

# Hybrid Powertrain Engineering and Driveability Evaluation with AVL-DRIVE

## Market Requirements

Increased crude oil prices and legislations have paved the way for the market introduction of Hybrid Electric Vehicles (HEV). Meanwhile, a wide selection of various hybrid configurations is on the market or under development. Customer expectations do not only concern better fuel consumption; they also apply to performance and driving enjoyment. This leads to enhanced functionality and complexity of hybrids compared to conventional powertrains. Thus, an intensive evaluation and calibration of driveability-relevant criteria is required.

## AVL Approach

AVL is committed to integrating and optimizing HEV powertrains by combining its know-how in engine and transmission engineering, simulation technologies and test systems. AVL acts in very close cooperation with OEMs and hybrid component suppliers to develop hybrid-specific criteria concerning driveability. This strength is utilized to create an objective driveability evaluation. Various assessments and benchmarks have been carried out to validate the requirements.

The AVL logo, consisting of the letters "AVL" in a bold, sans-serif font, is centered within a white square. This square is part of a larger graphic design of overlapping white squares and lines on a dark blue background.

## AVL-DRIVE HYBRID

### AVL Offer Package

AVL provides a tool for objective analysis of driveability in HEV powertrains. AVL-DRIVE for Hybrids is based on the conventional version of AVL-DRIVE and allows a hybrid-specific vehicle evaluation. Additionally AVL offers HEV powertrain engineering, testing and calibration support.

### AVL-DRIVE for Hybrid Technology

- Continuous data flow and data logging
- Automatic operation mode detection, e.g.
  - Regenerative braking
  - Acceleration/boost
  - Engine start (vehicle moving or at standstill)
  - Engine shutoff (vehicle moving or at standstill)
  - Pure electric vehicle launch
  - Drive away engine running/engine off
  - Power management failure
- Automatic calculation of identification parameters
- Objective assessment of vehicle's Driveability
- Various applications for full hybrids, mild hybrids and micro hybrids

### Engineering Services

- HEV benchmarks and assessments
- Creation of benchmarking plans
- Evaluation of driveability-relevant functionalities
- Optimisation of driveability
- Calibration of whole powertrain including engine, transmission and e-drive
- Documentation of hybrid-specific strategies

### AVL Strength

- Over fifteen years of experience in hybrid development
- Profound knowledge about driveability evaluation
- Engine, transmission and e-drive know-how
- Experience in energy management and hybrid controls

### Customer Benefits

- Fast and objective HEV driveability evaluation
- Easy comparison of different calibrations
- Efficient documentation of the development process
- Common criteria for different architectures (power split, parallel, serial)
- Straightforward troubleshooting
- Reduced testing and engineering costs

