



STEREO PIV INVESTIGATION OF FLOWFIELDS AROUND A TWO-WHEEL MAIN LANDING GEAR

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Fluid: subsonic flows

Visualization method(s): particle image velocimetry

Other keywords: aeroacoustic, landing gear

ABSTRACT: The purpose of this paper is experimental investigation of flowfield related to noise generation mechanism from tire-axle regions of a two-wheel main landing gear^{1,2}. JAXA 2m x 2m Low-speed Wind Tunnel (JAXA LWT2) was used for flowfield measurements. It is an atmospheric pressure closed-circuit tunnel with a solid wall square test section. The size of the test section is 2m in height, 2m in width, and 4m in length. Flowfields around a 40% of two-wheel type aircraft main landing gear model were measured by stereoscopic three-dimensional PIV (Particle Image Velocimetry). In the PIV test, two configurations; the baseline configuration with backward torque link (Case1) and configuration without torque link (Case2), were tested. The measurement sections which were originally planned in the test are shown in Fig. 1 although several sections and areas were not measured due to the constraint by the laser and camera settings. To understand the three-dimensional flow structure, the measurement sections in the freestream direction were set at 10mm intervals. The grid resolution in the section was about 4.3mm for the measurement sections between tires and 9.3mm for the measurement sections after tires. The number of vector maps to average was 1500 and the frequency of the measurement was 4Hz. Figure 1 (right) shows the mean velocity distribution measured by PIV. PIV results show asymmetry wake flow for symmetric configuration without the torque link. It may also include influence derived from slight drift angle and swirl in the wind-tunnel or slight asymmetry for the model fabrication and installation in the wind tunnel test.

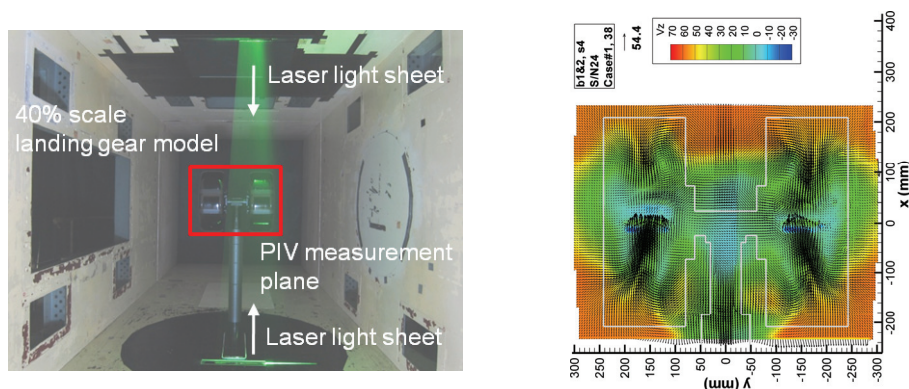


Fig. 1 Test model and Stereo PIV setup (left), mean velocity distribution measured by stereo PIV (right)

References

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