DEST participate in the European project IDEAS.

It is idea and project of new parts for Electric Vehicle.

Project full title: "**Interactive Power Devices for Efficiency in Automotive with Increased Reliability and Safety** "

DEST contribution in IDEAS is:

- The proposition of architecture of electronic control units and subsystems of sensors and actuators for torque adjusting in electric drive with mechanical gearbox operating in accordance with defined control strategy preprototype.

- Definition of the way of communication between the sensors and actuators in practice.
- The proposition of architecture of control system of Electric Vehicle (EV) drive with full diagnosis of battery parameters.
- The proposition of architecture of Master Controller for EV drive operating according to control strategy with minimum energy consumption.

In the preliminary phase we studied the concept of electric car, as it was designed by the Warsaw University of Technology and defined all elements crucial for the electric motor's drive. Then we constructed the general structure to manage all units, sensors and actuators. The chart of connected units includes Traction Motor (TM), mechanical gear box (GB), battery monitoring system (BMS1 or BMS2), step motors (SM), pedals, main battery and 12V battery. To facilitate the communication within the system we applied CAN BUS as well as the module of RS 485 for better supervision via PC.

When the chart was acknowledged we designed the architecture of the BMS electronic

hardware.

Two BMS assemblies can be also joined and doubling voltage of main battery. BMS consists of a DC/DC converter for loading the 12V battery as well as for power supply of other components. Moreover BMS enables digital measurement of current and full voltage of the main battery.

As the architecture of BMS has been acknowledged, we worked out construction of the Master Controller Unit (MCU) and the Gear Box Control System (GBCS). MCU provides the outputs of sensors, pedals and switches each vehicle is equipped with as well as differential inputs from encoders. GBCS, in turn, provides differential and analogue inputs from encoders and precise steering of stepper motor, which enables to receive a feedback message about the accomplished activity or measurement of the traction motor current). All units provide communication between CAN BUS and RS 485 modules as well as change of settings by means of the above mentioned nets.

The new prototype of BMS made in our company

Battery Monitoring System device another prototype

Plug cables for BMS

Front view of new prototype Battery Monitoring System device.

The prototype of GBCS made in our company

Prototype Gear Box Control System

The prototype of MCU made in our company

Prototype Master Control Unit