

# Installation of PH Aviation Flap Actuator in RV-14

To install the PH Aviation flap actuator in an RV-14, it is necessary to modify the F-01466-L and -R flap motor brackets that come with the fuselage kit. The stock brackets are too long and spaced too narrowly for the PH Aviation flap actuator. You should do this prior to installing the brackets on page 32-07 of the plans.

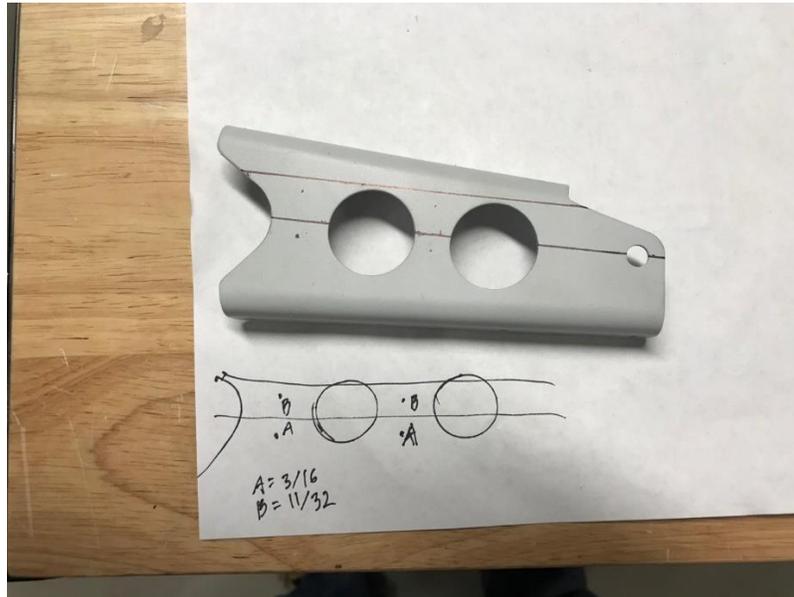
Required parts:

- PH Aviation RV-10/RV-14 Flap Actuator  
(<https://www.phaviation.com/products/product-category/rv-10-14-flap-actuator/>)
- Aluminum angle, 1" x 1" x 0.063" (8" length will be enough)
- Aluminum shim material, 0.063" thick by 1" wide (extra angle will work)
- 4 x AN470AD4-5 rivets
- 4 x CR3213-4-2 rivets
- 1 x AN5-13 bolt
- 1 x AN310-5 castle nut
- 1 x MS24665-134 cotter pin
- 4 x NAS1149F0532P washers (AN960-516L)
- 2 x NAS1149F0563P washers (AN960-516)

Step 1: Locate one of the F-01466 flap motor brackets (-L pictured) and, on the inboard side, mark the centerline through the stock flap motor bolt hole and the two lightening holes. (The second line marked in photographs is not necessary. It shows where the edge of the angle will be to confirm that it will fit. Note that the prototype had primed the brackets before making these modifications. You should prime the parts, if desired, later as discussed below.)



Step 2: Mark the four (4) rivet holes on the F-0166 bracket. The prototype shown here ended up being spaced wider than desired and AN470AD3 rivets had to be used in two positions. The prototype recommends centering the rivet holes  $3/16$ " to the aft and  $1/4$ " to the fore from the centerline mark. (Bracket pictured with aft toward the bottom.)



Step 3: Initial drill #40 the rivet holes.



