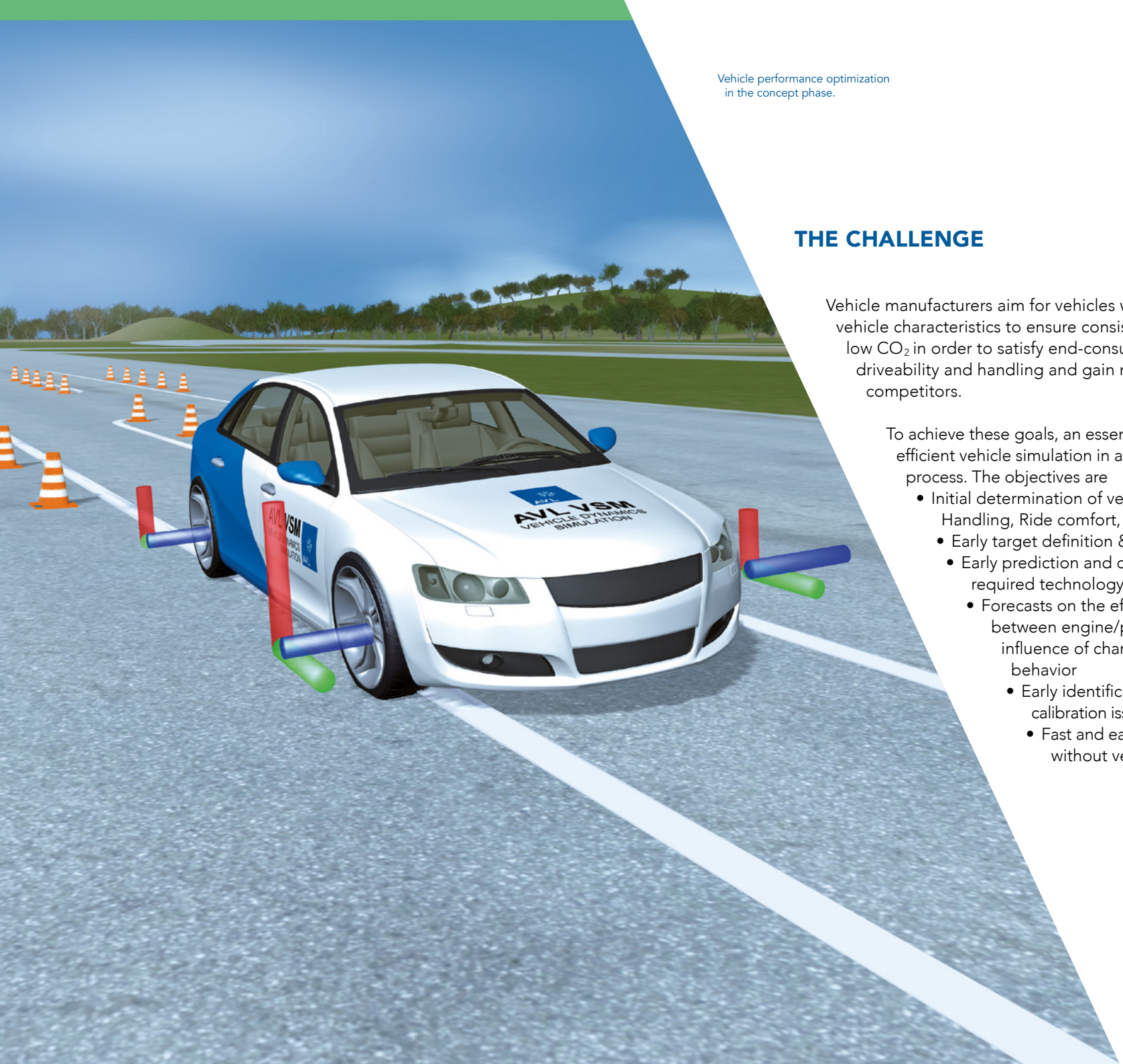
AVL VSM 4™

Efficient driving pleasure

AVL



Vehicle performance optimization in the concept phase.

THE CHALLENGE

Vehicle manufacturers aim for vehicles with strongly branded vehicle characteristics to ensure consistent driving pleasure with low CO_2 in order to satisfy end-consumer requirements for driveability and handling and gain market position against competitors.

