Evaluation of Novel Wing Design for UAV

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Abstract

Viable design alternative for the existing and fast growing UAVs which are optimized for unmanned flight is of great demand. Designing of a small scale UAV alternative to the AAI Aerosonde UAV Figure 1 has been considered changing the wing tail configuration of the vehicle analyzing both structural and aerodynamic performance improvements using COMSOL Multiphysics® software. Various Non Planar design alternatives have been considered and box wing configuration has been proven to be the best suited for the application. Variations in the design with box wing configuration Figure 2 have been analyzed by using Tornado scrip in MATLAB® and the important configurations have been analyzed Figure 3 using the CFD Module for aerodynamics and COMSOL Multiphysics for structural performance. The NACA 0012, ahmed body models have been very much helpful in learning COMSOL and applying it to the present situation for reducing the solving time and increasing the accuracy of solving the problem.

Reference

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Figures used in the abstract

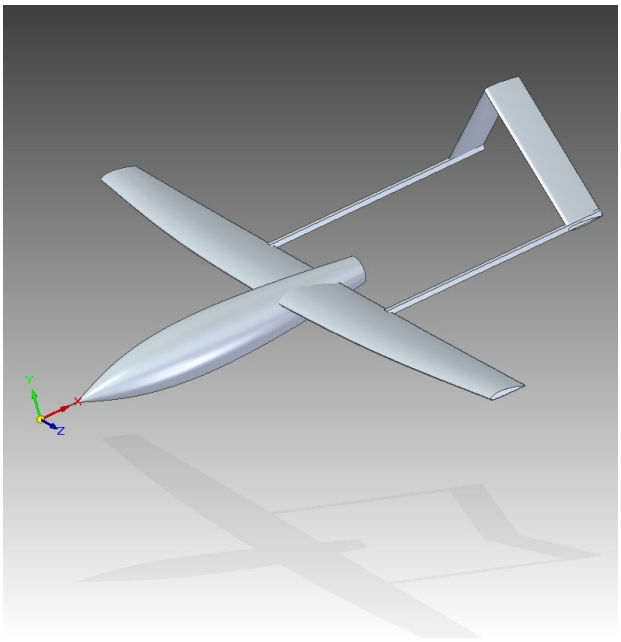

Figure 1: Aerosonde baseline geometry.

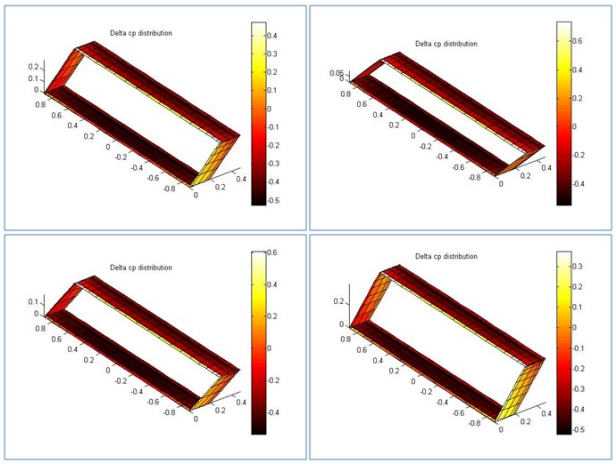

Figure 2: Variation in gap with constant stagger.

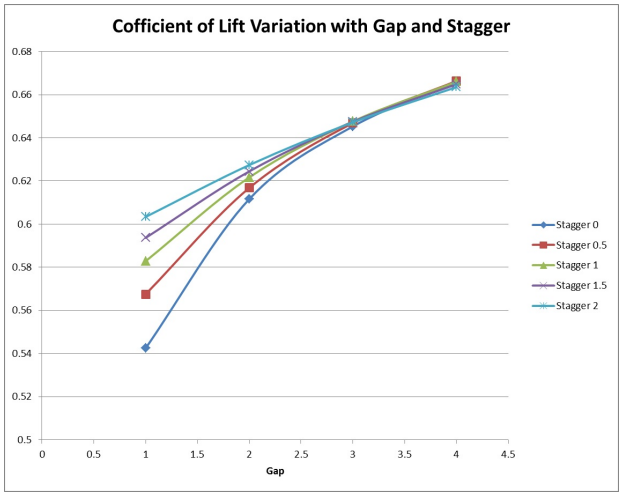

Figure 3: Coefficient of lift variation with stagger.

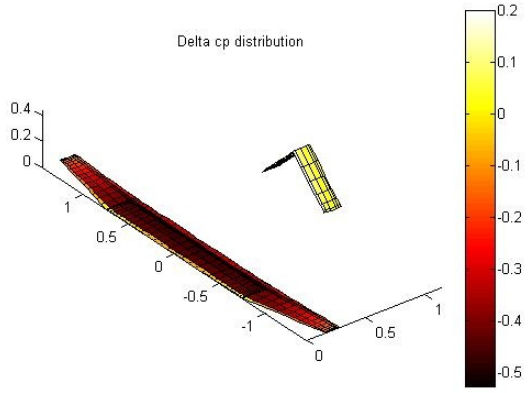

Figure 4: Aerosonde analysis.