Building the Estes Doorknob

By John Brohm, NAR #78048

A few years ago, Estes released a sport scale kit of the Doorknob, a prototype developed by Sandia Labs in the late 1950's (https://estesrockets.com/products/doorknob). The prototype's purpose was to serve as a test vehicle that would carry instrumentation into the upper atmosphere to measure radiation levels following high altitude nuclear test explosions. Estes' kit is based on their 3" PSII airframe tubing, which makes for a nice sized sport scale model. Overall, it's quite a complete and high-quality kit, and built out of the box the kit produces a robust model capable of flying on a variety of 29mm motors. I've had one of these kits lounging about in the shop for a while now, and so I thought I'd see what I could make of it.

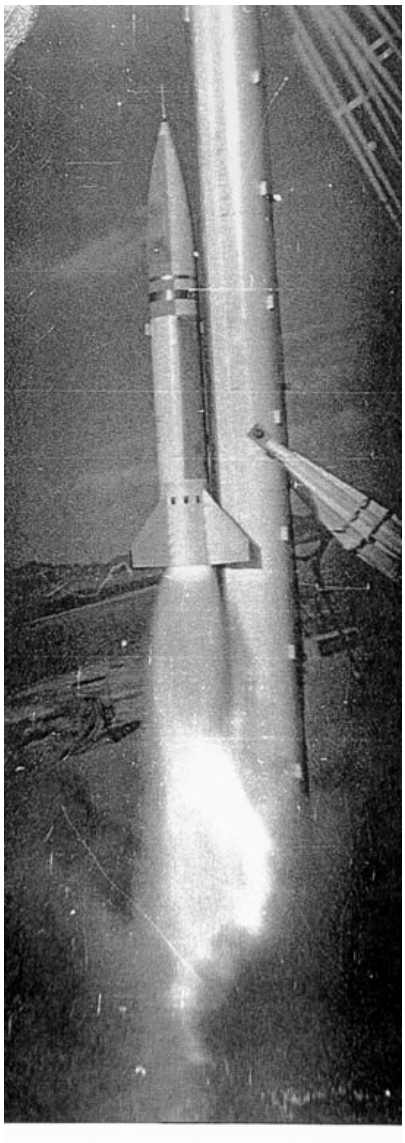

Photo 1: Sandia Labs Doorknob

https://space.skyrocket.de/doc_lau/doorknob-1.htm

To enhance my build, I chose to make use of Mike Nowak's/Galactic Manufacturing's 3D-printed Doorknob fin can (https://galacticmanufacturing.com/products/ultimate-3d-printed-scale-fin-can). Incorporating this part brings some additional detail into the model, with the kit's faux fin attachment bracket decals replaced with actual 3D fin mounting brackets. The part also includes twelve openings intended to represent the motor mounting bolt pockets that one sees in the prototype photo.

The kit provides balsa fins, the leading edges of which can be rounded for just regular sport flying, or carefully sanded to replicate the leading-edge wedge found on the prototype fins. I discarded the kit fins in favor of built-up versions, knowing that in my case any attempt to sand the tapered leading-edge wedge feature would only gift me with disappointment. So built up fins it was.

So let's start with that Galactic Manufacturing fin can. Being resin-printed, the part comes almost primer ready, needing just a bit of careful surface sanding with a medium grit to remove any remaining 3D-printing process artifacts. The following photo shows the part, and one can see I've just added a Styrene box to enclose one of the mounting pockets, as per the prototype.

