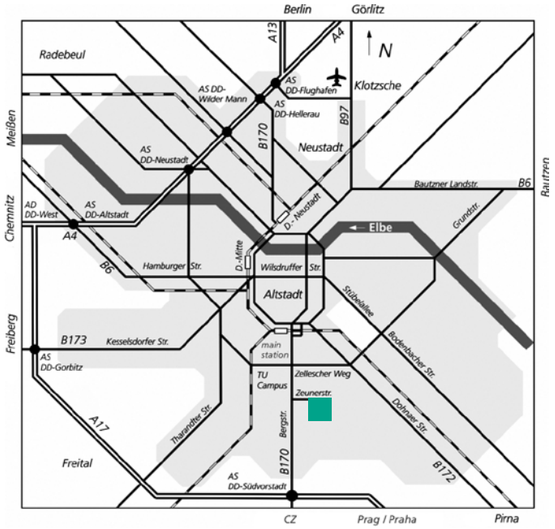
HOW TO GET TO THE INSTITUTE



Use the link **www.ivi.fraunhofer.de** to find a detailed description of how to get there.

For further information feel free to contact us.

Public Relations
Elke Sähn
Phone +49 351 4640-612 | presse@ivi.fraunhofer.de

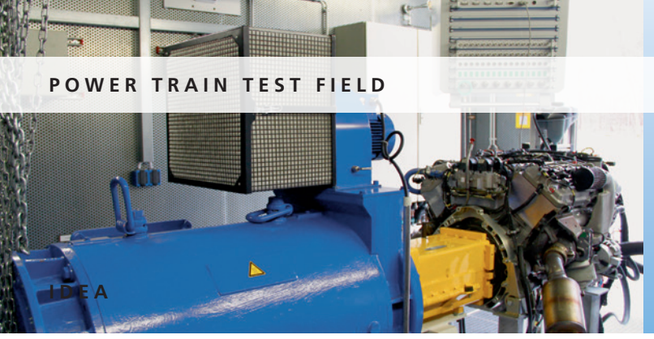
Fraunhofer IVI

FRAUNHOFER INSTITUTE FOR TRANSPORTATION AND INFRASTRUCTURE SYSTEMS IVI

Fraunhofer Institute
for Transportation and Infrastructure Systems IVI
Director: Prof. Dr. Matthias Klingner
Zeunerstraße 38 | 01069 Dresden
Phone +49 351 4640-800 | www.ivi.fraunhofer.de

MOVING THE FUTURE – INNOVATIVE POWER TRAIN SYSTEMS

POWER TRAIN TEST FIELD



The Fraunhofer Institute for Transportation and Infrastructure Systems IVI operates a test field, at which diesel engines, electrochemical and electrostatic accumulators (batteries, super caps) can be tested. The test stands can be operated separately or together allowing investigations of hybrid power trains of commercial vehicles.

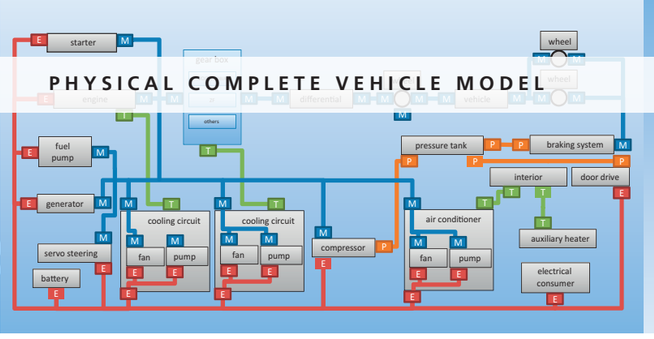
Engine test stand

- Load machine with 300 kW continuous power (four quadrant operation)
- Continuous torque 2000 Nm
- Max. engine-speed gradient 10 000 rpm/s
- Fuel conditioning and measuring equipment
- Measuring equipment for torque, speed, pressure and temperature
- Separate data logging for 64 channels with a sampling rate of 100 kHz
- Test stand automation

Accumulator test stand

- Air-conditioned test bed (20 – 60 °C)
- Variable electronic load of up to 250 kW (two quadrant IGBT-converter)
- Current 0 – 400 A
- Voltage 30 – 800 V
- CAN Interfac

