Overview
Lycoming Engines manufactures air-cooled piston engines for general aviation aircraft, ranging from 100-400 horsepower, as well as maintaining an extensive engine research and development test facility. Currently, Lycoming has no way of accurately measuring the rate of mass airflow entering the engines in their test cells. Knowing these values would improve the depth of engine analysis and could open new doors for Lycoming.

Objectives
The objective was to analyze the current design for the engine test cell air induction, research mass airflow sensors, and recommend a new design which utilizes methods for measuring mass airflow and temperature.

Approach
• After visiting the test cells, the team first modeled the current air intake system
• Flow simulations were conducted on the current design to identify areas for improvement
• The team researched possible designs for the new mass airflow measurement device
• Through concept selection methods, the Venturi meter was chosen as the design
• The team utilized a Taguchi Matrix and ran flow simulations to determine the optimal dimensions for the Venturi meter

Outcomes
• A 3D printed cross-sectional model was created as the mass airflow device prototype
• Venturi meter design is able to measure turbulent flow with ± 1% accuracy
• Final design is to be made of 316 Stainless Steel due to prevent corrosion of device
• As a result, Lycoming Engines will be able to accurately measure mass air flow intake in their engine test cell