

Test Systems for a Clean and Safe Environment



AIP General Presentation & New Products



Our Headquarter in the Beautiful Allgäu Welcome to Haldenwang...

Our headquarter is located in Haldenwang / Southern Germany (between Munich and the Lake Constance).

For more than 25 years, AIP has been developing, testing, and manufacturing future-oriented automotive testing systems to promote a clean and safe environment.



AIP Automotive – Member of APL Group: 8 Locations, >1.800 Employees, >240 Testbenches

AIP Automotive complements the APL Group's product line with premium-class customized vehicle systems.

APL, located in Landau (Germany, nearby Karlsruhe), is one of the leading engineering companies supporting the automotive service industry with a technological focus on power train-, engine- development and testing.

The APL-Group includes, in addition to APL GmbH, IAVF Antriebstechnik GmbH, APS-technology GmbH, the MOT

a R&D company for engine technology, optics, and thermo-dynamics mbH, the IAVF-Volke group, audit center for combustion engines (IVP) and AIP Automotive.



APL Group

■ AIP ■ IAVF ■ APS ■ IVP ■ MOT

Approx.
320
Test benches

Approx.
1800
Employees



Karlsruhe

Wolfsburg

APL
IVP

Landau

APL

Schechingen



Stuttgart

Bietigheim-Bissingen

Haldenwang



Technology- and Service Leadership is our claim ...



AIP develops and manufactures customized test systems for cars, trucks, motorcycles, special vehicles in the field of research and development, type approval and quality control at R&D and manufacturing centers of almost all major vehicle manufacturers and their suppliers locally and abroad.

A long-term close cooperation with our customers worldwide as well as a high degree of self motivation for the development of new testing systems guarantees innovative solutions for a variety of test requirements, today and in the future.

State-of-the-Art Solutions for a Wide Range of Requirements / Applications



The AIP comprehensive system solutions are of modular design and easily adaptable to various customer requirements (budget, time frame, laws and regulations, etc.).

- fast DC charging stations, battery test and simulation
- Emission- and consumption measurement, (RDE)
- Acoustic measurement (NVH), e.g. ISO 362
- Endurance testing, COP
- Performance measurement, e.g. in a wind tunnel)
- Functional testing, e.g. in climatic and altitude chambers)
- Verification electro-magnetic compliance (EMC)

- Hydraulic / Electric road drive simulation testing (shaker)
- Test automation software
- Robot driver
- Test Stand Accessories

Our company is certified:



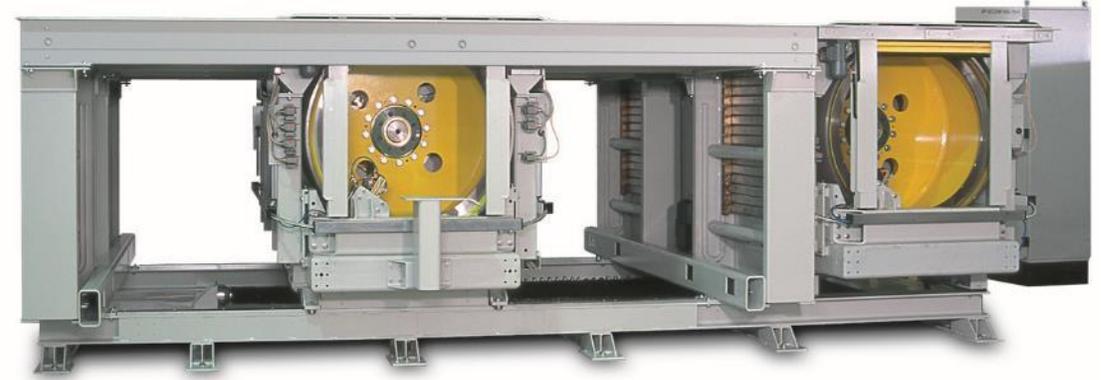
AIP customers



Our Core Product: Chassis Dynamometer in all Variations



NVH-CDM

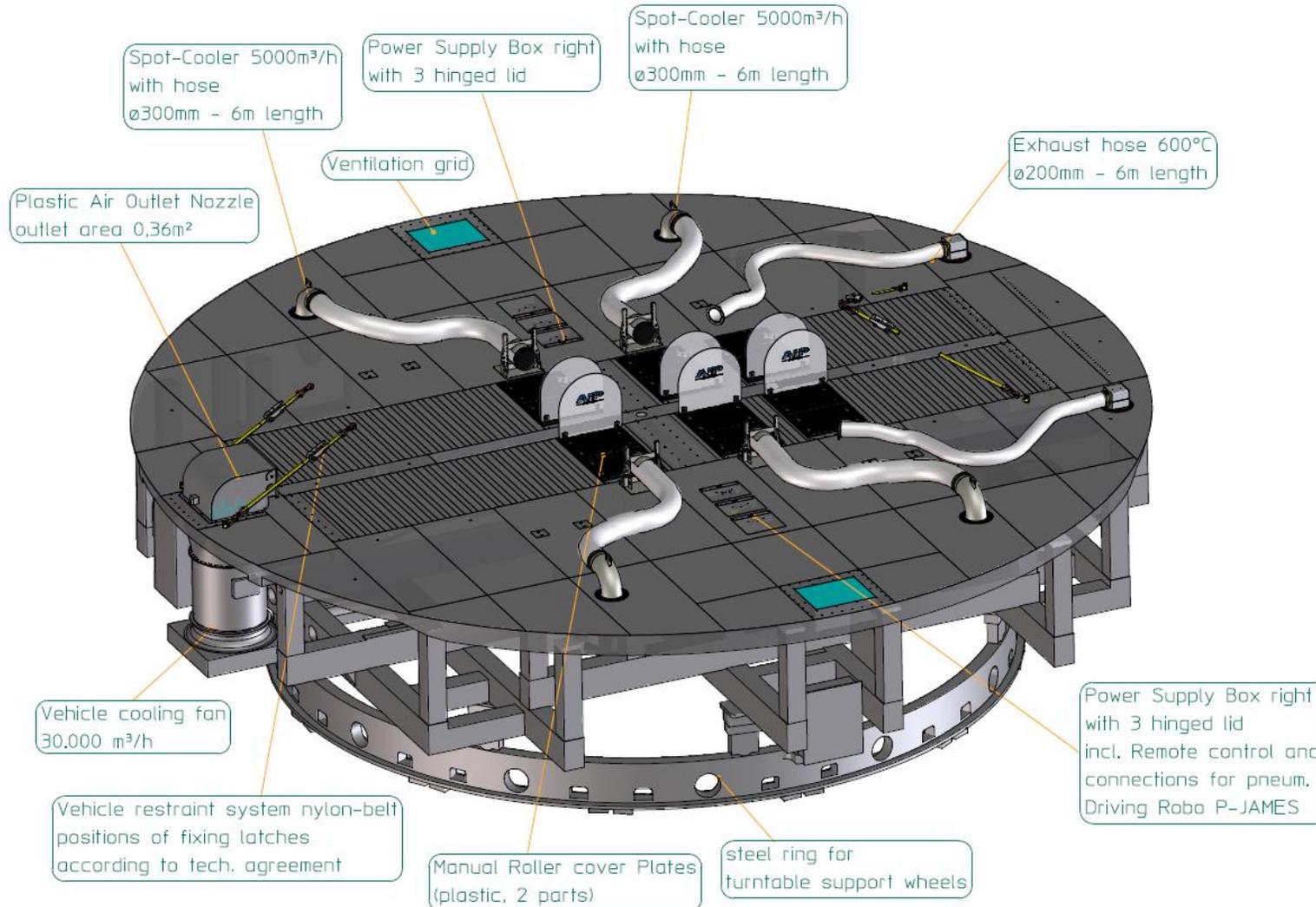


48"-CDM



EMC-CDM

New in Portfolio: AIP CDM 37.5H EMC 6x6



AIP MCS
DynoControl



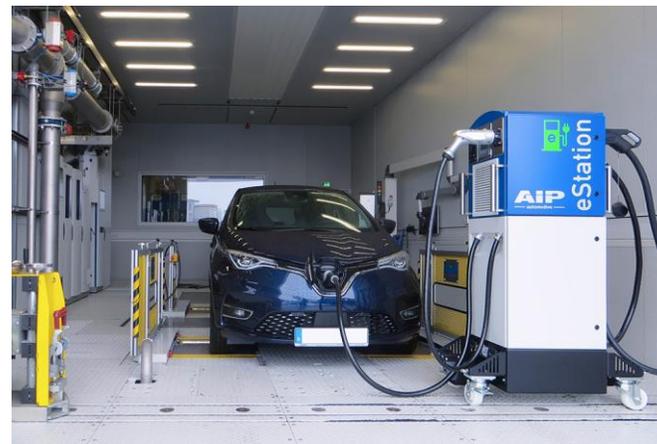
AIP
RTCU



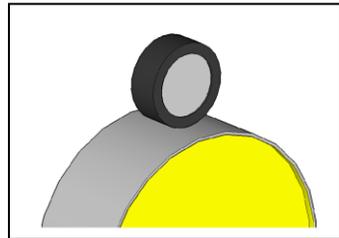
EtherCAT[®]
Technology Group

Extend the possibilities of your Chassis Dyno: Charging technology for different applications

