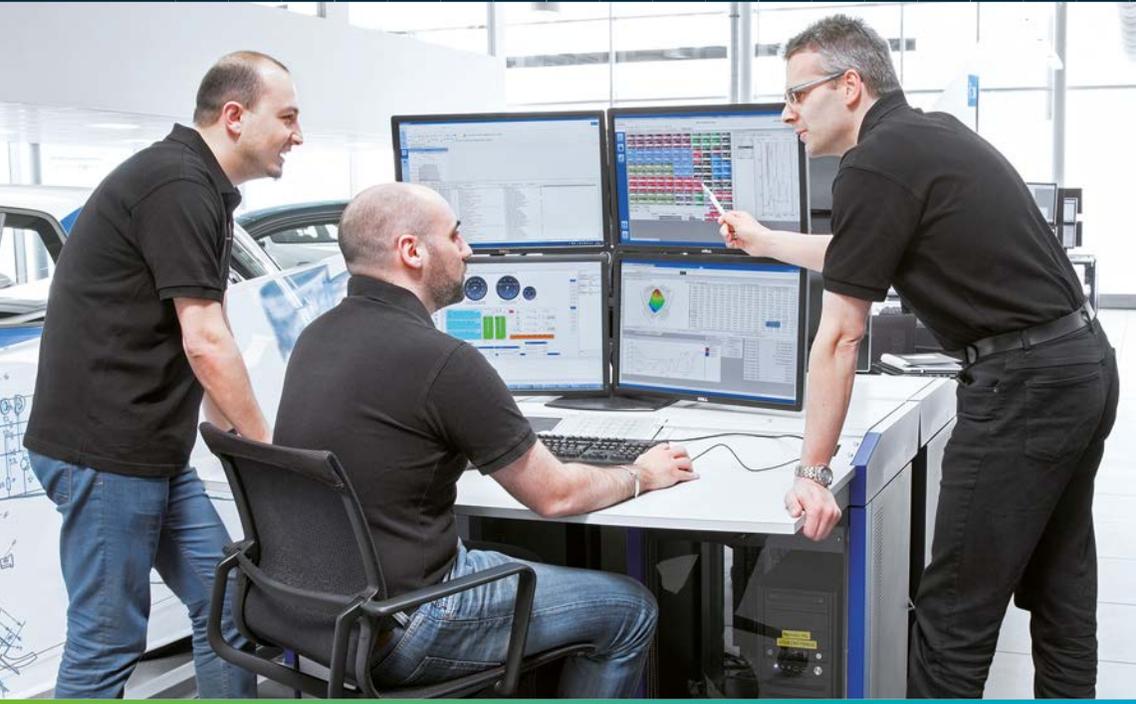




AVL VIRTUAL TESTBED™

Calibrate beyond the limits





AVL Virtual Testbed™ – Calibrate beyond the limits

THE CHALLENGE

Calibration Complexity

The increasing vehicle diversity, combined with a multitude of worldwide emissions regulations, the future introduction of RDE (Real Driving Emissions) and the hybridisation of vehicles is leading to significantly increased development requirements and efforts.

Meeting these stringent demands with conventional methods typically requires the need for additional test facilities: Engine & Vehicle Test Environments, Test & Validation Vehicles. In particular, calibration under extreme environmental conditions such as high altitude and extreme environmental temperatures (typically -30 to 40 degrees) requires the utilisation of expensive climatic test chambers.

