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Three-Dimensional Density Reconstruction of Supersonic Twin Jets by Background Oriented Schlieren Technique.[1] LEE CHUNGIL, OZAWA YUTA, SAITO YUJI, NONOMURA TAKU, ASAI KEISUKE, Department of Aerospace Engineering, Tohoku University — Strong acoustic waves emitted from a rocket plume possibly damage to payloads of a rocket because the acoustic waves vibrate the payloads such as a satellite. Recent rockets employ multiple engines configuration and the acoustic waves from multiple jets interaction are becoming important. Therefore, it is important to three-dimensionally visualize multiple jets flow structure and to accurately understand multiple jets interaction. The present study applies three-dimensional background oriented schlieren (3D-BOS) technique to density fields of supersonic twin jets. Here, 3D-BOS is a technique that enables quantitatively to measure the three-dimensional density field. The operating condition of the twin jets is an ideally expanded condition with a Mach number of 2.0. The three-dimensional density field of the twin jets was simply reconstructed by using a matrix in 3D-BOS. The interaction of the twin jets according to the nozzle spacing was compared. The results show that the interaction of each jet in the twin jets configuration is occurring and moves the downstream side with increasing the nozzle spacing. In particular, the density distribution of small nozzle spacing elliptically spreads towards the downstream side due to the strong interaction.

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