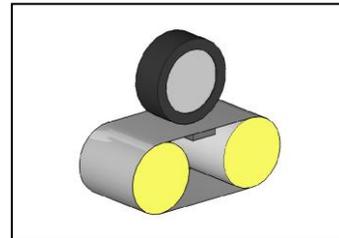
- CCS Typ1, CCS Typ2, CHAdeMO, GB/T, ChaoJi
- Bidirectional Charging (Smart Grid)
- MegaWattCharging (MCS)
- Modular and scalable architecture
- For every Application (Climate, Altitude, EMC, NVH)
- Power distribution for up to 4 DC-outputs
- Extended Charging Surveillance Functions



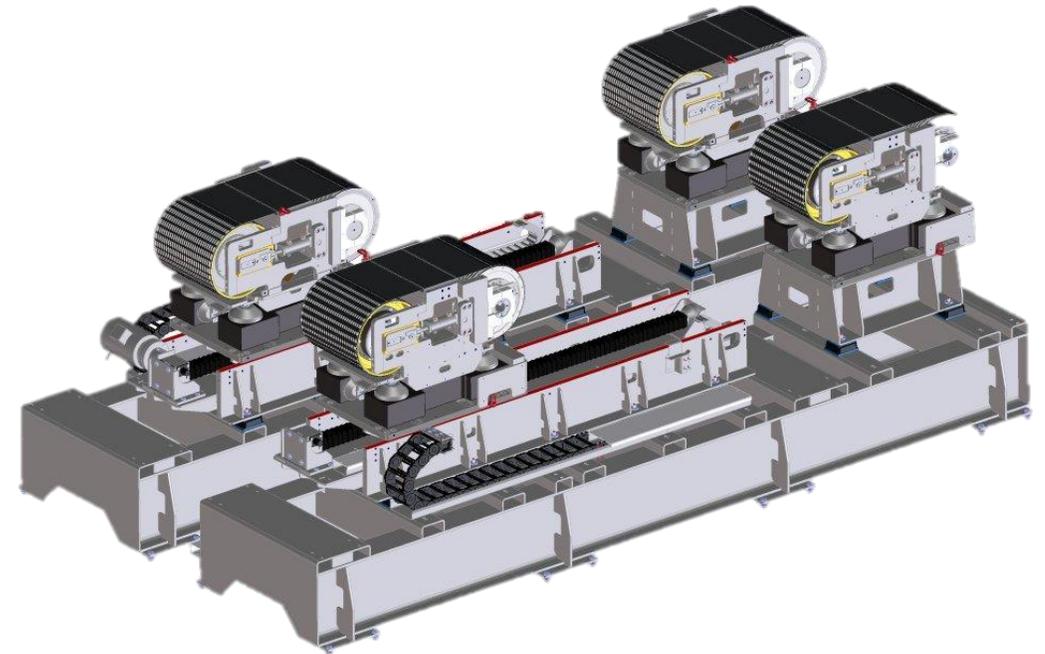
Newton Finder: Flat Belt Test Bench for Determination of Driving Resistance Coefficients



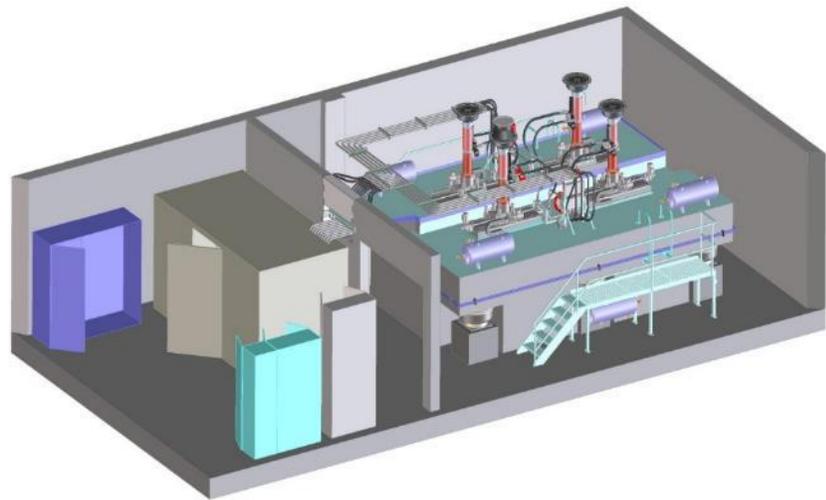
Roll



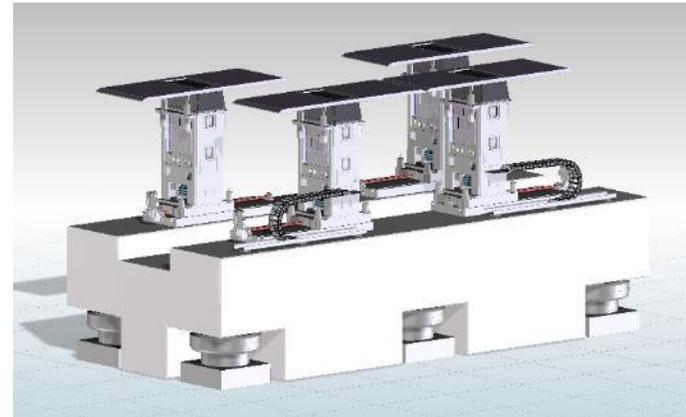
Flat Belt



New ways of pulsing: E-Pulser instead of Hyd-Pulser



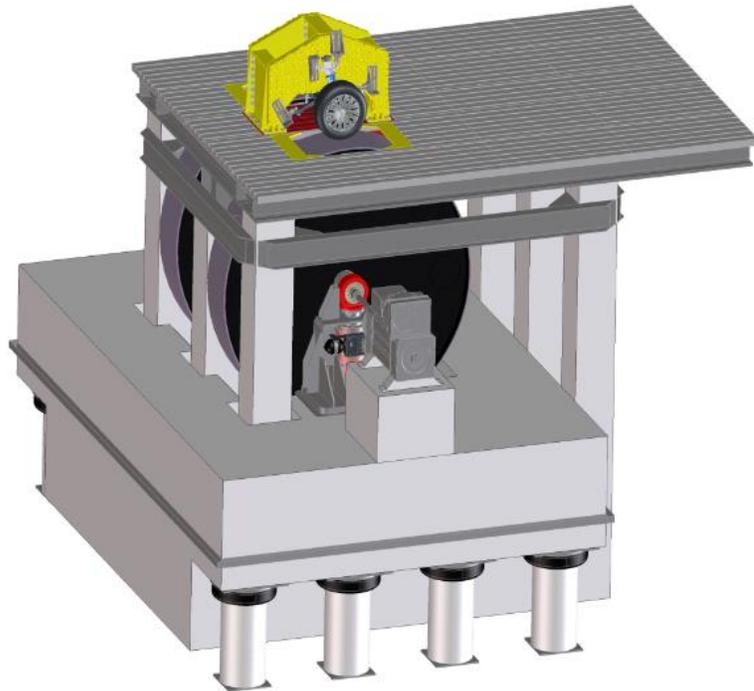
Hydraulic pulser



E-Pulser – high performance, quiet



The combination: Pulsar with rotating wheel

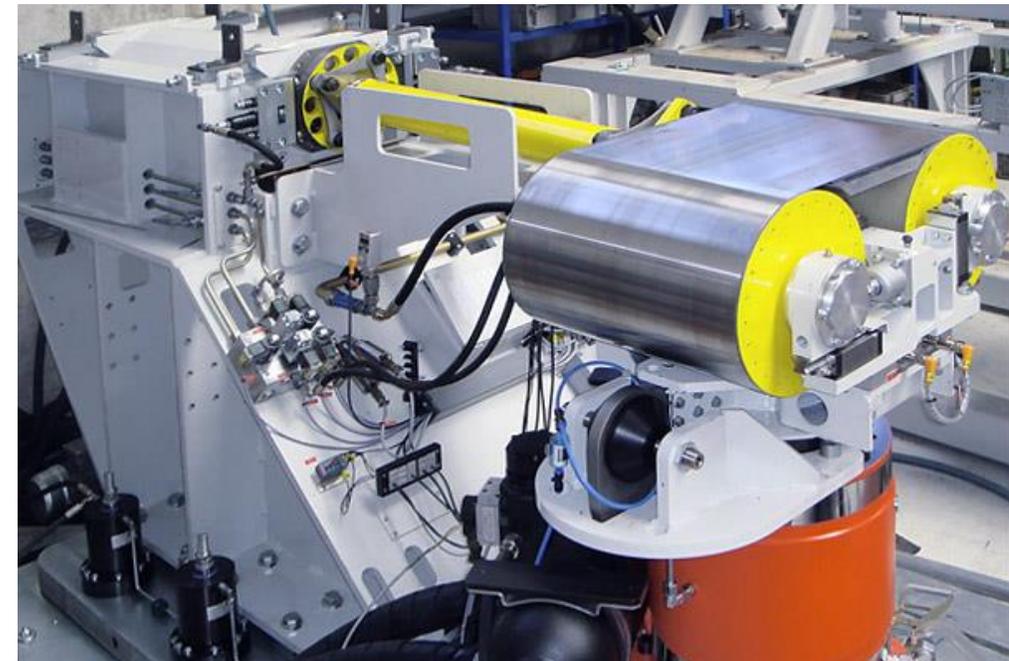


Pulsing:

