

Research program

SAFETY AND ENVIRONMENTAL TRANSPORT EQUIPMENT

Research and development of systems to promote effective mobility with a view to optimizing energy conversion and transmission in power units and other vehicles, mobile machinery or energy equipment to increase competitiveness and reduce environmental burdens. Research and development of systems ensuring a higher degree of safety and comfort of mobility.



Research activities

DRIVING SYSTEMS FOR TRANSPORT AND INDUSTRY

- ▶ Research on new methods for optimizing the working cycle of reciprocating internal combustion engines with the aim of increasing efficiency and reducing “pollutant emissions”. Use of new types of energy carriers produced from renewable sources.
- ▶ Research of the hybrid arrangement of the powertrain of a car using an internal combustion engine, electric motor and energy storage.
- ▶ Research of innovative powertrain accessory components to reduce weight, mechanical loss and force interaction. E.g. electronic control of valves with high control variability, use of sliding and insulating coatings of nanomaterials.
- ▶ Research and development of advanced gearboxes, inter-axle clutches and differentials for powertrain and mobile power applications with high power transmission efficiency, comfort control and low noise.

VEHICLES AND THEIR SYSTEMS

- ▶ Research into new vehicle chassis concepts with advanced systems and integrated steering for driving dynamics and stability, vehicle safety and driving comfort.
- ▶ Research of autonomous driving methods and systems providing a higher level of driving safety in interaction with the surrounding environment.
- ▶ New and advanced means to increase the acoustic comfort of the crew.

EXPERIMENTS AND DIAGNOSTICS

- ▶ New methods and experiments aimed at analyzing events that have a negative impact on the environment. Computer experiments – modeling and simulation of vehicles and its subsystems.
- ▶ New diagnostic methods for identifying the characteristics and parameters of powertrains and other devices affecting vehicle performance and interaction with the environment.
- ▶ Research and solution of vibration and noise problems with emphasis on optimization of construction parameters, relation to valid legislation and compliance with Industry 4.0 and automotive industry requirements.
- ▶ Research and development of materials with emphasis on sound absorption. Measurement of sound absorption in impedance tube and alpha-cabin.
- ▶ Application research and implementation of predictive maintenance principles of machines with a focus on vibration disassembly diagnostics.