PIV Systems
Fluid flow vector analysis systems for research
Application Note

VisiVector PIV systems allow you to measure the velocity of fluid flow. Here are some ways that our PIV systems are used in the aerospace industry.

The Firefly laser makes setting up a flow measurement easy. The built-in light-sheet generator means that you just have to point the laser at your experiment to get started. A slow-motion movie of the airflow around a desktop fan shows how pulses of air are generated by each of the blades as they move through the air. The airflow in this case is moving at approximately 5 m/s.

The airflow around a refuelling drogue in an open loop wind tunnel was measured with a Firefly laser and high-speed camera. The recording rate was set to 5000 frames per second, and the laser triggered to produce pairs of images with a short separation. Once the images were captured, they were analysed with PIV software to extract the flow velocities. The maximum airflow velocity was found to be 28 m/s.

Turbine blades in jet engines are cooled with a flow of air over their surface, which is generated from ports on the leading edge of the blade. Images of the airflow were captured, by seeding the flow with small tracer particles, and then analysed to measure the speed of the airflow.
Systems for every application

High performance fluid flow velocity measurement
Intuitive set-up and software
Non-intrusive
Image based – Visualise your process

Aerodynamics research and design
Water flow and hydrology
Educational systems
Drug delivery devices and consumer sprays
Automotive sprays

Powder jet from a dry-powder inhaler. Image captured with a Firefly laser as part of a MS500 system

Water flow velocity over series of steps in a laminar flow tank. Image captured with LG30 system
Measure flow velocity, turbulence, shear, vorticity.

Visualise motion within your flow— it's not just a velocity measurement system.

Non-intrusive measurement – collect data without disrupting the flow.

<table>
<thead>
<tr>
<th>Application</th>
<th>LS 12</th>
<th>LR 30</th>
<th>LG 30</th>
<th>MS 500</th>
<th>MS 2000</th>
<th>HS 5400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera Resolution</td>
<td>1.3 MP</td>
<td>2 MP (4MP option)</td>
<td>2 MP (4MP option)</td>
<td>0.5MP (1MP option)</td>
<td>0.5MP (1MP option)</td>
<td>1MP</td>
</tr>
<tr>
<td>Camera Frame Rate</td>
<td>6 pairs/s</td>
<td>15 pairs/s</td>
<td>15 pairs/s</td>
<td>500 frames/s</td>
<td>2000 frames/s</td>
<td>5400 frames/s</td>
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<tr>
<td>Time Resolved PIV</td>
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<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>Laser</td>
<td>Diode</td>
<td>Diode</td>
<td>Nd:YAG</td>
<td>Diode</td>
<td>Diode</td>
<td>Nd:YAG</td>
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<tr>
<td>Laser Pulse Energy</td>
<td>0.2-30mJ</td>
<td>0.2-30mJ</td>
<td>15-200mJ</td>
<td>0.2-30mJ</td>
<td>0.2-30mJ</td>
<td>10-40mJ</td>
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<tr>
<td>Maximum flow velocity in air or water (50µm particles)</td>
<td>50 m/s</td>
<td>50 m/s</td>
<td>&gt;300 m/s</td>
<td>50 m/s</td>
<td>50 m/s</td>
<td>&gt;300 m/s</td>
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<tr>
<td>Options</td>
<td>3D velocity measurements; additional light sheet optics to suit application; LIF module (LG and HS series only); micro-PIV</td>
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