MFMP 2015-02-03

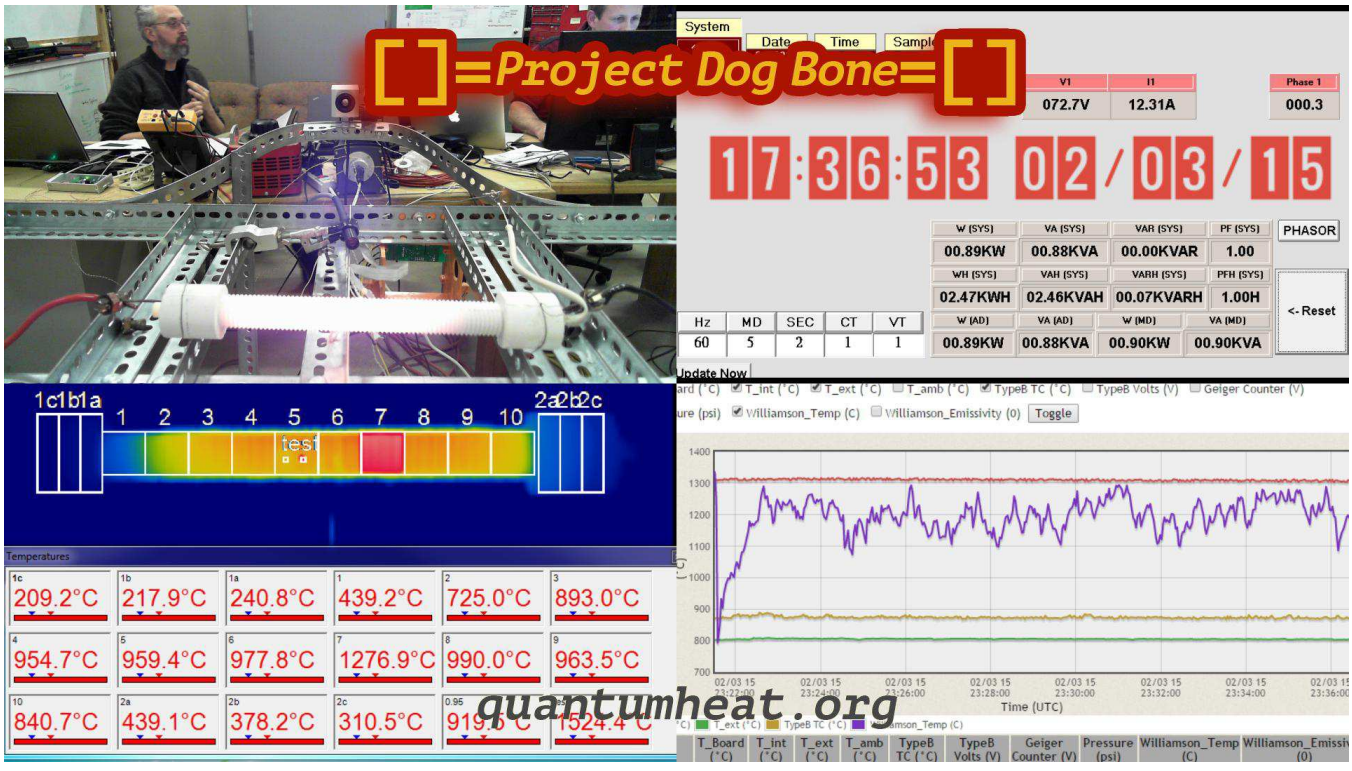
Interesting notes from the test

Our broadcast computer died from what appears to have been a ground loop involving the metal frame the dogbone sits in. It will take till at least noon tomorrow to be able to get it repaired or replaced. That means we have a change of program for tomorrow morning. Instead of doing things that require integrating and streaming many video streams, we will, instead, do things that are entertaining with one camera feed such as assembling powder filled fuel tubes and heating up a silicon-carbide heating element inside an alumina tube up to 1500C.

