

# Weekly Updates - 3/26/19



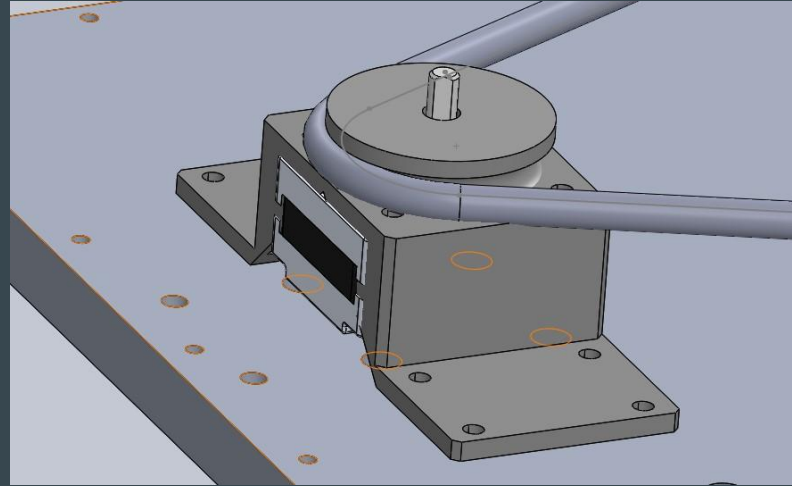
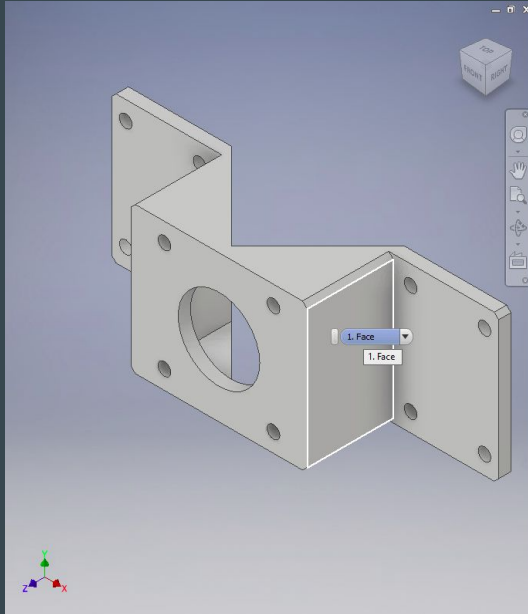
Team P.V.I.R

Advisor: Lukas Graber

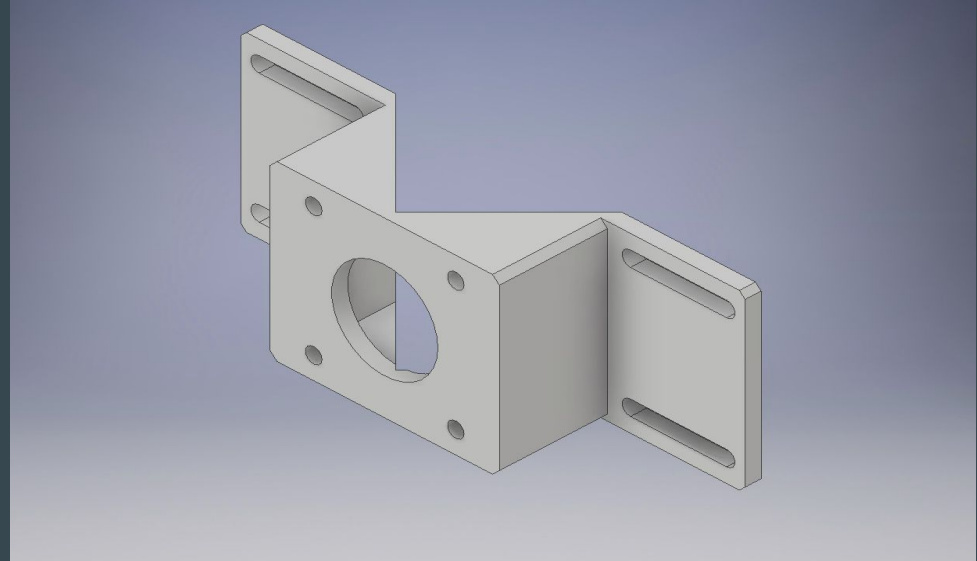
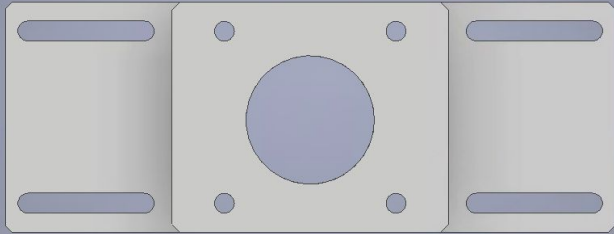
Team Members: Stephanie Chan, Elizabeth Fuller, Adrian Munoz  
Nelson Raphael, and Lemek Robinson