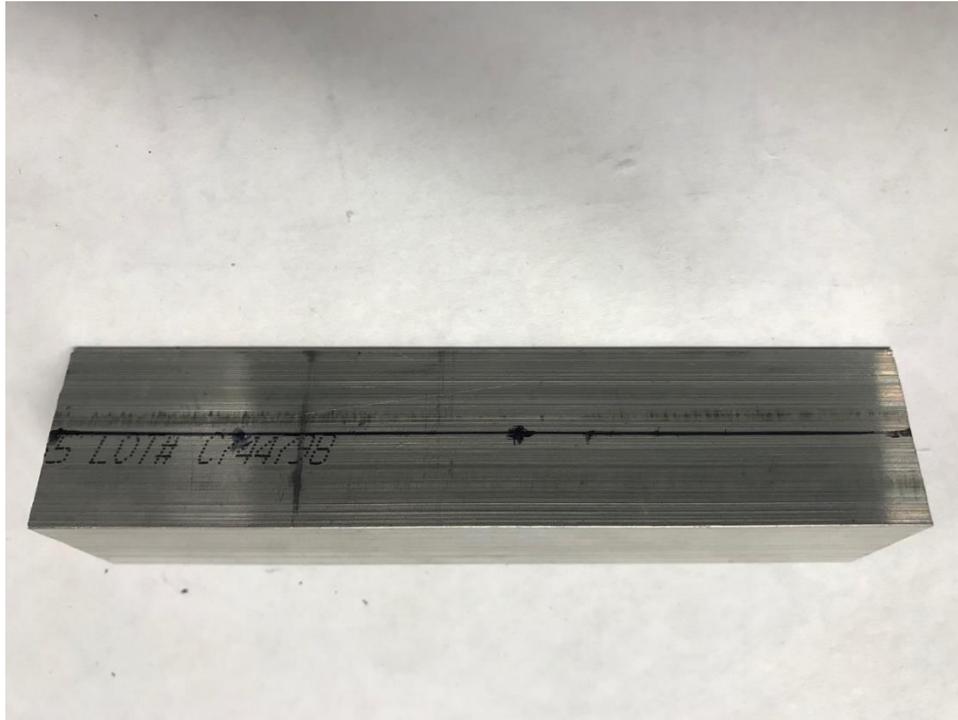
Step 4: Use an AN4 bolt (any length) and flat surface for alignment and clamp the F-01466 brackets together, inboard sides facing each other. **Precise alignment is critical in this step.**



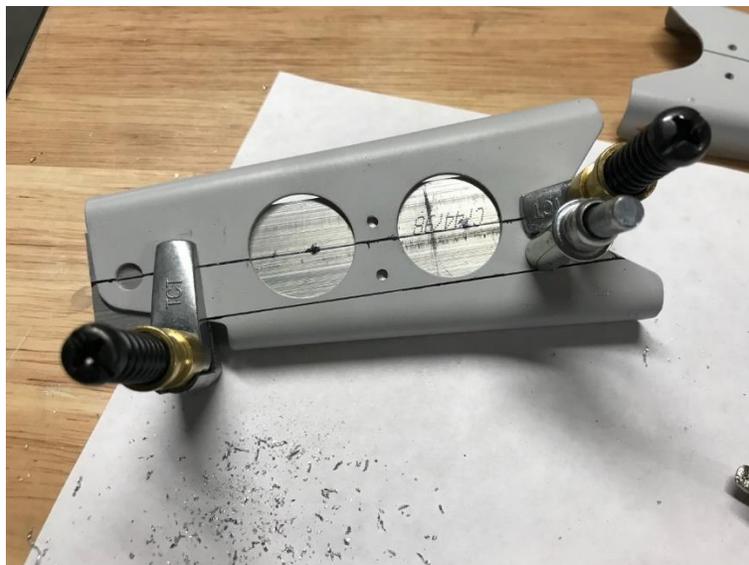
Step 5: Match drill #40 the rivet holes into the second F-01466 bracket. Cleco each hole after drilling. (Note that the F-01466-R bracket pictured has an offset centerline marked by the prototyper. Ignore this mistaken line.)



Step 6: Mark the centerline of the back side of one (1) piece of 1" x 1" x 0.063" aluminum angle approximately 4" in length.



