LaVision
FOCUS ON IMAGING

Focus on Motorsports

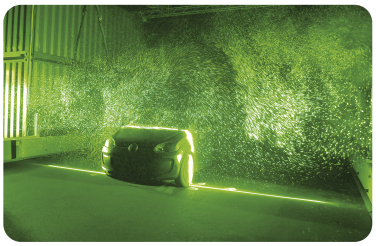
LaVision imaging systems have been involved in motorsports and formula 1 racing for many years. See how our imaging systems can help you to get the most out of your vehicle.

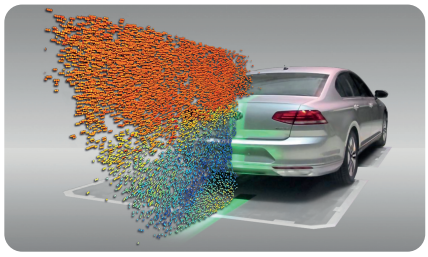
Aerodynamics

- Ring-of-Fire on-road aerodynamic testing
- Large-scale wind tunnel testing
- Automated robot-based aerodynamic testing
- Underfloor embedded PIV
- 360° measurements
- Cluster distributed processing

Ring-of-Fire on-road aerodynamic testing

For on-track measurements under real environmental conditions, our **FlowMaster** systems can be set-up directly on site. This enables the aerodynamic characterization of the complete wake of the car under conditions not producible in a classic wind tunnel.



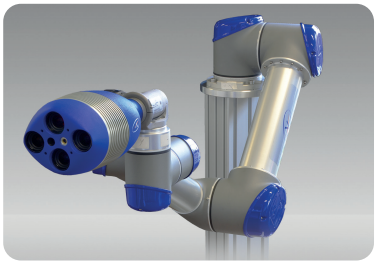


Large-scale wind tunnel testing

LaVision's **FlowMaster** measurement systems are capable of capturing large-scale 3D flow measurements in volumes up to several m^3. Combined with LaVision's Helium-filled soap bubble (HFSB) seeding generator this is possible with eye safe LED illumination.

Automated robot-based aerodynamic testing

To save valuable wind tunnel testing time, LaVision's **FlowMaster** systems can be highly automated and directly be connected to the operating wind tunnel control software. By incorporating our robotic systems, complex recording strategies can be programmed and large-scale flow fields can be obtained by our innovative volume-scanning approach.

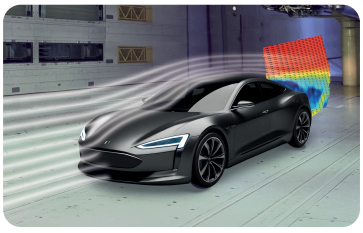


Underfloor embedded PIV

Understanding the underfloor aerodynamics is crucial for optimizing the full car performance. LaVision's **FlowMaster** systems can be configured with small form factor hardware to fit right into the wind tunnel model. This way, the air flow underneath the car can be measured without optical and aerodynamic obstructions.

360° measurements

By employing a multi-camera and multi-directional illumination configuration, volumetric flow fields can be reconstructed all-around the car with just a single measurement. This not only saves expensive wind tunnel run times but aerodynamic effects can be analyzed in the context of the complete car.



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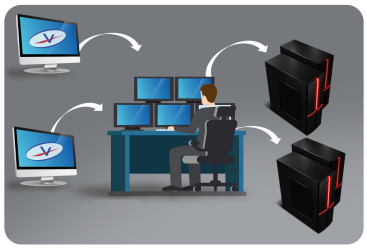


Cluster distributed processing

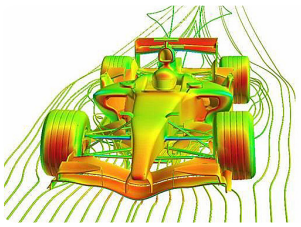
Expensive wind tunnel time and long processing times of large data quantities do not agree with each other. DaVis gives you the capability to minimize the time from measurement to processed results by making the most out of the available computing power with its cluster and distributed computing capabilities. Faster results means faster feedback and more effective usage of limited test times.