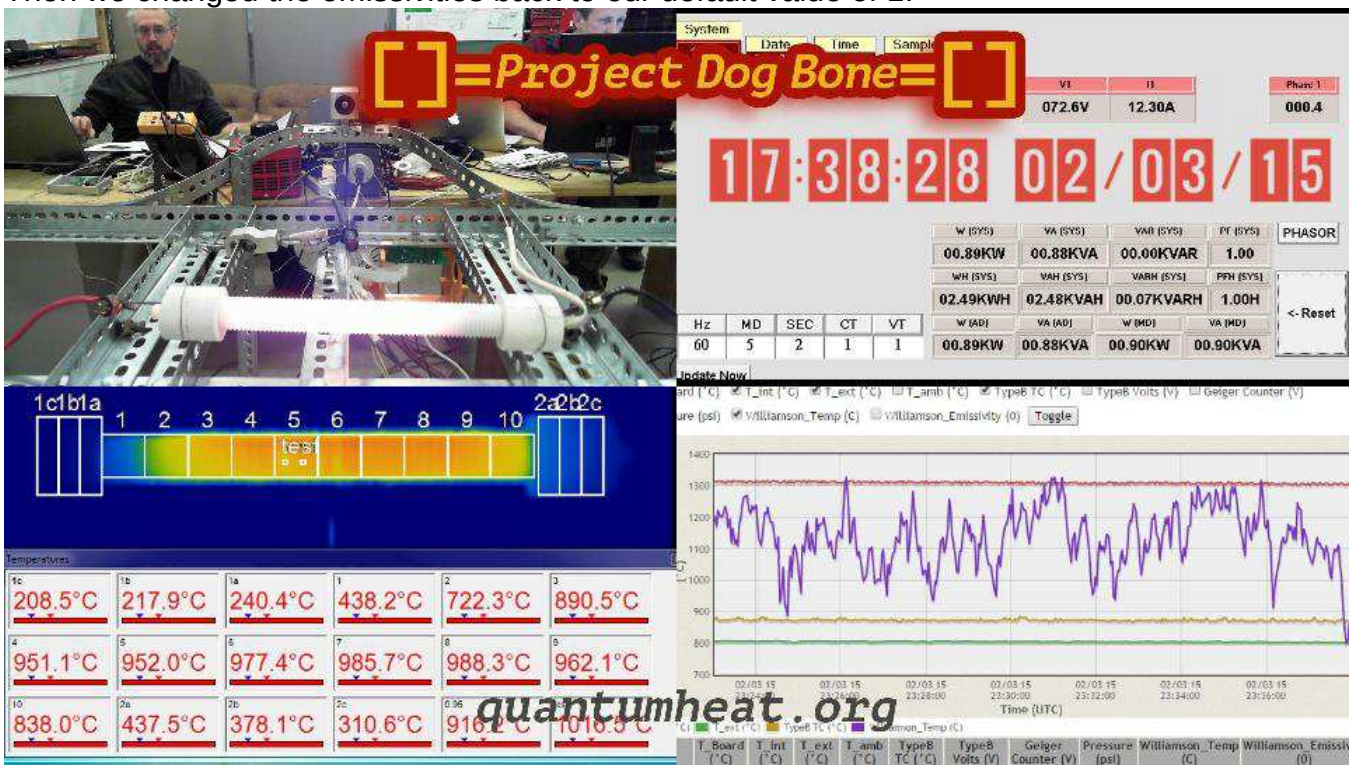
All the data is in this folder and available:
https://drive.google.com/drive/#folders/0Bz7lTfqkED9WaXdGZlUtck5hQkE
The spreadsheet is here: https://docs.google.com/spreadsheets/d/1t-qY7CBPCuEiJEDtjKv_lU1HfJdSNZkQwH3ZNUWAaUo/edit#gid=0

The main revelation was that the emissivity required for the camera to correctly interpret the temperatures on the surface was very close to .95. When we plugged in the emissivities cited from literature in the Lugano report (0.8 to 0.4), the apparent temperature was 1200 to 1500C at 900W in. Is our cast alumina significantly different than other alumina materials? Tomorrow we can compare several temperatures at once on a 1/2" OD alumina tube that we purchased from McMaster Carr. What else are we missing?

