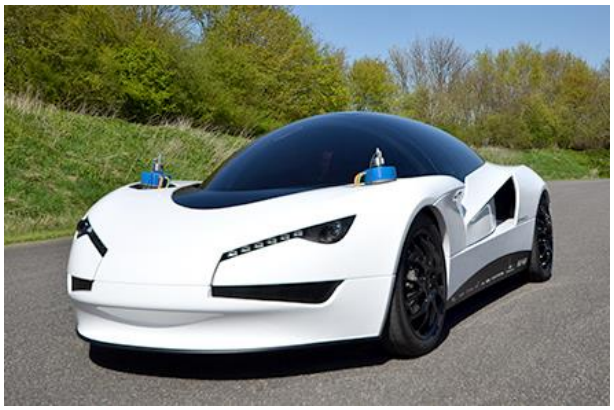
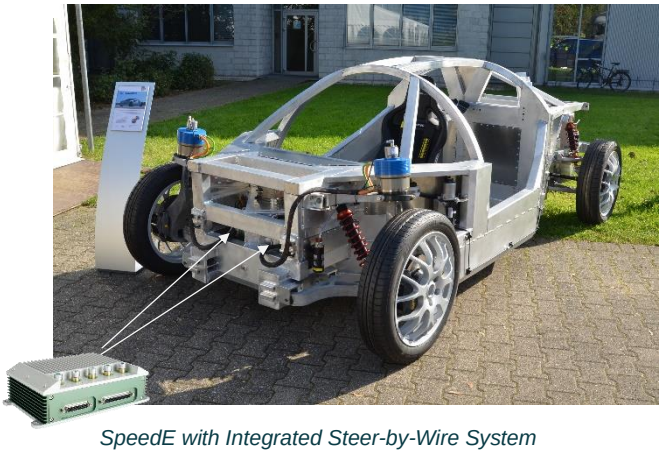
Steer-by-Wire in the Research Vehicle SpeedE

SpeedE is a research and development platform in the form of a sporty electric vehicle designed by the institute for motor vehicles (ika, Institut für Kraftfahrzeuge) of the RWTH Aachen University. Besides a variety of innovative systems, a steer-by-wire system for lateral guidance of the vehicle is an important research focus of the SpeedE. For this steering system, PUMA ECUs, which are networked via FlexRay with the vehicle, control the electric drive units for setting the desired wheel steering angle.

Each of the independent drive units of the steer-by-wire system consists of an electric motor in conjunction with a backlash-free strain wave gear as well as sensors for measuring the rotation angle and torque. The PUMA-MPI ECUs transform the drive units in smart actuators, which set the desired wheel steering angle demanded by an overlaid ECU with high dynamics. The networking of the PUMA ECUs with the vehicle is done via FlexRay to ensure synchronicity and real-time of the steering movements and at the same time increase the reliability. The driver controls the lateral guidance of the vehicle with two sidesticks, which are also linked via FlexRay.



SpeedE Concept Car



SpeedE with Integrated Steer-by-Wire System

The compactness of the PUMA-MPI ECUs enables a simple and space-saving integration into the space-frame aluminum carrying structure of the vehicle. The voltage supply comes from the powerful 48V electrical system. For very fast steering movements, for example for electronically controlled vehicle stability, each of the actuators can apply a power of up to 2.5kW at the wheel.

adcos GmbH
Zollstockgürtel 67
50969 Cologne
Germany

+49 (0)221 / 16 80 59 – 0
+49 (0)221 / 16 80 59 – 49
info@adcos.de
www.adcos.de