TO: Julia Dixon, Chief Operating Officer, Drone Delish
FROM: Vineeth Balachandran, Junior Mechanical Engineer
DATE: December 4, 2020
SUBJECT: Completion of Drone and Instruction Guide for Assembling Drone

Hi Ms.Dixon,

I would like to inform you that the drones have been completed and are operational for Drone Delish. I have made additional changes to the design of the drone that will allow more drones to fit in the charging docks. Furthermore, I will create an instruction guide for the assembly of the drones to go with the pieces for the workers who will reconstruct the drones.

As I was working on optimizing the parts of the drone, Mr.Hancock realized that two significant changes had to be made to the mechanical design of the drone, the first being able to fold the drone arms upward and to also create a lock system that will keep the arms in place when flying. Table 1 depicts the designs that I have come up with while also identifying the pros and cons of each concept.

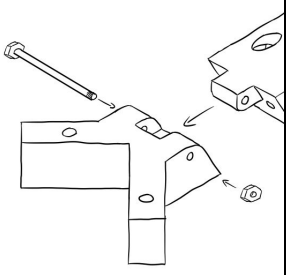
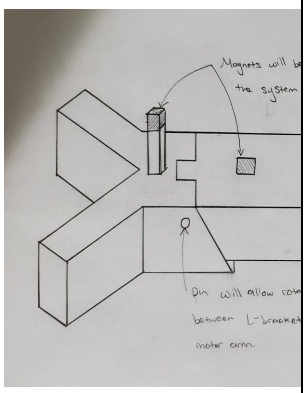
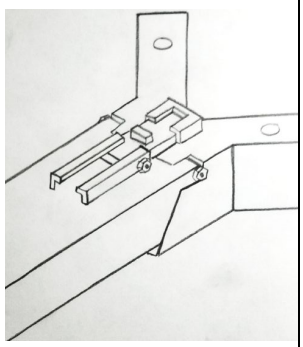
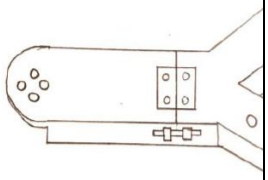
After considering each design, I decided to use a design that was a combination of both the first and third design concept as design 1 provided structural stability and sturdiness to the drone while the addition of the sliding mechanism in design 3 created a near perfect spring-loaded lock system. Fig. 1. and Fig. 2. show what the new locking mechanism would look like.

After implementing the locking mechanism into each drome arm and a complete assembly of the drone, I completed a few tests to see if the drone worked, and to conclude those findings, the newly redesigned drones are now ready to be used for Drone Delish.

As you requested, I will create an instruction guide for the assembly of the drones to go with the pieces for the workers who will construct them. The instruction guide will include step-by-step instructions to the workers with visual figures to aid them in the assembly. Furthermore, a able of components will be included with their designated part number, quantity, and a graphic of the part. To ensure that the number of questions for the assembly are minimal, the instructions will be detailed and clear, to allow the worker to understand how to construct the drone. This manual will approximately take me 3 days to complete.

Table 1

Initail design concepts for the rotating and lock system for the drone arms

Design Concept	Concept Sketch	Pros	Cons
Hinge with Internal Screw Lock		Sturdy Design Simple Design	Time consuming Requires a tool to lock/unlock
Simple Hinge with Magnetic Lock System		Easy assembly	Locking mechanism may not be strong enough to stay in place during flight.
Hinge with Top Sliding Lock		Easy to move arm part upwards	Extra part makes for harder assembly Less sturdy when locked down
Hinge with Side Sliding Lock		Light weight. Quick to lift arm.	No way to secure the arm in a folded position. Needs revision to the sliding pin to ensure it doesn't fall out.

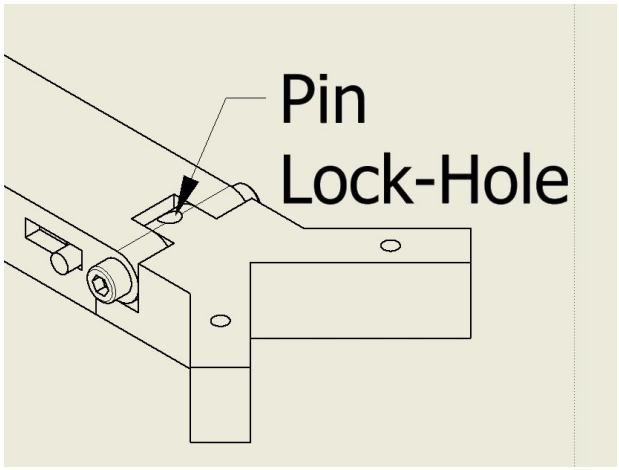


Fig. 1. Isometric View (top)

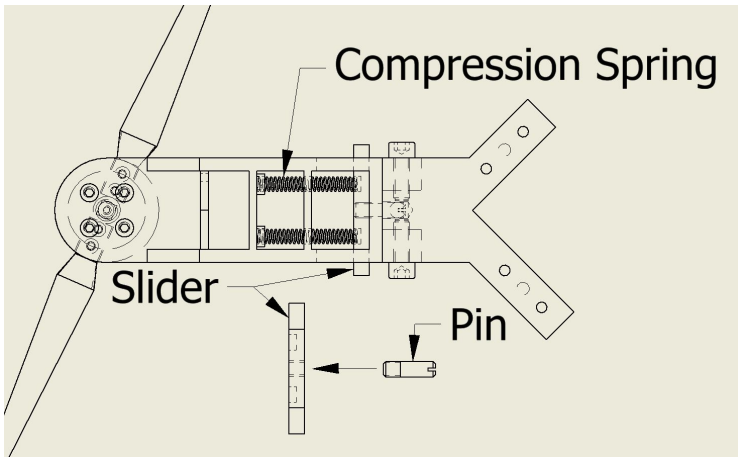


Fig. 2. Bottom View of Drone Arm, with Additional Pin and Slider views. Pin Lock-Hole for locking arm in down position shown with hidden lines.

To summarize, with the addition of a new spring-loaded locking system for the drone arms, the drones are now ready and operational for Drone Delish. I will begin to work on a detailed step-by-step instruction manual for the drone assembly, which will help the workers when building the drone. If you have any questions, please contact me at balacv1@mcmaster.ca or (905)-123-4567.

Sincerely,

Vineeth Balachandran