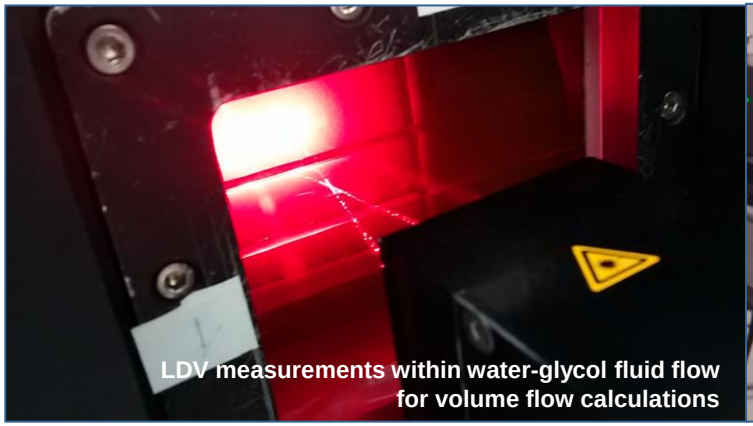
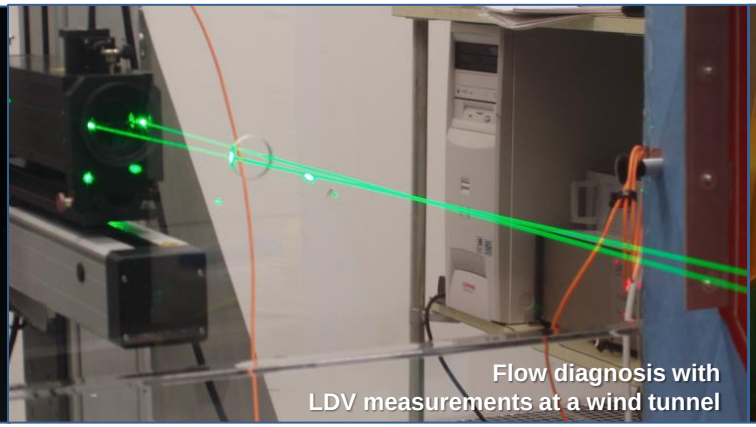
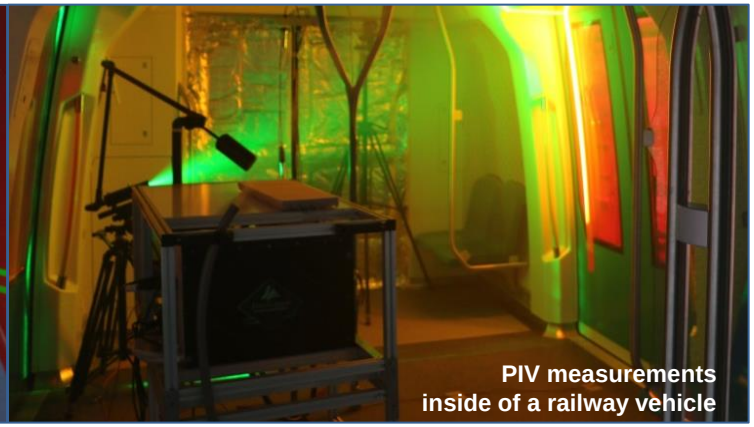
OPTOLUTION

Our technical service
LASER OPTICAL FLOW MEASUREMENT


LDV measurements within water-glycol fluid flow for volume flow calculations


Flow diagnosis with LDV measurements at a wind tunnel


PIV measurements inside of a railway vehicle

Laser optical flow measurement – our solution for a variety of measurement problems

Laser optical flow measurements enable precise flow quantification of velocities within hard to reach or delicate flow conditions due to its contact and intrusion-free measurement principle. Apart from fluids, moving surfaces can be measured with equal precision.

Laser optical flow measurements are particularly suited for:
- The measurement of one and more dimensional local flow velocities in fluids
- For calculation of the volume flow within systems
- Local or extensive measurement of flow indicators in fluids and at surfaces and
- Validation of CFD simulations.

Furthermore we offer numerical CFD simulations (especially for pipe flows).
Another service in our portfolio is the on-site calibration of large flow sensors. Our calibration laboratory is accredited by ISO/IEC 17025 (Link to our website).

