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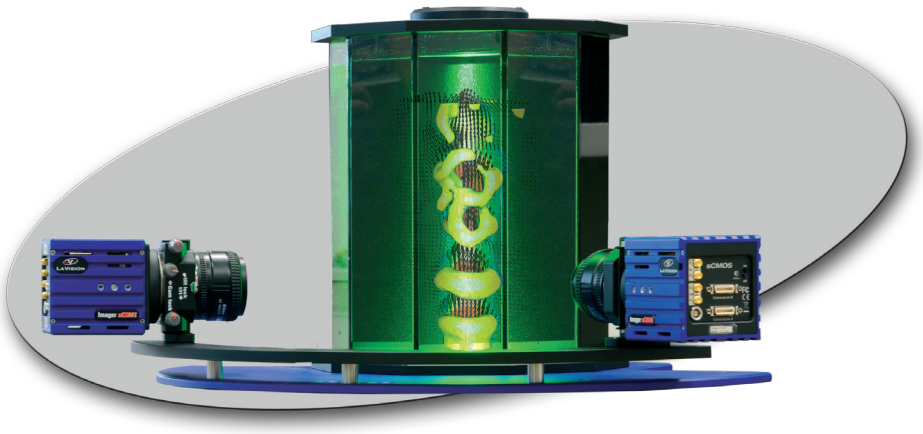
FlowMaster 2 Camera Tomographic PIV

with Motion Tracking Enhancement*

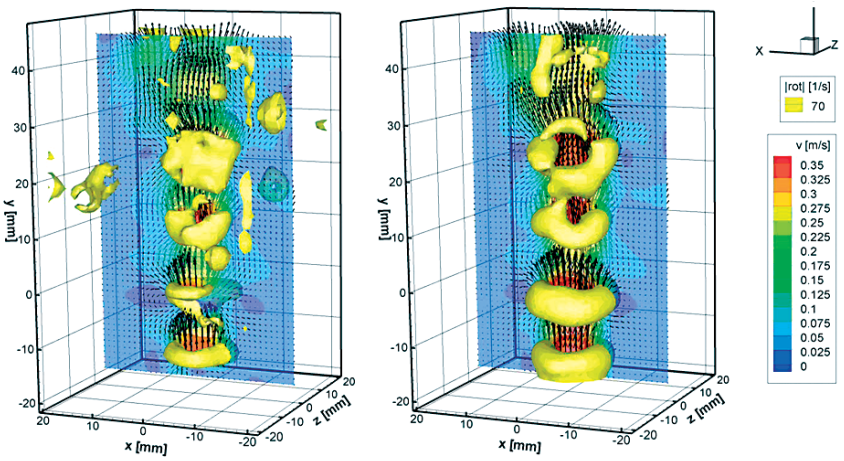
Up to now, 3-4 cameras had to be used for Tomographic PIV. The new reconstruction method **Motion Tracking Enhancement** (MTE)* in combination with the famous Multiplicative Algebraic Reconstruction Technique (MART) enables Tomographic PIV experiments using **only 2 cameras**. This approach minimizes the effort of migration from stereo PIV (2D3C) to full volumetric measurements (3D3C) with all the benefits that result from the ability to calculate the full velocity gradient tensor within a three dimensional measurement volume.



Advantages

- cost effective entry to instantaneous volumetric PIV
- easy software upgrade for existing Stereo-PIV systems
- seeding densities up to 0.03 particles per pixel (120 000 particles with 4 Mpixel cameras)
- even more effective for time resolved data
- upgradeable to 3-4 cameras for seeding densities from 0.05 to 0.2 particles per pixel (200 000 – 800 000 particles with 4 Mpixel cameras)

Standard MART **Motion Tracking Enhancement**



Effect of Motion Tracking Enhancement on the reconstruction of vortex structures: MART reconstruction (left) is not enough to extract the true vortex structures from the laminar jet flow. Only with MTE (right), the vortex rings and their breakdown farther upstream become clearly visible.

