A high precision self-localization system has been realized

- Laser scanner-based self-localization method for rural road sites and intersections
- High precision in position and orientation (less than 0.5 m / 0.5°)
- Suitable for security and comfort applications
- Robust against harsh weather conditions
- Stand-alone system or add-on for already built-in environment perception systems

Requirements

- Digital map including landmarks (LM)
- Landmark candidates extractable from laser scanner data
- Approximate position and orientation as initial values (GPS accuracy)
- Motion data (velocity and yaw rate) from vehicle

Positioning algorithm

Landmark candidate extraction

- Find small sized objects in history map using image processing algorithms
  e.g.:
  - Street lights
  - Reflector posts
  - Tree trunks
  - Road signs
  - etc.

Landmark association

- Creation of an association area surrounding a landmark from the digital map
- Association of landmarks and LM-candidates using geometrical methods
  Comparison of landmarks and candidates to avoid multiple/mismatched pairs