- Frequency: 0-100Hz
- Max. acceleration: 160 m/s²
- Max. speed: 1.2 m/s
- Max. travel: +/- 25 mm

Roll:

- Carbon wheels
- Diameter: 125" (317.5 cm)
- Speed 200 km/h
- Carbon pad shells



Pulsing:

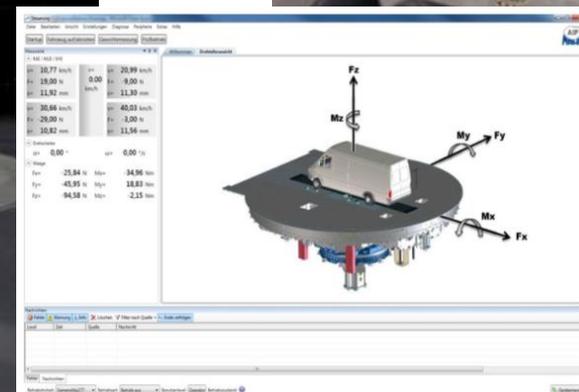
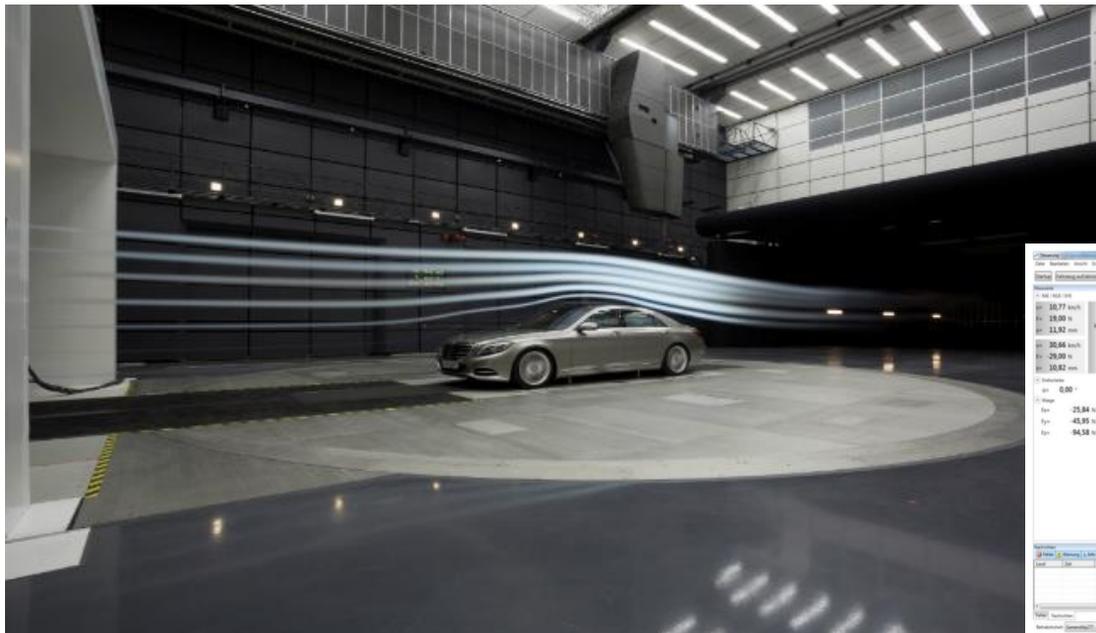
- Frequency: 0-70Hz
- Max. acceleration: 160 m/s²
- Max. speed: 4 m/s
- Max. travel: +/- 35 mm

Falt Belt:

- Speed: 0-250km/h

Top Class: Wind tunnel balance

- Total weight approx. 90 tons
- High-precision measurement of the air resistance on the vehicle -> especially the drag coefficient
- Incl. 5-band system – simulation of moving roads



