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Statistical SOTIF Validation and Verification for ADAS/AD functions

Quantitative arguments about the SOTIF according to ISO/PAS 21448

Smart PhysIcal Demonstration and Evaluation Robot (SPIDER)

- Self-developed mobile platform.
- Used for development and evaluation of Advanced driver-assistance systems (ADAS) / Automated Driving (AD) functions.
- Omnidirectional movements, including 360° or sidewalks movements.
- Prepared to work in adverse environmental conditions such as rain or fog.
- High flexibility to integrate different types of sensors – Extensible design.
- High Level Controller (HLC):
  - Ubuntu, Robotics Operating System (ROS), High-Performance Computer with a dedicated GPU.
- Low Level Controller (LLC):
  - CAN Bus, Automotive Realtime Integrated NeXt Generation Architecture (AURIX).

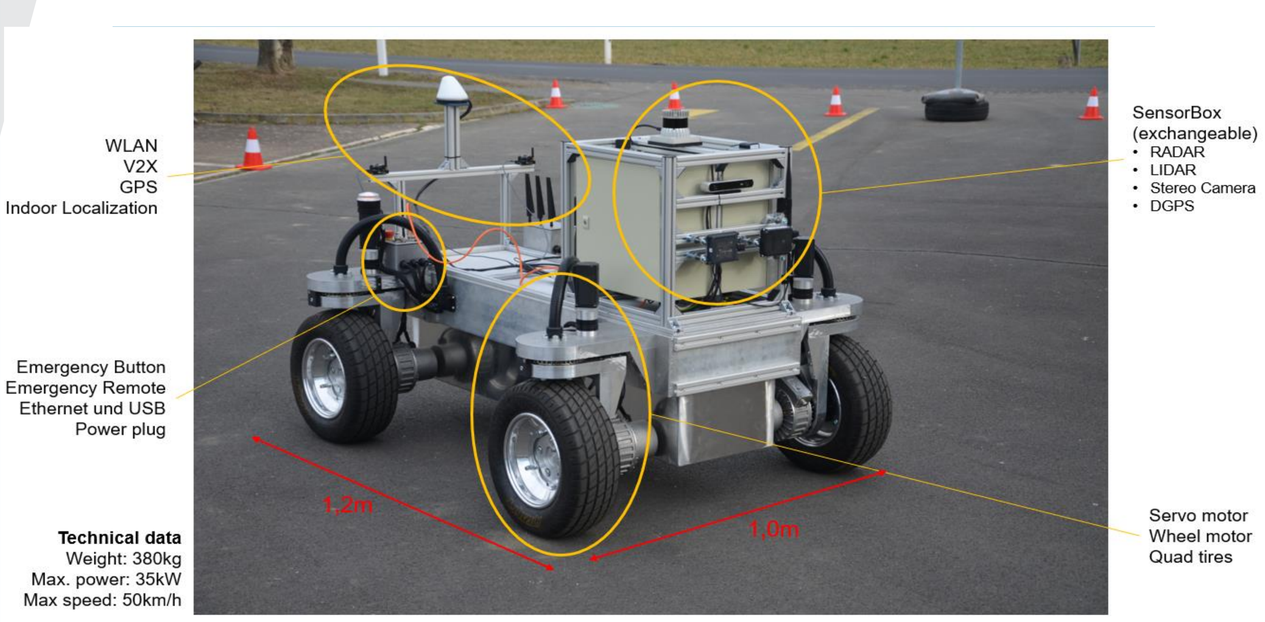

Fig. 1. Smart PhysIcal Demonstration and Evaluation Robot (SPIDER)

Validation and Verification of ADAS / AD functions

- Focused on the possible technical shortcomings to avoid these false positives and ensure safety in all situations, especially the edge cases in which sensors have high probability of deliver a false perception of the reality.
- Definition of scenarios that cover the maximum type of situations and sensors edge cases in which sensor functionality is put into the limit.
- Create a list of sensor fault models for most used sensor technologies (radar, camera, and lidars) in ADAS/AD functions, which will be used to inject faults in simulations.
- A statistical approach is carried out by simulations of the defined scenarios together with the fault injections to provide quantitative arguments for safety function validation.
- Testing activities:
  - SPIDER mobile testbench
  - Austria Light Vehicle Proving Region for Automated Driving (ALP.Lab)
    - https://www.alp-lab.at/
    - Real-life testing on public roads.
    - Collaborations with other related companies.

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