To achieve these goals, an essential step is accurate and efficient vehicle simulation in all phases of the development process. The objectives are

- Initial determination of vehicle attributes: Driveability, Handling, Ride comfort, Performance, Lap time
- Early target definition & chassis development
- Early prediction and optimization of the required technology
- Forecasts on the effects of the interaction between engine/powertrain/vehicle and the influence of changes on the vehicle target behavior
- Early identification of design and calibration issues to avoid design changes
- Fast and easy calibration and validation without vehicle prototypes

THE AVL SOLUTION

AVL VSM 4™ (Vehicle Simulation Model) is a comprehensive vehicle dynamics simulation package that predicts vehicle behavior precisely and enables improvement of various vehicle attributes from the initial concept to the testing phase. The non-linear multi-body approach allows for accurate representation of longitudinal, lateral, and vertical dynamic effects in office simulation and several real-time test environments. Combined with powerful execution add-ons (multicore calculation or cloud computing) and convenient parameterization features (maneuver designer or 3D track editor), AVL VSM 4™ supports an efficient vehicle development process consistently throughout.

Combined with AVL-DRIVE 4™ for objective vehicle assessment, AVL VSM 4™ enables frontloading of vehicle development tasks to reduce the number of prototypes, development loops and therefore costs.

3D VISUALIZATION

Real-time 3D visualization of vehicle behavior

VEHICLE MODELLING

Detailed vehicle component modelling for longitudinal, lateral and vertical dynamics

USABILITY & INTEGRATION

User friendliness through easy-to-use examples and seamless co-simulation via AVL Model.CONNECT™

MANEUVER & ROAD

Easy-to-use maneuver & track designer combined with precise and realistic driver models

