عنوان مقاله:

Design of Solar-powered Endurance Glider with Vortex Generators

محل انتشار:

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نویسندگان:

Sh. Sham Dol - *Department of Mechanical Engineering, Abu Dhabi University, Abu Dhabi, United Arab Emirates*.

S. Shahid Pervaiz - *Department of Mechanical Engineering, Abu Dhabi University, Abu Dhabi, United Arab Emirates*.

M. Uzair - *Department of Mechanical Engineering, Abu Dhabi University, Abu Dhabi, United Arab Emirates*.

Sh. Khalid Bashir - *Department of Mechanical Engineering, Abu Dhabi University, Abu Dhabi, United Arab Emirates*.

M. Mustafa Elzughbi - *Department of Mechanical Engineering, Abu Dhabi University, Abu Dhabi, United Arab Emirates*.

خلاصه مقاله:

The research aims at designing a solar endurance glider for an increased flight time. The constraints for design include reduction in weight compared to a typical glider and improving its aerodynamic performance by application of vortex generators on its wingspan. The design of each component was performed through various stages of similitude cases; furthermore, the components, such as solar panels and vortex generators were selected based on a decision matrix design process. This research utilized ANSYS ۱۸.۱ K-Omega SST turbulence simulation techniques to successfully simulate the glider at different speeds along with various angle of attacks for aerodynamics optimization. The results show an improvement in lift force from ۱۶۰ N to ۱۹۲ N once the vortex generators were installed. ۱۶ solar cells are installed on the glider's wings providing ۵۷.۶ Watts of power. This study faced a limitation on the physical testing using a wind tunnel for validation; therefore, the team relied on CFD simulations verification from published data. This report details the concept of boundary layer, design process, glider simulation as well as glider configuration, such as the wingspan and total length. The glider should be able to maintain a flight time of at least ۶ hours with vortex generators and solar panels.

کلمات کلیدی:

Vortex Generators, Solar, Glider, Lift, Drag