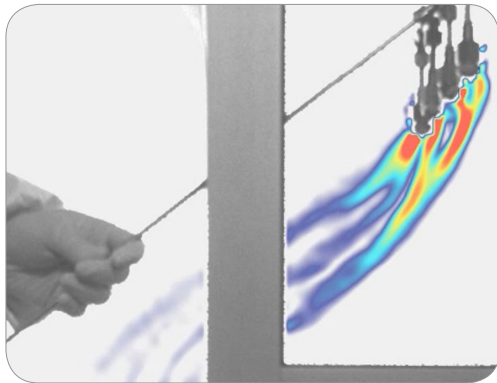


Make Air Flows Visible

Flow tracing without
contamination

LaVision's **FlowBOS** imaging system visualizes air (gas) flows in front of a projected or displayed background pattern without particle contamination. Optical changes of the flow (aka Schlieren) are detected which are already present in thermal flows or are introduced by a tracer or process gas.

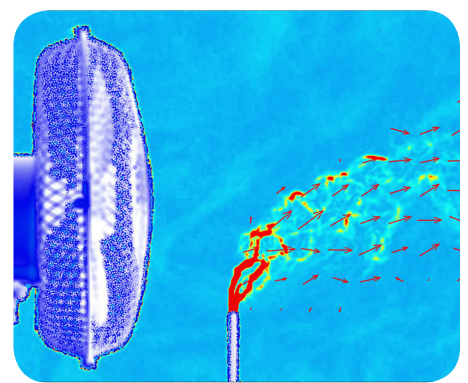
The applied **Background Oriented Schlieren (BOS)** imaging technique is highly sensitive, scalable in measurement area and monitors the flow motion in real time. Beside the background pattern nothing else is needed for flow capture.



Smokeless smoke testing



Thermal flow visualization



Air flow monitoring

Smokeless smoke testing

For flow visualization in cleanrooms and flow boxes particles (aerosols or smoke) are commonly used. The downside of this approach is the particle contamination of the investigated area. In contrast, the **FlowBOS** system works with a modified air (**BOS air**) for safe and clean flow seeding avoiding contamination. In **BOS air** the nitrogen is replaced by a noble gas mixture and is, therefore, safe for humans and does not interact with any material. **BOS air** is perfectly balanced with the surrounding air and follows even its slightest motions.

Thermal flow visualization

The applied BOS imaging technique is highly sensitive to air temperature differences and therefore requires no flow seeding at all for thermal flow visualization.

Multi-gas processes

Interacting flows consisting of multiple gases are detectable due to the different optical properties of the constituent gases.

Simplicity and versatility

The **FlowBOS** imaging system monitors all kind of flows in real time over a wide range of flow scales and flow rates with excellent spatial and temporal resolution. Simply point the **FlowBOS** camera through the flow onto the provided background pattern to uncover the otherwise invisible flow process. The pattern can be projected onto a background surface using a blue LED, or a laser in case of near surface measurements. In stationary applications without space limitations the background pattern can be generated on a TV-monitor placed behind the flow. The **FlowBOS** software provides a touch-screen optimized interface designed for intuitive camera control and live-view recording of the flow BOS images superimposed on the real scene. System setup is fast and straightforward and can be deployed at short notice and supports also on-line process control applications.

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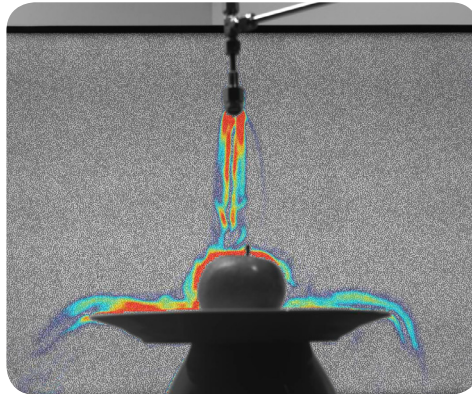
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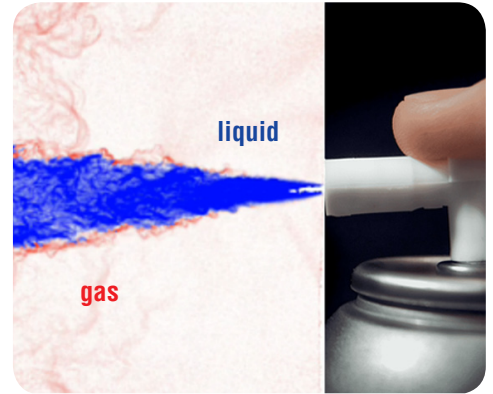
The extremely versatile **FlowBOS** imaging system can be used in a wide range of applications from leak detection, through car interior ventilation to full room flow behavior in cleanrooms or for heat, ventilation, air conditioning (HVAC) tests.



Leakage detection



Process gas visualization



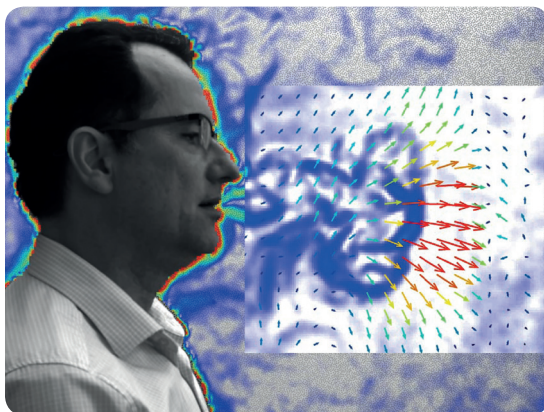
Multi-phase spray imaging

System features

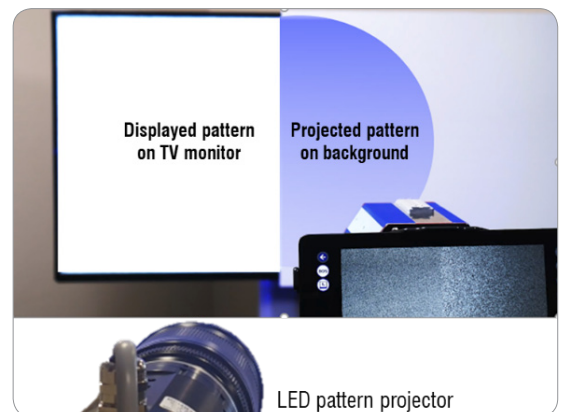
- ▶ sensitive imaging technique for (thermal) air flow motion visualization and velocimetry without particle seeding
- ▶ flexible fields-of-view up to large scales
- ▶ simple system setups
- ▶ software interface for process integration

Applications

- ▶ imaging of air flows and flow velocities in cleanrooms
- ▶ HVAC testing: air conditioning and heat management
- ▶ gas shielding inspection in welding and 3D printing applications
- ▶ fume hood inspection
- ▶ flow machinery



Thermal air flow visualization of a speaking person



FlowBOS setup with pattern displayed on a TV monitor or projected on background surface

Data provided by LaVision are believed to be true. However, no responsibility is assumed for possible inaccuracies or omissions. All data are subject to change without notice.

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