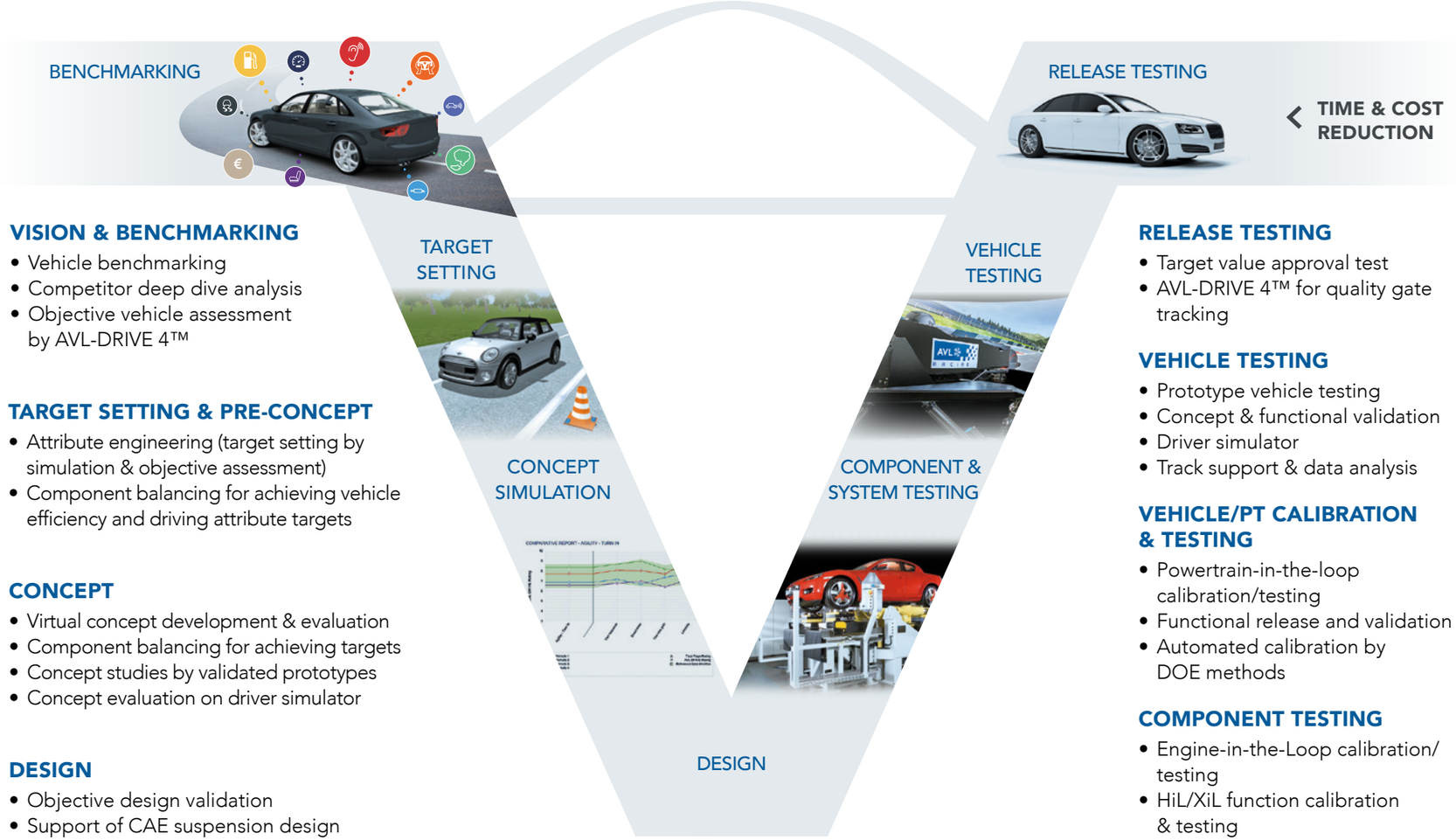
SIMULATION & AUTOMATION

Office and real-time simulation in various real-time platforms/environments

DRIVER

Precise and realistic driver models for a broad range of applications

AVL VEHICLE DYNAMICS ENGINEERING POWERED BY AVL VSM 4™



VISION & BENCHMARKING

- Vehicle benchmarking
- Competitor deep dive analysis
- Objective vehicle assessment by AVL-DRIVE 4™

TARGET SETTING & PRE-CONCEPT

- Attribute engineering (target setting by simulation & objective assessment)
- Component balancing for achieving vehicle efficiency and driving attribute targets

CONCEPT

- Virtual concept development & evaluation
- Component balancing for achieving targets
- Concept studies by validated prototypes
- Concept evaluation on driver simulator

DESIGN

- Objective design validation
- Support of CAE suspension design
- Recommendation of design changes

RELEASE TESTING

- Target value approval test
- AVL-DRIVE 4™ for quality gate tracking

VEHICLE TESTING

- Prototype vehicle testing
- Concept & functional validation
- Driver simulator
- Track support & data analysis

VEHICLE/PT CALIBRATION & TESTING

- Powertrain-in-the-loop calibration/testing
- Functional release and validation
- Automated calibration by DOE methods

COMPONENT TESTING

- Engine-in-the-Loop calibration/testing
- HiL/XiL function calibration & testing
- Automated calibration by DOE methods

POWERTRAIN DEVELOPMENT IS A TEAM SPORT

Today´s requirements in powertrain development move forward every second. Complex systems, shorter times to market and a global world of opportunities challenge you to be better, more flexible and faster than your competitors.

Development tasks aren't stand-alone. And it's not (just) about how good single individuals or tools are…

… it's about how well they work together.

AVL Team SUITE™

SUCCESS BASED ON INTERPLAY

www.avl.com/meet-the-team

COMBINE YOUR STRONG TEAM FLEXIBLY OUT OF COMPATIBLE, COMPLEMENTARY PLAYERS TO MEET YOUR NEEDS.

- AVL PUMA Open 2™
- AVL EMCON 6™
- AVL LYNX 2™
- AVL SANTORIN MX 2™
- AVL TESTLIFE 1™
- AVL CAMEO 3™
- AVL CRETA 4™
- AVL CONCERTO 4™
- AVL-DRIVE 4™
- AVL VSM 4™
- AVL ARTE.Lab 4™
- AVL InMotion 4™
- AVL IndiCom 2™
- AVL iGEM 2™
- AVL TESTGATE 1™
- AVL ISAC 6™

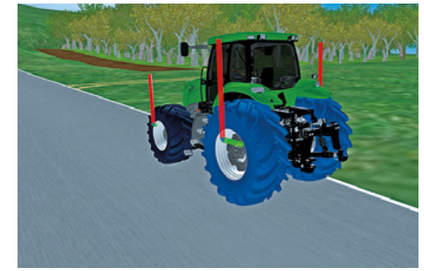
… and more joining soon

SUCCESS BASED ON INTERPLAY

OVERVIEW OF APPLICATIONS

- Driveability calibration and development in office, HiL, and engine/powertrain test beds
- Performance simulation
- Lap time optimization
- Balancing vehicle CO_2 and driving pleasure
- Handling and vehicle stability
- Steering development and testing
- Primary ride comfort optimization on virtual shaker rig
- Driver simulator
- Active chassis and suspension development
- Tractor & implement simulation
- Racing

Driveability & performance optimization on AVL high dynamic powertrain testbed



THE ADDED VALUE

- Enhance vehicle driving pleasure
- Develop brand driving characteristics
- Fulfill CO_2 legislation limits
- Increase product quality
- Save development time
- Surpass competition in driving performance
- Reduce costs

… on the basis of AVL strengths:

- Simulation & objective evaluation of many vehicle concepts in a short time
- Scalable model complexity fits broad range of vehicle dynamics applications
- Seamless models from concept to testing phase
- Definition of development targets in early development phase
- Ready-to-use examples for a broad range of applications
- Easy model integration & co-simulation by means of AVL Model.CONNECT™
- Drag & drop maneuver designing
- High dynamic development and testing in testbed environment
- Concept validation on driving simulator

FOR FURTHER INFORMATION PLEASE CONTACT:

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