



# COMPARISON BETWEEN CBOS (COLORED BACKGROUND ORIENTED SCHLIEREN) AND CGBOS (COLORED-GRID BACKGROUND ORIENTED SCHLIEREN) FOR SUPersonic FLOW

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## KEYWORDS:

**Main subjects:** supersonic flow, flow visualization

**Fluid:** high speed flows, flows with shocks

**Visualization method(s):** Background oriented schlieren (BOS)

**Other keywords:** image processing, quantitative density measurement

**ABSTRACT:** The Background Oriented schlieren (BOS) technique is one of the novel visualization techniques that enable the quantitative measurement of density information in the flow field with very simple experimental setup [1]. The principle of BOS is similar to conventional Schlieren technique and both techniques are sensible to density gradient. In recent years, CBOS (Colored Background Oriented Schlieren) technique using colored random dot pattern for background is developed to improve the performance of conventional BOS technique using monochromatic random dot pattern, and it is applied to various measurements of flow [2]. On the other hand, Colored-Grid Background Oriented Schlieren (CGBOS) technique using colored-grid pattern for background is developed and applied to measurement of supersonic flow field and reconstruction of 3D density field [3]. CGBOS is based on the image processing technique developed for the analysis of finite-fringe interferogram and using color information is based on the ideas of CBOS technique. In this report comparison of the measurement result between CBOS and CGBOS will be reported. Measurements of Mach 3.0 flow around a blunt body with a spike were performed for both CBOS and CGBOS at supersonic wind tunnel at ISL with same optical arrangements. The difference is only background and image processing procedure. Figure 1 shows pseudo-color images of vertical displacement obtained from CBOS (left) and CGBOS (center), and plots of calculated displacement on  $x$ -axis ( $y = 2100$  pixel) in pseudo-color image. Resultant displacement from both techniques agrees very well. Detailed analysis between two techniques will be very important for the future development of BOS technique.

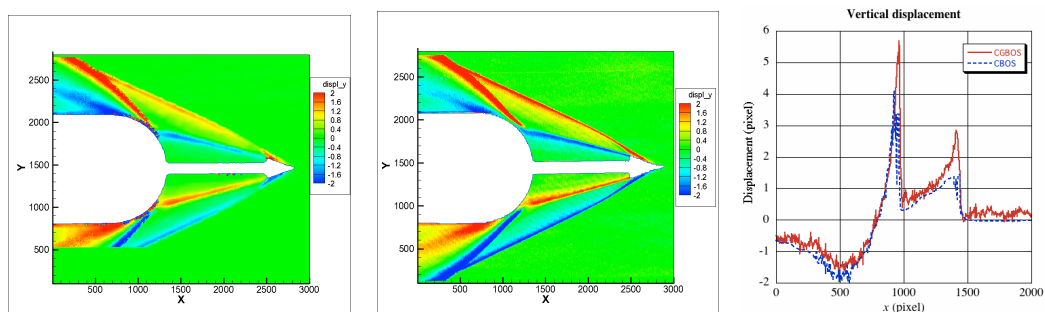


Fig. 1 Pseudo-color image of vertical displacement of background obtained from CBOS (left), CGBOS (center), and plots of displacement for both techniques.

## References

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