



VOLUMETRIC 3-COMPONENT VELOCIMETRY (V3V)

BRINGING FLOW MEASUREMENTS TO THE NEXT DIMENSION

The Volumetric 3-Component Velocimetry (V3V) System measures the instantaneous 3-Dimensional 3-Component (3D3C) velocity field within a truly volumetric region of the flow.

ILLUMINATION

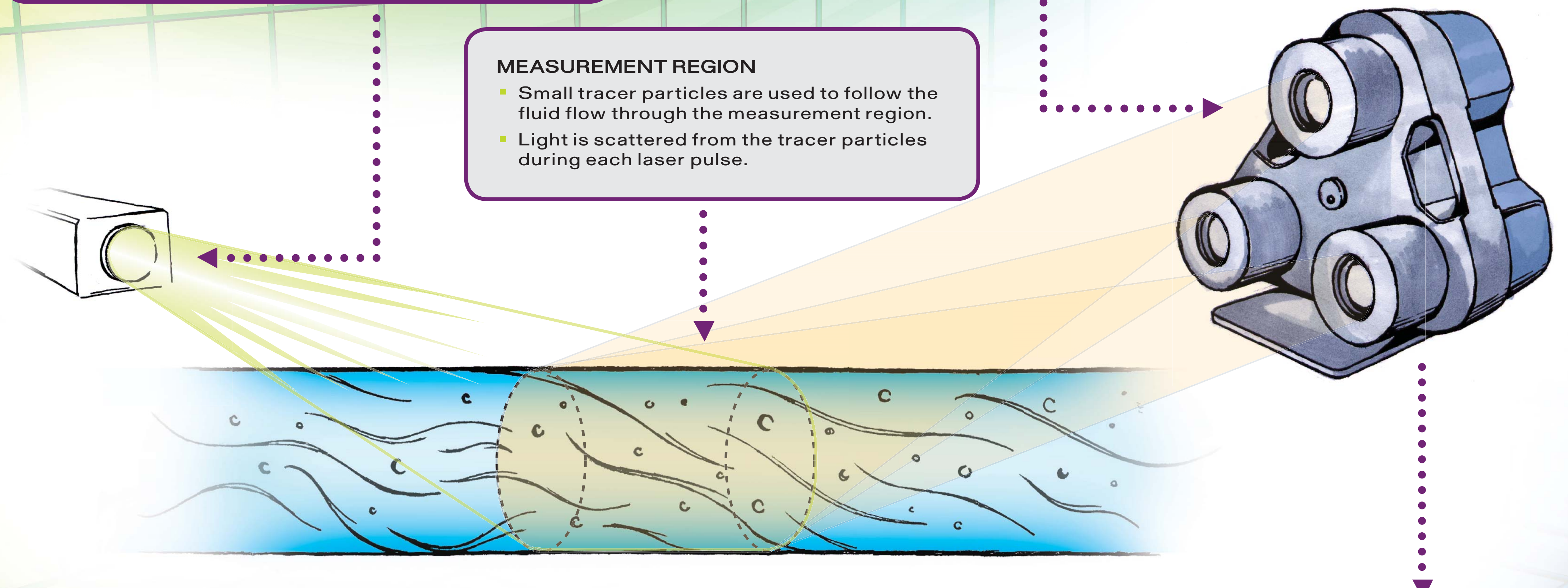
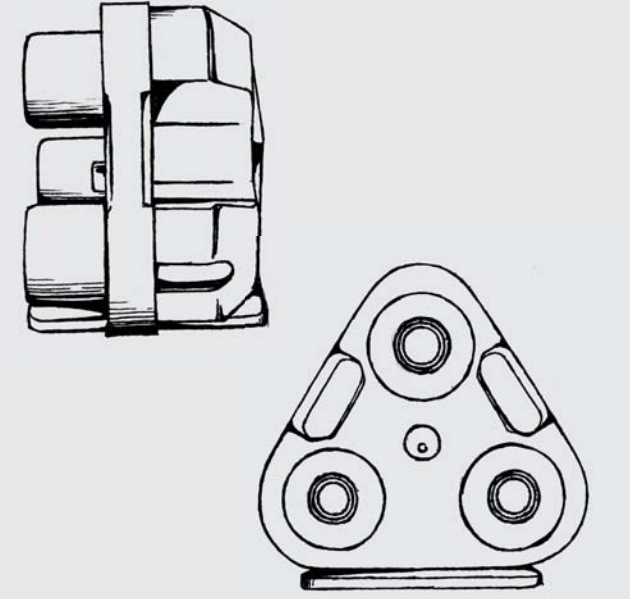
- A laser beam is drawn into a cone of light.
- Two laser pulses are fired in rapid succession, separated by a known time, Δt .
- The volumetric measurement region is illuminated by the laser pulses.

