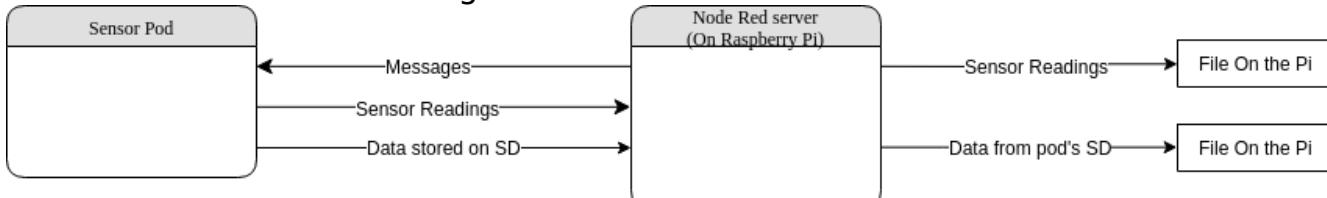


The basic way that the sensor pod works is as follows: The raspberry pi intended to collect the information is set up as an access point. The arduino of the sensor pod connects to that access point using it's wifi shield. If the arduino can't connect to the pi, it will write the temperature, turbidity, and dissolved oxygen readings to an SD card (if there is one in the slot on the wifi shield) instead. However, if it is able to connect, it uses the MQTT protocol to send/receive messages to/from the pi. The broker for MQTT is on the raspberry pi.

