

Through Rain, Dust and Fog: Our Industrial Consortium Arrives at Final Results from LiDAR Testing in Adverse Conditions

- fka leads an industrial consortium to develop a standardized methodology to test LiDAR Performance in Adverse Conditions (LPAC).
- The testing phase, involving 8 different sensors in adverse conditions, has concluded, and results were shared with the consortium.
- The project aims to develop a new standard for LPAC.

Aachen, March 2025: In today's automotive industry, LiDAR sensors have a key role in performing precise measurements and three-dimensional scans of the vehicle environment. Doing so, enables a wide range of features, making the driving experience safer and automated.

In October 2023, fka GmbH launched a new industrial consortium with the Driving Vision News (DVN) network to create a **test methodology to evaluate the performance** of LiDAR sensors when subjected to non-ideal or adverse conditions. Twelve companies integrate the consortium, representing OEMs, Tier 1s, LiDAR manufacturers, testing organizations, and LiDAR component manufacturers.

The methodology development for LPAC covers three main conditions that potentially affect the performance:

1. Adverse weather, such as rain or fog
2. Contamination of sensor surface through dirt, or contamination of transmission medium through road spray or dust
3. Interference with other LiDAR sensors or cameras

The overall test methodology, test tools, and scenarios were created and validated within the framework of this project. Data from 8 different LiDAR sensors (with wavelengths of 905 nm and 1550 nm) was gathered using temporary rain, fog, and spray chambers on the test track in Aachen. These tests were supplemented with interference tests in a week where all LiDARs were available together.

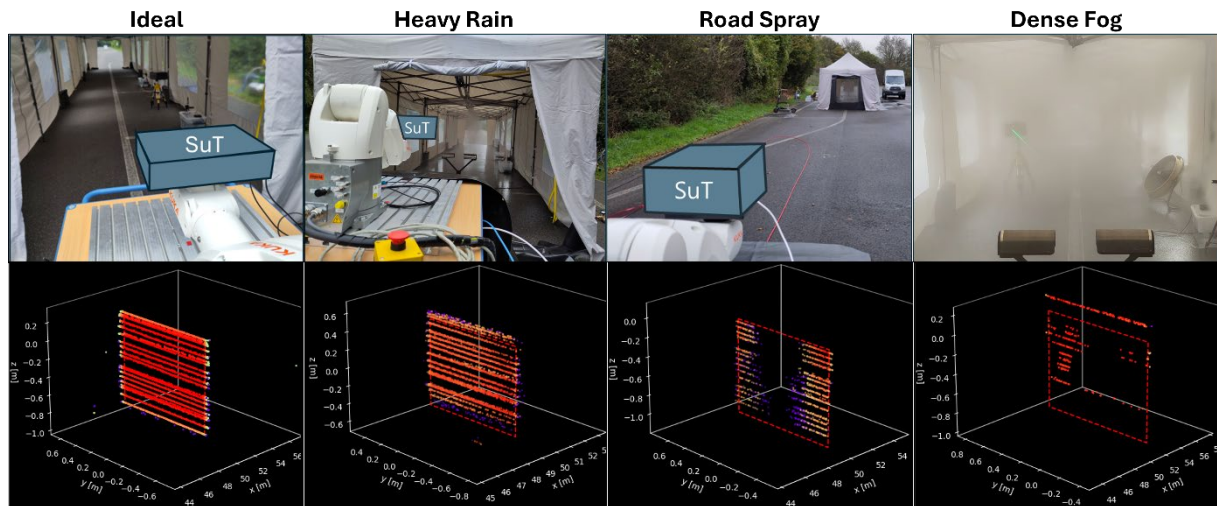


Fig 1: Example of LPAC adverse condition tests (conditions: ideal, rain, road spray, fog)

The testing phase of the 8 different LiDAR sensors concluded in November 2024. The data was analyzed using the DIN SAE 91471 specification, a specification that defines how LiDAR sensors should be evaluated in the automotive industry through key performance indicators (KPIs). The results were presented to all members of the consortium in a final online workshop on 18th February 2025. The project has helped provide insight into the LiDAR sensor performance and specifically limitations when subjected to adverse conditions.

The definitions created in this project shall be used for the formulation of a new testing standard for LiDAR performance evaluation. The official process is set to begin by the end of the first quarter of 2025.

LPAC Consortium Members

Valeo Detection Systems, Honda R&D Europe, Volvo Cars Corporation, TORC Robotics, DEKRA SE, Luminar Technologies, MicroVision, Scantinel Photonics, CHASM Advanced Materials, Kautex Textron, Daikin Chemical Europe

About fka

For more than 40 years, fka has been internationally known as an innovative engineering service for the mobility industry. Driving the world by developing ideas and creating innovations is the mission statement that fka's team is committed to.

The team is inspired by a passion for efficient, safe and fascinating mobility. As one of the first companies on the Aachen campus, the spin-off of the Institute for Automotive Engineering of the RWTH Aachen University demonstrated entrepreneurial foresight.

Interdisciplinary expertise in all aspects of mobility and technological visions, combined with the advantages of the inspiringly creative location, are fka's fuel. Ideas, innovations and unique methodological expertise are shaped into well-founded and secured solutions that give fka's customers the necessary edge in a wide range of issues.

A complete spectrum of services, ranging from consulting and conception to simulation and design, prototype construction and experimental testing, forms the basis for this. With the credo "creating ideas & driving innovations", the team constantly has the mobility of the future in mind.

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