IFJU LAB NOTEBOOK

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LiDAR Drone & Manta

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Entry 1: Drone Assembly

Date	September 8, 2026
Time	9:00 AM – 3:00 PM
Duration	6 hours

Objective/Goal

Assemble the LiDAR drone to get familiar with the inner workings of the drone. Understand each part and assembly problem to improve assembly and manufacturing time.

Take lots of pictures for future reference and upload them to Teams. These pictures may also be used in a future guide to make it easier for others to find inefficiencies in the assembly process.

Completed Tasks

Helped assemble the drone. This task included

- Physical assembly with routing wires and screws and attaching parts together
- Heat-set inserts and applying epoxy and cyanoacrylate glue when necessary

Took a total of 39 photos during assembly and uploaded all 39 to Teams (See General > Assembly Photos > Main Assembly)

Results/Observations/Notes

The total duration of the assembly from start to finish was 6 hours and 35 minutes. While this is within one day, this is still much higher than the stated four-hour goal in the September 3rd meeting.

- A significant portion of the time was spent trying to fit the small dome with a triangular interface over a compact avionics bay that is square-shaped
- I have small hands and thus screwed many of the hard-to-reach areas; however, it was still difficult, and access for screwing components could be improved
- Arms are difficult to align properly and perfectly. Even if the current rosette system is easy to align the arms while unfolding, aligning the rosettes in the first place is difficult. Any slight angular misalignment is amplified due to the length of the arm.

Next Steps

Continue to fully understand how each component of the drone works

Brainstorm ideas to help improve the assembly time

Photos

Figure 1 Applying cyanoacrylate glue to a heat-set insert

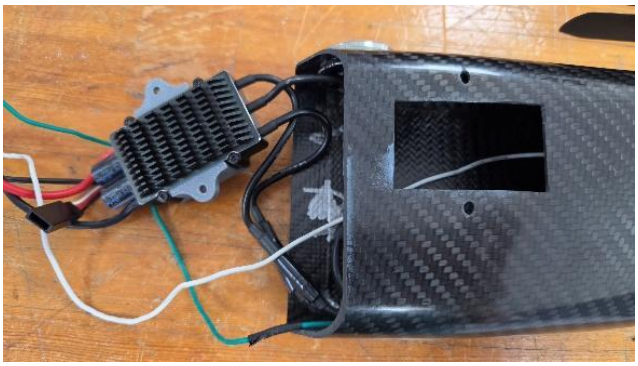

Figure 2 Avionics Bay wiring prior to enclosure

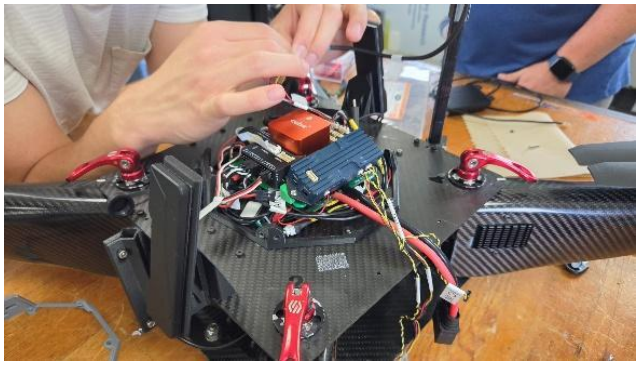

Figure 3 Routing wires through the central frame

Figure 4 Fully assembled LiDAR drone

Entry 2: Drone Arm Manufacturing Session 1

Date	September 8, 2026
Time	10:00 AM – 12:35 PM
Duration	2 hours & 35 minutes

Context

The drone arm consists of the frame of the arm. The arm refers to the portion highlighted in yellow (Fig. 5).

Figure 5 Drone "Arms" highlighted in yellow

Objective/Goal

Manufacture the LiDAR drone arms to be able to manufacture the drone when necessary. Understand the manufacturing process to find inefficiencies and improve overall build time.

Take lots of pictures for future reference and upload them to Teams. These pictures may also be used in a future guide to make it easier for others to find inefficiencies in the assembly process.

Completed Tasks

Helped assemble the drone. This task included

- Preparing the arm mold by applying a release agent uniformly every 15 minutes, three times in total to ensure the arm doesn't stick too much to the mold
- Lamination of prepreg carbon fiber in $[90/+45/\overline{90}]_s$ layup pattern to create a V effect on the outside

Took a total of 12 photos during assembly and uploaded all 12 to Teams (See General > Assembly Photos > Arm Assembly)

Results/Observations/Notes

The standard steps and procedure were conducted for carbon fiber layups. There were two major difficulties, however.

- Aligning the offset sizes to stagger the seam location of both sides of the mold was difficult, and as the arm is already overengineered, it may be better to instead place the seams all at the same location
- Cutting the carbon fiber shape in the correct orientation to have the V-shape pattern on the outside of the drone was difficult, and the same portion had to be cut three times to get it right. It turns out the pattern is not identical if the carbon fiber is turned 90 degrees apart.

Next Steps

Continue manufacturing the rest of the arms

Brainstorm ideas to help improve the manufacturing time and test optimizations in future sessions

Photos

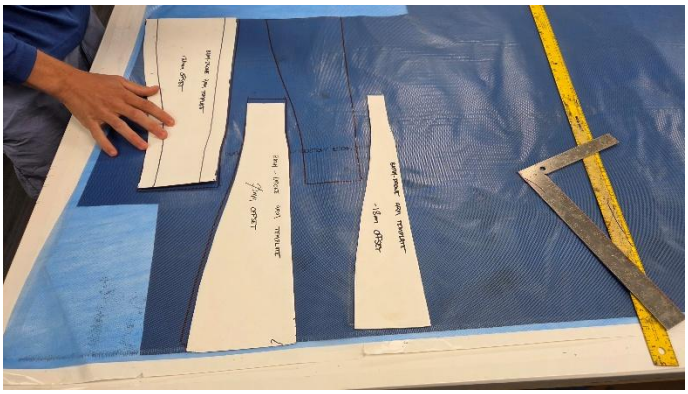

Figure 6 Configuring layup patterns before cutting

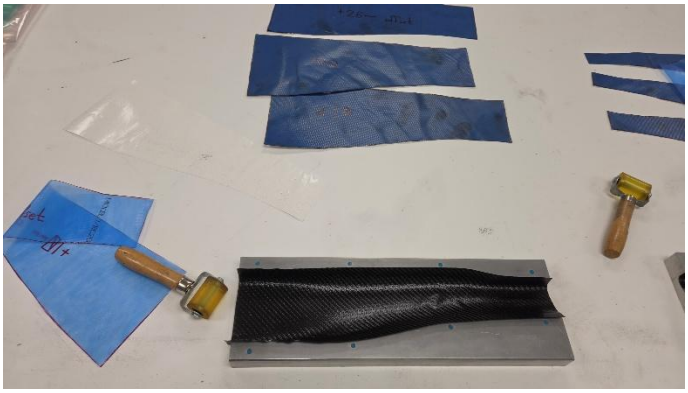

Figure 7 Setting the carbon fiber into the mold

Entry 3: Drone Arm Rosette Design Optimization

Date	September 26, 2026
Time	12 PM
Duration	NA

Context

Objective/Goal

Completed Tasks

Results/Observations/Notes

Next Steps

Photos