Project Overview

Problem Statement:
The PC case industry lacks comprehensive engineering in most contemporary case models. In the current state of high-performance PC usage, there is still much to be explored for PC cooling solutions. With this in mind, a PC case that would aid in cooling a PC running at high temperatures would be in demand.

Need/Project Description:
This project is for the design and development of a PC case with high cooling capability. We shall explore fluid dynamics and various fan configurations to develop a case with high airflow as the main method of cooling.

Our Team

Top (Left > Right)
Project Manager: Matthew Robert Ilagan
Manufacturing Lead: Biruck Halefom
Quality Lead: Xavier Leasau

Bottom (Left > Right)
Design Lead: Brett Schultheis
Design Lead: Leonardo Zuniga

Design Process/Iterations

Concept Drawings → Preliminary Designs → Critical Design → Fall 2021 Design → Final Design

Design Concept

The Vaporwave is IceCore’s first attempt at creating a commercial quality personal computer (PC) case. In order to compete with other PC cases on the market, our design highlights the following attributes:

Customizability:
This case has been designed to accommodate full ATX size motherboards as well as other necessary PC components. A generous internal space has been allocated for all sorts of hobbyist PC builds. Additional space to the intake panels allows for the use of water cooling systems and the panels have been treated to allow for the installation of LED strips. Once assembled, your entire build can be viewed through the acrylic side panel (forget worrying about shattering tempered glass!)

High Airflow:
Our design is focused on creating high airflow in a closed environment. Using a typical 4 fan configuration, the PC case geometry has been optimized for PC component air coverage and reduction of stagnant air spaces.

Dust Management:
PC case dust filters can be hard to clean thoroughly and can get dust everywhere when they are removed to clean. Our case uses disposable filters to facilitate the process of cleaning and keeping your PC dust free.

Assembly and Packaging:
To improve packageability, our case has been designed for a quick and easy user assembly. Our simplistic frame and panel format allows for an easy user assembly experience from case to full build.

Final Product: The IceCore Vaporwave

Tests and Analysis

Airflow Analysis
Throughout the course of this project, ANSYS airflow simulations were performed to confirm the airflow viability of each design.

Graphical Benchmarking Tests
To confirm the practical usage of the air cooling model, graphical benchmarking tests were performed with a full PC installed in this case using Heaven Benchmark 4.0. A similar test was performed using the same components in an NZXT H500 series case.

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