# Mechanical Arm Update

- U-brace design created!
- Integrated into the assembly

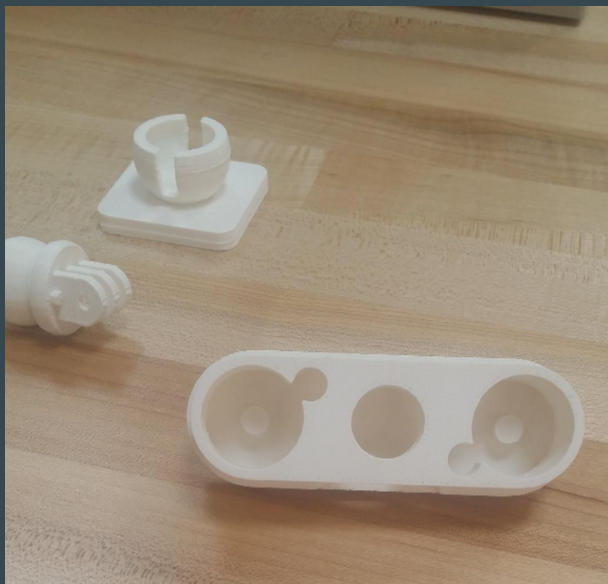
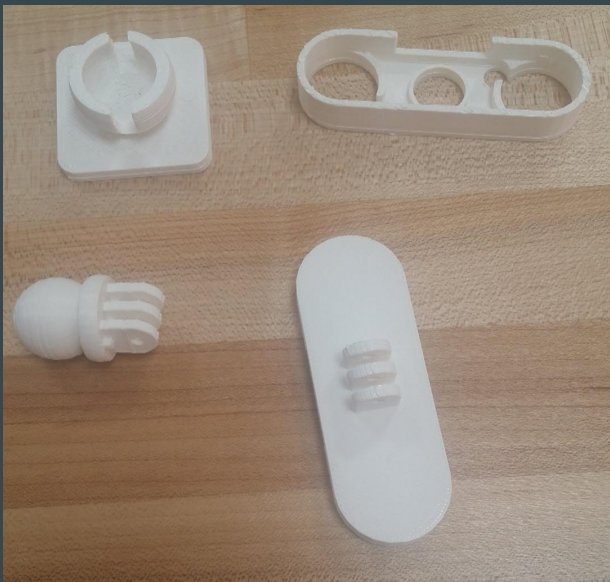


