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STEM 2°

May 22, 2019

Final Pegasus Status Update

Summary of the year:

This was a very productive year working on the plane. Things finally began to come together and what once was a bunch of pieces of metal now looks like a real plane. Perhaps the greatest two accomplishments this year were the attachment of the fuselage to the tail cone and the moving of the plane and all of our tools to what used to be the auto shop. There was a lot of progress that was made on all various parts of the plane as well. The wings were completed, as were the flaperons. These parts have not yet been attached to the body of the plane, but they can be at any moment. It is much easier to work on the plane when they are not installed, so they have been kept off the plane. There was also a lot of work that was done on the fuselage. The instrument panel is prepared and the instruments just need to be ordered and installed. My prediction is that the next year will be spent firstly on cleaning and organizing the auto shop even further, then fundraising for the parts that still need to be ordered like the engine. Finally, they will work on finishing the fuselage and starting the wiring for the avionics and the lighting. The skins covering the fuselage will get attached at the very end after the wiring is all finished because otherwise they will limit the access to the parts that need to be wired.

We worked on the fuselage for the majority of the year until the plane was moved into the auto shop. Much of what we did when we first began working on the plane was determining

where the other classes had left off because the master plans were not always updated properly. We had to check each part and make sure it was done properly, if it was done at all. The majority of the parts were done right, but there were some places where we had to go back and fix the other class's mistakes or finish working on a piece that was marked as finished. The rest of the time, before we moved into the auto shop, was spent working on the upper fuselage and instrument panel. There were a number of pieces that had to be manufactured from stock pieces of metal, so those took a while to do. There was one piece we even had to manufacture multiple times because it wasn't up to the standards we needed it to be in order to attach it to the plane and maintain the structural integrity. This was very frustrating as it took far too long to make that piece, and we could only know if it was good enough to attach once it was completed. This was a combination of the imprecision of the tools we had, our restlessness to move on, and simple mistakes we would make in the process.

The upper fuselage and instrument panel were a lot of tedious and precise work. There were a lot of smaller pieces we needed to prepare and attach, so it was very slow progress. Adding to this, there were certain tools that we didn't have, so we would often have to ask the mentors for the tool and wait a week until they brought the part. We also had to hunt for a lot of parts, as there were many small pieces that were scattered all across the room. Sometimes it would take an entire period to find a single part. Despite this, we were able to mostly finish the instrument panel so it is now ready for the various avionics that will be installed soon.

Moving into the auto shop was quite the ordeal. There was a lot of stress involved because none of us wanted to damage any of the parts and a lot of small pieces that we had to make sure weren't lost in the process. Before we could actually move anything, we had to make

sure the auto shop was cleaned out from the previous occupants. There was grease, dust, and dirt everywhere, so we had to spend a decent amount of time cleaning it up and making sure there wouldn't be anything that would damage the plane. The floor was swept multiple times, and all the cabinets were cleaned and labeled. One of the metal countertops was covered with a sheet of plywood so that we could work on parts there without damaging the aluminum on the harder steel surface. Once all of this was prepared, we were finally able to move things into the auto shop. We had to take each part slowly over so we didn't damage them in the process. This ended up going smoothly and there weren't any major problems that we encountered.

Once in the auto shop, we were kind of at a loss of what to do. We should have sorted and organized everything that had been moved into the room, but we didn't do that. In addition, most of the main projects people were working on were either finished or almost complete. This led to a lot of standing around doing nothing which was an issue.Eventually, we were able to figure out what needed to be done, and we started working on other pieces, including attaching the tailcone and fuselage.

Attaching the two main components of the plane was quite a task. Once the pieces were mated, which took a while to get them all properly lined up, we had to cleco them together to make sure the would stay in place. This was troublesome because the pieces didn't exactly line up like they should have. We had to pretty much hammer some of the clecos into the holes so they would pull the pieces together in the proper fashion so we could rivet them together. Once this was done, the riveting was not an issue; it was just very time consuming because there were so many holes that needed to be drilled, deburred, then riveted.

