Design and Development of an Online Wind Tunnel for the Aerodynamics Lab

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Overview
Wind tunnels are commonly used to test the aerodynamic properties of objects. Due to the COVID-19 Pandemic access to a wind tunnel might not be possible. This project aims to combat this problem though the use of LabView and Arduino by taking an existing wind tunnel (Flotek 360 Figure 1) and modifying it so that it can be used by a remote student using a webpage to access the graphical user interface.

Conceptual Framework
The Graphical User Interface (GUI) (Figure 2) was built using LabView and LabView Interface for Arduino. With this GUI we can remotely turn on and off the wind tunnel, (Figure 3) change the velocity of the wind tunnel and increase and decrease the angle of attack of the test subject. The GUI is also capable of displaying in real time the lift and drag generated by the test subject.

Results
The wind tunnel is able to be used for simple experiments in the lab, but with simple modifications and access to a server it can be used remotely. More experiments such as displaying the coefficient of lift vs the angle of attack graph are in the works.

Impact
Having access to an online wind tunnel will enhance the experience for remote learning students, such as during the COVID-19 Pandemic and will provide access to wind tunnels for schools who do not have the facilities or budget for a wind tunnel on their campus.

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