**Objective:**
Development of an innovative lightweight gearbox housing made from fiber-reinforced plastic with significant weight savings

**Implementation:**
- 3D scan of the previous housing

- CAE-based analysis of the component specifications using the scanned 3D data and relevant load cases of the vehicle in question

- Creation of the performance specifications based on the analysis of the mechanical requirements and requirements of conventional gearboxes

- Methodical selection of the materials system in combination with the strengthening technology to be used

- 3D FE-based topology, shape and ply drop optimization for the materials system selected: organo sheet with short-fiber reinforced, injection-molded ribs

- Injection-molding simulation to identify the fill level and material orientation, for example, with subsequent FE stiffness analysis with regard to wave drift/wheelset displacement

- Development, construction and manufacture of the gearbox housing by the ARRK Group

- Testing the materials quality achieved and component characteristics

- Optimization of manufacture and construction

**Result:**
- Organo-sheet gearbox housing with a weight saving of 30% offering the same performance as conventional gearboxes