Repairing the ascension fork axis on my ETX90

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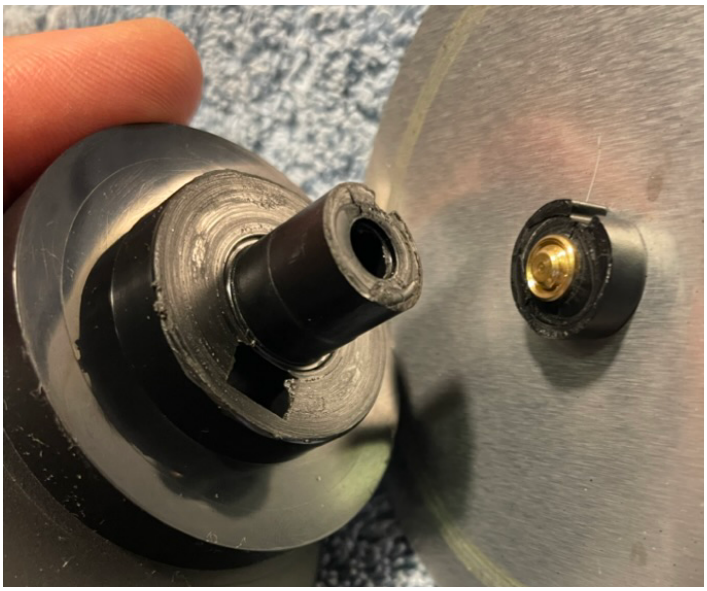
I recently bought a used ETX90 and the ascension axis was broken. Seems someone tightened the knob too much and broke the embedded nut right out of the axis. For this repair, I was fortunate that the break occurred high on the axis. I've seen other repairs that fix it closer to the base, but this repair uses the remaining plastic of the longer existing axis shaft:



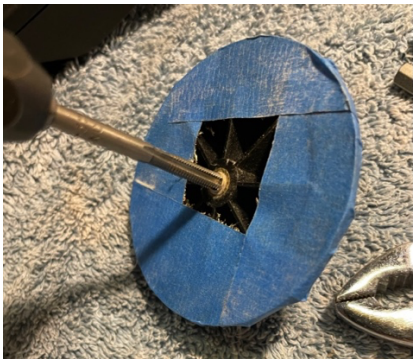
My goal on this was to place threads inside the hole in a way that would both create threads and add strength. Then to re-attach the small broken plastic ends to the axle and make it look as close to the original as possible.

I settled on using an #8-32 x 3/4" standoff to be placed inside the hole. The longer the surface of the standoff contacting the plastic the better to create strength against the pull of the knob. Also, a metal standoff all the way thru the shaft would give the axis superior strength. I didn't want to drill out the plastic, and my standoff was hex-shaped and was too big to fit. So, I placed it in my drill press chuck and used a file to slowly turn the hex shape into a round shape. It would have been great to do this in a lathe, or better yet, find and order a standoff with the exact shape, size, and threads I needed, but lacking that, I decided to craft my own. The result was an #8-32 threaded standoff, round on the outside and exactly ¾" tall that snuggly fit in the axis hole and surprisingly was exactly the right height:


I put Gorilla super glue inside the hole and some on the outside of the standoff and pressed it into the hole. I used a little too much glue and some of it pushed up into the standoff from the bottom. This was a problem as it gummed up the threads at the bottom and I had to repeatedly screw and unscrew a screw into it to clean out the excess glue. But the result of the insert was successful:

Next, I super glued the other two pieces in place against both the standoff and the plastic of the broken axle top. I was comfortable with just gluing this as the forces it experiences in operation are compressive and it should handle that well. I had to file out the insides of the two pieces to get them to fit well. I then glued them and squeezed them in place with a clamp to ensure they were well seated:

Next, I had to get the threads of the knob to match the #8-32 threads of the standoff. This took a little nerve. Ideally, I would have found a standoff that matched the thread size of the original knob, but I decided on a different plan because I wanted the knob screw to grab deeper into the standoff threads. So, with some nerve, I cut off the screw from the existing knob. I then filed it flat and drilled a hole into the remaining brass inside the knob. It seems to be at least 1/4” to 3/8” deep. I drilled this as deep as I could to be able to screw in a new brass screw stud. Once the hole was drilled into the embedded brass of the knob, I tapped the hole with #8-32 threads. Then I used bolt cutters to cut off the head of a brass screw and turned that into a stud. I then put super glue in the tapped hole and on the brass stud and screwed it in place. I was pleased that the brass screw stud matched the original brass and has longer threads.



I reassembled the fork and then put it all back together. The result is clean, strong and works perfectly: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