Flow diagnosis, volume flow measurements, validation of simulation results, specific applications – our portfolio

Depending on the task at hand, we use different measurement technologies and their technological enhancements, e. g.:
- Laser Doppler Velocimetry / Anemometry (LDV/LDA)
- Particle Image Velocimetry (PIV)
- Doppler Global Velocimetry (DGV) and
- Filtered Rayleigh Scattering (FRS).

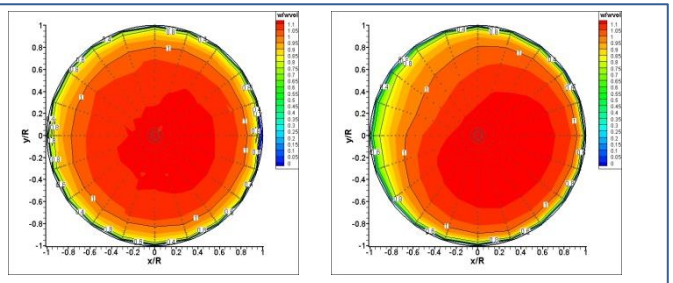
On our website you can find the description of the often used measurement technologies (Link).

Our services are based on a modular concept. They consist of:
- Systematic analysis of the problem
- Building a concept for the measurements
- Adaption and providing the needed measurement technology
- Realization of the measurements
- Evaluation and discussion of the measured data.

We use OpenFOAM® for our numerical CFD simulations. For pre- and post-processing we use our own software.

Your advantages – extensive knowhow and years of experience

The advantages for our customers are clear:
- Using high-end measurement technology without risks
- Fast problem solving
- No need to learn the handling of the measurement equipment
- Access to extensive experimental knowhow
- No costs for buying the measurement equipment
- Using our knowhow of fluid mechanics
- Support for internal capacity problems and
- Flexible and uncomplicated cooperation.


Example for comparison of LDV measurement results (left) and CFD simulation data (right) after a flow disturber

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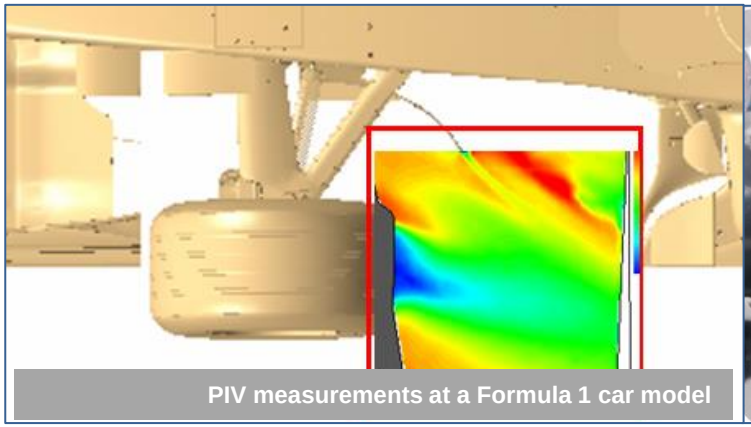
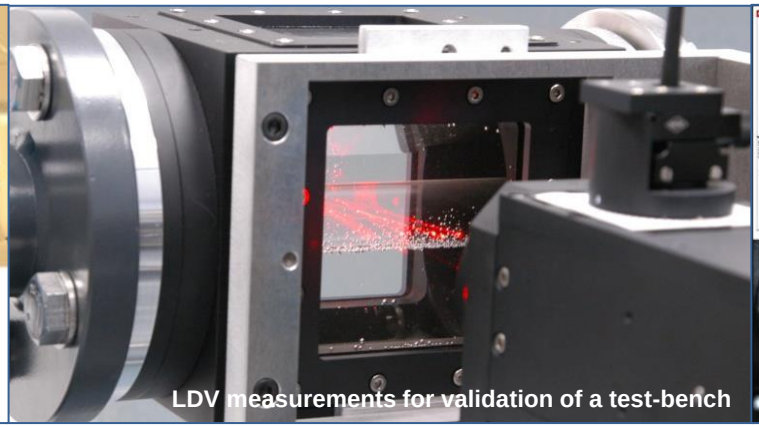
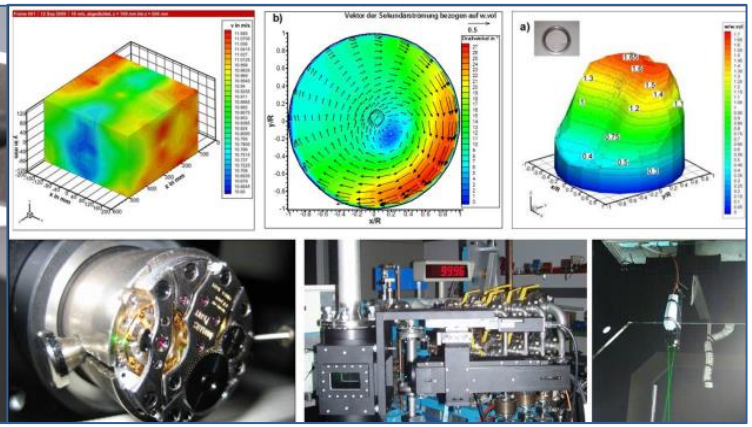


