

Advertising Center Enhancements

Objective

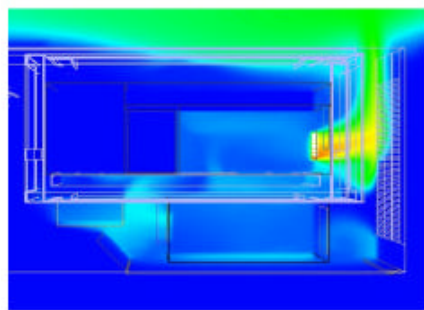
An advertising company has developed a new, interactive system for delivering their content. This system consists of a multimedia projector and a PC, all enclosed in a shroud. Installed in public venues, this new system was found to be shutting down in some sites. Root cause analysis showed the unit was overheating. ECS was asked to evaluate the current design and recommend modifications.

Methodology and Results

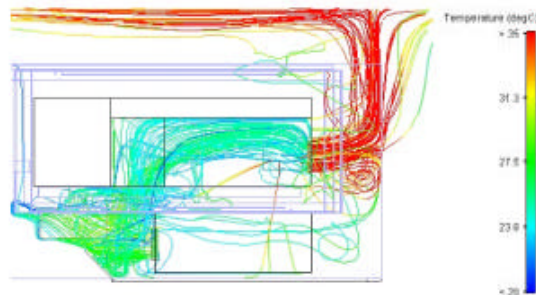
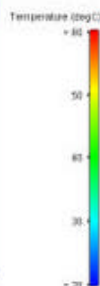
Airflow tests were conducted in the ECS laboratory to characterize the flow of the projector and the PC that were enclosed in the shroud assembly. From the airflow test results and from the mechanical CAD data provided by the client, a CFD model was developed. From the baseline CFD model, it was found that the shroud caused much of the exhaust air to return to the inlet of the projector. This re-circulation likely caused the projector to shut down. Several scenarios were evaluated to identify the best ways to eliminate or reduce the re-circulation. The constraints involved were the limited areas on the shroud panels where vents can be placed to allow for advertising space, and the need to limit line-of-sight to the equipment within the shroud from the public. Recommendations were given to improve the shroud design based on the scenario that gave the best results and met the constraints.

Conclusion

With a combination of airflow characterization and CFD modeling, viable solutions for an existing problem were determined. Although the solutions required a retrofit since the units were already installed, the benefit of this late stage analysis was the elimination of the 'hit-and-miss' or 'trial-and-error' approach to solve the problem. This also showed that shroud designs should be evaluated first with simulation to avoid problems in the future.



Temperature Field Showing Recirculation



Particle Trace Showing Recirculation

