Pseudo Code for Rocket Parachute Deployment Algorithm

**Idea #1 - Accelerometer and Time Based**

Overview:

1. Detect significant movement
2. Start timer for theoretical burn time of engine
3. Try to detect apogee
4. Deploy after a short delay from apogee detection
5. Auto deploy after theoretical burn time done after a longer delay if apogee wasn’t detected

**Idea #2 - Altimeter Based and Time**

Overview:

1. Detect significant altitude increase
2. Start timer for theoretical burn time of engine
3. Detect significant decrease in altitude, apogee detected
4. Release parachute after short delay from apogee
5. Auto deploy after theoretical burn time done after a longer delay if apogee wasn’t detected

Detailed Pseudo

Setup

1. Measure current sea level pressure of time and location for launch, manually change SEALEVELPRESSURE\_HPA and upload code
2. Begin I2C communication, if bmp.begin\_I2C fails flash RGB LED status to RED and stop loop from occurring with while(1)
3. Setup oversampling, filter initialization, and sample rate (100 hz chosen but can be changed) for BMP390 sensor
4. Use bmp.perormReading() command to setup reading communication and take a sample, returns true if successful and false if not
   1. If true continue, if false set status to RED

Loop

1. Use bmp.readAltitude(SEALEVELPRESSURE\_HPA) to get current altitude. It seems like the very first reading is always high so take a few samples before recording the initial value
2. Record an average of 50 initial values (.5 sec of data) 5 seconds after power on and compare this initial average to the current altitude value - **ONCE POWERED ON AND INITIALIZED THE ROCKET CAN’T BE MOVED**
3. Create an error bound, INIT\_BMP\_ERROR, for the altitude value, once the altitude value exceeds the current initial value range then start a countdown timer for the theoretical thrust duration (2.4s)
4. As timer is going check for a decrease in altitude within a larger error bound, DESC\_BMP\_ERROR, and if the altitude value drops below bound before the timer is done then release the parachute
5. If parachute isn’t released already after timer is done, continue to check within the bound and release if altitude drop is detected within the DESC\_BMP\_ERROR
6. Release the parachute 1s after the timer is done (3.4s) if all else fails to release the parachute