# Mechanical Arm Update



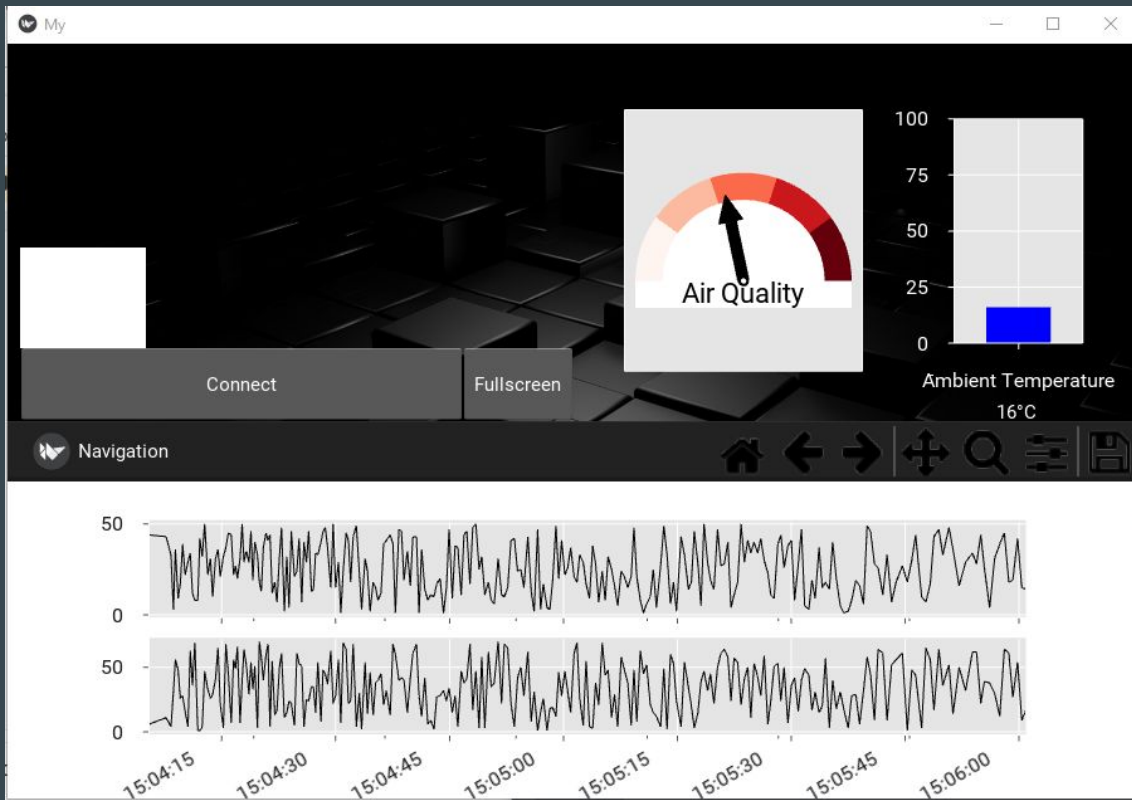
# Camera Mount Update

- Successfully printed!



