

Paper 15.1

Demonstration of the applicability of a Background Oriented Schlieren (BOS) method

by

H. Richard, M. Raffel, M. Rein, J. Kompenhans, G.E.A. Meier

Institut für Strömungsmechanik

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)

Bunsenstrasse 10, D-37073 Göttingen, Germany

E-mail: Hugues.richard@dlr.de, markus.raffel@dlr.de

ABSTRACT

A novel measurement technique based on the refractive index variation in a compressible flow field is presented. This concept is referred to as “Background Oriented Schlieren” (BOS) method in the following. The differences between BOS and other optical techniques which it can best be compared with, will be discussed. Already the first results illustrate an encouraging prospect for the future applicability of this technique. The BOS method offers the capability of qualitative and quantitative investigations of unsteady density fields in high speed flows, combustion, and full-scale flight tests. The underlying principle is briefly described and an extension to a three-dimensional quantitative technique by using multiple cameras is outlined. The experimental studies which have been carried out to investigate a supersonic jet, a turbulent flame, and the blade tip vortices of a BK117 helicopter in hover flight will be presented.



Blade tip vortices of BK117 helicopter as object of application of BOS method