VERIFICATION
VALIDATION
METHODS

PROJECT of the PEGASUS FAMILY

ADVERSE WEATHER VALIDATION FOR AUTOMATED DRIVING SYSTEMS (ADS)

Example: Spray generator for quantitative determination (valuation) of the effects of spray on the perception unit of an ADS.

Werner Ritter, Mercedes-Benz

Spray Impact: Spray caused by wetness or snow on the road surface, which is stirred up by vehicles, can lead to considerable disturbance in the detection and localization of other road users by the perceptual system of an ADS.

Spray Generator: In order to be able to determine the degree of disturbance or to verify the robustness of an ADS to different spray strengths, a repeatable measurement method for spray is necessary.

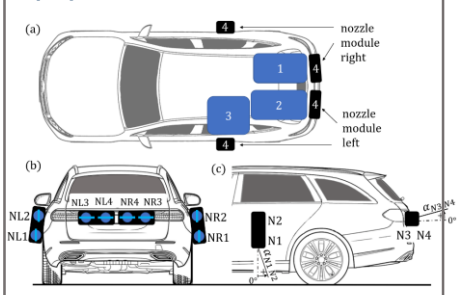
The core of our measurement procedure is the spray generator developed by us in cooperation with Messring. With the aim to keep the test effort low and at the same time to have a high flexibility regarding the test location, a transportable spray system was developed in VVM, which can be installed quickly and easily in almost any vehicle.

With this spray generator, different spray pattern variations can be generated by different installation positions, orientations and types of spray nozzles.

Spray Measurement Campaign: We used the spray generator to carry out and evaluate an elaborate measurement campaign at our Mercedes-Benz test site in Immendingen.

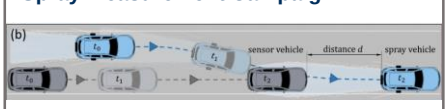
In the process, we have demonstrated the suitability of our approach in principle. For more details please refer to the paper “A Benchmark for Spray from Nearby Cutting Vehicles “, S.Walz et al, ITSC 2021

Spray Generator

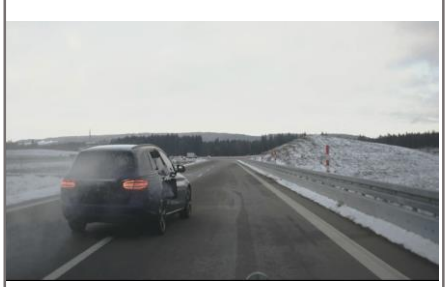


Design of the spray generator
Spray module components (see (a)):
1) Pump module, 2) Electric power module, 3) Mobile water tank (100l).
4) Four spray modules, each equipped with two flat jet spray nozzles

Spray Measurement Campaign

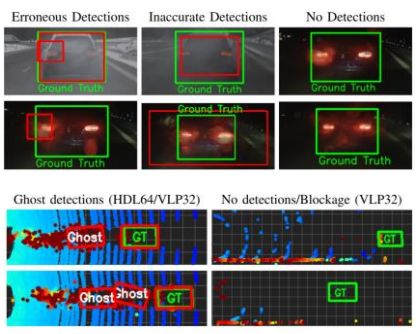


Test set up overtaking maneuver The sensor vehicle (gray) is overtaken by the spray vehicle at defined speeds and speed differences and shears in at a defined distance after overtaking.



Scene from overtaking maneuver with shearing spray-vehicle

Spray Impact



Effects on perception module
Spray causes significant disturbances in the perceptual module of an AD. Common effects are false detections '(halucinations), non-detection and incorrectly estimated object dimensions.

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Projektpartner

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