

Abstract Submitted
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Large-Scale High-Resolution Cylinder Wake Measurements in a Wind Tunnel using Tomographic PIV with sCMOS Cameras¹ DIRK MICHAELIS, LaVision GmbH, ANDREAS SCHROEDER, German Aerospace DLR — Tomographic PIV has triggered vivid activity, reflected in a large number of publications, covering both: development of the technique and a wide range of fluid dynamic experiments. Maturing of tomo PIV allows the application in medium to large scale wind tunnels. Limiting factor for wind tunnel application is the small size of the measurement volume, being typically about of $50 \times 50 \times 15 \text{ mm}^3$. Aim of this study is the optimization towards large measurement volumes and high spatial resolution performing cylinder wake measurements in a 1 meter wind tunnel. Main limiting factors for the volume size are the laser power and the camera sensitivity. So, a high power laser with 800 mJ per pulse is used together with low noise sCMOS cameras, mounted in forward scattering direction to gain intensity due to the Mie scattering characteristics. A mirror is used to bounce the light back, to have all cameras in forward scattering. Achievable particle density is growing with number of cameras, so eight cameras are used for a high spatial resolution. Optimizations lead to volume size of $230 \times 200 \times 52 \text{ mm}^3 = 2392 \text{ cm}^3$, more than 60 times larger than previously. $281 \times 323 \times 68$ vectors are calculated with spacing of 0.76 mm. The achieved measurement volume size and spatial resolution is regarded as a major step forward in the application of tomo PIV in wind tunnels.

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