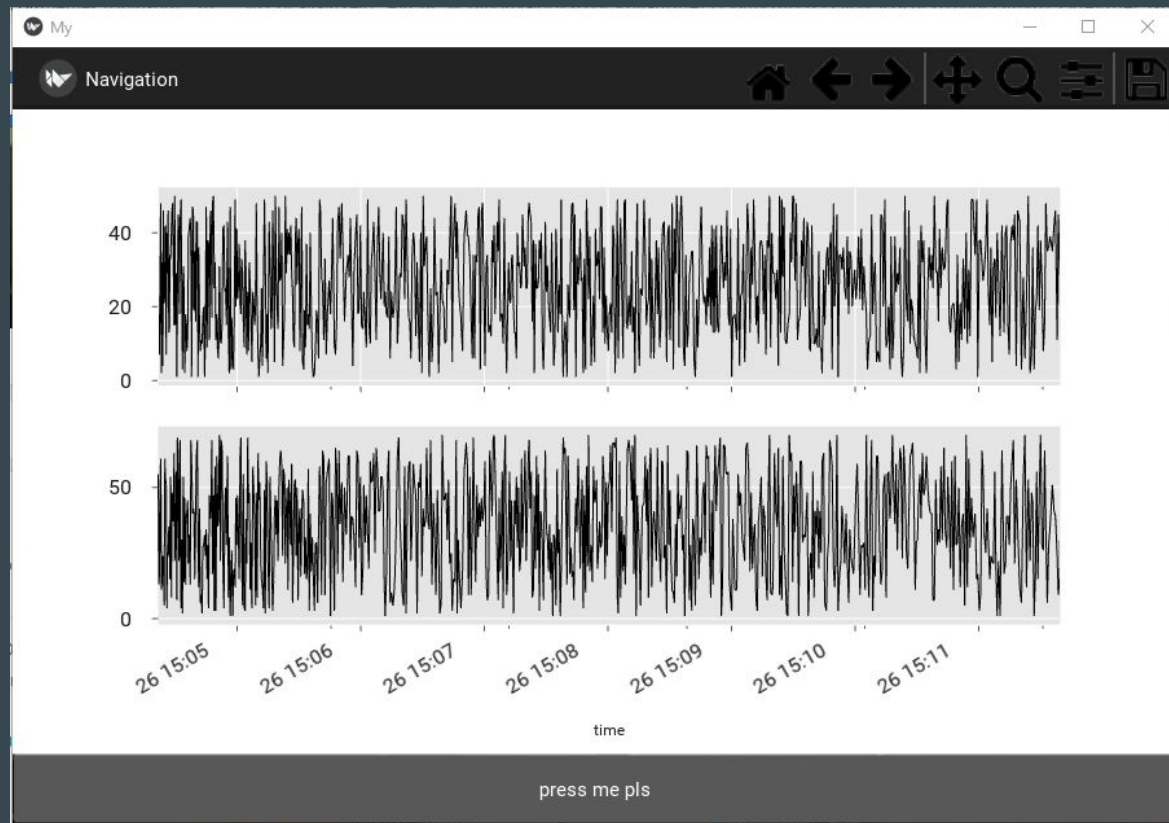
# GUI Update

- Working gauge
  - Modified drawing to reduce computational load
- Ambient Temperature
  - Color changes depending on live data
  - Live label
- Live Graph
  - Freeze option
  - Single navigation bar
- Optimization
  - Data cap/scrolling
  - dataframe



# GUI Update cont.

- Still graph that holds more information.
- Data cap is larger
- Information is not lost
- Potential Issues:
  - Memory
    - Refresh rate slows with more data
  - Video Stream lag



