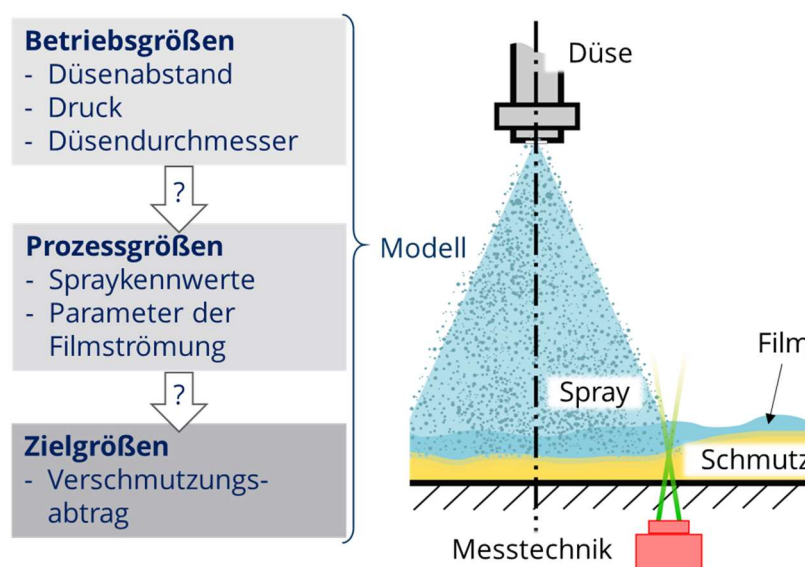


Summary

of IGF project 01IF22492N “Development and application of an adaptive 3D camera measurement technology for the semi-analytical modelling of spray cleaning processes” – “Measurement methods and modelling of spray cleaning” (MeMoSprüh)

The IGF project *MeMoSprüh* focused on the development and application of an innovative adaptive 3D camera measurement technique for the analysis and semi-analytical modelling of spray cleaning processes. Through the implementation of a camera measurement system based on three-dimensional particle tracking and a double-helical point spread function, it was possible to record highly resolved measurement data on film flow and dirt removal in spray cleaning processes with uncertainties of less than 10 µm for the first time. The ability to analyze flow profiles and the dynamics of dirt removal with high temporal and spatial precision has opened up detailed insights into the physical mechanisms of spray cleaning processes. The methodology developed in this project for combining experimental data and semi-analytical models enables the identification of relevant process parameters such as droplet sizes, impact forces and, to some extent, film flow dynamics and improves the prediction of cleaning processes. A significant technological advance lies in the development of a scalable method for mapping local cleaning efficiency as a function of operating parameters such as nozzle pressure, nozzle spacing and spray pattern shape. This enables the systematic optimization of nozzle and process designs, which can lead to improved cleaning performance while conserving resources.

The project has thus not only yielded new scientific and technical insights in the field of spray cleaning, but has also developed practical tools and methods that enable direct industrial application. The 3D camera measurement technology developed provides a valuable basis for the further development and adaptation of industrial cleaning processes. The progress achieved contributes to increased efficiency and cost reductions across various sectors and supports the industries involved in strengthening their technological base and securing their competitiveness. This applies in particular to small and medium-sized enterprises (SMEs) in the fields of food technology, packaging, automotive engineering and building services engineering.



Content and aims of project „MeMoSprüh” at-a-glance.