AIP state of the art powertrain test benches



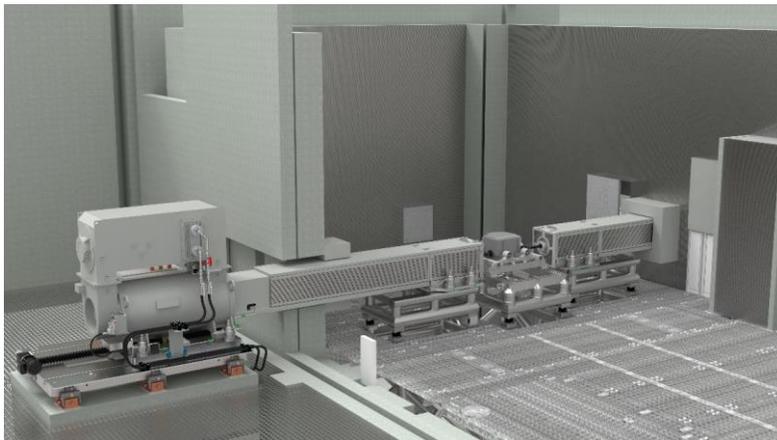
Rotor Testing



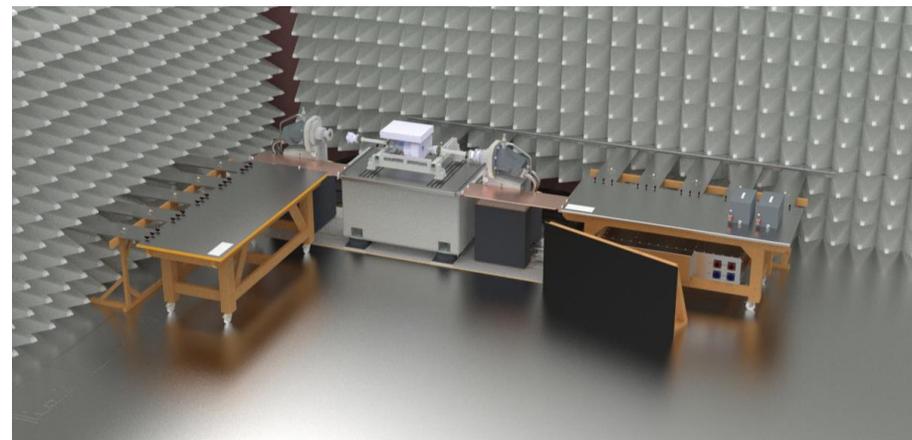
Wheel Hub Dyno - R2R



Pulsed Powertrain

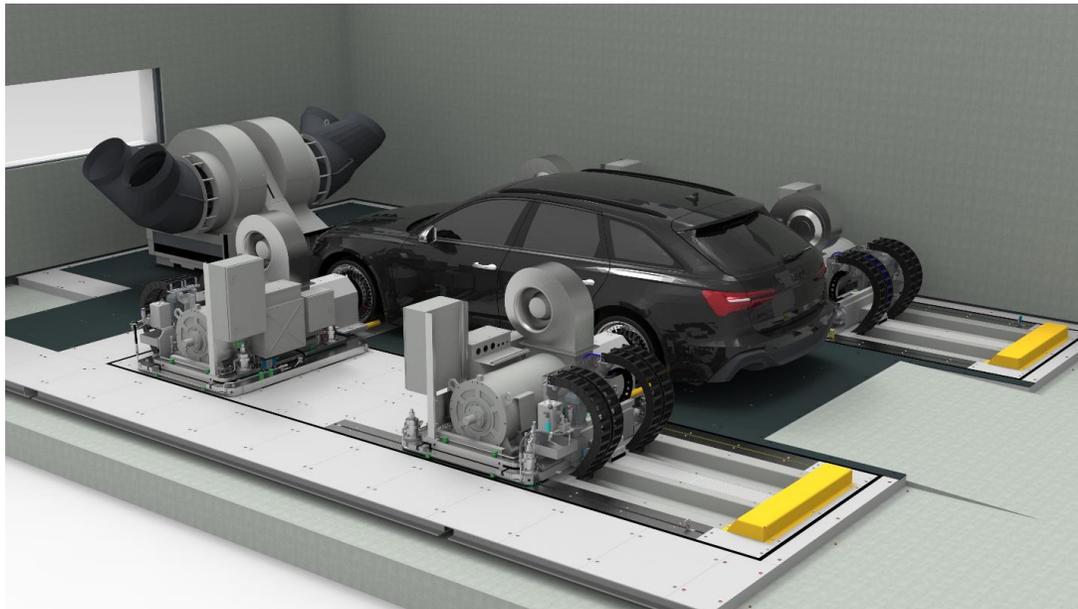


NVH Powertrain



EMC Powertrain

Wheel Hub Dyno Example: Full vehicle Road-to-Rig



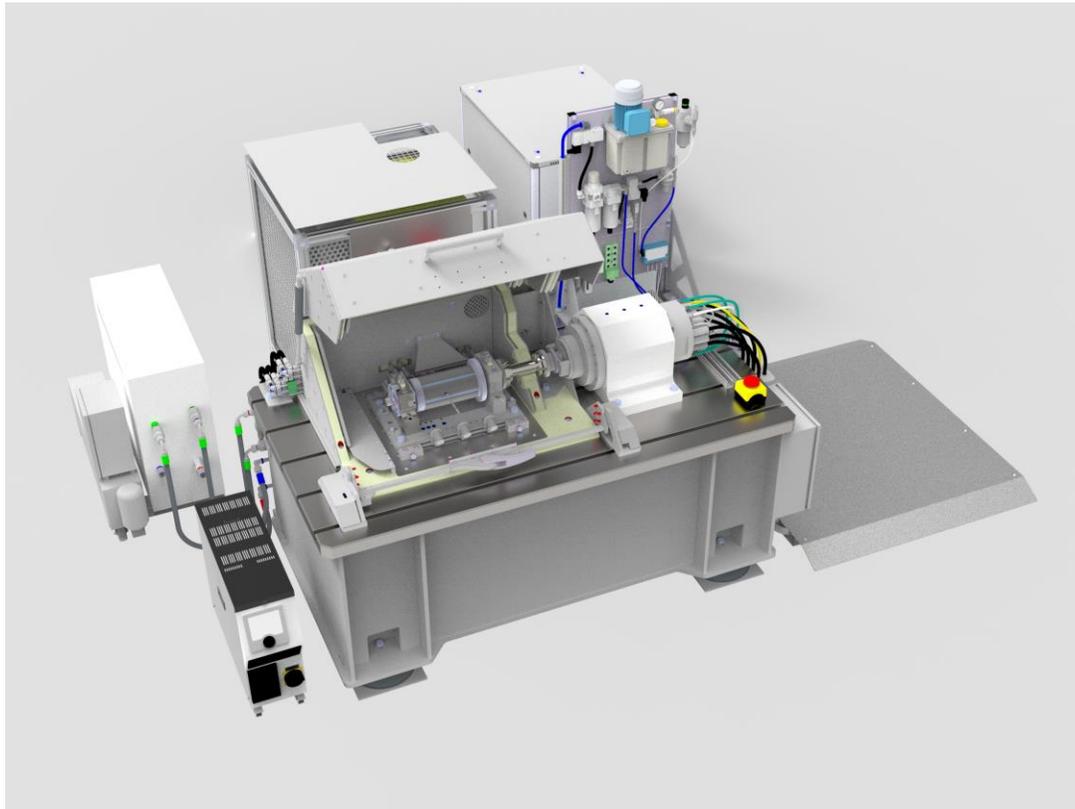
Wheel Hub Dyno for Road to Rig applications

- Automatic Docking Function
- Including powerful battery simulator
- Individual loading machines according to customer requirements
- High-precision measuring technology with optional DAKKS calibration (e.g. HBK measuring flanges, etc.)

Your benefits:

- ✓ Easy installation, no expensive consturctural requirements necessary
- ✓ Automatic Docking for minimized gear up times
- ✓ Undocking Mechanism for haverie case (e.g. burning battery)
- ✓ Performance design of machine and BattSim according to customer-specific requirements

PTD-Test Bench Example: Rotor Testing



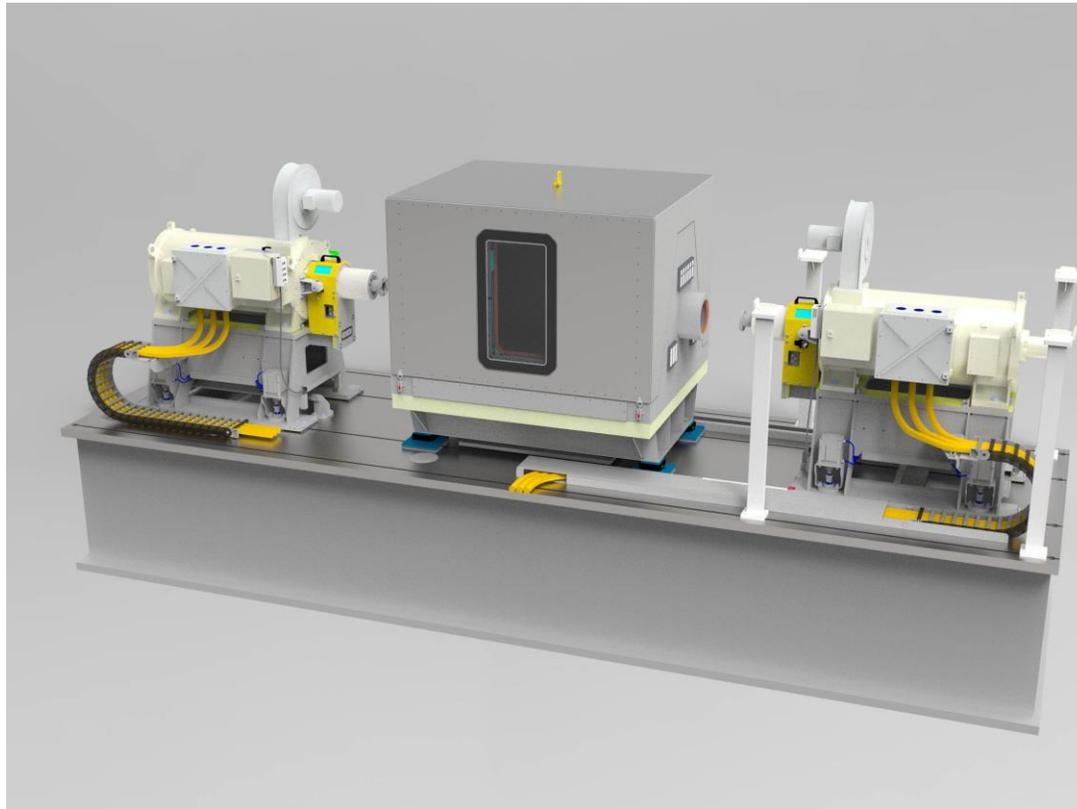
Test bench for rotor centrifugal tests on electric motors

- Up to 30,000 RPM to test component durability
- Incl. measurement technology for monitoring vibration, speed, torque, etc.
- Protective chamber for bursting tests including sacrificial bursting protection
- Optional air conditioning according to customer requirements

Your Benefits:

- ✓ Small test chamber for checking the stability of rotors in the high speed range
- ✓ Drive machines + test bench bed according to customer requirements
- ✓ Several test benches can be combined

PTD: E-Axle Test Benches



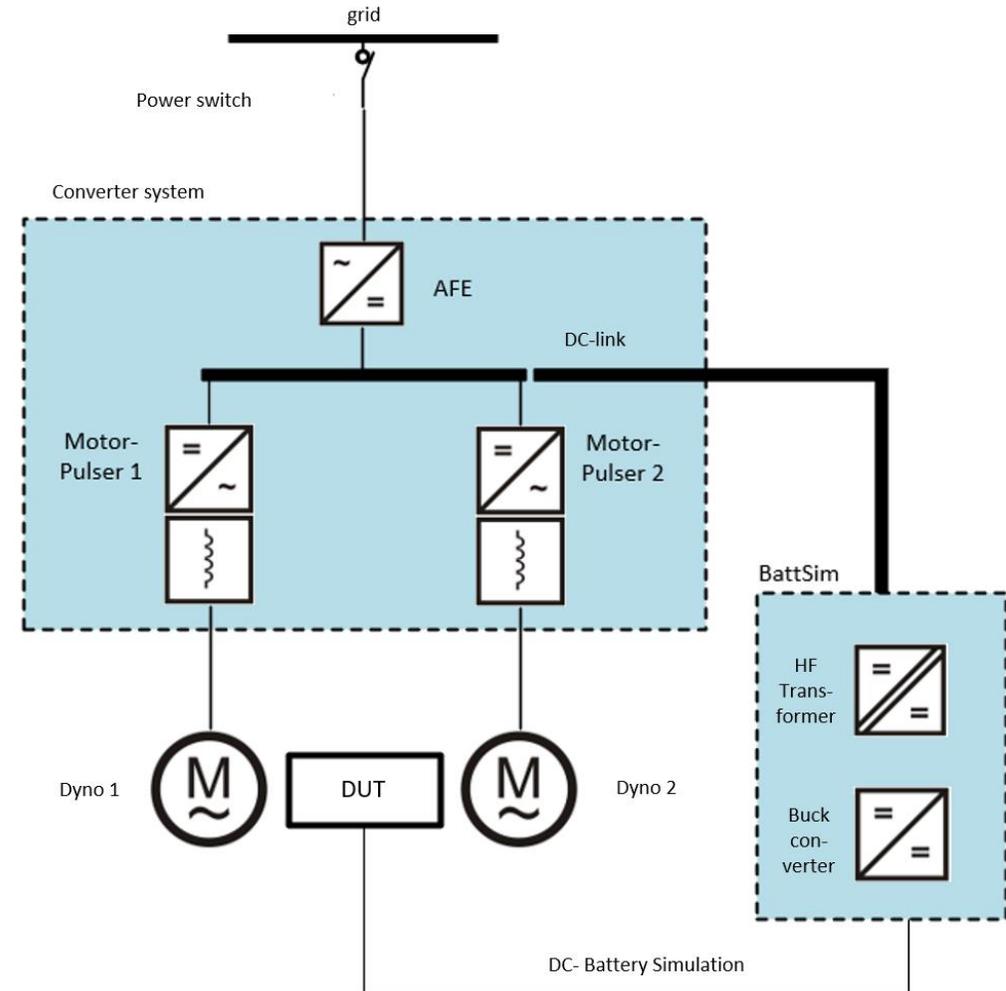
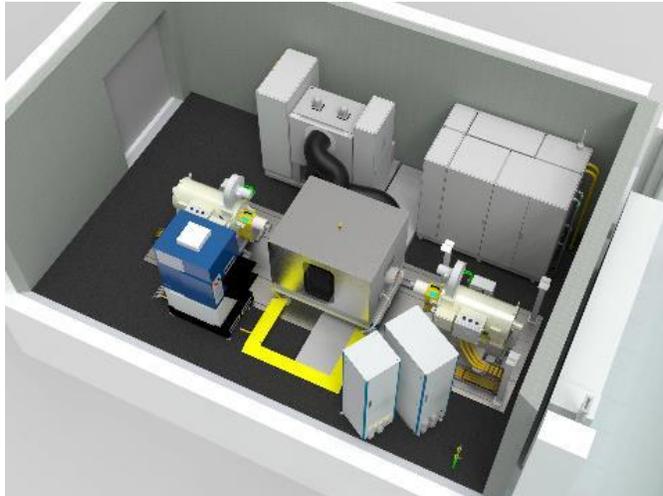
Drive axle tests for entire drive modules

