INCREASE OF ACCURAY FOR CBOS BY BACKGROUND PROJECTION

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Visualization method(s): Schlieren technique
Other keywords: image processing

ABSTRACT The Colored Background Oriented Schlieren technique allows the measurement of the light deflection caused by density gradients in a compressible flow. For this purpose the distortion of the image of a background pattern observed through the flow is used. In order to increase the performance of the conventional Background Oriented Schlieren (BOS) technique, the monochromatic background is replaced by a colored dot pattern. The different colors are treated separately using suitable correlation algorithms. Therefore, the accuracy and the spatial resolution can be highly increased. In order to evaluate the distortion of the image of the background with a correlation method it is important to focus on the background. Especially for big wind tunnels the distance between the flow field, which has to be observed, and the background is greater than the depth of field of the camera. A solution to overcome this problem is to project the background close to the wind tunnel model (fig. 1). In figure 2 the same flow field for different distances of the projected background from the model is shown.

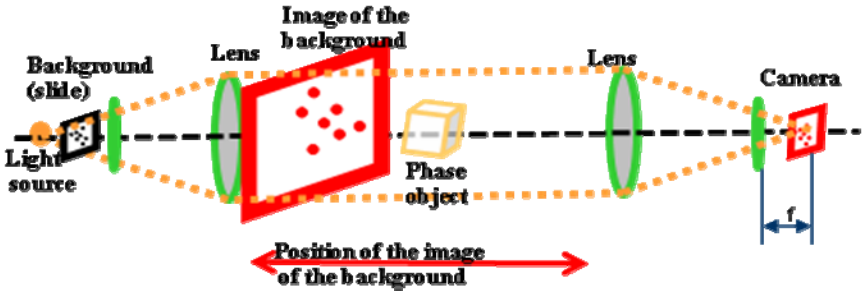

Fig. 1 Optical set-up for CBOS measurements with projected background

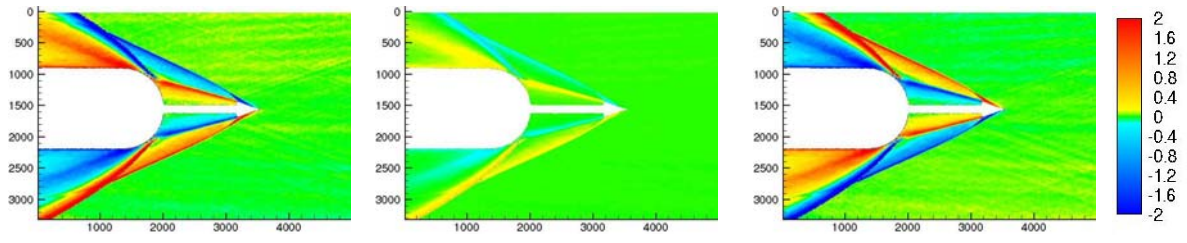

Fig. 2 Visualization of the vertical displacements for projected backgrounds before, near and behind the model

References

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