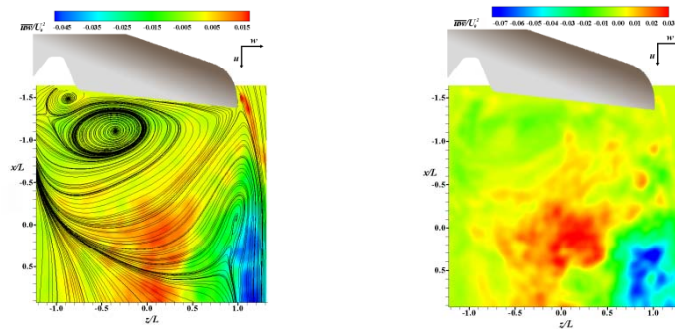
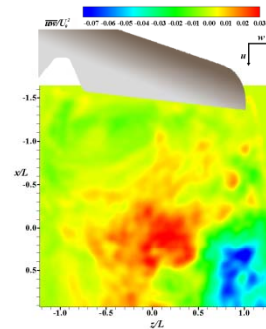


Visualization on Multi-Scale Structures of a Vehicle Door Mirror Wake

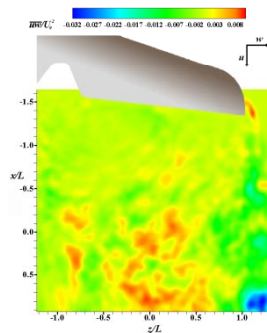
Professor Akira Rinoshika



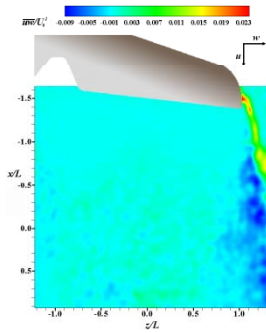
(a) PIV results



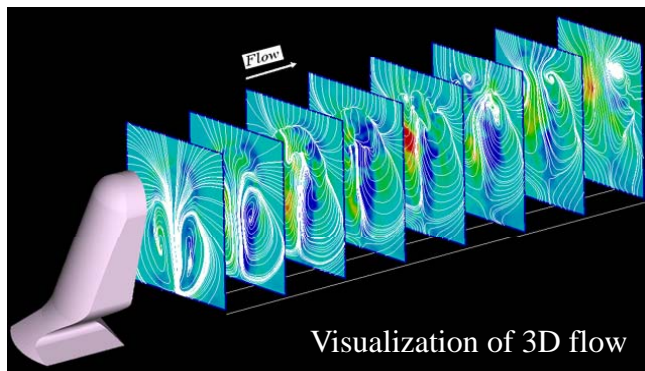
(b) Large-scale



(c) Intermediate scale



(d) Small-scale



Content :

The door mirrors that are added to the vehicle body exhibit aerodynamically generated drag, noise and vibration. The extensive effective analysis and control of flow around the door mirrors have been becoming a greater concern and an important theme. In order to study the turbulent structures of various scales around a door mirror, the high-speed PIV technique was first used to measure the velocity fields. Figure (a) shows the distribution of time-averaged streamlines and Reynolds stresses. The large-scale vortical structure shed from the root and side portion of mirror forms the separation region, the intermediate- and relatively small-scale structures are respectively generated from the tip of the mirror and the edge of the mirror. Then the instantaneous turbulent structures were decomposed into the large-, intermediate- and relatively small-scale structures by the wavelet multi-resolution technique. Figures (b)-(c) indicate that the large-scale turbulent structure makes the largest contribution to the Reynolds stress in the range of separation shear layer. The relatively small-scale structure, however, makes a more contribution to the Reynolds stress in the shear layer near the mirror.

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