

3D Numerical Studies on External Aerodynamics of a Flying Car

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Abstract : The external flow simulation of a flying car at take off phase is a daunting task owing to the fact that the prediction of the transient unsteady flow features during its deployment phase is very complex. In this paper 3D numerical simulations of external flow of Ferrari F430 proposed flying car with different NACA 9618 rectangular wings have been carried. Additionally, the aerodynamics characteristics have been generated for optimizing its geometry for achieving the minimum take off velocity with better overall performance in both road and air. The three-dimensional standard k-omega turbulence model has been used for capturing the intrinsic flow physics during the take off phase. In the numerical study, a fully implicit finite volume scheme of the compressible, Reynolds-Averaged, Navier-Stokes equations is employed. Through the detailed parametric analytical studies we have conjectured that Ferrari F430 flying car facilitated with high wings having three different deployment histories during the take off phase is the best choice for accomplishing its better performance for the commercial applications.

Keywords : aerodynamics of flying car, air taxi, negative lift, roadable airplane

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