**HELIOS Launch Procedure**

The following steps are to be completed before reporting READY TO LAUNCH to the launch director.

|  |  |  |
| --- | --- | --- |
| Step # | Directions | Signoff/Time/Notes |
| 1 | Blow through tubing to ensure no leaks. Visually inspect the wheel for potential leaks. Fill any areas of concern with epoxy. |  |
| 2 |  |  |
| 3 | Run the test code. This should take about two minutes. Ensure that the GPS connects (as evidenced by the valve opening) and that the valve closes after about a minute. Also practice calibrating the BNO055 as below:  3.10.1 Accelerometer Calibration  · Place the device in 6 different stable positions for a period of few seconds to allow the accelerometer to calibrate.  · Make sure that there is slow movement between 2 stable positions  · The 6 stable positions could be in any direction, but make sure that the device is lying at least once perpendicular to the x, y and z axis.    3.10.2 Gyroscope Calibration  · Place the device in a single stable position for a period of few seconds to allow the gyroscope to calibrate    3.10.3 Magnetometer Calibration  Move the box in 3D figure eight motions for several seconds |  |
| 4 |  |  |
| 5 | After valve has closed, turn power off. Remove the SD card, copy the data to the computer, and clear the “DATALOG.TXT” file from the SD card, but do not delete it from the computer. Return the SD card to the appropriate slot. |  |
| 6 |  |  |
| 7 | Install aluminum wheel inside the balloon neck before beginning inflation. Ensure a significant portion of the latex is below the wheel, not just barely. Wrap black ninjaflex around wheel and secure with hose clamp. |  |
| 8 |  |  |
| 9 | Ensure the payload is adequately attached to the reaction wheel and then attach to other payloads. Ensure all strings are adequately in place. |  |
| 10 |  |  |
| 11 | Check all wire connections and review the data from the SD card to ensure that all sensors are adequately connected. This is the most likely cause of failure for this payload!!!!! |  |
| 12 |  |  |
| 13 | Replace the SD card in the arduino. |  |
| 14 |  |  |
| 15 | Flash actual flight code to arduino. Turn the whole payload on per cooper’s instructions and seal the box well. Recalibrate the BNO with the same motions described above. |  |
| 16 |  |  |
| 17 | Add desiccant. Secure with duct tape. |  |
| 18 |  |  |
| 19 | Open fill valve, attach hose to helium valve with duct tape, begin inflation. |  |
| 20 |  |  |
| 21 | Record the temperature and pressure at the launch site to compare with measured values.  Temperature: \_\_\_\_\_\_\_\_\_\_ **°**C  Pressure: \_\_\_\_\_\_\_\_\_\_\_\_\_ in |  |
| 22 |  |  |
| 23 | End inflation, close fill valve. Remove fill tube by unscrewing. Treat payload gently until launch. |  |

**THERMOS Launch Procedure**

The following steps are to be completed before reporting READY TO LAUNCH to the launch director.

|  |  |  |
| --- | --- | --- |
| Step # | Directions | Signoff/Time/Notes |
| 1 | Add 6 new AA batteries to battery port. |  |
| 2 |  |  |
| 3 | Check all wiring connections to ensure that there will be no shorts. Check to see if any wires have snapped from soldered points on breadboard. Remove tension from the wires to reduce stress on soldered points. Use electrical tape to isolate the open connections. |  |
| 4 |  |  |
| 5 | Power Arduino, check to see if the LED lights turn on to indicate flight readiness. |  |
| 6 |  |  |
| 7 | Calibrate temperature sensors. Record temperature of launch site using “atmosphere” temperature sensor located outside of the four boxes. Logging test to make sure data logger is working. Remove SD card and use an SD card adapted to plug it in the computer. First we wipe the card, then we calibrate it. We will check to see if it records the data again, then insert it back inside the Arduino box.  Temperature: \_\_\_\_\_\_\_\_\_\_ **°**C  Pressure: \_\_\_\_\_\_\_\_\_\_\_\_\_ in |  |
| 8 |  |  |
| 9 | Seal the Arduino and battery box. Make sure the other 4 boxes are air tight. This includes using tape and hot glue to fill in any gaps. |  |
| 10 |  |  |
| 11 | Remove Battery until ready for launch |  |
| 12 |  |  |
| 13 | Tie to payload string and power on when ready to launch. There is no external power switch. Power on the arduino, and then seal the box with duct or packaging tape. This box does not need to be airtight. |  |

**MASIV Launch Procedure**

The following steps are to be completed before reporting READY TO LAUNCH to the launch director.

|  |  |  |
| --- | --- | --- |
| Step # | Directions | Signoff/Time/Notes |
| 1 | Taking a base reading for temperature and pressure looking at the serial monitor on the code.  Temperature: \_\_\_\_\_\_\_\_\_  Pressure: \_\_\_\_\_\_\_\_\_\_\_ |  |
| 2 |  |  |
| 3 | Calibrate popsicle stick at 0 on the servo motor |  |
| 4 |  |  |
| 5 | Turn on the GoPro, mount the GoPro, then start recording at the same time the battery gets plugged into the arduino. We know the GoPro is recording when the red light is blinking. |  |
| 6 |  |  |
| 7 | Change arduino batteries to flight batteries |  |
| 8 |  |  |
| 9 | Make sure that there is no light coming into the box by looking through the collimator. |  |
| 10 |  |  |
| 11 | Put in any last minute insulation to make sure there is no light coming in. Fill any voids by duct taping the outside of the box if necessary. |  |
| 12 |  |  |
| 14 | Mount desiccant using duct tape. |  |
| 15 |  |  |
| 16 | Plug in the battery into the arduino while turning on the GoPro. Put the cover on the arduino after the arduino is plugged into the battery to cover up the blinking lights on the arduino. |  |
| 17 |  |  |
| 18 | Tie the payload to the string. cover the tube with electrical tape so that no light goes into the payload. |  |

**IRIS Launch Procedure**

The following steps are to be completed before reporting READY TO LAUNCH to the launch director.

|  |  |  |
| --- | --- | --- |
| Step # | Directions | Signoff/Time/Notes |
| 1 | Follow the instructions to initalize the LiPo protection circuit. |  |
| 2 |  |  |
| 3 | Turn on GoPro |  |
| 4 |  |  |
| 5 | Add desiccant. Secure with duct tape. |  |
| 6 |  |  |
| 7 | Seal the payload with duct tape. |  |
| 8 |  |  |

**Stress Eaters Launch Procedure**

The following steps are to be completed before reporting READY TO LAUNCH to the launch director.

|  |  |  |
| --- | --- | --- |
| Step # | Directions | Signoff/Time/Notes |
| 1 | Turn the GoPro on and begin recording. Verify that its recording by viewing the power button flash. |  |
| 2 |  |  |
| 3 | Tie the payload string to the polycarb. The middle two holes in the polycarb will be used; ignore the other holes drilled into the polycarb. |  |
| 4 |  |  |
| 5 | Connect the battery to the LCD powering the light source. |  |
| 6 |  |  |
| 7 | Redirect the camera so that the polycarbonate is approximately centered in the field of view. Stop the GoPro recording, remove the SD card, load the video onto a laptop and review it to verify. Repeat as necessary until the video frame is centered as desired. |  |
| 8 |  |  |
| 9 | Wipe the SD card. Replace the SD card into the camera and begin recording, Verify that its recording by viewing the power button flash on. |  |
| 10 |  |  |
| 11 | Add desiccant. Secure with duct tape. |  |
| 12 |  |  |
| 13 | Tie a safety line to the payload string above and below the payload in such a way that it will take the load from the payload string in the event that the polycarbonate fails. |  |