PIV measurements at a Formula 1 car model



LDV measurements for validation of a test-bench



Numerous applications

Sensors and actors

- Optimization of flow sensors for extension of measuring dynamic, minimizing measurement uncertainty and reduction of the sensitivity to flow disturbance
- Validation and optimization of test-benches for flow sensor calibration
- LDV application as a working standard or reference standard for volume flow calibrations
- Research for reduction of pressure drop after fittings and
- Analysis of flow in small cross sections.

Heating, Cooling and ventilation industry

- Validation of models for the circulation inside and outside of buildings
- Visualization and optimization of the flow in clean rooms and
- Optimization of smoke detectors.

Fine-tool engineering and medical technology

- Detection of uneven surface velocities at turning parts and
- Improvement of implants in flow and blood and insulin pumps.

Concept for specific solution

Process and apparatus engineering

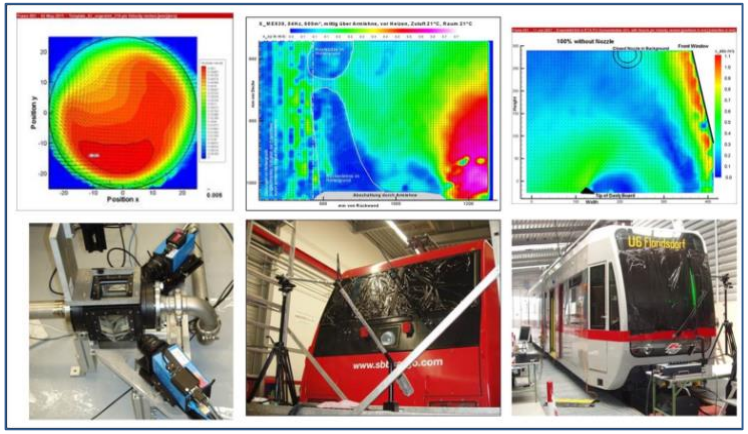
- Technical understanding and targeted manipulation of one- and multiphase flows
- Analysis and Improvement of injection, mixing and separation processes
- Reduction of cavitation
- Optimization in plants for filament processing
- Optimization of the flow in coating processes.

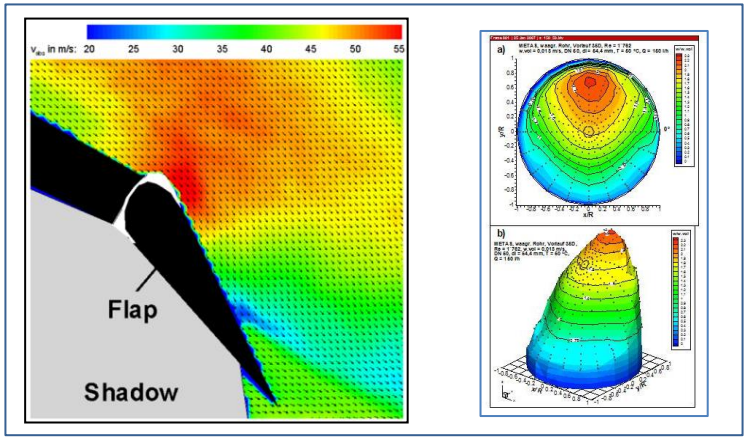
Automotive and turbo machinery industry

- Research to increase process efficiency
- Optimization of geometries for minimizing drag of components
- Parametric study for reducing driving noise and increasing comfort
- Research of phenomena at boundary layers and
- Analysis of combustion processes.

Aerospace industry

- Analysis and reduction of separations of the flow at profiles and
- Research and targeted manipulation of liquid movements during the flight.





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