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Visualization of flow structure and its changes on flap with vortex generators YOSHIYASU ICHIKAWA, SHUNSUKE KOIKE, YASUSHI ITO, MITSUHIRO MURAYAMA, KAZUYUKI NAKAKITA, KAZUOMI YAMAMOTO, KAZUHIRO KUSUNOSE, Japan Aerospace Exploration Agency (JAXA) — For the aircraft design, the high-lift systems have an important role because of satisfying the demand for improving the lift for the take-off and landing configurations and increasing the payload. Vane-type vortex generators (VGs) are sometimes installed on the flap as a passive flow control device to improve the high-lift performances. However, the effect of VGs on the flow physics of the flap is still in discussion. In this study, the performance of VGs installed on the flap of a half-span model with a three-element high-lift wing was investigated by low-speed wind tunnel tests. In the tests, VGs were installed where chordwise velocity became nearly maximum on the flap, and flow visualization was conducted with VGs in different size. The test results revealed that the interaction between longitudinal vortices generated by the VGs and cross flow on the flap influenced flow separation patterns behind the VGs, which depended on the size and installation spacing of the VGs. We also evaluated the lift coefficient of the wind tunnel model to investigate the relationship between the flow structures and aerodynamic performance of the flap with VGs.

Yoshiyasu Ichikawa
Japan Aerospace Exploration Agency (JAXA)

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