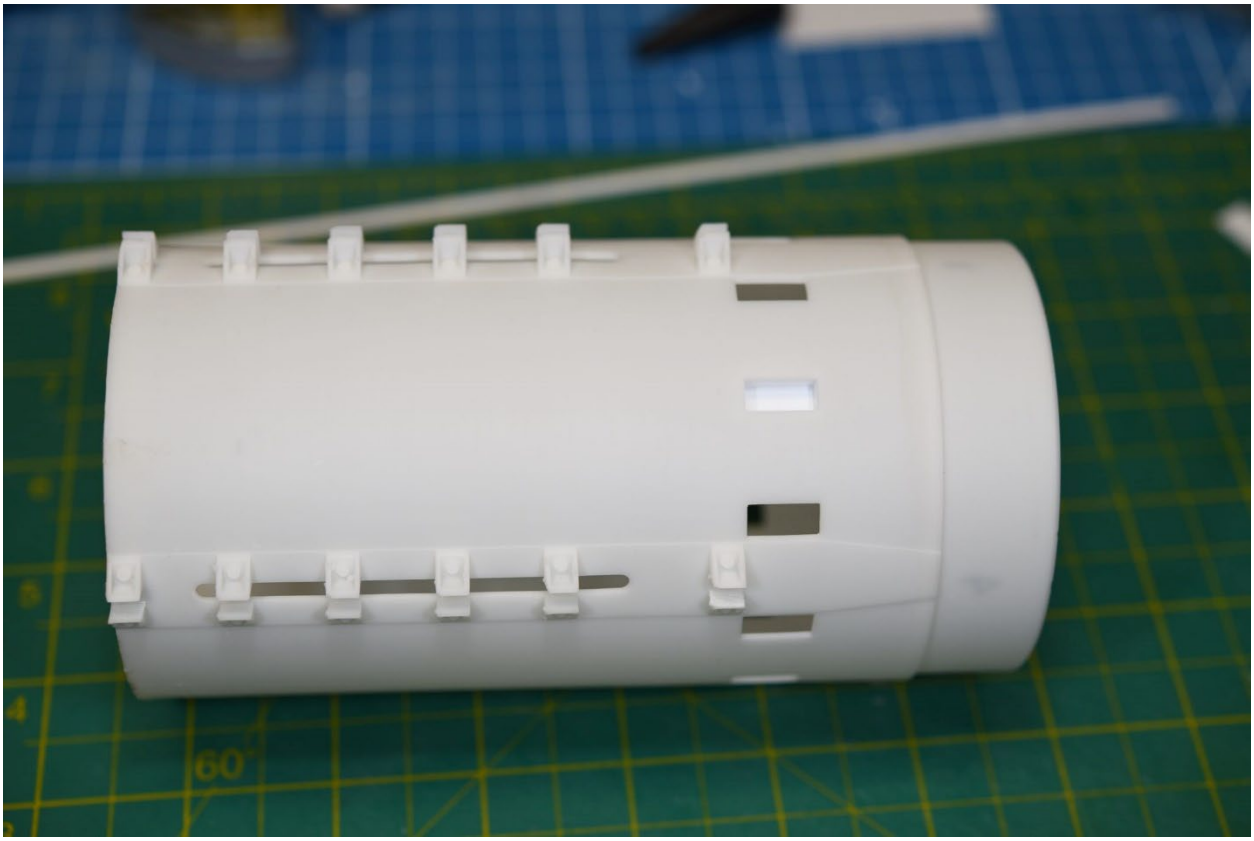

Photo 2: Galactic Manufacturing Doorknob Fin Can

The mounting pockets are crafted from pieces of sheet Styrene, as seen in the next photo.

Photo 3: Fin Can Mounting Pockets

Once crafted, the twelve pockets were glued in place inside the fin can with careful dashes of medium CA. I found CA accelerator to be a big help with this process.

For fins I started with appropriately sized 3/32" thick balsa fin cores which were then faced with 0.010" sheet Styrene. I made sure to size the balsa cores so that the Styrene faces could be bent along the wedge line to form the leading-edge knife edge found on the prototype fins.