- Including powerful battery simulator
- Individual loading machines according to customer requirements
- Various versions available (air conditioning, acoustics, EMC, etc.)
- High-precision measuring technology with optional DAKKS calibration (e.g. HBK measuring flanges, etc.)
- DUT conditioning to suit the requirement

Your benefits:

- ✓ Flexible system
- ✓ Performance design of machine and BattSim according to customer-specific requirements
- ✓ Load units Movable and height-adjustable for different test object geometries

Your Advantage: More Power @ Less Grid Supply



E-Axles: Accessories



Energy and Transition Unit

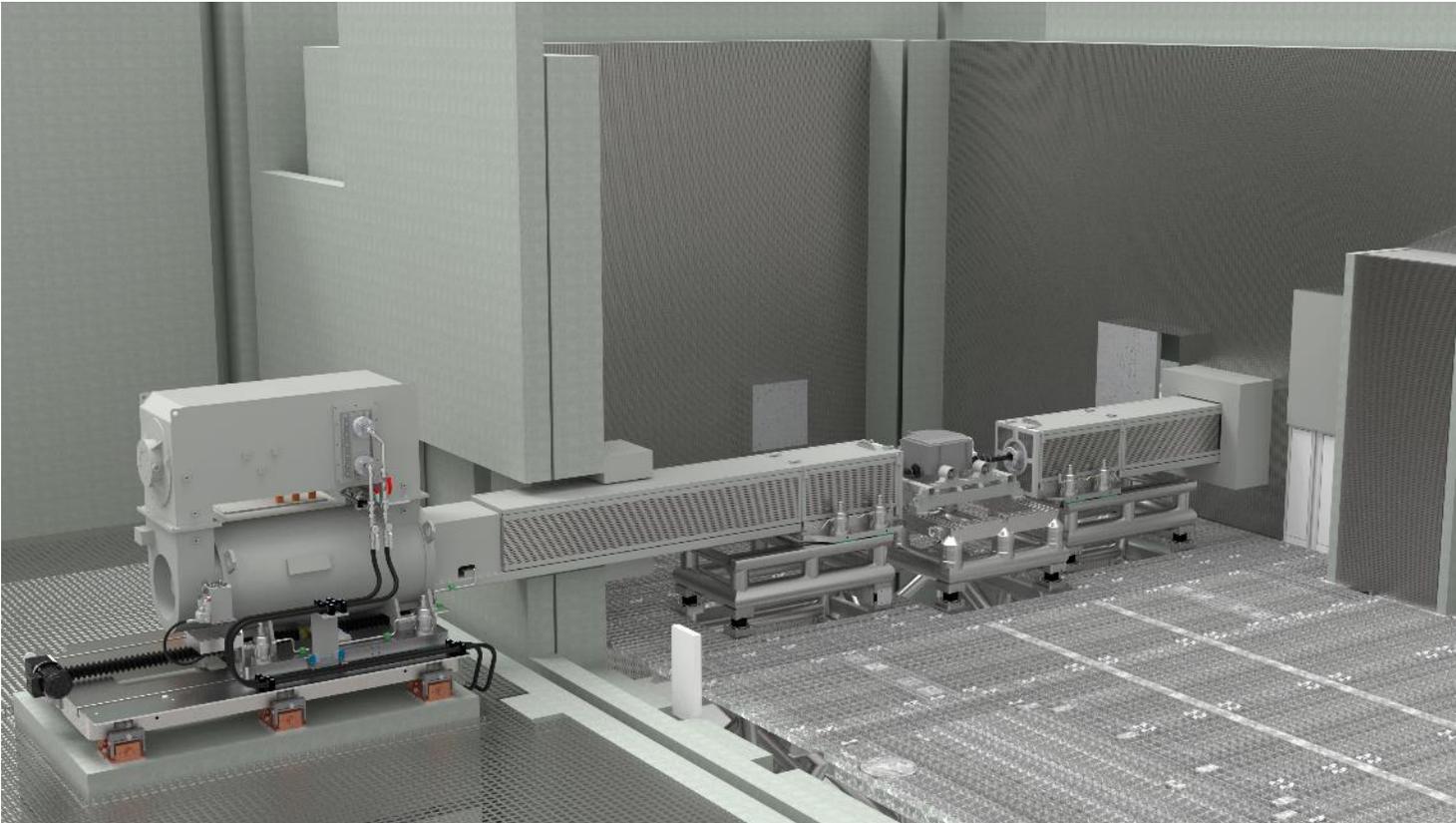


LV-Supply



Measurement Rack

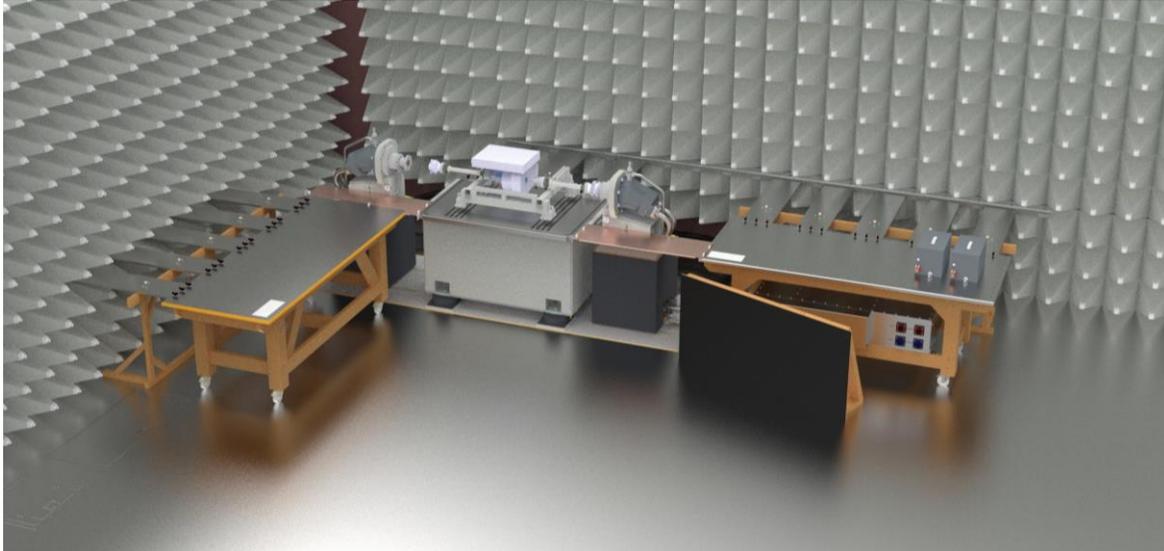
Example: NVH E-Axle Test Bench



Turn Key:

- Acoustic chamber
- Electrical load unit
- Battery simulation
- Automation
- Safety

Example: EMC-E-Axle (hydraulic version)

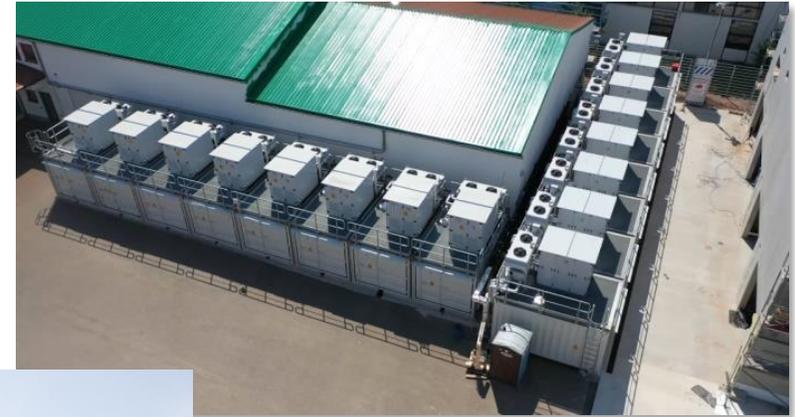


Turn Key::