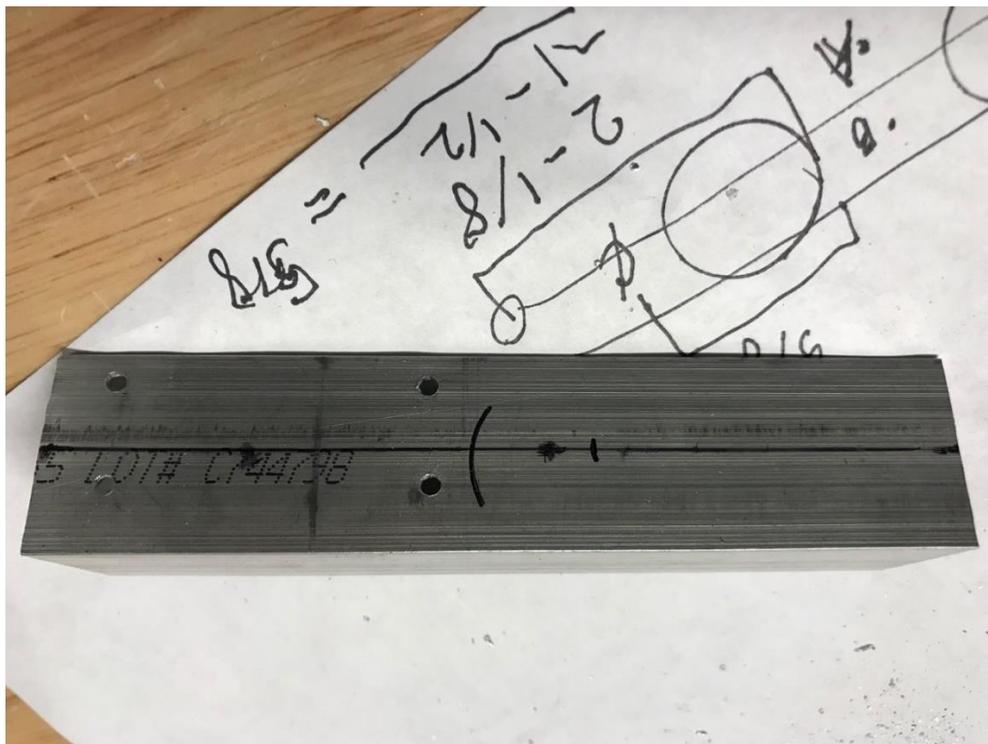
Step 7: With the protruding side of the angle toward the aft, clamp the angle to the outboard side of the F-01466 bracket with the centerline marks aligned. (Precise alignment is not critical in this step. It just has to be close.)



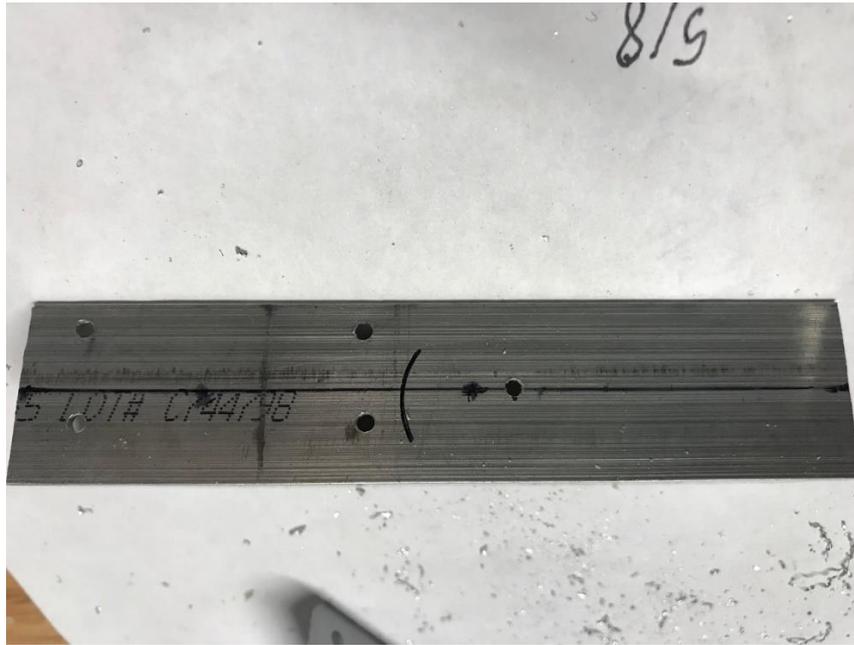
Step 8: Mark the upper radius of the lower lightening hole in the F-01466 bracket on the angle, where it crosses the centerline.



Step 9: Mark a point  $\frac{5}{8}$ " downward from the radius marked in step 8, at the centerline of the angle. (This measurement comes out to  $1\frac{1}{2}$ " up from the original flap motor hinge hole, to take up the  $1\frac{1}{2}$ " additional length of the PH Aviation flap actuator compared with the kit-supplied part.)



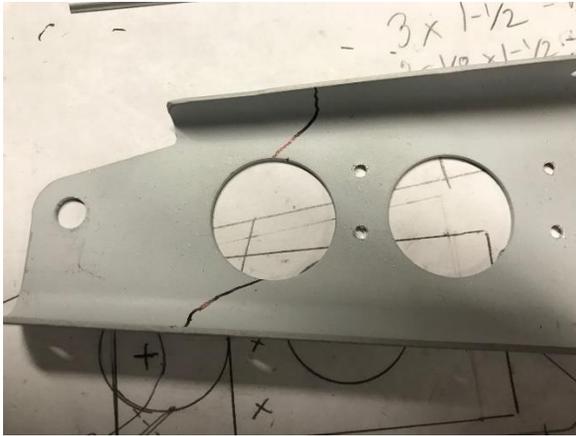
Step 10: Drill #40 the center of the new flap actuator bolt hole.