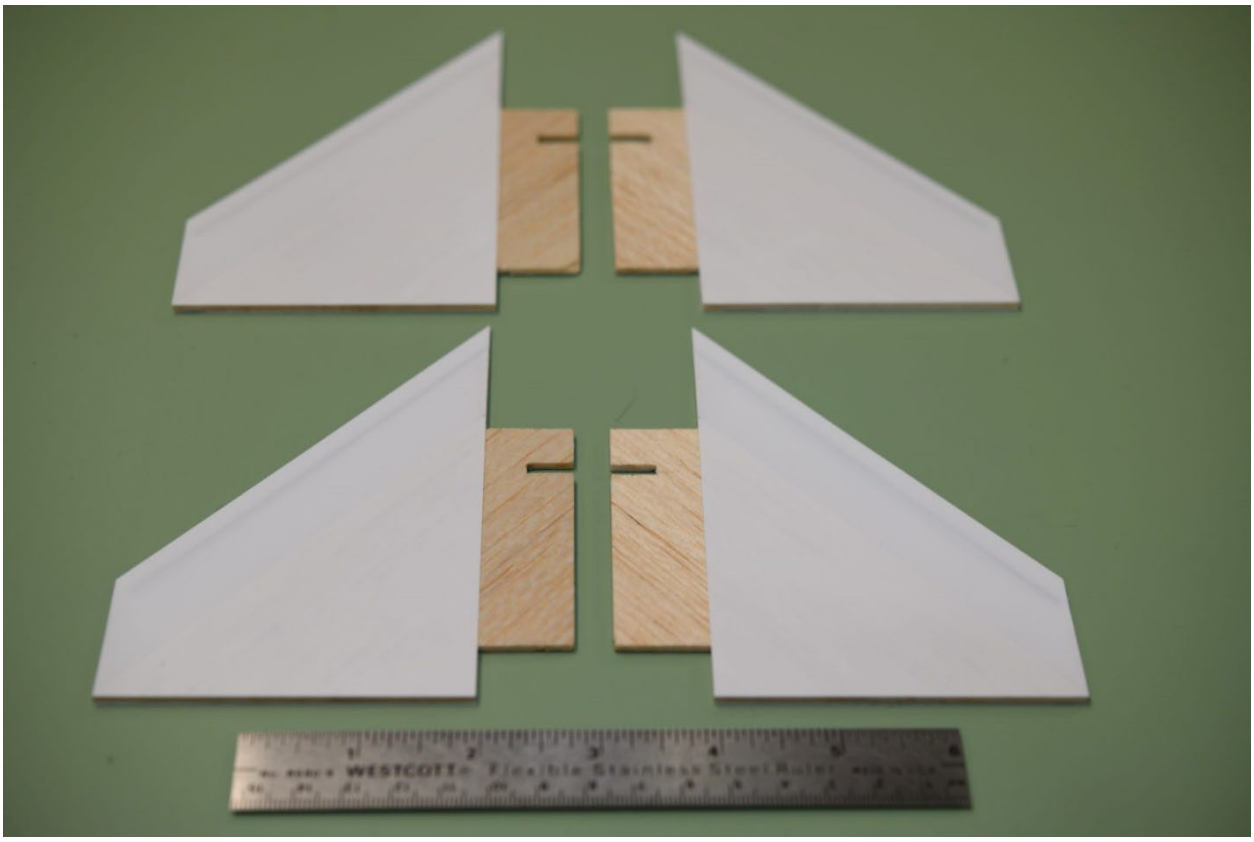

Photo 4: Doorknob Built Up Fin Set

Next, I worked up the motor mount, carefully positioning Galactic Manufacturing's 1/8" ply forward and mid centering rings in the correct locations. I left the aft centering off until I had the fins installed and internally filleted. The internal fillets stiffened these lightweight composite fins considerably.