*Novara, Batenburg, Scarano, Motion tracking-enhanced MART for tomographic PIV, Meas. Sci. Technol. 21 (2010)

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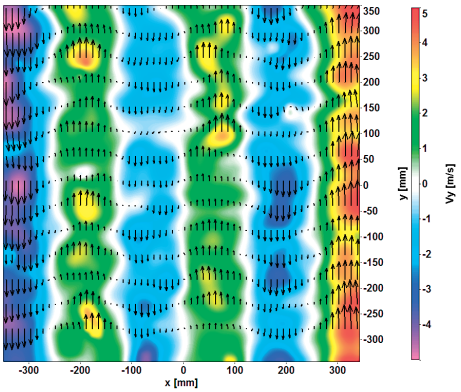
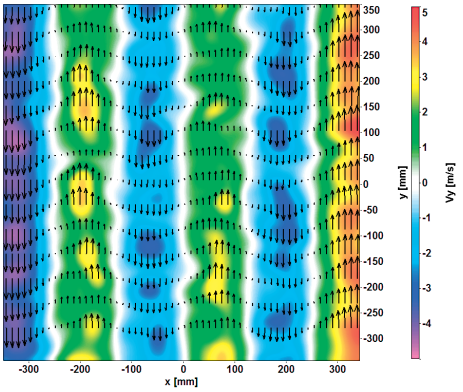
Reconstruction Techniques

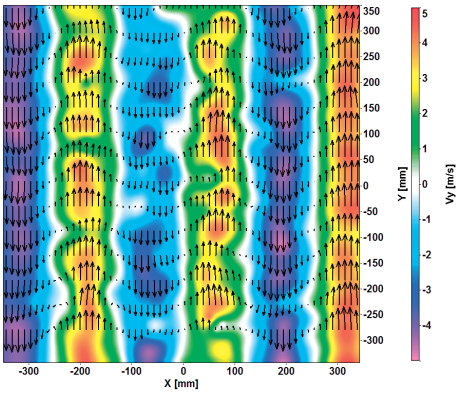
2 camera MLOS



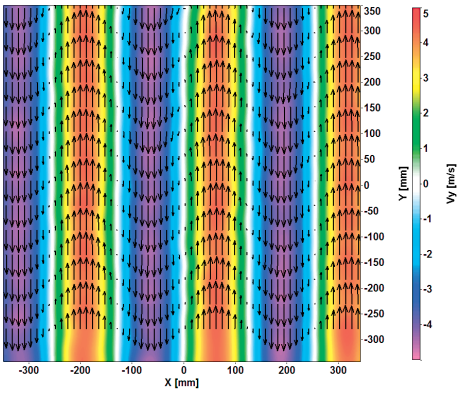
2 camera MinLOS



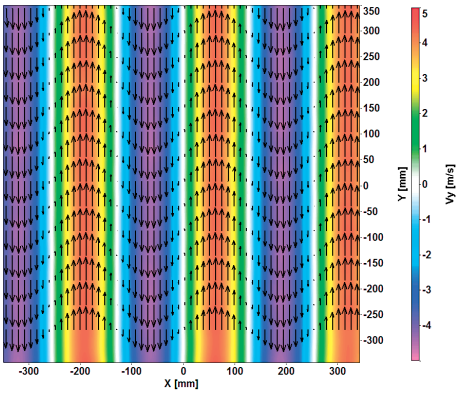
2 camera MART



2 camera MTE



4 camera MART



Advanced reconstruction techniques make the difference between unappropriate and adequate quantification of volumetric flow fields using only two cameras. Prior methods like Multiplicative Line of Sight (MLOS), Minimum Line Of Sight (MinLOS or MinART) and even MART failed to give an appropriate result using only two cameras. Now with Motion Tracking Enhancement (MTE) the quality of results from a two camera system matches the quality of prior results from a four camera system.

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