# Serial Comms

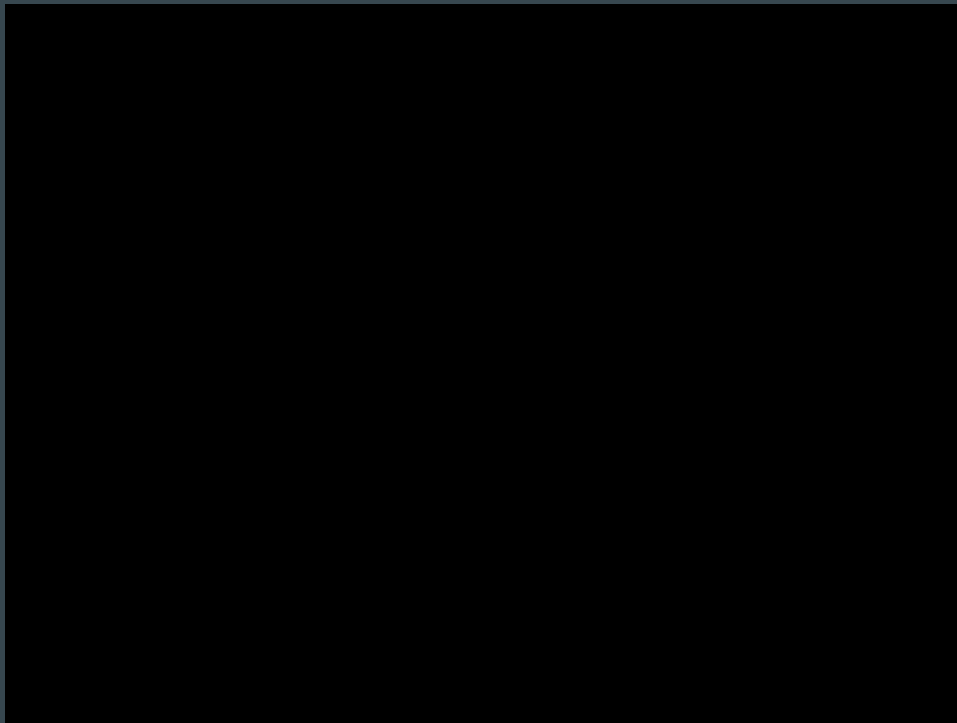
- Pi to arduino and back are functional.
- Can read strings from python and send strings back.
- Potential issue:
  - Different loop speeds (Sync)

```
String incoming;    // for incoming serial string data

void setup() {
    Serial.begin(9600);    // opens serial port, sets data rate to 9600 bps
    incoming = incoming.reserve(1);
}

void loop() {
    // send data only when you receive data:
    if (Serial.available() > 0) {
        // read the incoming:
        incoming = Serial.readString();
        // say what you got:
        Serial.flush();
        //Serial.println(incoming);
        //Serial.flush();
        if (incoming.substring(0) == "thiss"){
            Serial.println("the message you have sent is: "+incoming);
            Serial.flush();
        }
        else{
            Serial.println(incoming.substring(0));
            Serial.flush();
        }
    }
    delay(500);
}
```

# Serial Comms Demo Video





# Arduino Sensor Package Code Outline

- Need to specify delay time between sensor info updates
- Question for delays: How will the processing of the sensors and motor control work in tandem? (Smaller delay when not moving?)
- TO DO: determine formatting of ALL data printed so that GUI can interpret it (ie headers to separate temp data from gas data)

```
sensor_package

void setup() {
    // put your setup code here, to run once:
    //include setup codes for each of the functions and define variables
}

void loop() {
    // put your main code here, to run repeatedly:
    MeasureTemperature();
    delay(1000); //experimental delays
    mq2read();
    delay(1000);
    mq7read();
    delay(1000);
}

void MeasureTemperature(){
    //insert code for IR temp sensor
}

void mq2read(){
    //insert code for mq2 gas sensor
}

void mq7read(){
    //insert code for mq7 CO sensor
}
```

# Arduino Motor Control Outline

- Need to have set restrictions on motors
  - Height
  - Rotation
  - Speed
- All motors receive a pwm value from the controller
- TO DO: determine format of values incoming from controller (will the values need to be modified etc)

motor\_package

```
void setup() {  
    // put your setup code here, to run once:  
}  
  
void loop() {  
    // put your main code here, to run repeatedly:  
}  
  
void reset(){  
    //realigns all motors to startup position|  
}  
  
void leftMotor(){  
    //will take in a pwm value from controller and move fwd  
}  
  
void rightMotor(){  
    //input is pwm value from controller to move fwd or back  
}  
  
void rotate(){  
    //rotates  
    //restrictions on degrees of rotation  
}  
  
void lift(){  
    //raises platform  
    //restrictions on max height  
}
```

# Order Status

The following parts have been ordered:

- 2 Grove MQ2 Gas Sensor (\$7.53)
- 2 Grove Infrared Temperature Sensor (\$9.90)
- 1 30pcs Protoboard set (\$10.85)
- 1 130pcs Jumper Wire Kit (\$7.89)
- 1 3pcs Solderless Breadboard (\$7.99)
- 1 Arduino DUE board (\$37.40)
- 1 Waveshare RPi Camera F Module (\$25.99)
- 1 Sandisk 32gb micro SD card (\$8.90)
- 2 Parallax Carbon Monoxide Sensor (\$5.99)