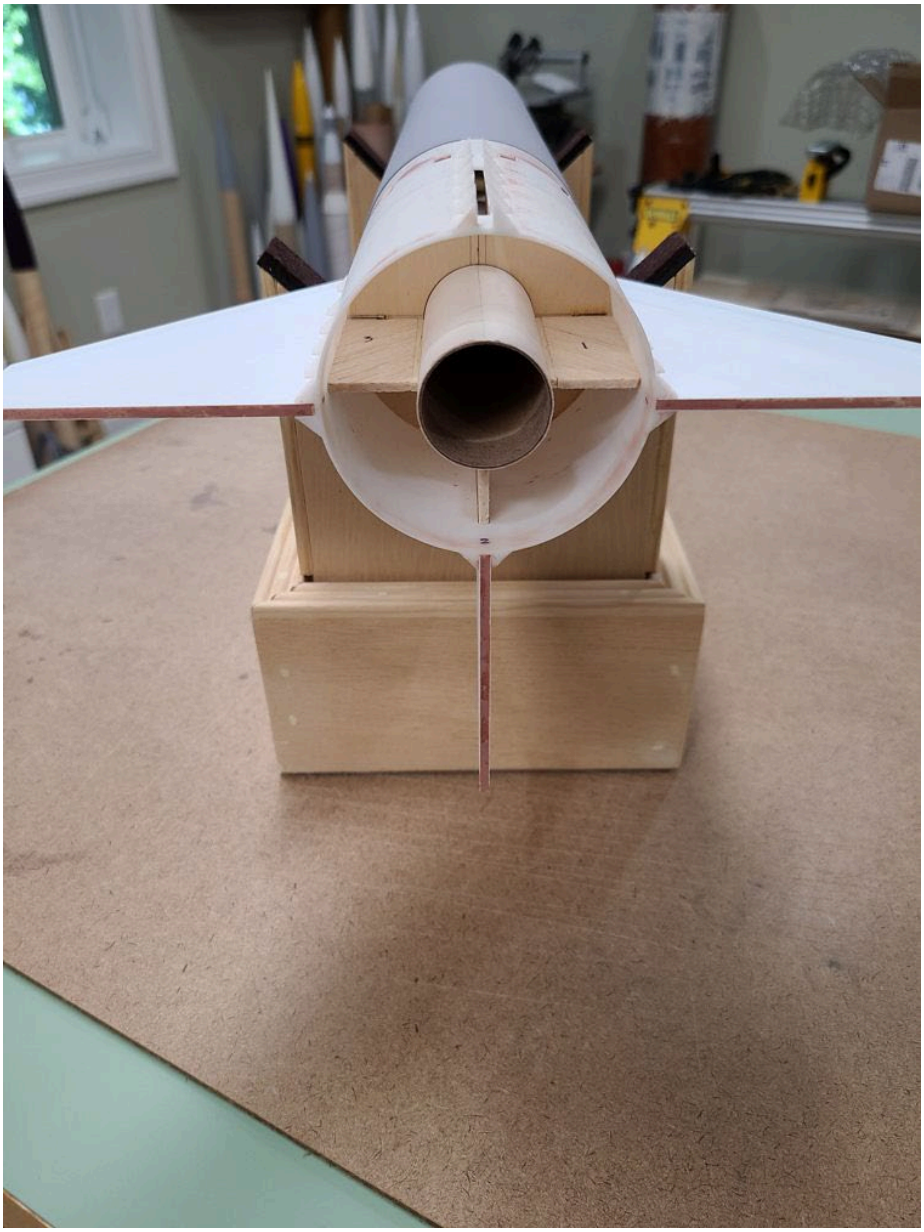

Photo 5: Fin Dry Fit

Once the internal fillets had cured, the aft centering ring was installed, followed by the 29mm motor retainer.

A Kevlar shock cord anchor was added to the forward centering ring, and with this the fin can assembly was ready for finishing. The fin can assembly was primed with Rustoleum Automotive Primer, with remaining surface blemishes resolved with Bondo Glazing & Spot Putty. Once satisfied with the final surface, the assembly was sprayed with Dupli-Color Perfect Match Polar/Arctic White lacquer. The black fin was sprayed with Dupli-Color Perfect Match Universal Black, with the whole fin can assembly flat-coated with Testors Dullcote. I then added a bolt head detail to each fin can mounting pocket to complete the assembly. The built-up fins delivered sharp leading edges, just as we would see on the prototype.

