SAE AERO DESIGN TEAM 3
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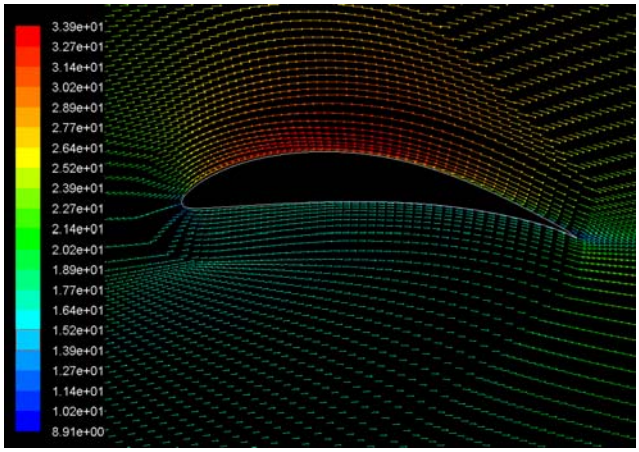
The purpose of the CEC project was to create a capstone experience, the culmination of four years of rigorous study in mechanical engineering. Tools and knowledge from virtually every area of study is incorporated within the project. The goal of the CEC project is to successfully build an RC airplane capable of meeting the design requirements of the 2008 SAE Aero Design Competition.

The flight and control of a radio controlled airplane in flight is an incredibly diverse and widely varying task. In order for an aircraft to fly it must meet several criteria. It must have a lifting surface, whether this is a wing, lifting body, or other means, this surface allows the airplane to generate a positive force to act against gravity and allow the aircraft to remain aloft. The general modus operandi by which this is accomplished is to take a stream of air traveling with velocity relative to the lifting surface. The top of the lifting body curves concavely, while the bottom is typically convex or flat. This causes the air on the top surface to experience an increase in the velocity relative to the



free stream, as Bernoulli's principle of fluidity dictates this lowers the density creating a low density field of air above the lifting the surface. The inverse of the operation occurs on the lower surface of the lifting body causing flow to slow and generating a field of higher density. The resulting disparity creates and upward force acting on the wing surface called lift. The second requirement is a propulsion system; this allows the aircraft to move through the air and thusly generates lift by moving the free stream air over the surface of the wing.

The wings were built first being the most critical part of the airframe. Significant effort was placed into finding the appropriate airfoil. Visualfoil was used as a database for airfoil shapes to use to create a wing. Visualfoil gave rudimentary performance characteristics which were backed up with CFD work. The CH10 was chosen and the shape and coordinates of this airfoil are annexed in the appendix of this report. The wings were constructed by printing out a scale template of the airfoil. This template was used to cut out the airfoil shape. These forms were drilled and mounted on wooden dowels.

The choice to incorporate a dihedral in the wing was to increase the stability and performance of the aircraft. Dihedral works by creating restoring moment should the airplane rolls too much to one side or the other. This is accomplished by aligning the wing so that it is at angle slightly above the horizontal.