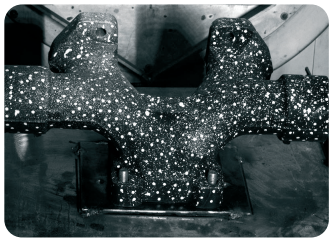
Deformation, vibration and strain

- FSI for flexible aerodynamic parts
- Non-destructive testing
- Component and materials testing
- Deformation, vibration and strain
- Surface and volume measurement
- Mechanical, thermal or combined loading

FSI for flexible aerodynamic components

Combine flow measurements with simultaneous deformation analysis on flexible aerodynamic parts such as airfoils.



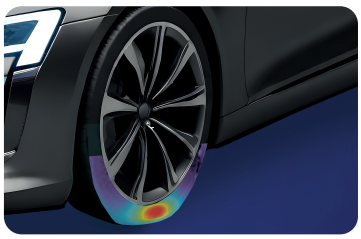


Advanced materials component testing

Deformation, vibration und strain analysis of advanced materials such as CFRP, including high temperature testing.

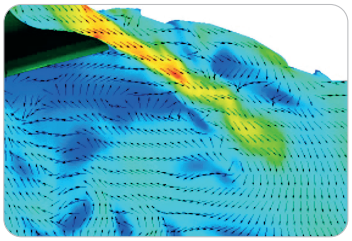
Tire deformation

Tire performance is critical for both direct emission reduction as well as efficient propulsion. A deeper understanding of the tire deformation helps to advance in this field.



Air intake and charge motion

- Air intake and in-cylinder flow
- Tumble and swirl test stand
- Mixture formation & air/fuel ratio



Air intake and in-cylinder flow

LaVision's **FlowMaster** systems can be arranged to measure fluid motion in the most challenging applications. Fully characterize air intake and in-cylinder flow to optimize your combustion process.

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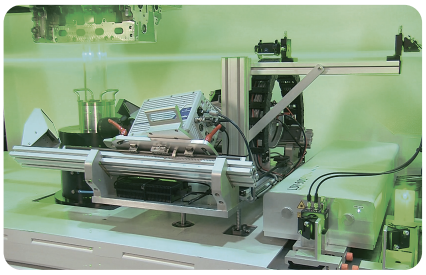
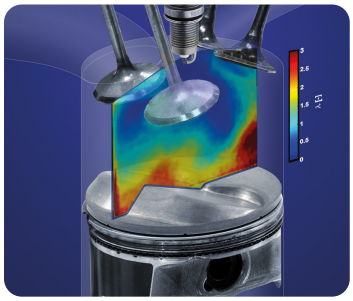


Fully automated flow field Q.C.

LaVision's **FlowMaster** can be integrated into fully automated flow field inspection systems. For example, cylinder head quality control by measuring tumble and swirl.

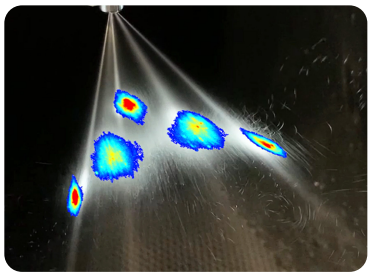
Mixture formation and air-fuel-ratio

The modular laser imaging **FlameMaster** systems provide detailed insights into mixture formation and combustion by providing multi dimensional information on AFR, NOx & soot formation, flame radicals and gas temperature.



