Name(s)	Project Number
Alap A. Sahoo	**S0322**

Project Title

Designing the Optimal Winglet for Flight

Abstract

Objectives/Goals

My objective was to determine the aerodynamic capabilities of winglets # the tips at the ends of wings that point up. I wanted to test the differences between different sizes as well as different models of winglets and discover which was the most effective. I believe that a ½# winglet on a 7 wingspan # a 1:14 ratio # will be the most effective, and that a translated winglet (a design which tapers to an upward point) will be more effective than a regular one.

Methods/Materials

I constructed 5 balsa wood airplanes with winglets of different sizes (none, 1#, ½#, ##, and ¼#) as well as 3 paper airplanes with 3 different models of winglet # none, regular, and translated. I measured the lift and drag of these models, as well as how the air flowed around the balsa wood models, using a wind tunnel and some punks.

Results

The balsa wood plane with ½# winglets had the most lift and least drag, with no other plane being as effective, while the translated winglet produced more lift than the regular winglet on the paper airplanes, even though they both produced the same drag. In the airflow experiment involving punks, the ½# winglet had the least turbulent airflow.

Conclusions/Discussion

The data confirmed my hypothesis, confirming that the 1:14 ratio is indeed the best, and that a translated winglet is better than a regular one.

Summary Statement

My project seeks to find the best size and best model of winglet - an add-on to a wing that is supposed to reduce drag.

Help Received