# 1 Operation Manual

I. Device Setup

A. Turn on the Jetson by plugging the power port in

B. Turn on the motor controller with the switch

C. Turn on the power supply with the switch

D. Ensure everything is plugged in correctly

i. USB ring light is powered

ii. Jetson is connected to motor controller with a USB-B to USB-A cable

iii. Jetson is plugged into the monitor with DisplayPort to HDMI converter

iv. Power supply is plugged into the wall and also into the motor controller

v. Motor controller is connected to X, Y, and Z motors

vi. Motor controller is connected to X, Y, and Z limit switches

E. Log into the Jetson

i. Username: dragonfly

ii. Password: alls33ingFly

F. Launch the GUI

i. Open Terminal

ii. Run the following

a. cd /Desktop/refactored

b. python gui.py

G. Use the GUI to connect to establish a connection between the Jetson and the motor controller

i. Press the physical 'Reset' button on the motor controller

ii. Click the 'Serial Connect' button on the GUI and wait until the GUI is responsive again.

iii. Test that the connection has been made by clicking the arrows to manually jog the machine

H. Set Home

i. Confirm that there are no obstructions in the machine that will cause a collision

ii. Click the 'Set Home' button on the GUI. This will move the machine towards the limit switches until they are triggered

iii. *** If the machine doesn't move, repeat the previous step to establish a connection between the Jetson and motor controller ***

II. Sample Setup

A. Sample levelling

i. Ensure that the the top and bottom face of the cookies are relatively level

ii. Take note of the sample name, id, etc on to a piece of paper

iii. Place the cookie on sampling table

iv. Place the bullseye level on top of the sample

v. Rotate the sample until the bubble is biased towards the side of the levelling table with only one screw

vi. Loosen the lone screw until the bubble is centered on the bullseye

B. Multiple samples

i. Level all samples and make sure to note their sample identifiers and relative positions on a piece of paper

III. Capturing samples

A. Click the 'Fast' option in the jogging controls section of the GUI

B. Set the jogging distance to be relatively large like 10 or 20mm

C. Navigate with the jogging arrows to the approximate middle of a sample

D. Jog in the Z-axis to get the sample in focus

   i. I like to start by setting the jog to 5mm, and seeing the sample go into then out of focus

   ii. To tune closer, I then change the jog to 1mm to get roughly to the focus

   iii. Finally, I switch to 0.1mm and get as in focus as possible

   iv. Note that it is pretty important to start off in focus. While the machine has a control algorithm to help keep the machine in focus, it performs best with a good start

E. Fill in the 'Sample Height' and 'Sample Width' text boxes with an estimation of the size

F. Click 'Test Sample Boundaries'

   i. The purpose of testing the boundaries is to show the user the border of the sample.

   ii. The button will take the location of when you click the button, and traverse around the border of the sample according to what you defined as the height and width

   iii. You should watch to verify that all of the sample that you want is within the border

   iv. If you do not see all of the cookie, adjust either the starting location of the sample with the jogging arrows, the 'Sample Height' text box, the 'Sample Width' text box, or a combination of the three

IV. Potential errors

A. Running out of memory

   i. While this shouldn't be a problem, there is still a memory problem in the stitching implementation from when it was ported from Stitch2D. In theory this is fixable, but I haven't had the time to get to the root bug yet.

   ii. If you need a higher resolution stitch than what the Jetson can do, you'll need to load the images onto a computer with more RAM, such as the Legion laptop, and stitch them on there.

B. Visible seams

   i. This is an annoying artifact from what we have deduced to be a poor lens. If you want to maximize sampling speed, it is possible to take zoomed out photos with larger field of view. Although this results in visible seams which have seemingly only been able to be fixed by cropping the images to a size which effectively cancels out the increased field of view.

   ii. If you are going to be using a manual dating software like Coorecorder, then the seams may not be the end of the world. As long as you can differentiate the seams from the rings.

C.