For vision based tasks in driver assistance systems it is desirable to have a large view of the surrounding of the vehicle. However, conventional perspective cameras typically used in vehicles, only provide a horizontally limited field of view. In contrast, catadioptric camera systems which are a combination of a convex mirror and a lens, are able to provide a 360° field of view of the environment with only one camera.

With a catadioptric camera system it is possible to see objects alongside the vehicle and not only in front of the vehicle. This allows to provide information like passing vehicles, pedestrians and lane markings. For applications like blind spot detection, lane departure warning and lane tracking knowledge about the sides of the vehicle is essential. In addition a panoramic view of the surrounding could improve new applications like crossroad reconstruction in urban environments.

The goal of this project is to develop a catadioptric stereo rig which improves application for advanced driver assistance systems like object detection, 3D reconstruction and localization. Therefore, we evaluate the advantages of different catadioptric stereo setups and different mirror shapes for environmental perception in traffic scenarios.