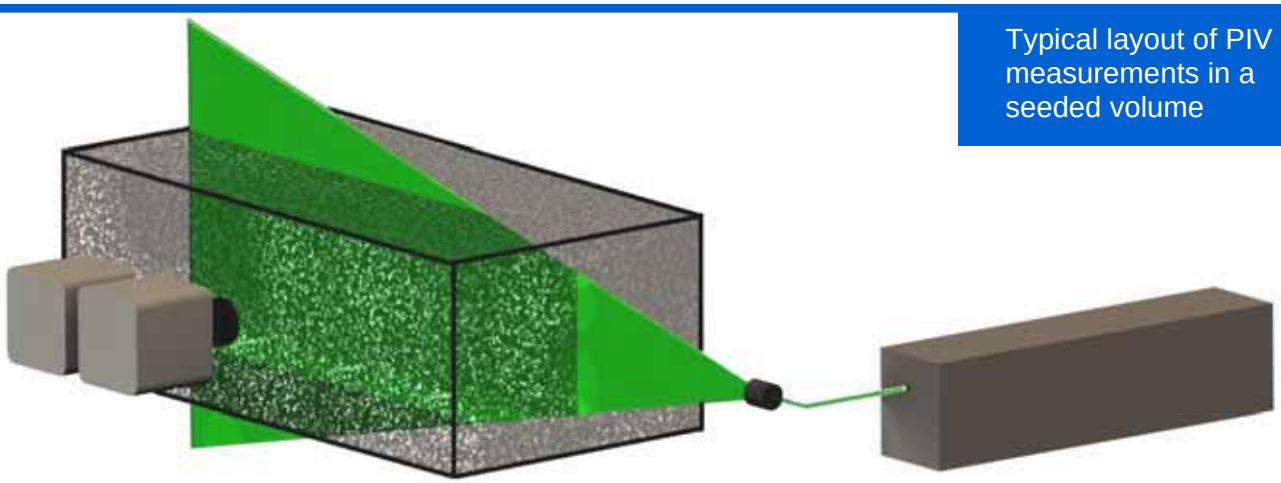
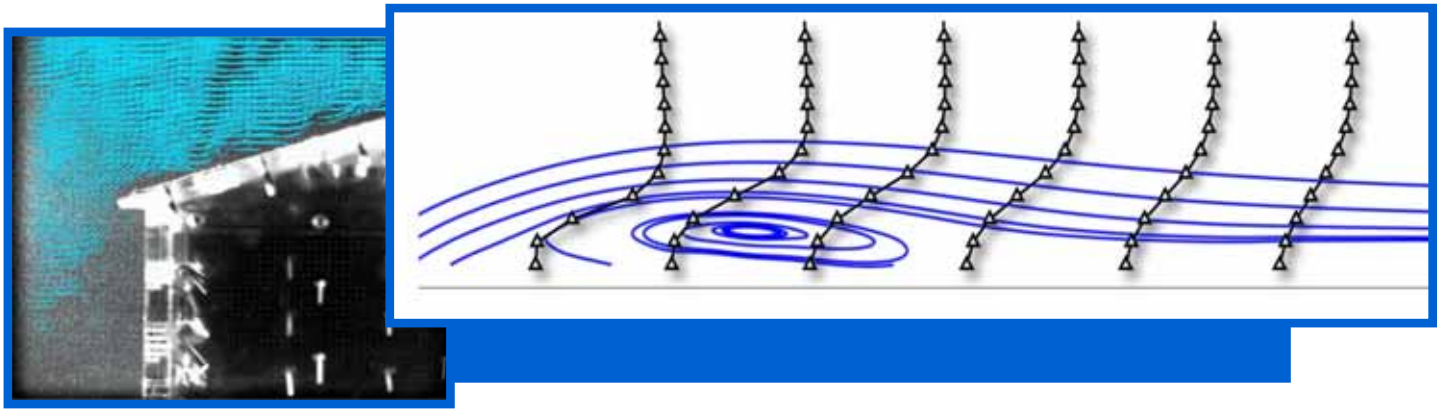
Particle Image Velocimetry

The System



Typical layout of PIV measurements in a seeded volume

Particle Image Velocimetry (PIV) is an experimental technique capable of measuring fluid flows with high spatial resolution. The PIV technique involves seeding the measurement plane with tracer particles. That plane is then illuminated with a laser sheet and two images are captured in rapid succession. Statistical correlation of the images yields two components of velocity in standard PIV techniques and three components in Stereoscopic PIV. As camera and laser technologies have both become faster, so too PIV temporal resolution has increased. This is the only tool capable of reliably measuring reversed flow fields with both high spatial and temporal resolution. We offer a PIV system capable of sampling rates up to 500 Hz with long recording times (on the order of minutes).



Above left is an example of the instantaneous flow field around a low-rise building in an open terrain using PIV. With our high speed system, the possibility exists to trigger both pressure measurements and PIV measurements simultaneously. Above right is an example of a recirculation bubble created as the flow separates at the leading edge of a bridge cross-section. Velocity profiles are superimposed on streamlines, both of which are taken from the PIV measurements. From the velocity profiles one can see that measurements can be made very close to the body. With our unique time-resolved PIV system, we are able to determine spatially and temporally dependent statistics such as cross-correlations, cross-spectra as well as traditional single point temporal statistics such as auto-spectra and auto-correlations within and across separated flow regions.

For more information visit: http://www.blwtl.uwo.ca/

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