Team Number: LLHS53
School Name: Los Lunas High School
Area of Science: Aerodynamics
Project Title: The Effects of Drag in Different Environments

Problem Definition:

Drag is the force opposing thrust, or when you push forward, drag pushes back. This occurs during an aircraft's motion during flight and on every part of the plane while motion is transpiring, and will exist in all environments. So our group is going to analyze the effects of drag in different environments. The goal of this project is to create a program that will simulate the effect of drag using data from an external program. However the data must be entered manually. There will not be a takeoff or landing part of the simulation, just a mid-flight simulation.

Problem Solution:

The solution to our problem is to make a NetLogo program to simulate the effects of drag. We will use only aircrafts this time to test the effects in different environments, but in the future we will expand to other sources of transportation. We will also put in some degrees of randomness, such as a fifty percent chance to rise or drop when the simulation is running, instead of that rise or fall being guaranteed. Our program will collect the data, output the data, and then find the statistical results. This means the mean. median, mode, range, etc.

Progress to Date:

So far, we have set up the infrastructure for the Thrust, Lift, Drag, and Weight, as well as the beginnings to a system that will determine if the plane is moving, and keeping its altitude moderately low, not exceeding a point, but will end the program if the aircraft goes below the elevation input that the user has specified, defaulted to sea level. We are also seeing if we could get a real life wind tunnel to replace the virtual one, but we are still trying to find one. If we did find one that would be great , but there is also a chance that we will make a virtual wind tunnel ourselves.

Expected Result:

The end result for this project, after all the programming and testing, we will have a program that will be able to draw from a database that will be provided by another program, a virtual wind tunnel, and run the calculations. The program will then output the data which will then be used to find the statistical results, such as range, median, mode, mean, the minimum, maximum, and the standard deviation.

Team Members: Brandon "Everest" Sonnenberg, Elena, and Chloe Sawatzki

Sponsoring Teacher: Ms. Loveless

Bibliography
- "The Drag Equation." *NASA*, NASA, 5 May 2015, www.grc.nasa.gov/www/k-12/airplane/drageq.html.
- "The Drag Coefficient." *NASA*, NASA, 5 May 2015, www.grc.nasa.gov/www/k-12/airplane/dragco.html.