further. By enhancing radar with Artificial Intelligence (AI) and Machine Learning (ML), Aptiv has developed a groundbreaking radar-based object-classification system.

Virtual Simulation with Software-in-the-Loop

It is expensive and time-consuming to load software into a vehicle and test-drive it for the potentially hundreds of thousands of miles needed to make sure the software works in all driving conditions. Software-in-the-Loop (SIL) is a method of testing code in a simulation environment to quickly and cost-effectively catch bugs and improve the quality of the code. SIL is particularly important in the automotive industry

as OEMs move toward building software-defined vehicles that enable features through software.

The effectiveness of SIL is dependent on the quality of the modeling software and the test cases developed to simulate driving conditions. Aptiv has developed simulation frameworks that integrate sensor models, automated driving algorithms and logging tools that enable the recording and the visualization of the environment, sensor data, performance of the algorithms and vehicle in the scene. This enables us to create accurate test cases to evaluate the software-defined vehicles in a virtual environment. The result is faster time to market for key industry applications.

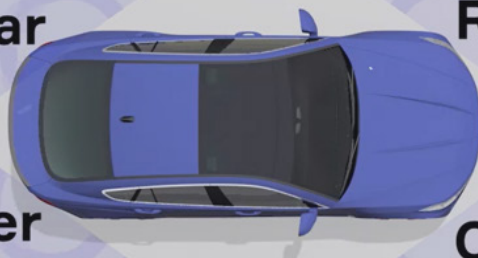
Aptiv in Hi-Drive

One of the goals of the Hi-Drive EU project is to define and implement technology enablers, targeting defragmentation and extension of the Operational Design Domain for different automated driving functions. Aptiv contributed to this goal by enhancing the perception capabilities through machine learning, and it provided a virtual simulation with software-in-the-loop as long as a full equipped vehicle for testing.

A radar-centric approach to ADAS offers the broadest possible operating performance

Corner
Radar

Corner
Radar

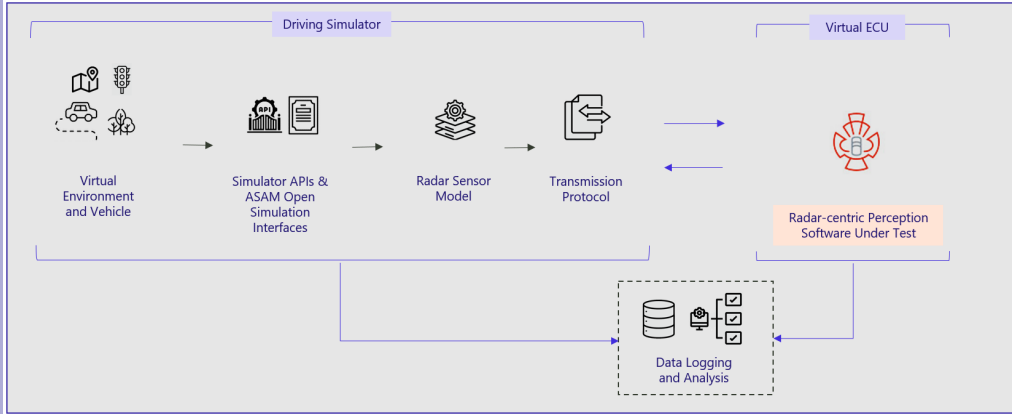


Corner
Radar

Corner
Radar

Forward-Facing Radar

Virtual Simulation Framework developed in Hi-Drive



The Aptiv virtual simulation framework for testing radar-centric perception stack is composed of a virtual Driving Simulator and a Virtual ECU, which executes the software components.

The driving simulator includes a virtual environment and a vehicle, a simulator API and an ASAM Open Simulation Interface (OSI) layer, an enhanced high-fidelity radar model and a transmission protocol.

The Aptiv virtual simulation framework helps engineers create new perception features and test them at an early stage of their development.

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PROJECT FACTS

Budget € 60 million | Funding € 30 million | Consortium 53 partners | Involvement 13 countries | Timeline July 2021 – June 2025 | Project coordinator Aria Etemad, Volkswagen Group Innovation, aria.etemad@volkswagen.de | LinkedIn company/hi-drive | Twitter @_HiDrive_ | www.hi-drive.eu



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