

Lessons Learned

This project went as smoothly as it could given the circumstances. Obviously in the future, hopefully the team coordinating the project can meet on a regular basis and ensure that plane models, flying the drone, and recording data is done on a regular and consistent basis. There were too many times in the beginning of fall semester where the group was not able to meet and as a result, our data had to be recollected later down the road. Issues revolving what kind of data was collected and what techniques we were utilizing to collect said data would have been easily resolved. Also collecting the data in a timely manner would have been beneficial as we could have had more time to implement other ideas or optimize our code or website. Practicing proper time management would have relieved the team of a lot of pressure toward the end of the project. When folding planes in preparation for the propellor attachment, having a consistent folding technique that follows the design of the plane. Some folds made to change the measurements of the plane could drastically affect the design of the plane unintentionally, essentially making the purpose for the design of the plane obsolete. When folding areas such as the keel, be sure to consider the wingspan. This was especially true for the delta variant plane and somewhat true with the invader plane. Adding centimeters to the heel would make the wingspan smaller and adding to the elevators on the invader model had a similar effect. This issue was not as prevalent with the hammerhead model as that plane was built of separate pieces, but other plane models had measurements affected by other plane measurements, meaning that they were correlated with each other. For example, a smaller front angle could mean a larger outer wing length or vice versa. We tried our best to control these variables but sometimes a model couldn't be helped and changing one measurement might have a drastic effect on how the plane's end design would look. This could be potentially fixed with 3d printing planes and individual parts rather than folding the plane from one piece of paper.

If there was more time I could put towards the website, it would have been nice to have multiple more additions. Dynamically changing 3-D models would make things look better in of itself, perhaps making the sliders look and feel better would help with user experience, and generally trying to fill the screen a little more to make it not feel as empty as it did. One addition I do not know how I would've implemented exactly would be to have vertical spinning of the model as well as the horizontal that was currently shown.

Moving Forward

It would be beneficial to hopefully in the future combine all algorithms to potentially give a user or customer one overall best plan for their needs. This was brought up during our presentation at the scholarship expo where one of the judges had brought up what was the *best* overall plane comparing all the designs. In a commercial setting, especially as the goal of this project was to have a steppingstone for allowing a greater number of the public to access and be able to use microdrones, this combination of finding the best plane given a customer's goal targets would save a lot of confusion and time. Intrinsically, we know that some planes perform best in certain areas, we should translate that to design a genetic algorithm that can a few solutions rather than one final design. Obviously, testing different designs that work with the PowerUp 4.0 propellor

module is a must for continuing the project. Some of the designs include, the *Nakamura* design, the *thermal* design, the *maestro* design, the *firestrike* design, the *Onslaught* design, and others that can be based upon other designs that might not be intended to work with the PowerUp 4.0 propellor system but can be slightly modified to be added onto the module. Models as the *Dart* design, and the *boomerang* design would be very interesting to work with and compare with the rest of the designs that were made for the PowerUp 4.0 system.

What I would have changed knowing what I do now would primarily be to have multiple pages on the site. A title and help page alone would be good to have, additionally, there should have been a selector page outlining what each of the planes are the best in. Lastly, having a 2d visual of the plane might help with recognizability for the models, instead of just a name and model that might not mentally register at first.