This is the state the plane will probably finish the year in. There aren't too many more days left for us to do work, so there are minimal projects we will be able to complete. We want to leave as much finished for the next year so they do not have to pick up out projects in the middle and not knowing any of the small nuances that come with working on that part or section. This will make things easier for them, because we know from experience how painful it can be to try to figure out what happened in the previous years without any communication. We also want to sit down as a class with the other period and plan out how we could let next year's class what has and has not been done. The master plans are a good spot for them to check, but it is also very nice if someone leaves a list of things that can be done so there is less time wasted.

The pictures of the various projects we worked on can be seen below.

First image: Upper Fuselage, Engine Mount, and Oil Reserve

Second image: Instrument Panel and Upper Fuselage

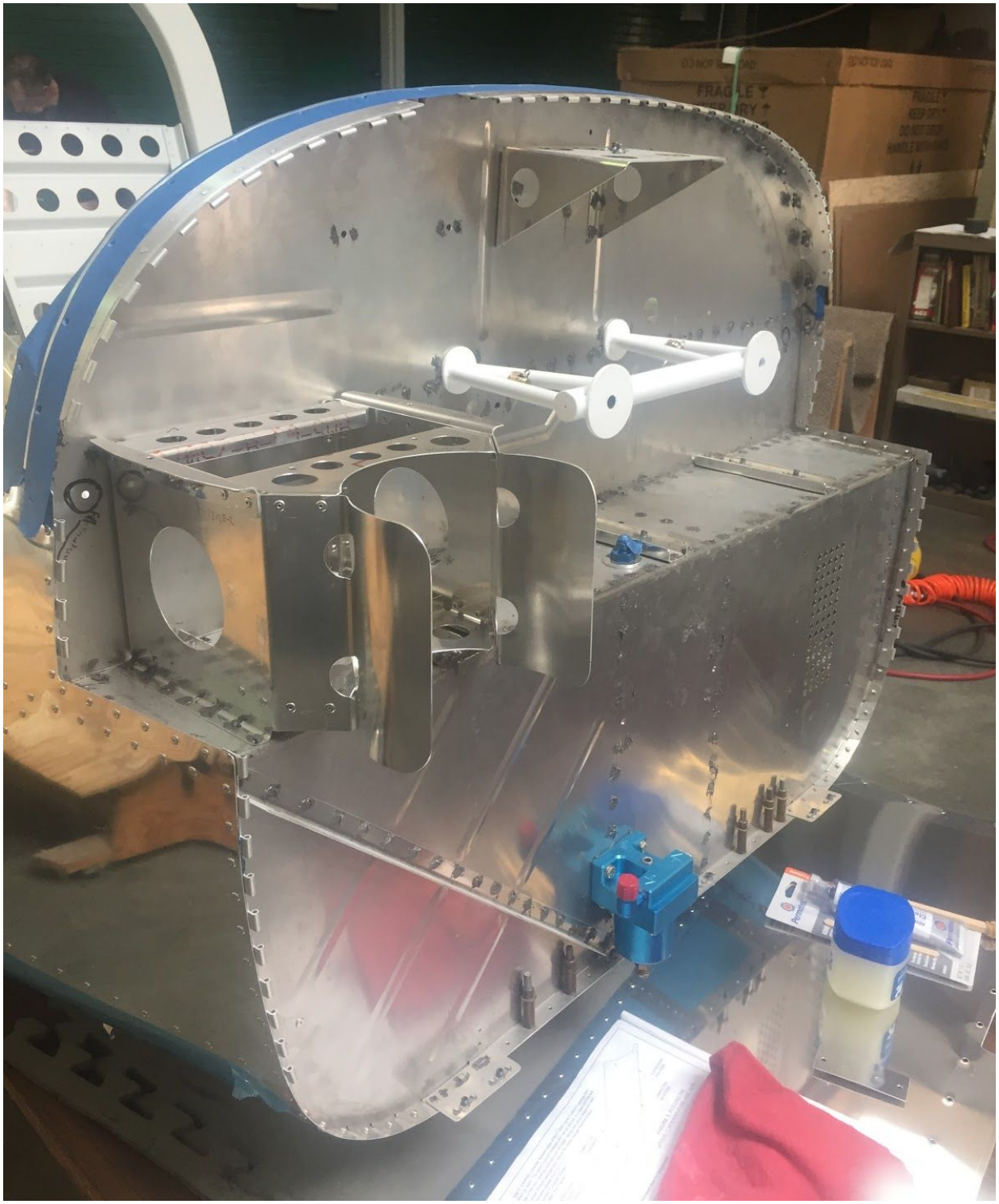
Third image: Instrument Panel

Fourth image: Seat Backs

Fifth image: Tailcone and Fuselage attachment

Sixth image: Roll Bar

Seventh image: Upper Fuselage Cover Skin

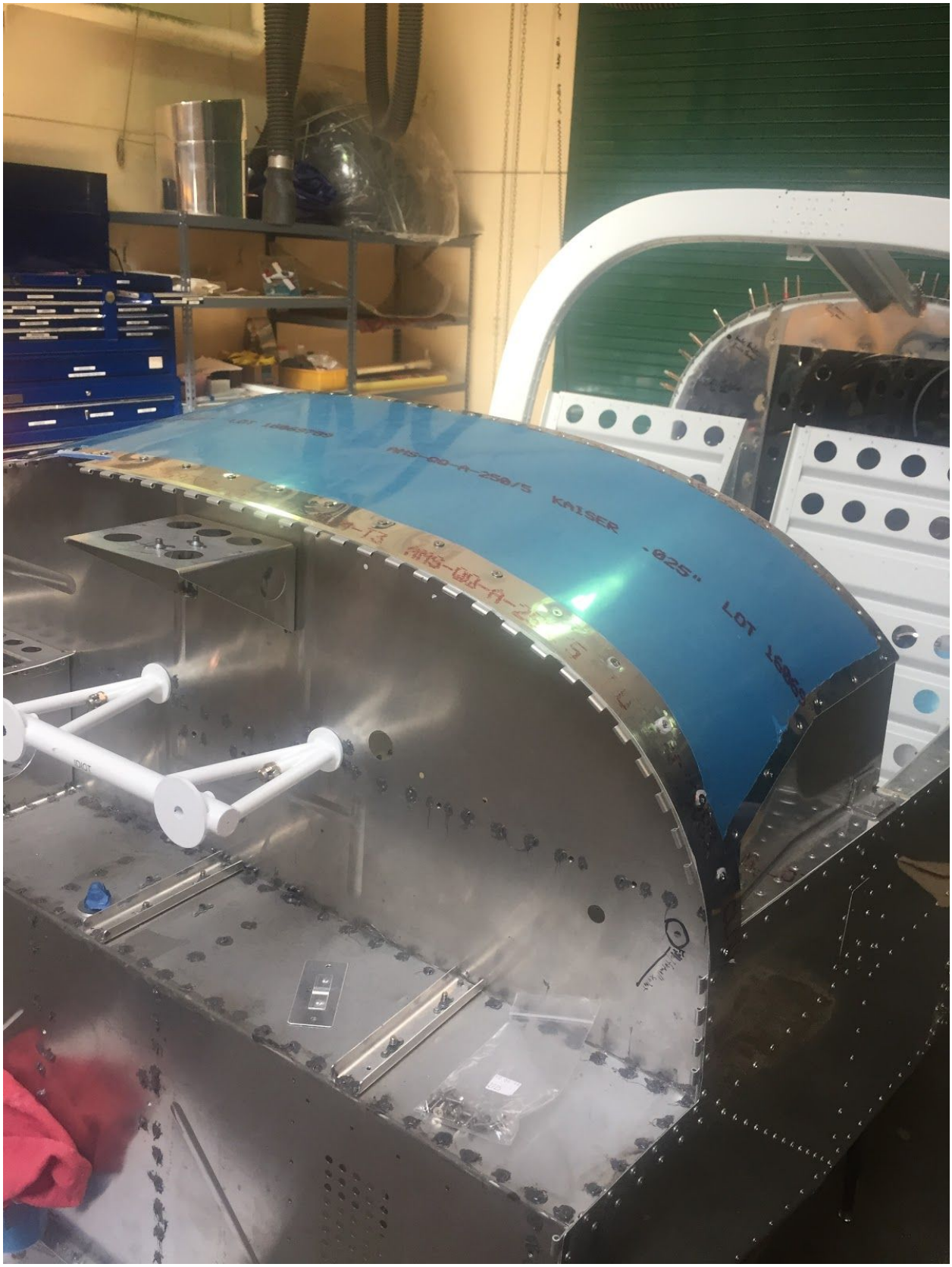



To do
Fuselage - needs to do


Period 2


55810
Austin Marshall


FRAGILE
KEEP DRY
DO NOT DROP
HANDLE WITH CARE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LOT

Individual projects:

Nathan:

I worked on a variety of different side projects this year. At the beginning of the year, Kendal, Michelle, Hunter and I all worked on creating a fundraising letter that we could send out to previous GFCA donors. Kendal took charge and drafted a very strong letter which we then all helped edit. We then signed and addressed the letters by hand to the various members of GFCA who would be receiving them. We also included a return envelope that was pre addressed and stamped so it would be even easier for the people to donate. Some very generous donations were sent in because of that letter.