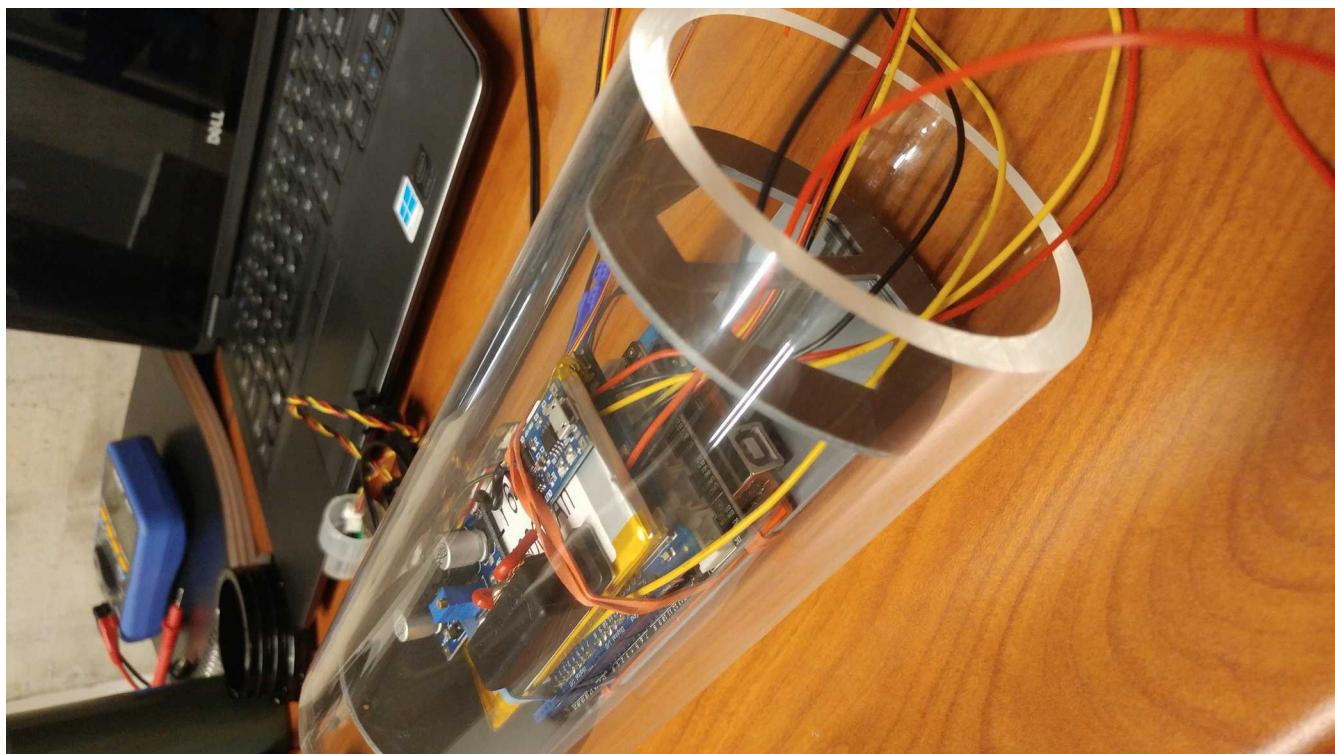
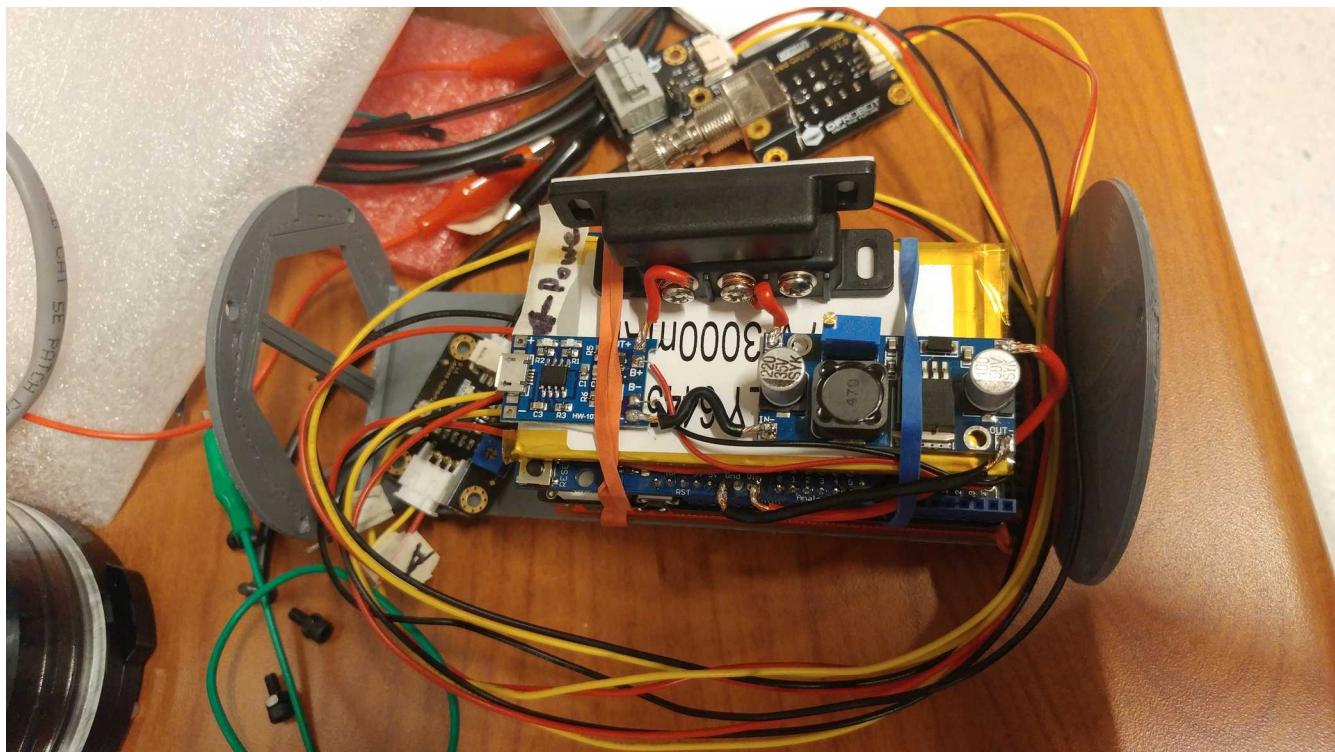
The pi also has a node-red server set up on it that allows the user to see what's going on if they want. This is done by connecting to the pi with the laptop and then opening a web browser with the correct address. For the pi I've been using it's <http://10.42.0.234:1880/>. The address will of course depend on what address the pi in use has – the address listed above is for when the pi was connected to my laptop with an ethernet cable. In theory, this could be done wirelessly by connecting a computer to the pi's access point and then opening a browser to access the node-red server.

Here is a basic data flow diagram:



The arduino, wifi shield, grove connection shield, battery, lipo charger chip, step up converter, and reed switch are all held in place on a 3D printed bracket of sorts as shown in the following pictures:





The whole pod can be turned off by placing a magnet near the reed switch. The following images have some annotations for clarity of what's what.



