

Review on progress and application of active flow control devices - Coandă effect on unmanned aerial vehicles

ABSTRACT

Coandă effect can be found in virtually all aerodynamic applications, and has drawn renewed interest for various applications, among others for generating lift and maneuvering impulses to be applied for unmanned air vehicles (UAV) and micro air vehicles (MAV). These air vehicles have the potential to revolutionize our sensing and information gathering capabilities, in homeland security and environmental areas. Sophisticated unmanned air vehicles for general applications have been developed rapidly across many different industries and interested researchers. In order to carry out a task, these air vehicles have to face many different challenges, due to the MAVs small size, flight regime, and modes of operation. This has led to the development of novel platforms that move away from traditional aircraft design in order to make them more capable. A good example is the Coandă MAV which uses the Active flow control Coandă Effect. Improved aerodynamic performance of these air vehicles can lead to fast take off and slower landing speeds that can be related to reduce noise and crash survivability issues. The investigation and research in this field is rapidly rising and there are many concepts currently being considered around the world. This report provides an overview on the state of unmanned air vehicle and introduces the techniques of Active Flow Control ACF that could be potentially used for control of UAV. Furthermore, this paper may also focus on the review research involved with the design modification and the generated flow phenomena of Micro air vehicle MAV.

Keyword: CFD; Circulation control; Coandă effect; Flow control; MAV; UAV