# 03/07/2019 - Capstone Meeting Notes

**Discussions:**

* Hollow cube discussion
  + [Emissivity blog post for ANSYS](http://www.padtinc.com/blog/news/advanced-ansys-functionality)
  + Absorptivity, emissivity values important here
* Math model
  + *Not* a numerical model, but more of a “get your view factor ratios, get your material properties numbers and just know what variables affect what parts of the heat transfer problem”
  + Using projected area to calculate the surface area that is receiving radiation from the sun
  + Fun fact: emissivity of earth is 0.5
    - Varies on cloud coverage
  + Look at papers in the drive, there’s a lot of useful information about radiation and how it affects the satellite (albedo, calculating solar flux from winter -> summer solstice, etc.)
    - **Discusses how the batteries are affected as well, which is the top of the list item that OreSat cares about the most**
* Measurements stuff
  + Conduction measurements on the PCBs
    - Thermal paste + 50W power resistor in hand
    - Full time use of the IR camera in the EPL
  + Totally fine to rely on the IR camera for measurements, no need for additional sensors
* Future plans
  + Katherine did a lot of great work with the PDS and discussing how we go about wrapping up writing it (due in 8 days)
* Deadlines
* GitHub

**Progress:**

* Parker
  + Lets talk:
    - Doodle poll scheduling - Katherine
    - Hollow cube - Griffin
    - Math model - Katherine/Tyler
    - Measurements stuff - Griffin/Jeremy/Parker
    - Future plans
    - Reminder of deadlines
    - GitHub progress
  + Making the purchase today for the DAQ and platinum RTDs
* Katherine
  + Outline for report - roughly completed sections to be assigned
  + Would like to briefly discuss what we would like to include on tuesdays presentation
    - 3D calcs
    - Details on 2D
    - Advance of 3D model
* Tom
  + Not much progress -- had to stop a robot arm from killing itself.
* Jeremy
  + Running CFD simulations with Star-CMM+. Getting nowhere.
* Griffin
  + Refined hollow cube model
    - Wondering how to include emissivity into the model
    - Possibly get reasonable results to present on Tuesday?
  + Did trial run of ME-411 model
    - Had a hard time seeing conduction through the PCB
* Tyler

**Action Items:**

**Important notes for Ansys:**

**Important dates:**

* Feb. 28 Extract data from 1D sim (run w/ proper emissivity and view factor values)
* March 15 Create a math model for the 3D sim
* March 15 Report
* March 22 Create an appropriate sim model
* March 29 Finish post processing and error analysis
* March 30 Sim demonstration to OreSat

**Important links:**

* **Emissivity of Ano**
  + <https://www.design1st.com/Design-Resource-Library/engineering_data/ThermalEmissivityValues.pdf>
* **Emissivity of Earth** - this is a pretty informative article on how they calculate this
  + <https://www.acs.org/content/acs/en/climatescience/atmosphericwarming/singlelayermodel.html>