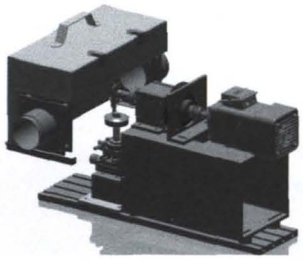
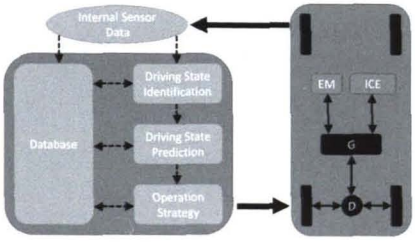
Evaluation of sensor systems for absolute position measurement and shaft torque estimation



The aim of this project is to conduct research on different sensor technologies, which are utilized in automo-tive engineering to determine the rotor position of electric motors, since the information of the position angle is essential for a high quality control of electric drives. The project includes the assessment and evaluation of differing sensor technologies, e.g. resolver or methods, which are based on magneto-resistive effects.
During the project, a specific test bench is designed and built up to enable a detailed hardware-based study of various sensor concepts in consideration of the requirements to be met in automotive applications. Therefore, the functionality in misalignment and at temperature ranges from -40 °C up to 180 °C is analyzed and compared to the measurement results of a high-precision reference system. In a subsequent project phase, the test bench capabilities will be augmented for enhanced functionalities such as current measurements as well as the estimation of drive shaft torque.

Intelligent Components and Control Strategy for predictive control of fluid-circuits in Commercial Vehicles



The objective of this project is to support the enhancement of multipath rotary slide control valves for coolant- and oil-circuit by virtual, i.e. computer-aided, methods. In order to reduce the engine friction and therefore, ultimately also the fuel consumption, a suitable distribution of the volume- and heat-flow, as well as an accurate regulation of the engine temperature, has to be established.
An algorithm is developed that predicts the vehicles driving state in a short- and long-term time horizon. Therefore, only internal sensor data of the vehicle is used. Typical trajectories of the parameters, describing the driving state, are saved on a database. By comparing the actual driving state with the database a predic-tion is possible. In a validated simulation environment adaptive and predictive operation strategies are de-veloped and their benefit is calculated. The operational strategies comprise to a great extend the regulation of the vehicles hybrid functions as well as the thermal regulation of the internal combustion engine (ICE), electric motor/generator (EMG), Battery (BAT), etc. The verification of optimal operational strategies is con-ducted with functional prototypes on an engine test bench and in a reference vehicle.