Things to discuss with the dog house now that it has been a full year

* The interior structure (and the insulation and the reflective insulation)
  + For the dog kennel, I converted half of my shed into the kennel. To do this I framed that half of the shed so I could insulate the dog kennel enclosure for temperature regulation. Initially, I found that the kennel was sealed too well, and the A/C unit did not have enough air sources to suck in for circulation. This meant that the doggy door was continuously open due to the pressure differential. I installed a vent to prevent this from happening.
  + Installed the windows to allow natural light and fresh air when the weather is nice. There are future plans for the attach motors to the windows so they can open and close automatically when the outside weather is nicer than the environment in the dog kennel.
* The deck with the doggie door
  + Due to the elevation difference of the interior and exterior of the dog kennel, I had to build a deck for the dogs to go in and out. The deck was actually a big hit with the dogs and they tend to spend lots of time on the deck. Me made sure put shad there for them because they spend so much time there.
* The fence and the sections that are buried
  + On the interior perimeter of the fence, I buried 2.5’ fence to prevent the dogs from digging out of the kennel when we are not around. I dug a 2.5’ wide and 6” deep trench around the interior perimeter to bury the fence. This was LOTS of work and looking back I would probably just lie the fence down and throw sod on top of it. I twisted the fence that is buried into the standing fence. I cut the underground fence in a way to where the fence itself is being twisted into the standing fence. There are no additional twisting materials.
* The setup for the water bowl
  + During the summer months, we wanted the dogs to have more than just the water that is in the inside of the kennel. Also, one of our dogs is big and drinks lots. For this we went to Tractor Supply and bought a livestock watering bucket and built a bracket to install it in the corner of the outdoor kennel area.
* The water and electric lines that I ran
  + Another daunting and physically challenging task.
    - The water portion of this was not difficult because there is not water on the plumbing all of the time. This allowed me to not worry about installing the plumbing underground below the frost line. I have the plumbing routed to the outdoor water bowl and down to the dog kennel, so it is easy to fill the interior bowl. The system is designed to just hook a water hose up to it and then have water down at the kennel areas without dragging the water hose down there.
    - I learned lots with installing the electricity to the shed. This section of the build may require its own dedicated section with more detail.
* Ethernet (cameras and internet)
  + Due to the location of my shed (aka dog kennel) to the house, I could not get wifi down to the shed. I tried to get a range extender, but still didn’t have the wifi strength that I wanted. This meant that I went with ethernet cameras for the kennel. I ran the cables while I had the ditch dug for the power and water. My biggest regret is that I would have ren more cables for future projects.
* Hooking up the air conditioning and ensuring that the hot exhaust escaped the shed
  + We went with an interior A/C unit which led to the challenge of expelling the hot exhaust. These units are designed to have the exhaust go out of an interior window in a house, but this was not an option for us. So we ran the exhaust of the A/C for the kennel into the shed and then out of the shed to the outside. The inside of the shed gets really hot and this was making it difficult for the A/C to keep the kennel cool. We had to insulate the exhaust ducting form the A/C to prevent as much of the heat as possible from getting into the shed.
* The chicken coop fan and all of the vent that I installed in the shed.
  + Again, the inside of the shed was getting to hot for the dog kennel to regulate the temperature inside of the kennel. I had to get some fans for the inside of the shed and install 3 different attic type vents for the air circulation.
* The Arduino/ Pi setup
  + The relay for turning on the kennel fans
    - There are days in the spring and the fall where the morning is really cold, but in the afternoon the temperature is in the 80s. I hate turning the fans on in the morning prior to going to work and then the dogs have to lay in the cold with the fans on, but I want the fans to be on for the afternoon when it gets hot. For the days where the morning and afternoon temperature differentiate by 25-30 degrees, I want the fans to automatically turn on and off. This led to the Arduino control system for the shed. In order for the Arduino to know when to turn the fans on and off, I need to install lots of different temperature sensor. I want the Arduino to know when it is cold out, then the kennel should be warm and then visa versa. Sense I was doing all of this work, I went ahead and added other weather sensor and components.
  + All of the temp sensors
    - There are two sensors located in the kennel. One near each of the dogs. I am going to use the average of the two for the kennel temp. I am also making the code notice when one of the sensors fail (the difference in temp is large) and then using the temp sensor from the shed and outside to make the assumption of the bad sensor.
    - There is a sensor in the actual shed (just curious to how hot/ cold it gets in the shed)
    - There are two outdoor temp sensors for redundancy and I will used the average. One of the sensors takes baro, hum, alt, as well.
  + Obviously, the dope ass case that all of the electronics are housed in.
    - I went a little overboard with building and designing the case for the hub of the shed control system, but I have big dreams for the shed and I wanted something that could support the system as it grew.
* Then I can get into the weather station, but I think I will make this into a different section of the blog
  + I used the following 3D print for the radiation shield for the temperature sensors. For the print that I did, I only used 3 of the disk (#####). This was because the srcews that I had on hand were only 3” long. U oersonally wouldn’t go any lower than 3 levels of the disk.
  + The sensor attachment pieces did not fit the ##### sensor that I was using, but this was ok because I modified the temperature sensor housing to hold 2 sensors. I used both the ##### and ##### because I wanted to have a redundant temperature reading for the code that is being ran in the dog kennel.
* Decided to use a D-sub connector for the connection between the Pelican case and the shed. I wanted the box to be