Group 4 - AWG

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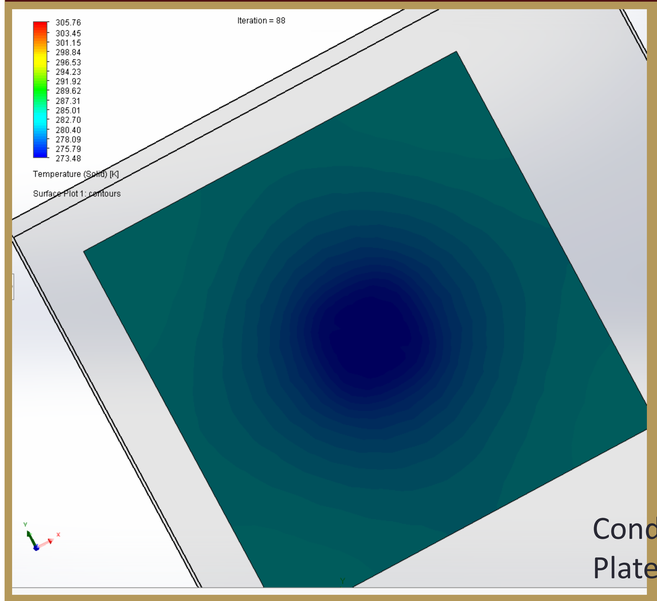
Project Description

- Our project is to utilize SOLIDWORKS to design, optimize, and build an Atmospheric Water Generation (AWG) test platform using Peltier devices or TEC. Multiple configurations and heat transfer mechanisms are to be considered to produce the maximum amount of water using a minimum amount of electrical power.

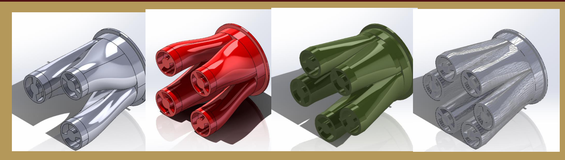
Background Information

- Atmospheric Water Generation (AWG) is nothing new. In fact, there are many different ways to achieve it. The most common and efficient way to do so is with a HVAC system containing refrigerant, which produces harmful emissions at the cost of water generation. Our project is not going to use refrigerant, or any means that create pollution. Our product will have zero carbon footprint and should be able to be powered by a solar panel, meaning it can go anywhere there is sufficient sun light.

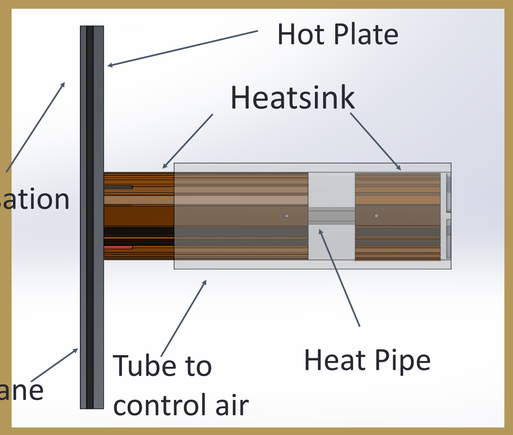
Visualization



Above is a sample the data we would get from a simulation. To the right is one of the models we used to simulate the system.

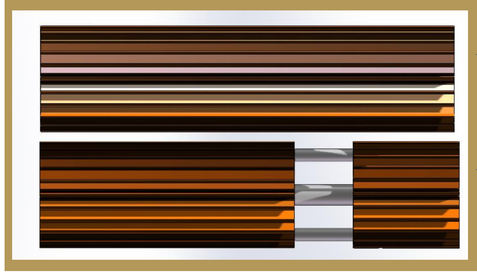


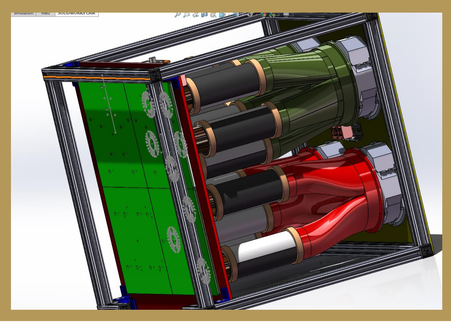
The Air Ducts Designed for the Project



Process

To test and get data we used SOLIDWORKS and its tools. We developed and created assembly models of what we planned to make and then ran Flow Simulations to model what will happen to the designs. Based on our testing, we have selected two Design to showcase. One will be a solid aluminum heatsink of 7.8”, the other is a 4” heatsink joined by heat pipes to a 2” heatsink.





Metrics

- We want to make the condensation plate stay at a stable 38-40°F.
- We want to do this by using as little power as possible.
- Below is a sample of our data collected.

Conceptualization

- We were given an initial design, made by Mr. Mark Summers. Our task is to build upon his initial design.
- We have simulated many designs and have picked two that we have built.