The knowledge of the Earth's gravity field is essential for many scientific disciplines. One possibility to determine the regional gravity field is airborne gravimetry. Within the project GRAVIS, this method is adapted for terrestrial use where the sensor platform consisting of a GNSS antenna array and an inertial measurement system (IMS) is mounted on a vehicle moving on the Earth's surface. This method is a fast and cheap alternative to airborne gravimetry and can be applied for the densification of gravity measurements in regions with sparse gravity distribution.

One innovation of this concept is the use of an antenna array to compensate the drift behaviour of the IMS gyroscopes. The feasibility of this approach was investigated in detail. The biggest challenge compared to the airborne case are the poor surrounding conditions along the trajectory which lead to cycle slips, multipath and shadowing effects for the GNSS measurements.

The investigations led to special emphasis on error analysis since the measured gravity is strongly influenced by GNSS and IMS error sources. In order to achieve mGal accuracy, intensive investigations were done under laboratory conditions including a climate chamber, as well as real conditions.

This poster presentation introduces this novel system design for a car-mounted GPS/IMS gravity measuring system and gives first test results and a short outlook to further investigations.