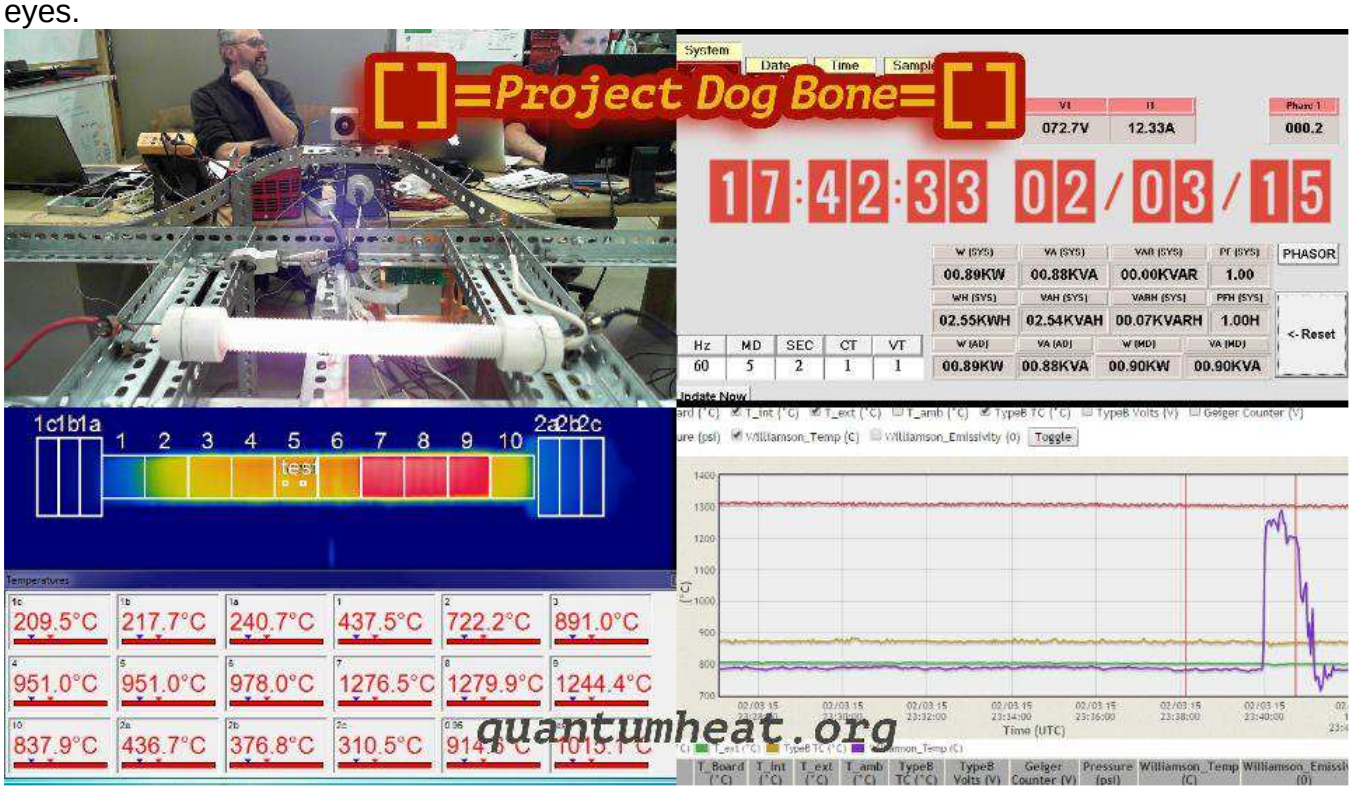
When we set the emissivity in Zone 7 to 0.7, it popped up to 1277C. The zone called Test was changed to 0.45 or so (I can't remember just which) because that's what what the emissivity from Plot 1 of the Lugano Report would have indicated for temperatures near 1000C



Then we changed the emissivities back to our default value of 1.



Then we set three zones to 0.7 emissivity. See if you can tell which ones they were. Note: The video camera shows more glow in the dogbone than we observed with our eyes.



This is all discussed in the video recording here: http://youtu.be/uxTos11fcs8?t=2h3m17s

Meanwhile, here is some other interesting data. The uptick in temperatures at the end looks interesting. We saw something similar in the previous calibration on 2014-12-31, only we have extended it one more data point to 900W input. We have no clue what to make of it. We had no nickel or Hydrogen anywhere near the hot dog bone. Any suggestions? Could this be a change in material property like a thermal conduction change or radiant heat transmittance effect that could be misinterpreted?