Order 1 Total: \$145.86

- 8 Samsung 30T 21700 Battery (\$7.99)
- 2 EFAN 4 Channel Battery Charger (\$9.97)
- 4 21700 Battery Tray (\$5.25)
- 1 10ft Ethernet Cable (\$5.99)
- 1 8" Aluminum Lazy Susan (\$17.00)
- 1 USB Breakaway cable for Xbox 360 (\$3.99)
- 1 6061 Aluminum plate 12" x 12", 1/4" thick (\$47.11)
- 1 6061 Aluminum plate 12" x 24", 1/8" thick (\$43.12)

Order 2 Total: \$220.07

- 1 Test Pressure Gauge (2-1/2") (\$1.61)
- 1 General Purpose Pressure Gauge (2-1/2") (\$3.59)
- 1 Liquid Filled Pressure Gauge (2-1/2") (\$4.85)
- 1 Xbox 360 Controller, Wired USB controller (\$16.99)
- 4 T-slot sliders (\$5.50)
- 3 30mm x 30mm T-slotted profile 6ft (\$19.23)
- Timing Belt Kit (Includes timing belt, pulleys, tension spring, clamp mount) (\$12.99)
- 5 Zinc-plated steel corner bracket 2" x 2" (\$0.92)  
(Note: Steinberg also ordered the item from the additional link which costs \$9.99 for 16 L-brackets)
- 1 6061 Aluminum plate 12" x 12", 1/4" thick (\$43.12)

Order 3 Total: \$167.44 (Note: The additional \$9.99 was NOT included in this calculation)



# Items on Final Order

- 2 Nema Stepper Motors
- 1 ¼" diameter round belt
- 1 pulley for round belt
- 1 6061 Aluminum Sheet 1/8" Thick, 12" x 12"
- 4 Zinc-Plated Steel Corner Bracket, 5/8" x 1" x 1/2"
- 1 Foamular board (For testing environment) 4' x 8'
- Waterproof DC/DC 12V Step Down to 5V 3A 15W Voltage Buck Converter
- Zinc-Galvanized Low-Carbon Steel Rod (3ft)
- AutoEC 20A Inline ATC ATO Waterproof Fuse Holder (1 Set)
- GiBot Cable Glands - 25 Pack Plastic Waterproof 3.5-13mm Cable Glands Joints Wire Protectors

- 304 Stainless Steel Screw and Nut 515pcs, M3 M4 M5 Metric Socket Head Bolt and Nut
- Male-Female Threaded Hex Standoff
- 10-32 x 1-1/2" Hex Head Cap Screw Bolts, External Hex Drive, Stainless Steel 18-8, Full Thread, Bright Finish, Flat Point
- 1 6061 Aluminum ½" thick x 10 inch wide - 2ft
- Qunqi L298N Drive controller board DC stepper
- Spiral-coiled ethernet cable (2ft-9ft)
- #6-40 x ¾" flat head screw 100 pack
- #6-40 Tap
- 6 ft. USB 2.0 to USB Micro-B, Coiled, USB Type-A to Micro-B

**Total: \$319.28**

# Expense Summary

Order 1 Total: \$145.86

Order 2 Total: \$222.07

Order 3 Total: \$167.44

Order 4 Total: \$319.28

Grand Total: \$854.65

Remaining Budget: **-\$354.65**

**(Again, note: additional \$9.99 was not included in this calculation)**

# Items to be Discussed

- Task Status: Arm CAD design, Sensor Package Schematic, Control System Design
- Action Items for the week
- Concerns:
- **Important Dates:**
  - Last day to order parts: April 8 at 7am
  - Next scheduled lecture: April 8
  - Capstone Design Expo: April 23
    - Team and all team members have been registered
    - Our registered set-up time is 2-3pm