PHYSICAL COMPLETE VEHICLE MODEL



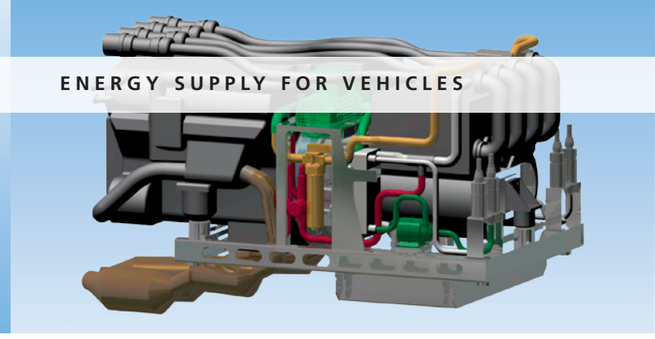
Conventional commercial vehicle concepts offer a lot of possibilities to optimize fuel consumption. The focus of current developments is on minimizing the energy consumption of the power train.
The power demand of the auxiliaries also influences the fuel consumption significantly, but has not yet been widely considered.

The institute disposes of a physical complete vehicle simulation model for the analysis of the energy consumption of various auxiliaries, which includes power train components e. g. the

- pressure system,
- on-board supply system,
- steering servo system,
- cooling system and
- air conditioning system.

The modular concept of the model allows the design, test and analysis of different technical measures. Furthermore, operation strategies for the power train and the auxiliaries can be developed and tested. The simulation model can also used for power train dimensioning and controller testing.

ENERGY SUPPLY FOR VEHICLES



The Fraunhofer IVI developes concepts for the on-board power supply and the energy transfer from roadside charging stations to vehicles. The concepts are implemented into vehicle prototypes and tested.

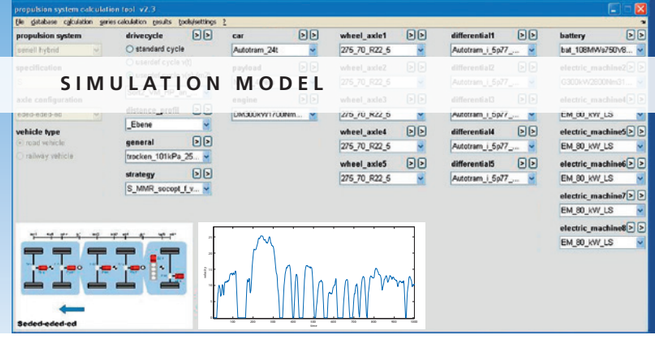
The minimization of their mass and dimensions as well as the reduction of emissions and energy consumption are essential for the development of power supply systems. To achieve these objectives, the Fraunhofer IVI carries out:

- studies on compact power trains consisting of an engine, a generator and power electronics as well as on all-electric power trains for public transport vehicles and
- the development of operation strategies for maximum energy efficiency taking vehicle-specific operation conditions into account.

The Fraunhofer IVI expertise on roadside energy supply comprises:

- discontinuous energy supply for all-electric puplic transport vehicles using charging stations,
- conception, construction and testing of systems for high current energy transfer from local charging stations to buses and trams and
- reduction of grid loads by using electrical energy storages in local charging stations (»docking principle«).

SIMULATION MODEL



At the Fraunhofer IVI longitudinal dynamics simulations can be carried out using a simulation model, which makes it possible to configure power trains and improve power management strategies.

The modular model structure, consisting of

- vehicle modules of up to 3 segments and five axles or bogies,
- map-based internal combustion engine modules,
- map-based electric engine and gearbox modules,
- characteristic curve based power electronics,
- on-board supply system and traction-energy storage modules,
- tyre-slip and rail-wheel-contact modules,
- control strategies as well as,
- time- and distance-based velocity and height profiles

enables the composition of a wide variety of conventional, hybrid and electric vehicles. More than 100 different power train configurations can be simulated and analysed. The selection of the power train configuration and operating strategy as well as the parameterization of the components and the driving cycle is supported by a visual user interface and a components database. Time-consuming serial simulations of single parameters and complete data sets can be carried out automatically. For the study of the results, comfortable analysis and visualization tools are implemented.