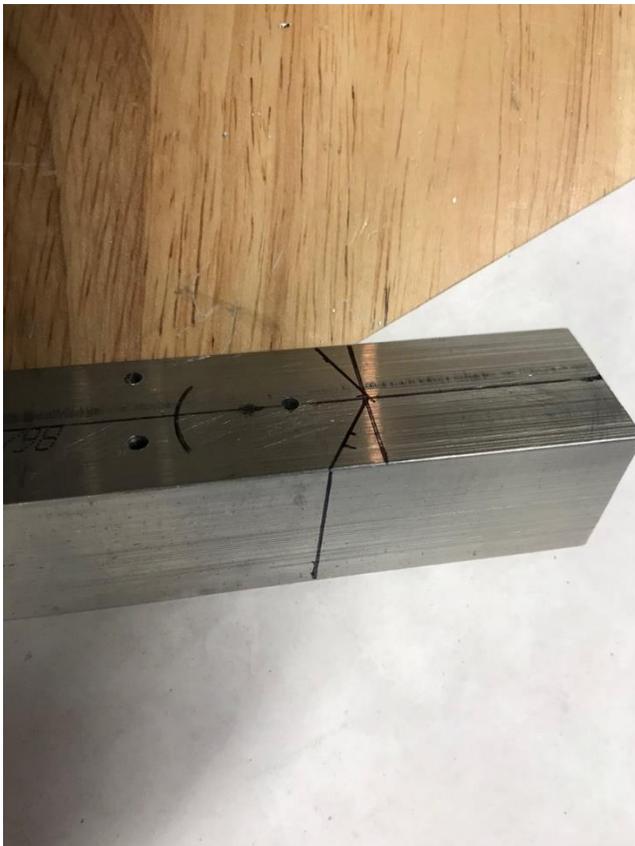
Step 11: Using a flat surface for alignment, clamp a second piece of angle to the first one. **Precise alignment is critical in this step.** Match drill #40 the five (5) #40 holes from the first angle into the second. Cleco each hole as it is drilled.



**Step 12:** Mark and cut off the excess portion of the F-01466 brackets. The aft flange is cut between the lower two rivet holes. The forward flange is cut tangent with the upper part of the lower lightening hole. (The markings shown here were modified in the final cut of the prototype. See final profile pictured in step 14 below.)



**Step 13:** Mark the end of the angle pieces and trim to final length and profile,  $\frac{1}{2}$ " beyond the center of the bolt hole and rounded on the forward corner to allow the flap actuator to rotate freely. (The second picture shows the initial prototype on the left and the final product on the right.)



Step 14: Measure and cut shims. (Note that the shims pictured here were too thin for the prototype. The final shims for the prototype installation were fabricated from 0.063" thick angle material.)



Step 15: Clamp each shim to the angle it will be riveted to and match drill #40 the four rivet holes. Cleco each hole as it is drilled.



Step 16: Mock up the assemblies and match drill #30 the four (4) rivet holes through the angles, shims, and F-01466 brackets. Re-cleco each hole as it is drilled.

Step 17: Mark parts for reassembly and disassemble.

Step 18: Cleco the angles together and final drill  $5/16$  the bolt holes. (The prototype drilled the holes incrementally up to  $17/64$  and then used a 0.311" reamer to finish them.)

Step 19: Disassemble, debur, and prime as desired.



Step 20: Cleco and rivet the angles and shims to the F-01466 brackets using AN470AD4-5 rivets.



Step 21: (Perform this and the following steps after riveting the upper end of the F-01405 flap motor channel to the F-01405F mid fuse brace in step 1 on page 32-07.)

Cleco and rivet the finished bracket assemblies to the F-01405G flap motor channel and F-01405F mid fuse brace. Leave the lower two prepunched #30 rivet holes in the F-01405G flap motor channel open. Use CR3213-4-2 CherryMax rivets in place of the AN470AD4-4 rivets called for in the remaining six #30 rivet holes.



You can now proceed with step 4 on page 32-07.

When you install the flap actuator (steps 3 and 4 on page 34-04), you will use the AN5 hardware called out in the parts list above. The lower end of the actuator connects to the flap crank with the stock hardware.

