AVL Simulation Suite 2024

The AVL product team announced the release of **AVL Simulation Suite** . This suite offers comprehensive simulation solutions covering multi-physical component and system simulation requirements and thus enables engineers to efficiently develop clean and energy-saving powertrain concepts as a powerful backbone of the development process.

AVL's Integrated and Open Development Platform (IODP) is a strategic orientation to bridge the gap between the virtual and the real worlds. Model.CONNECT has been designed to integrate virtual and real components to create and test consistent vehicle prototypes along the whole development process.

- Independent, open, tool/model free
- Connect models with hardware
- Local and distributed co-simulation
- Compensating coupling errors
- Fully supporting interface standards and customized wrappers

With decades of experience, AVL provides a wide range of solutions for developing and testing modern powertrain systems, from test beds for optimizing internal combustion engines, to test systems for all components in an electrified powertrain, to roller testbeds for full vehicle development and testing. AVL is the only company in the world to combine competence in powertrain design with compe-tence in state-of-the-art measurement and testing technology. Many instruments and test systems are already based on the AVL Open Development Platform, which considerably boosts the ef-ficiency of the testing process. Using numerous shared software and hardware technologies, AVL test systems delivers consistent, comparable results that significantly help lower development times and costs. This makes them an ideal, integrated tool chain for de-veloping efficient and environmentally friendly powertrains.

The unique power of AVL Advanced Simulation Technologies is derived from the systemic netting of single simulation results to integrated, multidimensional simulation platforms on the basis of AVL's deep engineering expertise. Those simulation platforms address the key tasks of the powertrain development process. The close loop with measurement enables a very early verification of testing data and the significant reduction of test efforts. Used on their own, or combined with other methodologies and third-party tools, they support OEMs in the creation of market-leading products that meet global legislation:

AVL BOOST is a fully integrated IC engine simulation software. It delivers advanced models

enabling accurate prediction of engine performance, tailpipe emissions and acoustics.

AVL CRUISE is a flexible vehicle driveline simulation solution, supporting a wide range of applications. These include the analysis of the powertrain concept in the office environment as well as real time applications, such as Hardware-in-the-Loop (HiL), Software-in-the-Loop (SiL) and testbed plant models.

AVL CRUISE M is a multi-disciplinary vehicle system simulation tool. It can be used in the office for powertrain concept analysis, sub-system design and virtual component integration. Alternatively it can be put to use in HiL (Hardware-in-the-Loop) environments for control function development and in testbed environments.

AVL EXCITE is an innovative rigid and flexible multi-body dynamics software solution for powertrain analysis. This powertrain development tool calculates the dynamics, durability, vibration and acoustics of combustion engines, transmissions and entire ICE-based or electrified powertrains.

AVL FIRE is the leading computational fluid dynamics (CFD) simulation package for the Internal Combustion Engine. And in the era of new drive technologies, it is a powerful tool in the development of major components in the electrified powertrain. Designed to accurately simulate relevant physics and chemistry, it has a wide range of uses. These include the prediction of fuel sprays, ignition, combustion and engine-out emissions as well as tailoring components of exhaust gas aftertreatment systems, but also the modelling of electrochemistry and thermal behaviour of batteries and fuel cells.

AVL FIRE M is new, unique computational fluid dynamics (CFD) simulation solution supporting the development of both conventional and electrified powertrains. FIRE M offers cutting edge turbulence modelling accounting for the complexity of real flows and grid independent heat transfer modelling, enabling the accurate computation of single and multi-phase flows, heat transfer between arbitrary fluid and solid domains and temperatures in structures. It also allows computing electromagnetic fields and the electro-thermal behavior of batteries. The generation of computational models is possible with little effort.

AVL TABKIN is a powerful combustion module enhancing CFD simulation results whilst shortening turn-around time. Chemistry tabulation is the most cost-effective way to include detailed chemistry in CFD simulations. AVL TABKIN embodies more than a decade of experience with chemistry tabulation for combustion applications.

Model.CONNECT improves development efficiency by interlinking simulation models into a consistent virtual prototype. As part of our integrated and open development platform, it achieves this regardless of the tools they were created with. Model.CONNECT empowers informed decision-making by connecting models and know-how from different departments in a secure and reproducible way. It can be used in a wide range of development projects, and is ideal in areas such as thermal management, RDE, vehicle dynamics and ADAS/AD.

AVL SPA is the ideal solution to assess and optimize driveability and shift strategy offline, using more than 30 objective assessment criteria for a detailed analysis. AVL SPA visualizes the effects of calibration changes, which allows you to easily control the brand-specific driveability of a single vehicle or the entire fleet. It reduces workload and manpower requirements as well as the need for prototype vehicles and environmental tests. Thus, SPA increases product quality while reducing time and cost.