# 2018-11-6 - Meeting with Andrew Notes

**Jeremy**: What are the max and min temperatures the satellite can reach?

-Standard chips: -20 to 80 C

-Industrial: -20 to 100 C

-Military: -40 to 140 C

Batteries:

* Standard: 0 to 60 C
* Lithium-ferrous-phosphate: -20 to 70 C

Optimum case: 0 to 70 C during our time in space

**Katherine**: Is there anything special that we need to be aware of on the ride up to space?

* No, we’re going to be in bubble wrap and stay cozy

**Tom**: How do the boards interact with the frame?

* Slots in the frame, and using springs as additional thermal contacts
* Thermal grease that is vacuum safe (?)
* Can we dump heat from ground planes into the satellite (?)
* We love the idea of phase change stuff, wax could be sweet but also messy
  + “Active control”
* We might have to put a heater on the batteries, but specifically only the batteries

**Griffin**: What is our timeline?

* Tomorrow, 8AM
* We really want info on the passive mode ASAP, and the rest following

**Jeremy**: Are we essentially doing thermal simulations of the two worst states?

* We want to know about thermal behavior while orbiting around the planet
* We want to know what our maximum beta angle is, what is the worst beta angle?
  + How much time are we spending behind the earth?
* We have freeflier software available for our usage

**Tuesday nights are the easiest to meet with Andrew to ask questions and for guidance.**

**Andrew**:

* Thermal is the only thing that is not de-risked
* Thermal state of satellite during passive mode is the most important
  + Steady state of 3 months
    - Anodization?
    - Paint it black?
    - Coatings?
* Timescales of heat we care about
  + First 10 minutes we’re shot out
  + First few days
  + During antennae deployment
  + During passive modes