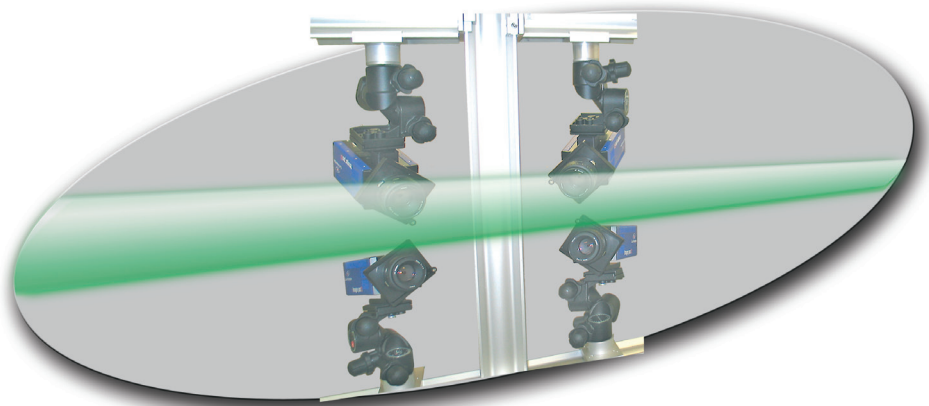


FlowMaster Tomographic PIV

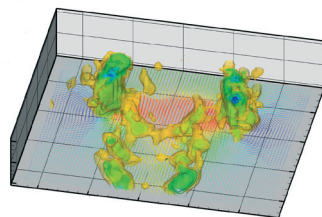
instantaneous 3D3C-vector
field in a complete volume

Tomographic Particle Image Velocimetry (Tomo-PIV) is a novel technique for 3D velocity measurements. The three-dimensional particle distribution within a volume is reconstructed by optical tomography from 2D images taken from typically 4 viewing directions simultaneously. Velocity information results from three-dimensional particle pattern cross-correlation of two reconstructed volumes obtained from subsequent exposures. The technique is fully digital and allows relatively high seeding (information) density and provides dense vector fields, compared to sparse 3D-particle tracking. The method is truly instantaneous across the volume, as opposed to scanning PIV and is suited for fast flows requiring small dts between exposures and allows high time resolution using high speed cameras.

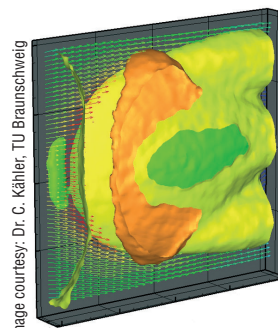


- Advantages:**
- ▶ instantaneous 3-dimensional 3-components (3D3C)-vector field in a complete volume
 - ▶ fully digital recording and processing
 - ▶ up to 800,000 particles (in comparison: 3D-PTV and digital holography: typically 1- 5 k)
 - ▶ time resolved Volume-PIV (3D3C+T) with high-speed cameras: > 250 million vectors/s
 - ▶ volume self calibration, correction of mapping function using actual recordings
 - ▶ advanced cross-correlation with deformed interrogation volumes, multi-pass iterations, etc.
 - ▶ reconstruction with extremely large volumes: > 4000 x 2600 x 1500 voxel possible
 - ▶ displacement accuracy down to 0.05 px

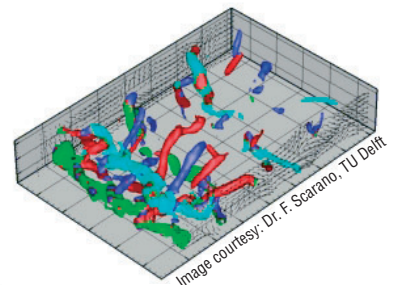
- Applications:**
- ▶ Turbulence research
 - ▶ 3D-flow structure visualization
 - ▶ Full 3D-Vortex analysis



ring vortex in air



horizontal velocity iso-surfaces
of flow across top of cylinder
stub



vorticity iso-surfaces of Karman
street at Re= 540

LaVisionUK Ltd

Downsview House/ Grove Technology Park
Grove/ Oxon/ OX12 9FF, United Kingdom

E-Mail: sales@lavision.com/ www.lavisionuk.com

Phone: +44-(0)-870-997-6532/ Fax: +44-(0)-870-762-6252

LaVision GmbH

Anna-Vandenhoeck-Ring 19
D-37081 Goettingen / Germany

E-Mail: info@lavision.com / www.lavision.com

Tel. +49-(0)551-9004-0 / Fax +49-(0)551-9004-100

LaVision Inc.