Another project I worked on was receiving the finishing kit with Kendal. She again took charge, calling the delivery company and scheduling a pick up for the package. The issue was that it was pretty big and heavy, so we had to make sure we could open the gate to the auto shop when we needed it to be opened. We also had to do it in the middle of the day, because that was the window in which the driver could get to us. Once he arrived, all we had to do was make sure the gate and garage doors were open in the auto shop.

The final, and much smaller but very important, project I worked on was again with Kendal. The master plans were out of order and poorly labeled, so we went through and repaired any pages that were falling out. We also marked off any section that was totally complete and compiled a list of all the sections that weren't. This hopefully will help the next class in understanding what has and has not been done.

Joey:

There were several smaller parts I worked on that helped make the plane as a whole come together. The biggest thing was that I was the communications liaison for second period. If we needed to communicate with first period, I was the person they would contact to relay information to. I was also the one who set up the group chat for second period so we could communicate and ask each other for help if it was needed.

I also worked on remaking the fuel like. In the past years, one of the other classes made a piece from stock metal that was a critical piece of the fuel line, but it was not shaped well enough, so it did not fit. I had to remake it which took a very long time and was pretty frustrating. After a couple days of straightening it then bending it to the proper dimensions, the pipe fit perfectly where it needed to be.

I was also the person who was in charge of the firewall sealant. I worked with the mentor Frank to measure out the proper amounts of the different components, then tape off the area and apply the sealant.

Reflection:

Nathan:

There were a lot of good days, but there were also some not so good ones this year, especially when we moved into the auto shop. When working on the upper fuselage, there were some chemicals we needed, and we had to wait on the mentors to bring them. We didn't have anything else we could work on, so we kind of just sat around and didn't do much while we were waiting for the chemicals. Instead of doing this, we could have found another small project to work so we weren't wasting our time and the mentors. For next year, I think it would be very

helpful to have a plan of what needs to get done, so that when they reach a point where they can't work on a certain piece anymore because they either need something ordered or something brought in, they have another project they can work on. I also think that there was terrible communication between the different classes, especially once we got moved into the auto shop. Joey made a group chat, but it was pretty late in the year and it was only our class. If it was implemented earlier and it included both classes, I think it could have been very useful. Joey and I worked very well together. We each had our strengths and they complemented each other, making the year both fun and relatively easy in terms of working together. Whenever we would have a problem, we would ask the other for help and they would usually be able to help solve it.

Joey:

It was a really great year. There were some things I could have done better, but overall I am very happy with how the year went. I grew as a person, and made a lot of progress on the plane which was really satisfying. I could've been a little more dedicated and focused on some days, but most days I did a good job. Nathan and I worked well together, and it was fun working with him on the fuselage.