- EMC chamber
- Hydraulic loading unit
- Measuring technology
- Automation
- Safety



Battery test benches for special applications



Battery Lab APL Landau

The Core Product for Battery Testing / Simulation



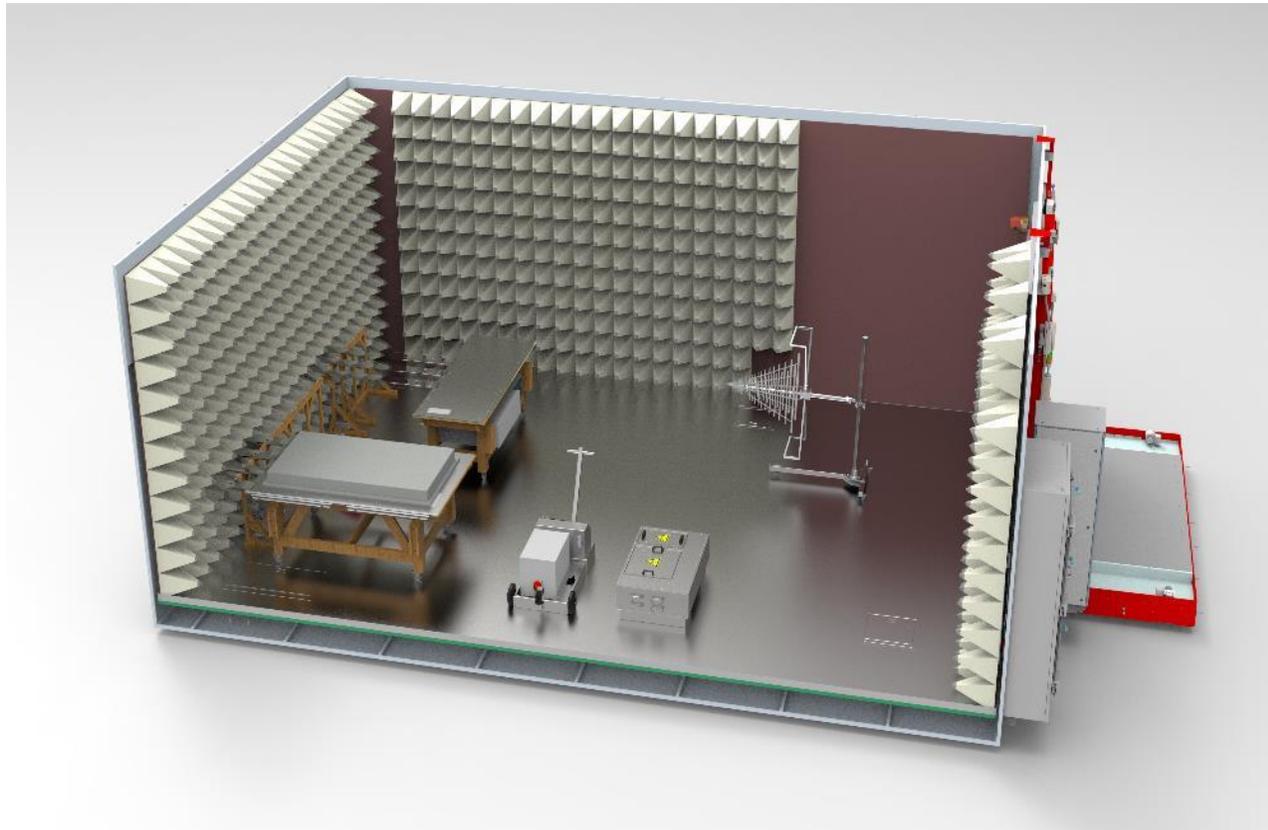
Battery simulator for almost realistic simulation of battery models on the test bench

- Individual design with output power from 200kW up to 1.2MW
- Output voltage up to 1200V
- Output current up to 1600A (more on request)
- Mapping of a real-time test environment for an almost realistic simulation
- MATLAB / SIMULINK interface for your own battery models

Your benefits:

- ✓ Directly compatible with your AIP test stand (roller / flat track / drive train / motors etc.) without a separate transformer connection
- ✓ Adjustable via your automation system
- ✓ Various control modes available by default (U / I / P mode)

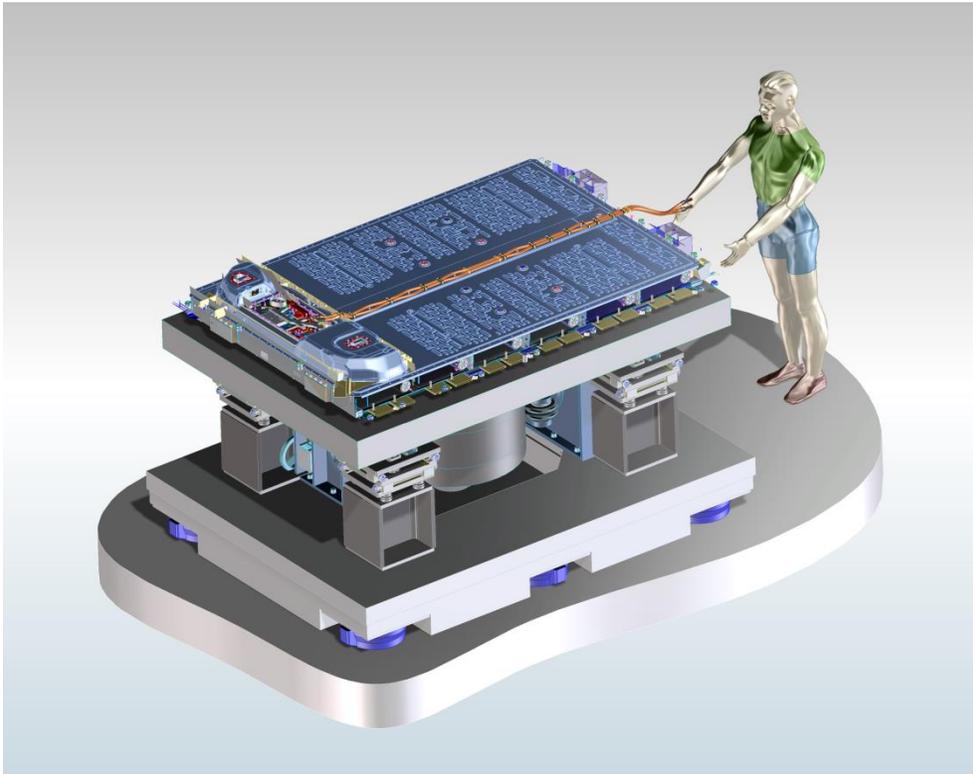
Example: Battery EMC Test Bench



Turn Key:

- EMC chamber
- Load unit
- Measuring Technology
- Automation
- Safety

Example: Battery Shaker



- Test system for mechanical road loads for battery systems.
- Excitation of the battery with different vibration patterns (sine, rectangle, etc..)
- Battery data: adapted to customer system
- Maximum Shaker Force: 300kN (individual)
- Incl. Control Software VR9500 Vibration research

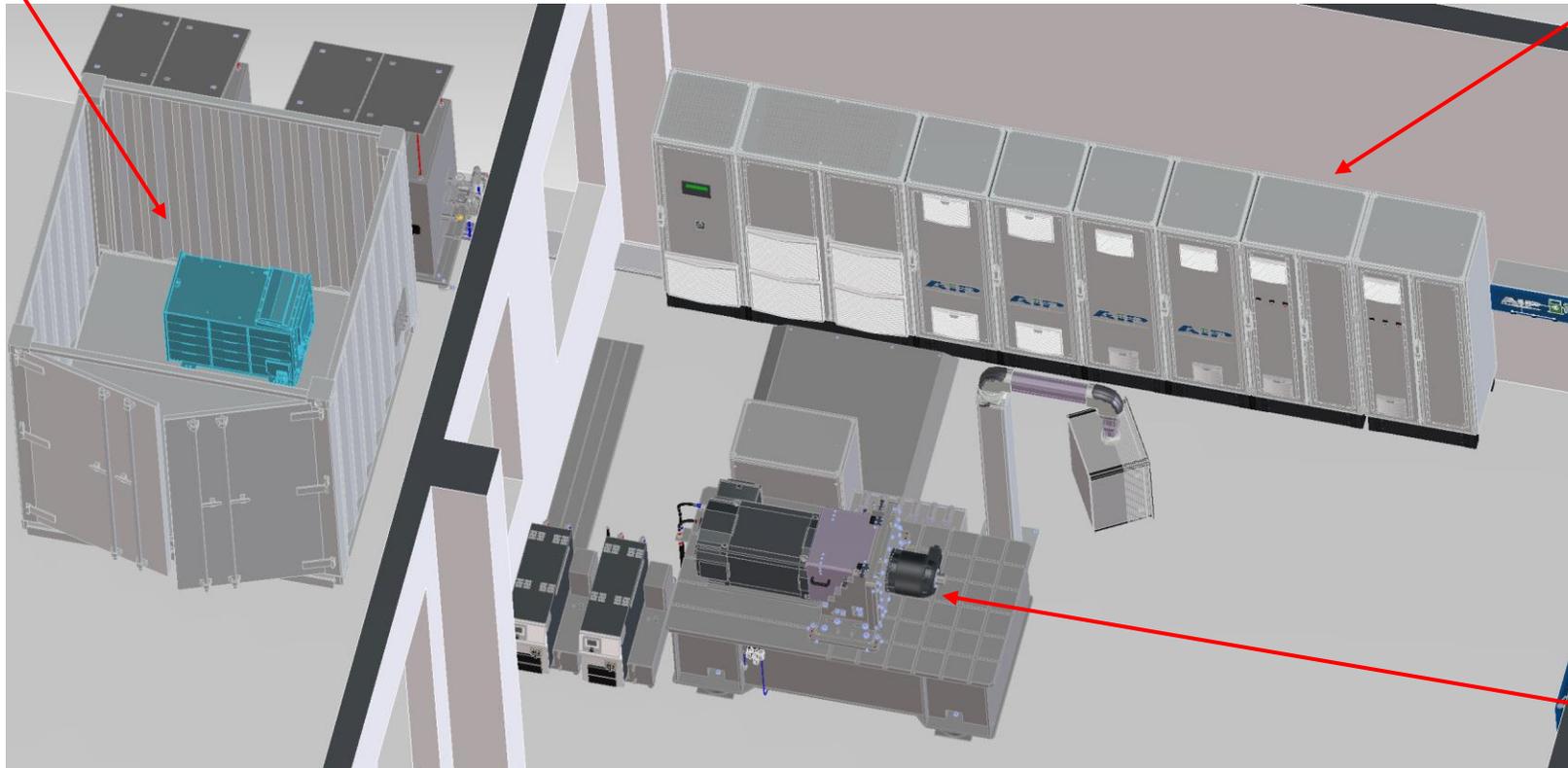
Your benefits:

- ✓ Comprehensive mechanical testing of batteries with regard to road vibration
- ✓ Integration into existing automation for automatic test cycle definition and data collection
- ✓ Graphical analysis of all data
- ✓ Customized battery fixation on the shaker plate

Combination of Battery and Powertrain Testing: Example: Heavy Duty 700V System Test Bench

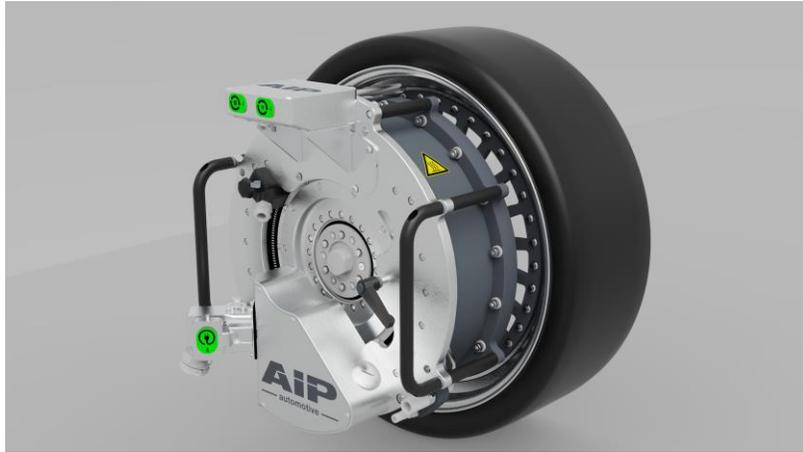
Battery Test Container

Battery Tester / Simulator

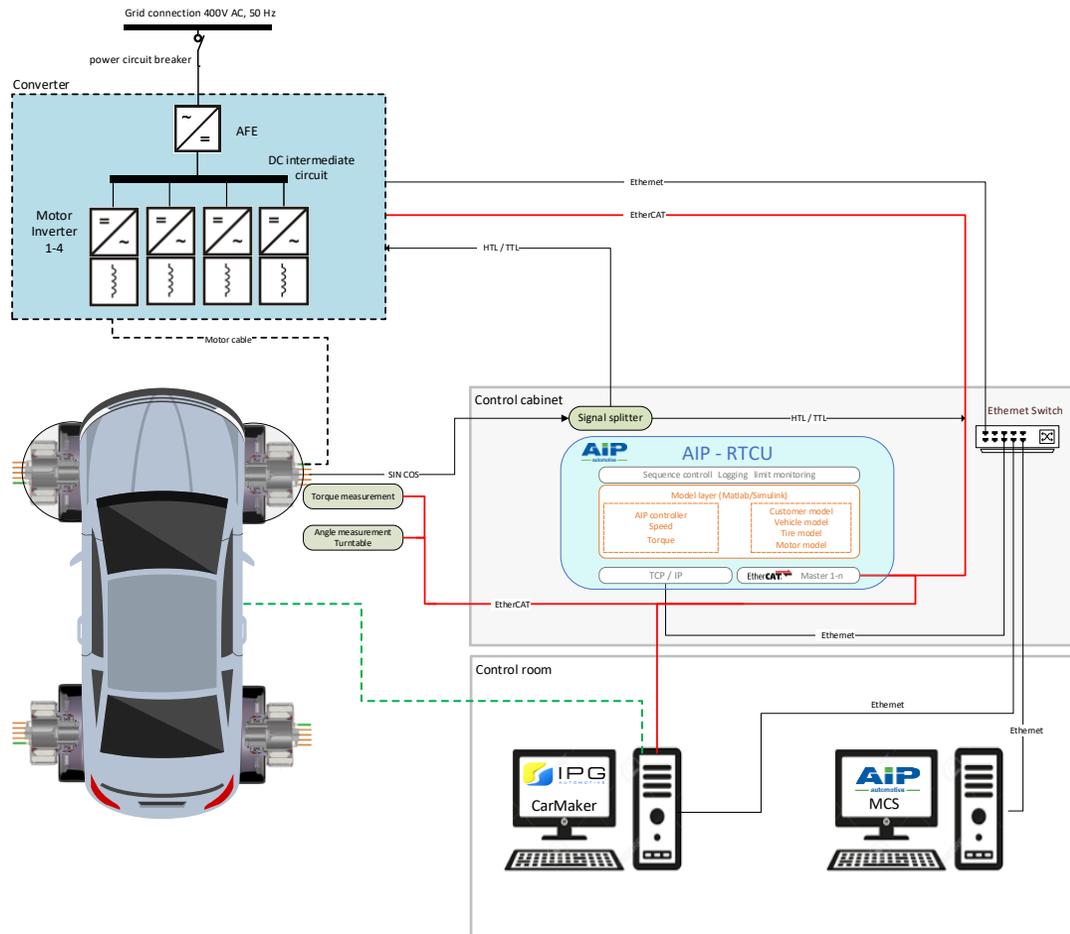


E-Motor Test Bench

New in the portfolio: TWDM – Torque Wheel DynamoMeter



TWDM – Multi Purpose Testing



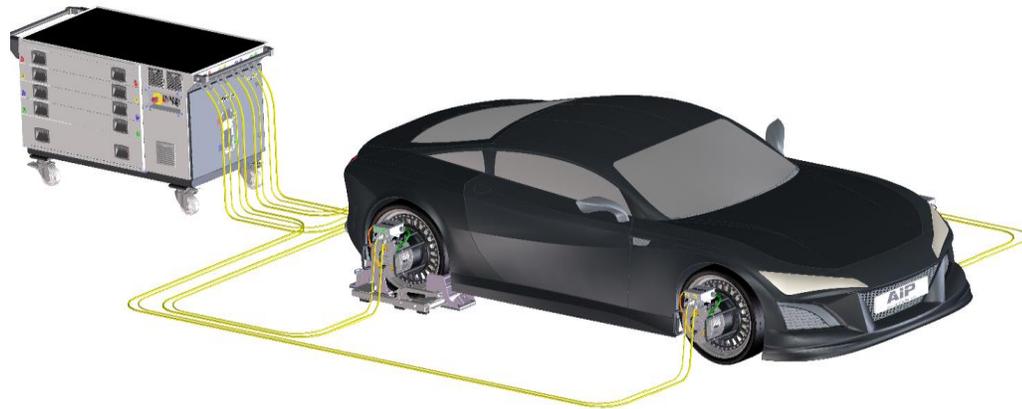
The Torque Wheel Dynamometer TWDM (patent pending) is designed for various test applications, e.g.

- E-Architecture testing
- WLTP testing
- Special Drive & Steer applications
- ADAS/AD environment
- A lot more of use cases....

