

## Plasma Actuator Application to Control Surfaces of a Model Aircraft

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**Abstract :** Plasma actuator is very effective to recover stall flows over an upper airfoil surface. We first manufacture the actuator, test the stability of the device by trial and error basis and find the conditions for steady operations. We visualize the flow around an airfoil in the smoke tunnel and observe the stall recovery. The plasma actuator is stationary device and has no moving parts, and it might be an ideal device to control a model aircraft. We can use the actuator not only as a stall recovery device but also as a spoiler. We put the actuator near the leading edge of an elevator of a model aircraft as a spoiler, and measure the aerodynamic forces by a three-component balance. We observe the effect of the plasma actuator on the aerodynamic forces and the device effectiveness changes depending on the angle of attack whether it is positive or negative. We also visualize the flow caused by the plasma actuator by a desk-top Schlieren photography which is otherwise very difficult in a low-speed wind tunnel experiment.

**Keywords :** aerodynamics, plasma actuator, model aircraft, wind tunnel

**Conference Title :** ICAAFW 2018 : International Conference on Aircraft Aerodynamics and Flow Technology

**Conference Location :** Singapore, Singapore

**Conference Dates :** March 22-23, 2018