Fuel sprays

- Fuel spray characterization
- Fuel injector quality control
- Liquid-vapor separation

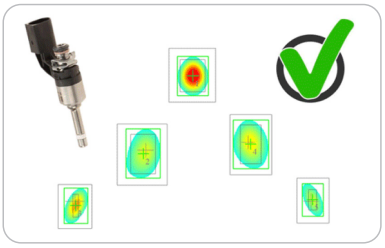


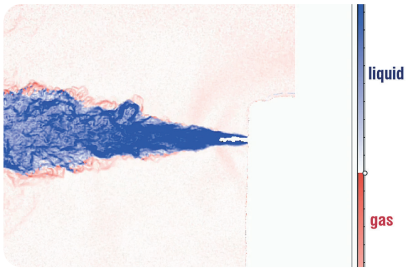
Fuel spray characterization

LaVision's **SprayMaster** systems can provide full characterization of fuel sprays: spray pattern, time resolved axial spray propagation, detailed spray break-up visualization and droplet size distributions.

Fully automated fuel injector Q.C.

To save valuable testing time and to ensure high quality products, **SprayMaster** has been integrated into fully automated fuel injector production lines for 100% quality checks of spray patterns.





Liquid-vapor separation

Combine **SprayMaster** with **BOS** digital schlieren imaging to separate liquid and vapor phases in your fuel spray to get an even more detailed insight into the evaporation process of the fuel spray.

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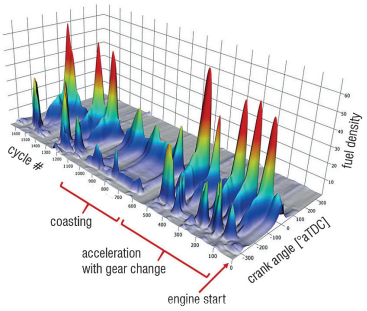
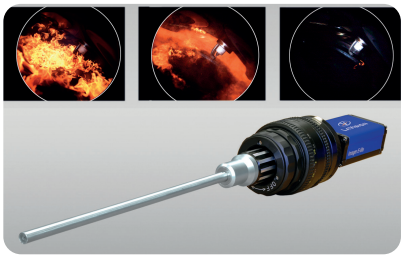
Optical engine indication for single cylinder & race engines

- Ultra-fast optical engine indication
- In-cylinder endoscopic imaging
- UV endoscopic flame front imaging

Ultra fast optical engine indication

LaVision's **ICOS** systems allow ultra fast optical indication of air/fuel ratio, EGR, gas temperature and fuel concentration. A variety of in-cylinder probes can be used for research and production race engines without modification.



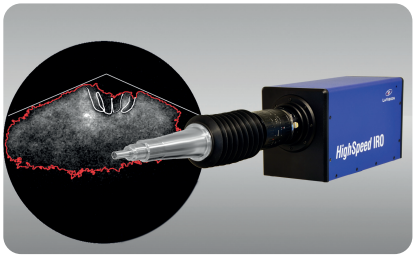


In-cylinder endoscopic imaging

LaVision's **EngineMaster inspe*x*** has been used for in-cylinder imaging for fuel spray and combustion visualization as well as quantitative analysis of flame propagation and spray geometry. High light transmitting endoscopes are paired with latest camera technology to provide ultra high-speed videos from inside the engine.

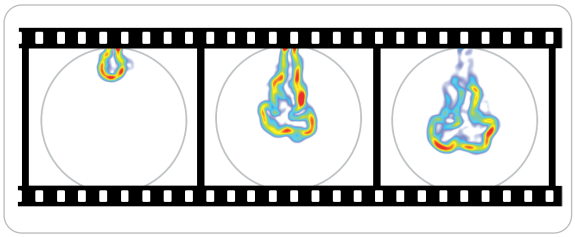
UV endoscopic flame front imaging

For combustion analysis OH* self emission is still the parameter to visualize the flame front. Combining LaVision's unique **High Efficiency UV Endoscope** with IRO intensified camera gives you the best quality images of your flame.



Future fuels

- Hydrogen (H_2) visualization



Hydrogen visualization

Hydrogen cannot be visualized like other gaseous or liquid fuels. Use LaVision's **BOS** digital schlieren imaging to make hydrogen visible to enable to be prepared for the challenges of hydrogen and/or hydrogen dual fuel combustion.

May-24

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