MEASUREMENT REGION

- Small tracer particles are used to follow the fluid flow through the measurement region.
- Light is scattered from the tracer particles during each laser pulse.

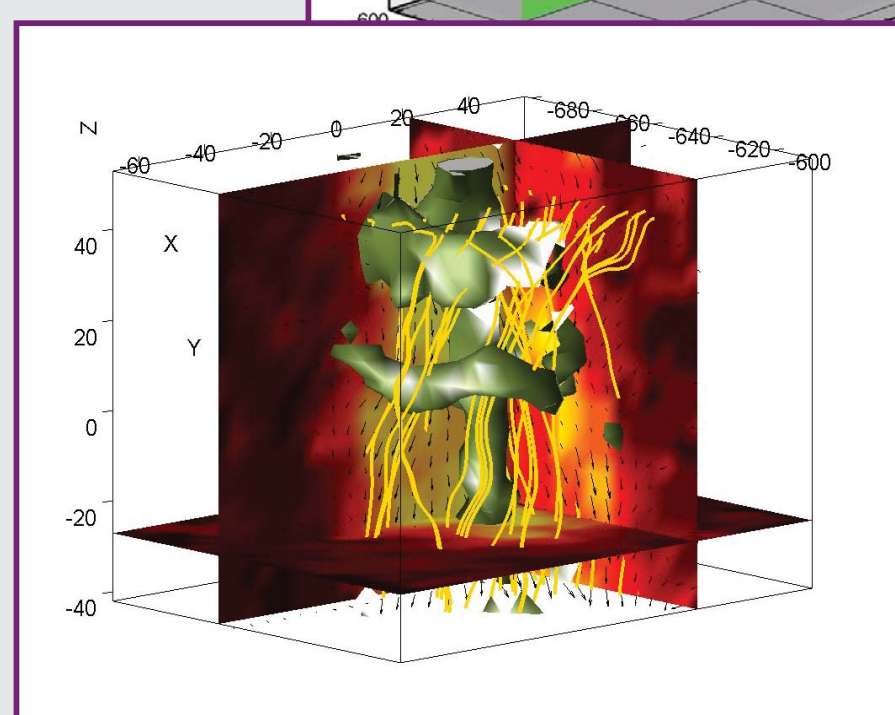
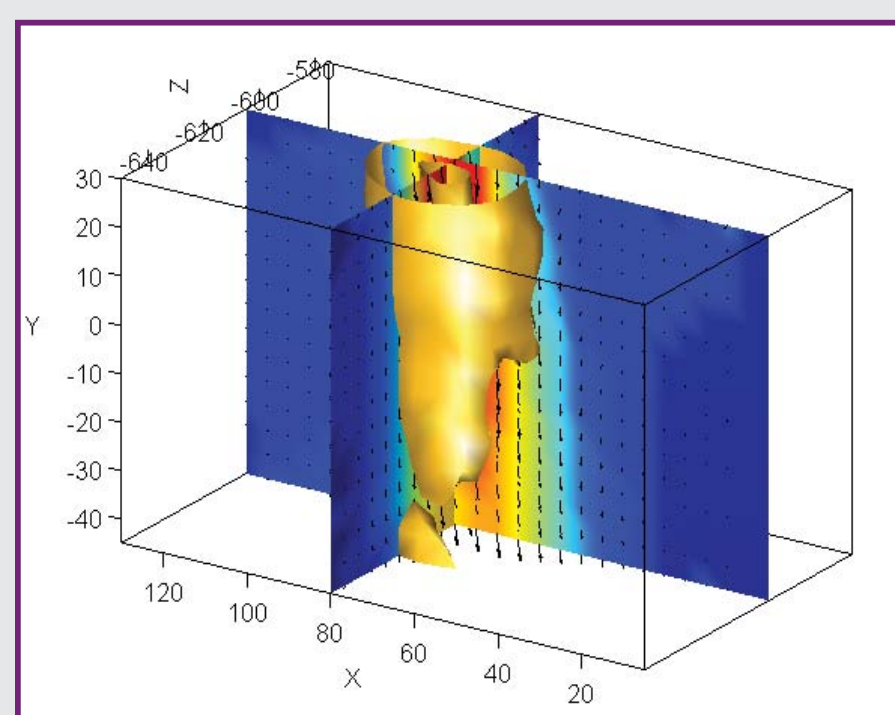
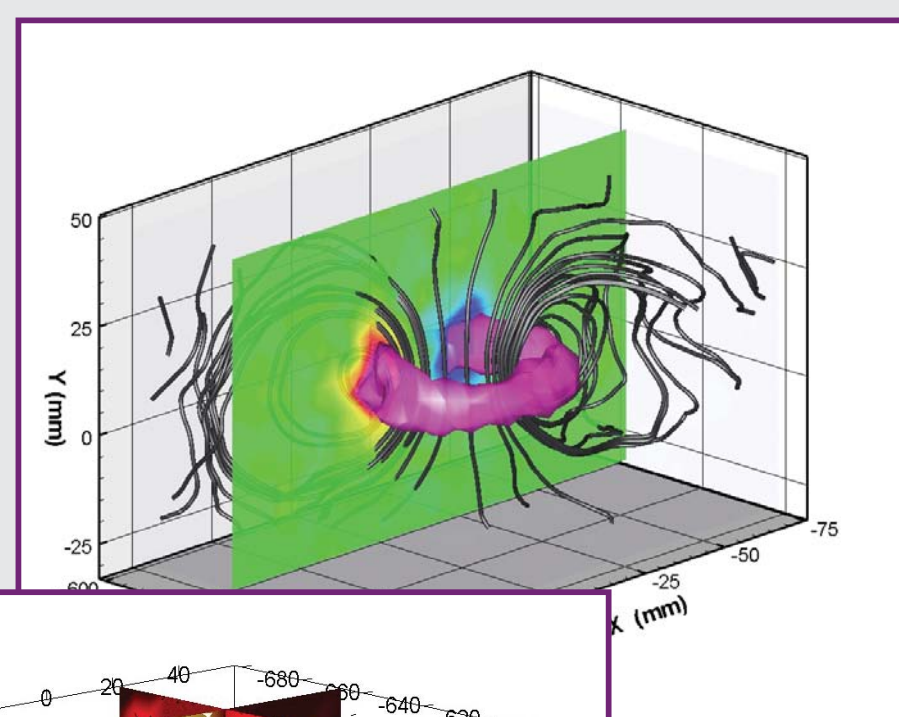
V3V CAMERA PROBE

- The scattered light is collected by the patented V3V Camera Probe*, with three independent imaging apertures.
- Separate images of scattered light are recorded from each of the two laser pulses.
- Images are transferred to the *HyperStreaming™* Computer System at full camera frame rate for up to 17 minutes of continuous capture.



V3V RESULTS

- Volumetric Velocity Plots
- Volumetric Iso-Surface Contours
- Volumetric Stream Lines
- 3D graphics and data analysis
- Higher order quantities such as vorticity
- Movie generation and export



PROCESSING ALGORITHMS

- Information from the 3 apertures is used to determine the 3-dimensional particle locations.
 - <20 micron uncertainty in the x-y plane
 - <80 micron uncertainty in the z plane
- Particle displacements are calculated between the two laser pulses, giving the local 3-Dimensional 3-Component (3D3C) fluid flow velocity.