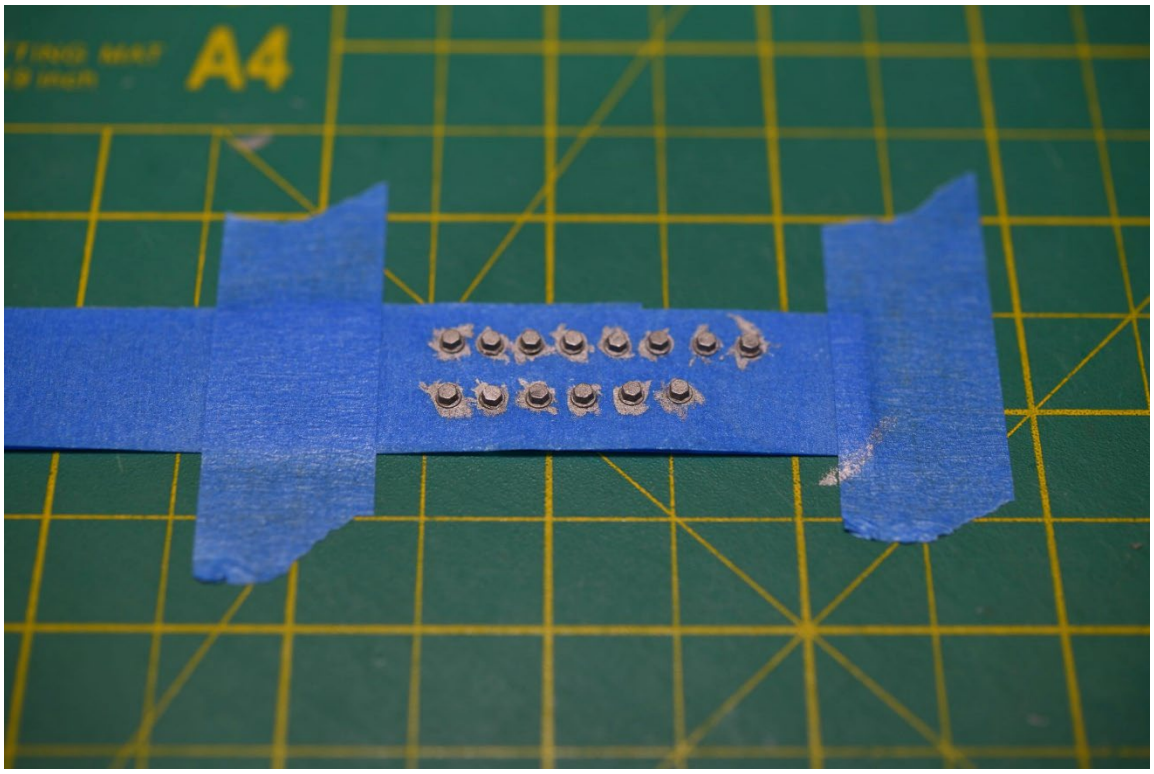

Photo 6: Mounting Pocket Bolt Heads

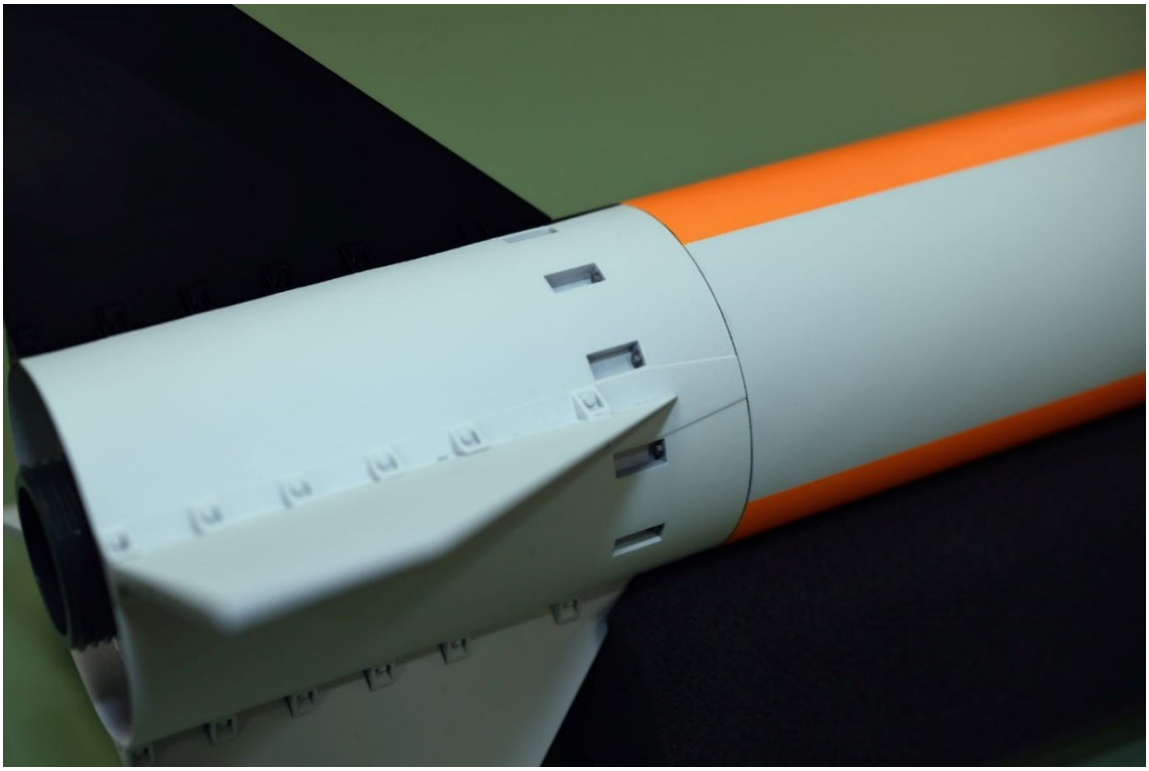

Photo 7: Bolt Heads Installed

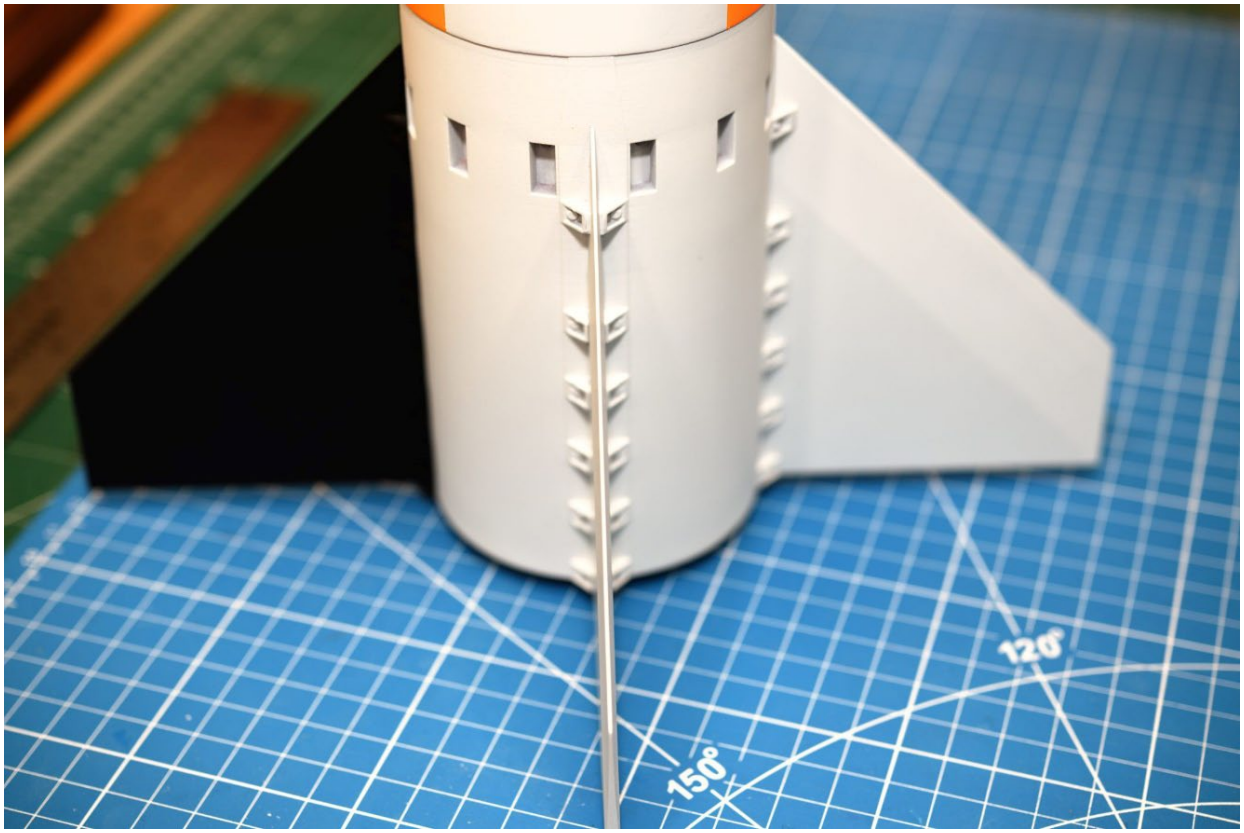

Photo 8: Built Up Fin Leading Edge

The airframe and nose were finished per our usual practice, with Bondo Glazing & Spot Putty filling the spirals followed by several coats of Rustoleum Automotive Primer. Dupli-Color Perfect Match Polar/Artic White provided the base coat, and the assembly was then masked to spray Tamiya Fluorescent Orange for the roll pattern. Once the paint had cured, the assembly was over-sprayed with Testors Dullcote.

