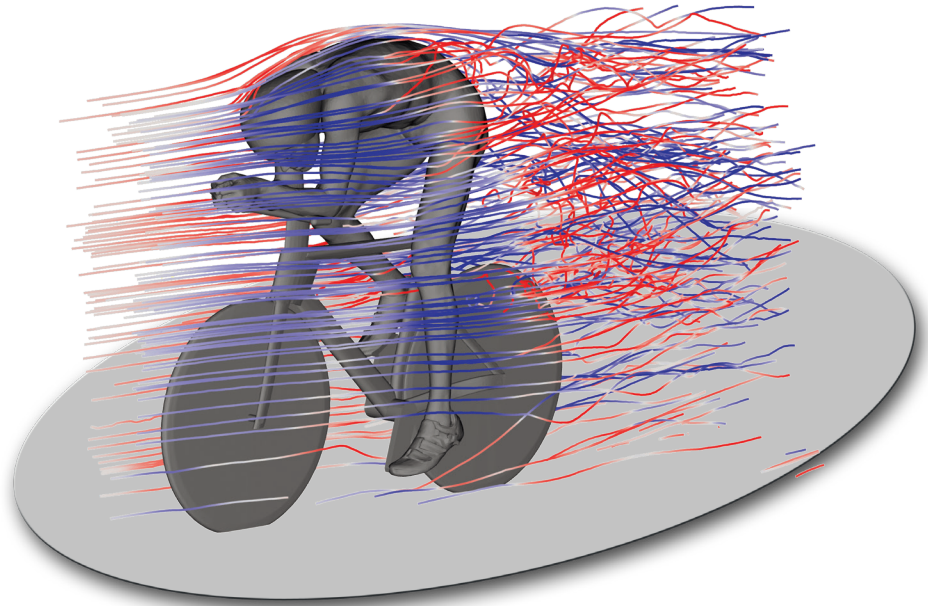


Object-aware Shake-the-Box

Lagrangian Particle Tracking around
obstructing objects

LaVision's **Shake-the-Box** technique (developed in cooperation with DLR Göttingen) is extended by a unique **Object-aware Shake-the-Box (OA-STB)*** approach, which seamlessly integrates solid object information during the tracer trajectory reconstruction process. This enables the flow field characterization for various fluid-structure interaction applications, for which both upstream and downstream information can be acquired simultaneously.



360° measurements

With a multi-camera set-up covering the complete surrounding of the object of interest, **OA-STB** offers the possibility to perform instantaneous 360° flow field measurements without the need of scanning the measurement system at several unobstructed locations. The unique **OA-STB** approach leads to a continuous flow representation without reconstruction artifacts at the interfaces of differently covered sub-domains of the measurement field.

Marker reconstruction

An important part during the **OA-STB** processing is the correct positioning of the digital model within the measurement's coordinate system. This alignment can be easily done by a surface marker reconstruction prior to the actual flow field reconstruction. After triangulating the surface markers, a CAD model of the object can be aligned with respect to those markers within the DaVis software and enables **Shake-the-Box** to take full advantage of the geometric information.

*B. Wieneke and T. Rockstroh, "Lagrangian particle tracking in the presence of obstructing objects," Meas. Sci. Technol., vol. 35, no. 5, p. 055303, 2024, doi: 10.1088/1361-6501/ad289d.

Data courtesy:
L. Hendriksen, Aerodynamics Group
TU Delft

LaVisionUK Ltd

2 Minton Place / Victoria Road
Bicester, Oxon / OX26 6QB / United Kingdom
E-Mail: sales@lavisoin.com / www.lavisoinuk.com
Phone: +44-(0)-870-997-6532 / Fax: +44-(0)-870-762-6252

LaVision GmbH

Anna-Vandenhoeck-Ring 19
37081 Göttingen / Germany
E-Mail: info@lavisoin.com / www.lavisoin.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@lavisoinc.com / www.lavisoinc.com
Phone: (734) 485 - 0913 / Fax: (240) 465 - 4306

Depth maps

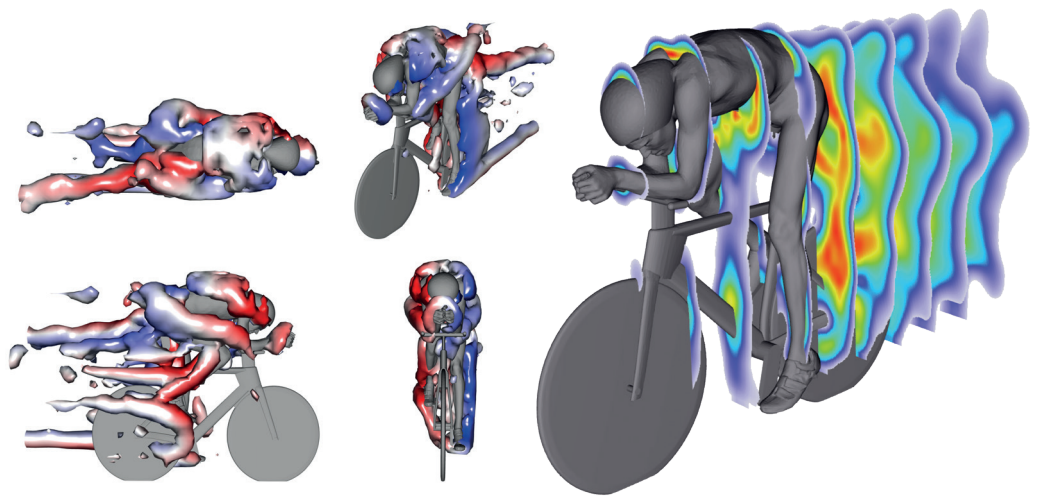


With the knowledge about the object's location and orientation and the accurate multi-camera calibration obtained with DaVis, the object information can be efficiently encoded in depth maps. Those depth maps store the distance from the camera to the object for each camera of the measurement set-up and each pixel. By utilizing these values in the Iterative Particle Reconstruction (IPR) step, DaVis is automatically able to determine, which cameras needs to be involved during the flow field reconstruction.

CAD visualization in DaVis



In addition to the computational advantages of using the object information during the flow reconstruction, DaVis also offers the possibility to visualize the CAD models alongside your measurement results. The simultaneous visualization of flow field and object data greatly improves the interpretability of the involved physics. Supported are both, the visualization alongside vector fields and particle trajectories.



Availability

LaVision's Object-aware Shake-the-Box is available from DaVis 11.2 upwards.

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.

June-24

LaVisionUK Ltd

2 Minton Place / Victoria Road
Bicester, Oxon / OX26 6QB / United Kingdom
E-Mail: sales@lavisoin.com / www.lavisoinuk.com
Phone: +44-(0)-870-997-6532 / Fax: +44-(0)-870-762-6252

LaVision GmbH

Anna-Vandenhoeck-Ring 19
37081 Göttingen / Germany
E-Mail: info@lavisoin.com / www.lavisoin.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@lavisoininc.com / www.lavisoininc.com
Phone: (734) 485 - 0913 / Fax: (240) 465 - 4306