THERMO-GEN

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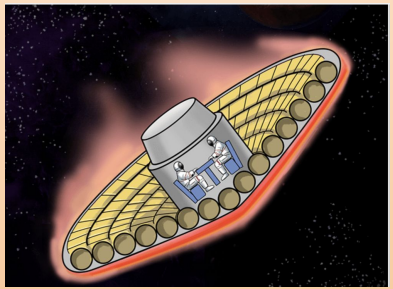
About!

- Ever wondered about what keeps human-made space objects or maybe firefighter gear from burning up or freezing over when exposed to extreme conditions?
- How is it even determined that those objects would be protected in those conditions?
- What is the importance of protective materials? Could certain research even be conducted?



Images from HeetShield.com

Our Client

- Our client, Steve Miller, and his company HeetShield, make and test these products!
- After many years of development, they have created their own functioning thermal diffusivity apparatus
- Though the device meets the team's base line standards for gathering data; it requires hours of manual adjusting that is not always precise

HeetShield

Thermal Diffusivity Apparatus Functionality

- Last week we visited the workspace where Mr. Miller and his team conduct their research
- We met the apparatus operator, Luke, and he spent an hour or so explaining how it works
- Basics:
  - Small samples of the material being tested are cut with tools that make each one the same size and shape, then they are set up in the apparatus
  - 30 seconds of data is collecting to record stability
  - A lamp is turned on for a few seconds (to generate a heat pulse) that heats up a metal plate adjacent to the test sample
  - Data is collected that shows the heat pulse moving through the sample over time
  - The data is analyzed to calculate thermal diffusivity

The Baseline Problem

- This process sounds short and sweet but takes up to 5 hours per sample depending on the conditions without much guarantee for precision
- Say you are about to embark on a mission to space; wouldn't you want to know that the materials meant to keep you safe on this trip were developed with precise conditions that would more accurately account for your safety?

Our Job

We will work towards:

- Allowing the test operator to set test conditions and walk away and notifying them when the conditions are stable and a test can be run
- Allowing lamp time to be set by operator so they can start the test sequence
- Making the control panel display live data and thermal diffusivity
- Giving the operator upfront data at the end of a test that determines if lamp time should be changed at all
- Making the system achieve and maintain the specified test conditions until the operator changes them
- Outputting to a data file with a table indicating test temperatures, pressures,and corresponding diffusivity values
- Including an error report process that lists any anomalies during the test indicates the standard deviation of the predicted vs the measured results

Development Plan

- Step one: Meet client and view technology we will be working with
- Step two: Obtain specs for the technology that they are using we can make recommendations.
- Step three: Obtain LabView package we can use. The base version is ~$500/year, there is a CE however, we are unsure if it can do everything it needs to.
- Step four: Obtain sample data to use in LabView to test our programs
- Step five: Write program to interface with labview and sensors to help with productivity.
- Step six: Make program user friendly.

To Summarize…

We are Thermo-Gen, and we’re working to create a program to aid HeetShield speed up their testing and make it more precise. With both of those they can deliver better results faster and more efficiently.