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

• Significant cost and time savings throughout the development process
• Improved calibration quality
• Maximum reproducibility of testing conditions
• Integrated development environment: lab – testbed – road
• Early issue detection
• Common platform: Same user experience from road to virtual environment
AVL Virtual Testbed™ – Calibrate beyond the limits

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

- Stringent emissions legislation
- Increased control strategy
- Increasing technology complexity
- Hybridization
- Reduced development times
- Increasing vehicle variants

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.
SOLUTION OVERVIEW

AVL Virtual Testbed™:
is an advanced hardware-in-the-loop
testbed extended with:

dSpace or ETAS
pre-configured HiL System
with AVL specified extensions

Advanced semi-physical powertrain
model (MoBEO, CRUISE M, customer
specific models)

AVL CRETA™ dataset manage-
ment to store and share the
DCM calibration VTB

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

AVL CONCERTO™ post-processing
using same layouts & scripts for
data analyzing

AVL SANTORIN HOST™ server connection,
storing simulation results in same format as
real test data
CONNECTIONG 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:
- Proven since 2010
- Seamless transition from real to virtual environment
- Flexible and modular approach for virtual powertrain calibration
- Significant cost and time savings throughout the development process

Virtual Testbed – “The digital twin”

Base Calibration

Run it like one

Variant Calibration

Same User Experience

Same Models
Same Tests
Same Tools
Same Data Storage
Same Analysis