

# **Particle Image Velocimetry in a Full-scale Car Model**

by

S. Ammourah, A. Aroussi, M. Vloeberghs

Flow Diagnostics Laboratory  
The University of Nottingham  
Nottingham, U.K.

## **ABSTRACT**

Thermal comfort inside passenger cars has lately been receiving greater attention by the automotive industry. Demand for a more comfortable journey forces the industry to search for design improvements to optimise vehicle air-conditioning systems. This requirement is critical not only to the comfort of passengers but also to their safety.

In this study, the interior airflow characteristics, in a full-scaled model, are numerically simulated using CFD. Particular attention is given to the influence of the airflow characteristics discharged, from the windshield defrosters/demisters, on the overall flow behaviour within the compartment.

Particle Image Velocimetry (PIV) measurements are taken, at different planes within the compartment, and the data obtained are then used to assess the accuracy of the numerical predictions. In general the numerical predictions compare well with the experimental measurements made at various planes and operating conditions. The locations of maximum velocity and pressure, as well as width and length of re-circulation regions, are correctly predicted.