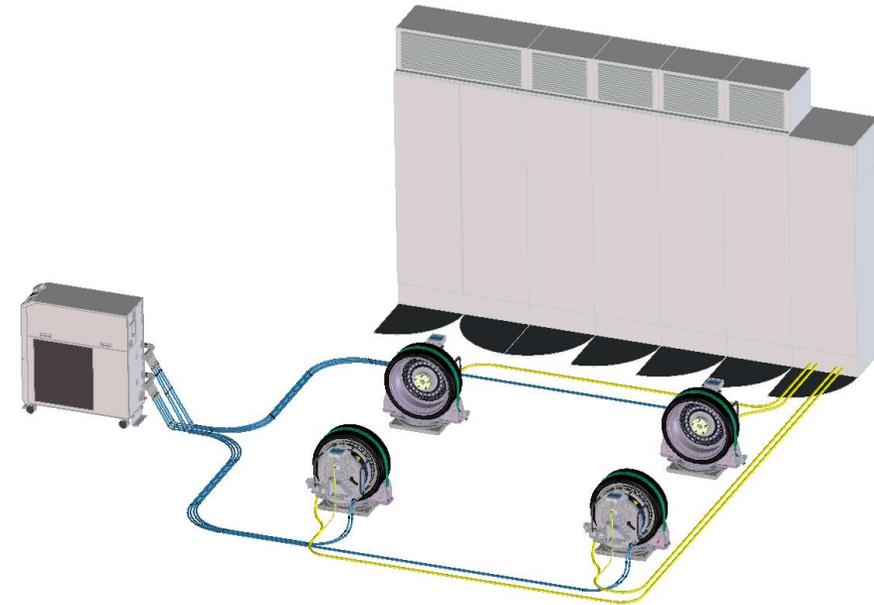
Your benefits:

- ✓ Easy installation, no expensive consturctural requirements necessary
- ✓ Only power is required (no hydraulic or air supply necessary)
- ✓ Mobile compact design for non-location-based applications
- ✓ Free accessibility for stimulation of AD/ADAS sensors such as radar, lidar and cameras, GPS, G5 ... communication systems
- ✓ Simulation of cornering, lane change, automatic parking/unparking, distance warning. Emergency braking behavior, etc.

Two Version of the TWDM available

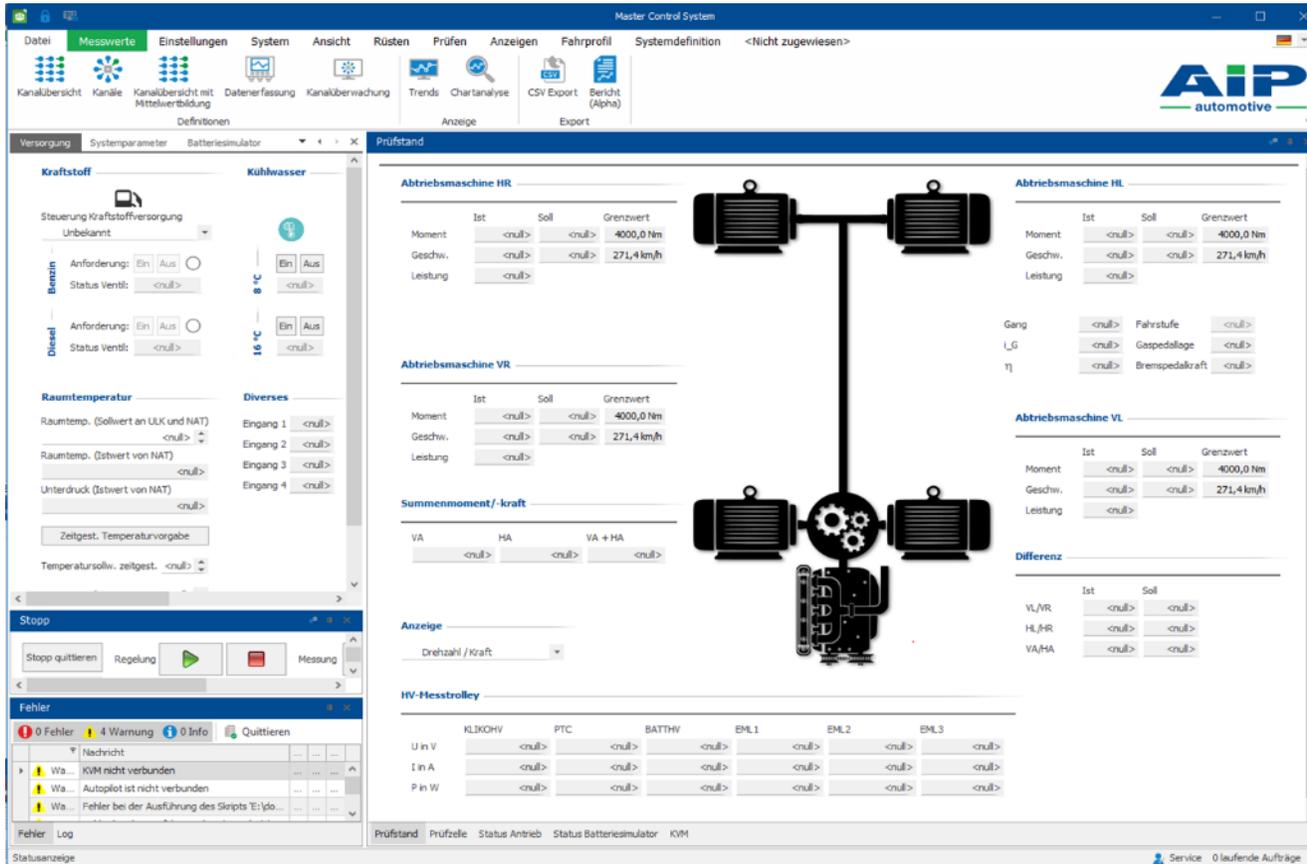


Air cooled mobile Version



Water cooled high performance Version

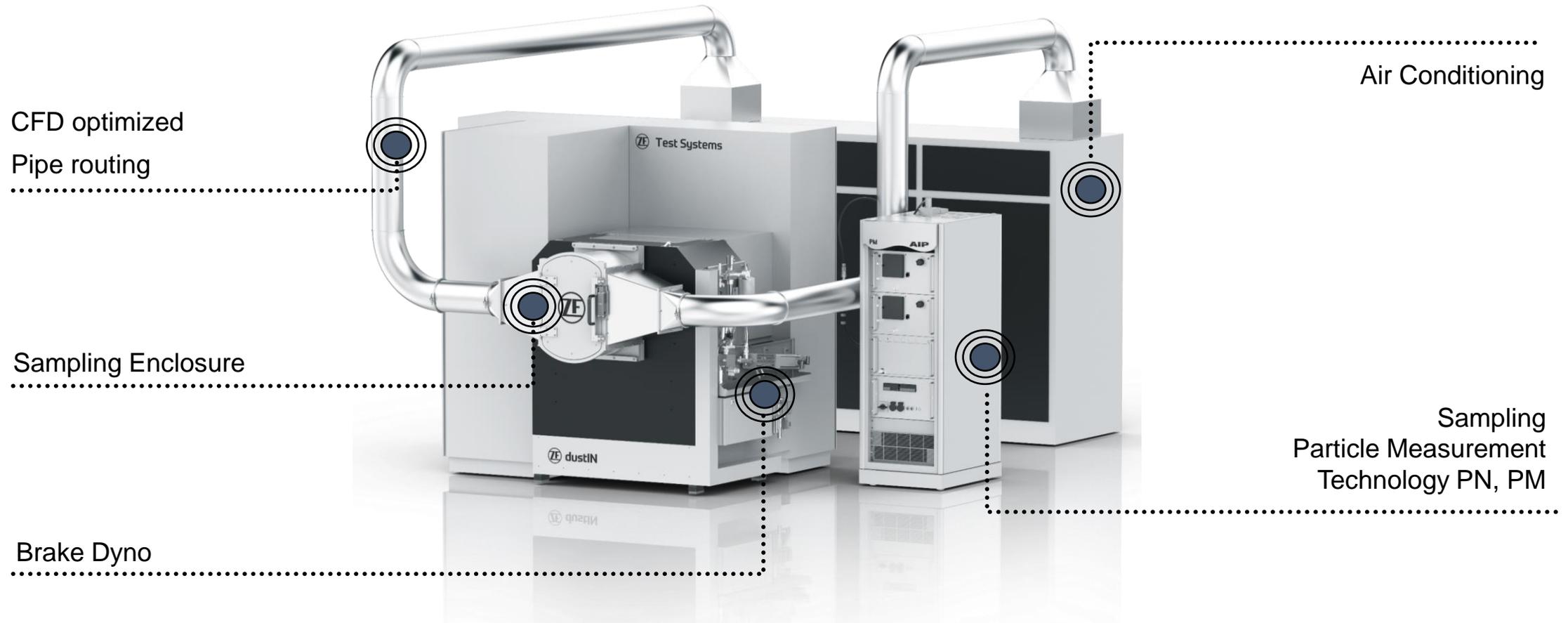
The interface to the operator: MCS – Master Control System



- Management of test fields
- Parameter management
- Test bench control
- Creation and monitoring of test procedures
- Data recording
- Limit monitoring
- Visualization of the test process and GUI
- Powerful real-time system



Upcoming Euro 7 / CN7 - Brake Dust Measurement Partnering with ZF





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Emission Measurement Systems
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Real Drive Emission
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Chassis Dynos
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Flat Track Systems
- 

Hydraulic Shaker Test Stands
- 

Multi-Shaker Unit
- 

Windtunnel Balance
- 

Powertrain Test Benches
- 

e-Mobility
- 

Autonomous Driving
- 

Test Bench Automation
- 

Driving Robot
- 

Vehicle Cooling Fan