**Boundary Layer Characterization over an Airfoil**

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**Introduction**

A boundary layer forms over any surface when a fluid in motion passes over it, or when the body moves through a fluid. This boundary layer forms a velocity gradient from the surface of the body to the free stream. Due to the no-slip condition, the particles at the surface of the body will have close to zero velocity with respect to the body. The velocity will increase exponentially with respect to height until it reaches the free-stream velocity.

During the experiment, the Kiel probe was calibrated by a piece of paper placed on the surface of the tunnel, directly under the probe. The probe was then lowered until it barely touched the paper. This ensured the probe was as close as possible to the surface and able to capture as much of the boundary layer as possible. Two trials were conducted for each location with the probe, one at 10m/s and one at 15m/s. During each trial, the probe was moved in very small increments vertically, approximately 1mm, until it reached a height of 25mm for the flat plate and leading edge, and 35mm for the trailing edge. Dynamic pressure was sampled at each increment.

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| **Test Parameter** | **Test Condition** |
| Ambient Pressure (Pascals) | 101400 |
| Ambient Temperature (Kelvin) | 299.8 |
| Reynolds Number Flat Plate |  |
| Reynolds Number Leading Edge |  |
| Reynolds Number Trailing Edge |  |
| Dynamic Pressure 10m/s (inches of water) | 0.2366 |
| Dynamic Pressure 15m/s (inches of water) | 0.5322 |

**Table 1.** Experiment Parameters

Chart

Description automatically generated**Results and Discussion**