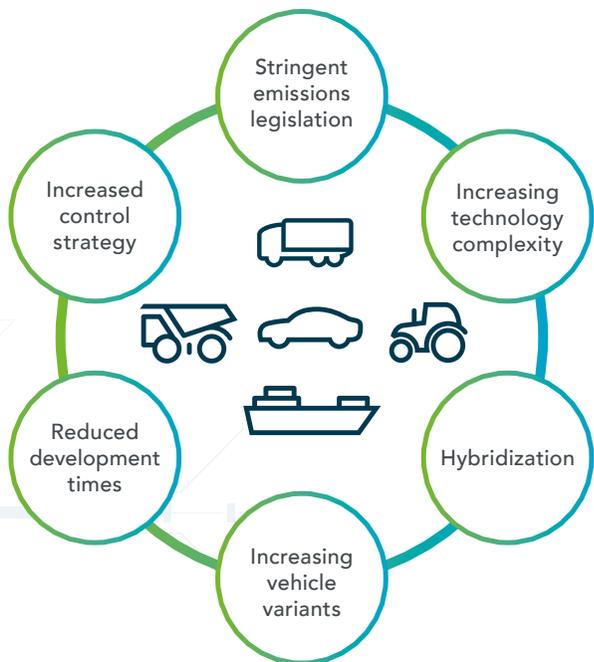
To maintain competitive development times and costs despite the increasing complexity and test requirements, new methodologies are needed to ensure an efficient, reliable and flexible approach.

THE ADDED VALUE

- Maximum reproducibility of testing conditions
- Significant cost and time savings throughout the development process
- Early issue detection
- Integrated development environment: lab – testbed – road
- Improved calibration quality
- Common platform: Same user experience from road to virtual environment

AVL has developed a virtual calibration solution as an efficient way of responding to these challenges. This approach enables calibration development which is traditionally conducted in the real test environment to be transferred to its digital twin – the AVL Virtual Testbed™. A virtual powertrain with real xCU is running on a virtual test environment.

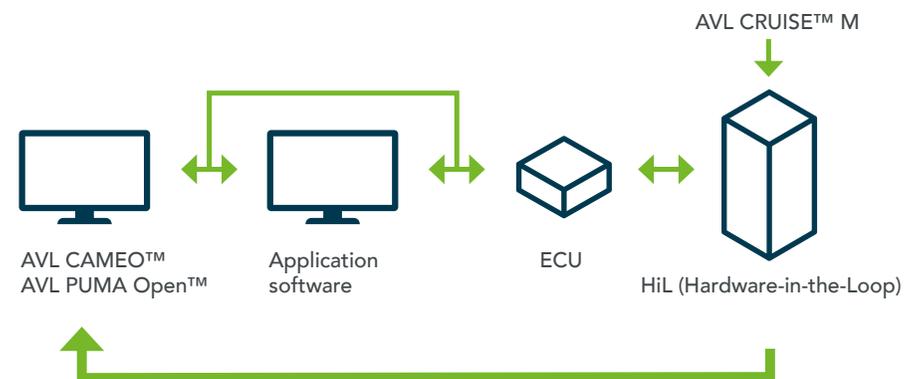
Challenges in Calibration



A common platform for calibration engineers (real to virtual)

THE AVL SOLUTION

The AVL Virtual Testbed™ makes the model based development and calibration approach easy to access and implement into the development process for the calibration engineer. The AVL Virtual Testbed™ provides a turnkey solution for virtual calibration with a consistent user experience.



The central components of the platform between real and virtual environments

SOLUTION OVERVIEW

AVL Virtual Testbed™:
Extension of real testing facilities to
perform virtual calibration development



Application software

AVL PUMA Open™ & AVL CAMEO™ testbed automation delivering identical interface for the calibration engineer as on real testbed

Integration of customer specific models and establish 3rd party simulation platforms

AVL SANTORIN HOST™ server connection, storing simulation results in same format as real test data

AVL CRUISE™ M & MOBEO Advanced semi-physical powertrain model



CONNECTING THE REAL & THE VIRTUAL WORLDS

THE AVL SOLUTION

The AVL Virtual Testbed™ is a digital twin of the real testbed and an advanced Hardware-in-the-Loop test system, which is enhanced with powerful semi-physical powertrain models. Coupled with test automation, central data management and application software – it provides the same user experience and platform as a conventional testbed.

This ensures a seamless shift from the real engine testing environment to virtual testing environment.

Key Aspects:

- Flexible and modular approach for virtual powertrain calibration
- Proven since 2010
- Seamless transition from real to virtual environment
- Significant cost and time savings throughout the development process

AVL VIRTUAL TESTBED™ - "THE DIGITAL TWIN"



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