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Aerodynamic Analysis and Design of Banners for Remote-Controlled Aircraft

Authors : Peyman Honarmandi, Mazen Alhirsh

Abstract : Banner towing is a major form of advertisement. It consists of a banner showing a logo or a selection of words or letters being towed by an aircraft. Traditionally bush planes have been used to tow banners given their high thrust capabilities; however, with the development of remote-controlled (RC) aircraft, they could be a good replacement as RC planes mitigate the risk of human life and can be easier to operate. This paper studies the best banner design to be towed by an RC aircraft. This is done by conducting wind tunnel testing on an array of banners with different materials and designs. A pull gauge is used to record the drag force during testing, which is then used to calculate the coefficient of drag, Cd. The testing results show that the best banner design would be a hybrid design with a solid and mesh material. The design with the lowest Cd of 0.082 was a half ripstop nylon half polyester mesh design. On the other hand, the design with the highest Cd of 0.305 involved incorporating a tail chute to decrease fluttering.

Keywords : aerodynamics of banner, banner design, banner towing, drag coefficients of banner, RC aircraft banner
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