The kit provides two mylar self-adhesive strips to represent the bare metal bands that encircle the instrumentation section of the vehicle, and these too were applied.

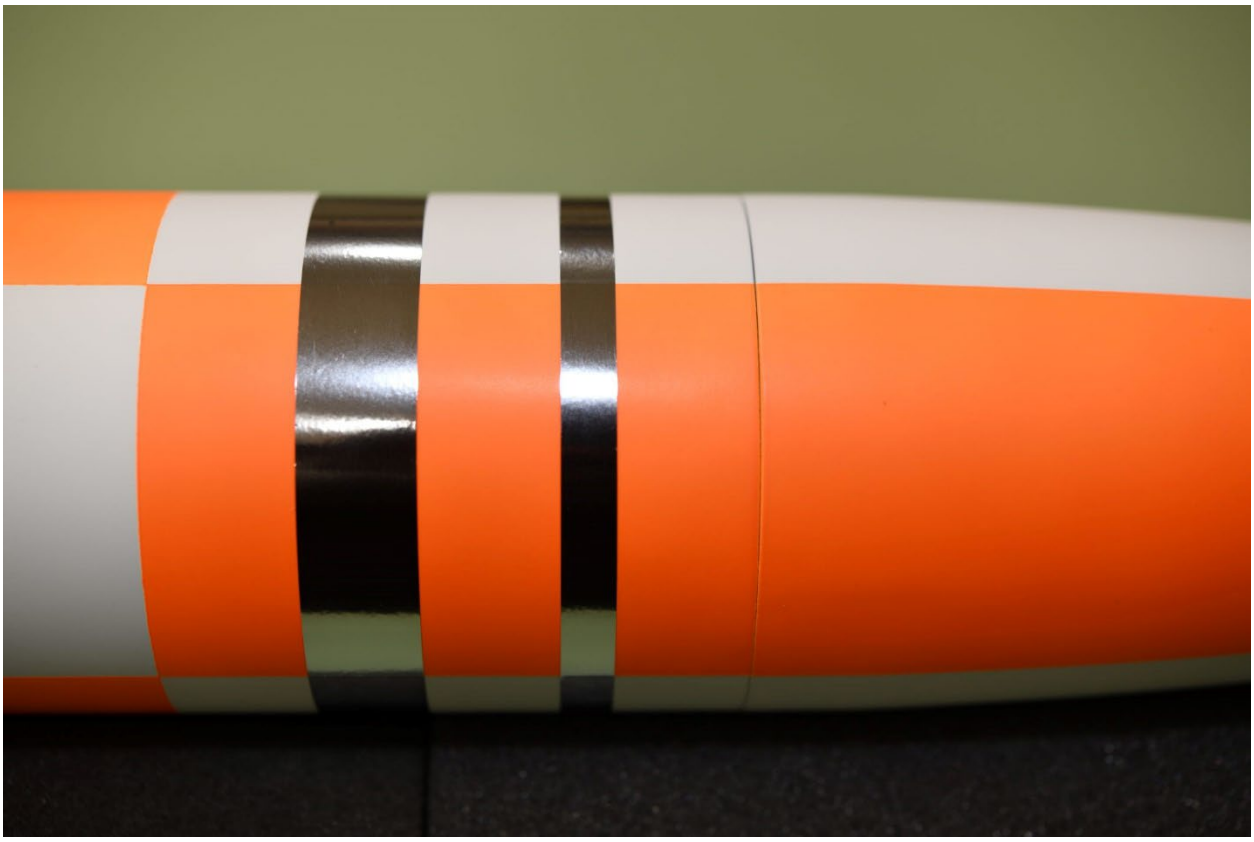

Photo 9: Instrumentation Section Bands

With this, the airframe was mated to the fin can, putting us in position to take a photo of the completed model.

Photo 10: Completed Estes Doorknob

As can be seen in the photo, I chose not to apply the kit's black airframe joint decals as I felt they were too wide to realistically represent this feature on the model.

And there you have it, a semi-scale/Sport Scale Doorknob build. I found the Doorknob to be a fun, quick build that, with a just a bit of detailing, provided quite a nice stand-off scale result. A precision scale build is entirely possible with this kit should one choose to make the effort. Best wishes with your Doorknob build!