211 W. Michigan Ave. / Suite 100
Ypsilanti, MI 48197 / USA

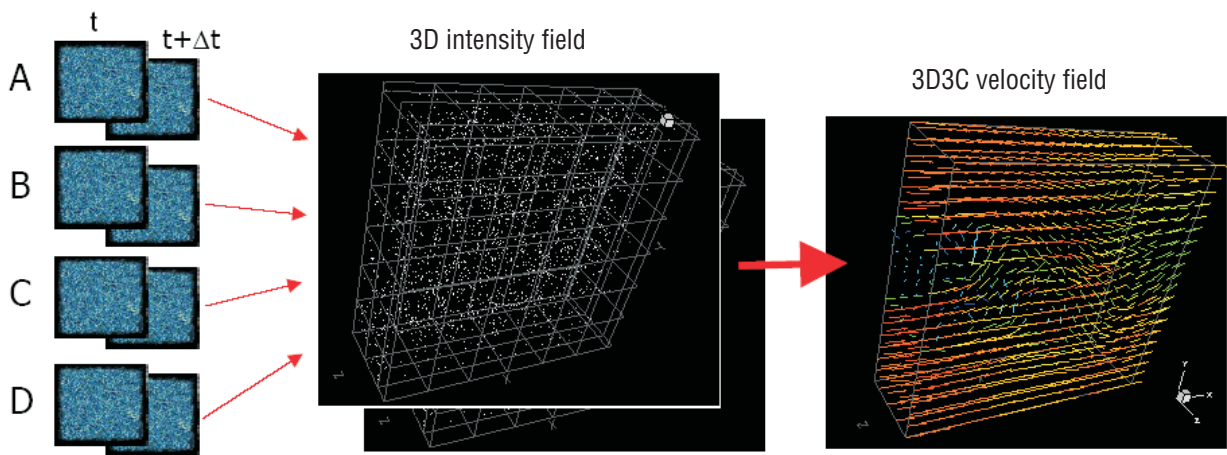
E-mail: sales@lavisioninc.com / www.lavisioninc.com

Phone: (734) 485 - 0913 / Fax: (240) 465 - 4306

Working Principle

3D light intensity field reconstruction

Tracer particles within the measurement volume are illuminated by a high power pulsed light source and the scattered light pattern is recorded simultaneously from typically 4 viewing directions using CCD cameras. The 3D particle distribution is reconstructed by a tomographic reconstruction algorithm (MART) as a 3D light intensity distribution for each voxel. The particle displacement within a chosen interrogation volume is then obtained by the 3D cross-correlation of the reconstructed particle distribution at the two exposures using advanced iterative multi-grid algorithms with deformed interrogation volumes.



System Specifications:

Low Speed

High Speed

- ▶ PC with 4 x quad core processors, 32 GB RAM
- ▶ 4 x Imager Pro X 4M (2k x 2k), 4 x Imager Pro X 11M (4 x 2.6 k)
- ▶ 200 to 400 mJ laser
- ▶ 4 x HighSpeedStar cameras
- ▶ typ. 20 mJ lasers
- ▶ volume optic: adjustable height 20 to 100 mm, adjustable width 5 to 50 mm (larger volumes possible on request)

Our website provides further interesting information about practical application and results of **Tomographic PIV**. Please visit the following URL:

<http://www.lavision.de/en/products/flowmaster/tomographic-piv/>

Ordering Information

Part number	Description
1105055	Tomographic PIV software module

Data provided by LaVision are believed to be true. However, no responsibility is assumed for possible inaccuracies or omissions. All data are subject to change without notice.

May-15

LaVisionUK Ltd

Downsview House/ Grove Technology Park
Grove/ Oxon/ OX12 9FF, United Kingdom

E-Mail: sales@lavision.com / www.lavisionuk.com

Phone: +44-(0)-870-997-6532/ Fax: +44-(0)-870-762-6252

LaVision GmbH

Anna-Vandenhoeck-Ring 19
D-37081 Goettingen / Germany

E-Mail: info@lavision.com / www.lavision.com

Tel. +49-(0)551-9004-0 / Fax +49-(0)551-9004-100

LaVision Inc.

211 W. Michigan Ave. / Suite 100
Ypsilanti, MI 48197 / USA

E-mail: sales@lavisioninc.com / www.lavisioninc.com

Phone: (734) 485 - 0913 / Fax: (240) 465 - 4306