

Product description

3D MiniLDV™ System

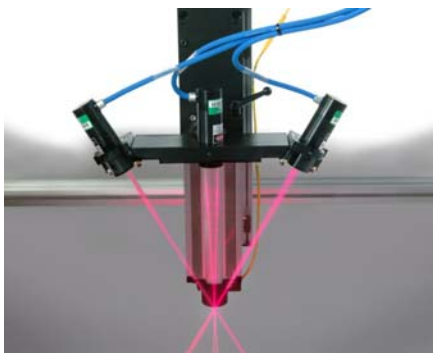
VioSense Corporation



Background

High-resolution measurement of the 3D velocity field of a fluid is a challenging task requiring sophisticated equipment. Most applications for such equipment require high data rates, small measurement volumes and the ability to measure positive and negative velocities, all in an easy to use system. VioSense has developed a system that accomplishes these objectives, featuring color separation for low cross-talk, large included angle for high on-axis resolution and frequency domain processing for use in low signal to noise ratio environments. The 3D MiniLDV System can be used in

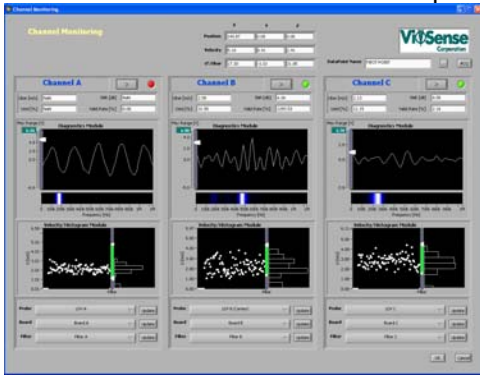
most applications with optical access and suitable seeding particles.



System overview

The VioSense 3D MiniLDV™ System consists of three 1D MiniLDV Probes operating at different wavelengths. The probes are fixed in position using a mounting bracket with adjustable supports. This configuration has a large included angle for good on-axis resolution. Off-axis backscatter reduces the measurement volume size with component separation achieved using color filtering.

Vector decomposition to laboratory coordinates is simple using prescribed set points for yaw and pitch angles. Optical frequency shift is included on all three channels.



A computer-controlled 3D Traversing system is available for moving the measurement volume through space to provide automatic profiles of mean velocity and other statistical quantities.

The VioSense 3D MiniLDV is a sophisticated measurement system that is easy to use, incorporating state-of-the-art technology and features.

VioBP-3 Software interface

System specifications

Product ID: 3D MiniLDV™ System

Description: 3 component laser Doppler velocimeter system incorporating: fiber optics, frequency shift and color separation

Measurement: instantaneous 3D velocity at a single position or at multiple positions using optional traverse.

Principle(s) of operation: Doppler effect, color separation, FFT processing

Laser diodes: wavelengths: 660 nm, 785 nm, 830 nm
power: 20 mw, typical

Probe volume: size*: $d_x \times d_y \times d_z$: 300 x 300 x 300 μm , typical
* for off-axis backscatter configuration, only
working distance (in air): ~230 mm, typical
fringe spacing (each component): 10 μm , typical

PM Tube bandwidth: DC - 10 MHz or 4kHz - 100 MHz

Digitizer: sampling rate: 100 MS/s, max.

bandwidth: 100 MHz

timestamp resolution: 2 ns

max. output data rate: 10 kHz

Velocity (each component): range: -20 to 80 m/s or -200 to 800 m/s, typical

resolution: .1%, typical

accuracy: .3%, typical, depends on SNR

Software: National Instruments LabVIEW® runtime

Outputs: U, V, W_i , $i = 1, N$, U , V, W_{bar}

U_{rms} , V_{rms} , W_{rms} , UV_{bar} , UV_{bar} , VW_{bar} , VW_{bar} plus higher moments

All above available as function of x, y, z, using traverse.

PC requirements: PCI bus, Windows 2000®, Intel Pentium4® recommended

Operating temperature range: 0 - 40 °C

Probe: size: 38 mm (diameter) x 100 mm (length)

weight: 200 g

Specifications subject to change without notice.

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