CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
35623

Project Title
What Is the Best Aerodynamic Design for a UAV Wing?

Abstract

Objectives/Goals
My science project was to identify the best aerodynamic design for a Unmanned Aerial Vehicle wing. I understand why different UAVs had such a larger difference in the shapes and sizes of their wings.

Methods/Materials
I built 8 different shapes that could be tested within the wind tunnel. 5 of the shapes were non-flying shapes but were used to demonstrate smoke patterns off of different surfaces. 3 of the shapes were traditional wing shapes of varying aspect ratios. I placed each shape into the wind tunnel and used video to record the test events. Each shape was moved through a series of directions. The point of turbulence noted on each shape was identified. Using a contrasting grid pattern I was able to utilize a ratio to compare each shape as to its aerodynamic attributes.

Results
The smaller wing shape had the least noted turbulence.

Conclusions/Discussion
My conclusion is that a traditional wing shape is preferred shape but the most important characteristic for the long loiter time requirement of a UAV is aspect ratio. The higher the aspect ratio, the better the lift characteristics.

Summary Statement
My science project was to determine what is the effect of changing the shape of a wing and how that affects its flight characteristics.

Help Received
My entire project was built in my garage. I used household items that could be repurposed for this project. My father helped with the cutting of the cardboard while building the wind tunnel and provided a second set of hands for the larger items.