

# EEI-KOLLOQUIUM

## Dynamic Simulation of Car Integrated Multiple Antenna Systems for MIMO and Diversity

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**Diskussionsleitung: Prof. Dr.-Ing. R. Weigel**

Mobile automotive communications, including broadcast, is one of the fastest growing areas in communications. Mobile phone, Wireless LAN, data transfer, radio, TV and many other candidates require the installation of numerous antennas on the vehicles. To overcome the fading, most services require multiple antennas for Diversity or MIMO operation, which multiplies the number of antennas by a factor of 2 to 4. The design, placement and test of these antennas requires enormous efforts in man power, time and cost. The solution to overcome this is *Virtual Drive*. The idea is very simple and intends to model the system electromagnetically. This procedure has the following steps:

- model the complex, vehicle integrated antennas
- model the environment were to drive the vehicle
- model the vectorial coverage by the communication transmitter
- let the vehicle drive through the covered area and sample the received signals of all antennas

The modeling of the vehicle integrated antennas requires the knowledge of the vehicle structure and material composition. The antennas have to be integrated in their intended positions. The calculation of the complex antenna characteristic may by standard EM tools or better by hybrid tools, because of the vehicle size. These hybrid tools combine the Method of Moments f.e. with ray-tracing.