

# Boomerang Ranger Composite



## **Required for Flight:**

- (1) 9+ Channel Transmitter
- (1) 9+ Channel Receiver
- (1) 80-130N Sized Turbine
- (5) Standard Sized Servos
- (1) Mini Servos
- (2) Flat Servos

## **What's Included:**

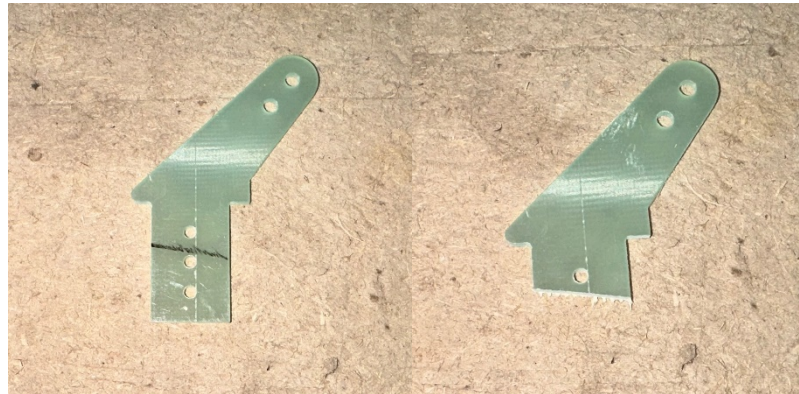
- (1) Boomerang Ranger ARF Jet Kit
- (1) Composite Fuel Tank
- (1) Hardware Package
- (1) Electric Retract System w/ Electric Brakes
- Carbon Fiber Wing and Stab Tubes



1. Open and inspect all the parts on your new Boomerang Ranger.

### Control Horns

2. Test fit and trim all control horns to fit into each of the control surfaces.

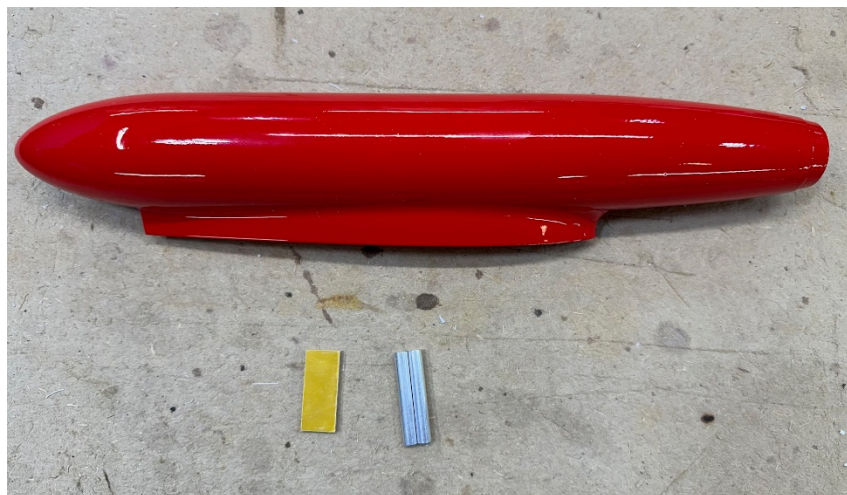




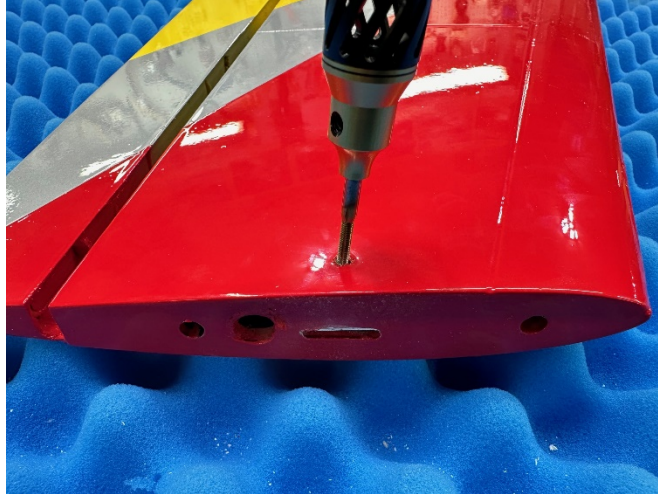
3. Once trimmed, if you want to paint the control horns and flat plates this is the time to do it. We take an empty cardboard box and put slices in for the control horns and then lay down some double-sided tape to secure the flat plates.



4. While those are drying, mounting the wing tips while the wing is still light without any servo or landing gear is quick and easy. This is the same if using the tip tanks or the standard tips.
  - a. Gather all the parts, the 2 aluminum tubes and one small flat G10 plate, the wing and the chosen tip.



- b. Using a 3mm tap clean out the screw hole in the bottom of the wing at the tip.



- c. Test fit the aluminum tubes and the G10 plate, make sure they fit into both the tip and the wing, they will get glued into the tip.
- d. Glue the Aluminum tubes and G10 into the tip, once dry slide the tip on to the wing so there is no gap. Using your tap gently run it down to make a centered mark on the G10 and remove the tip.





- e. Drill on the mark with a 2.5mm drill bit and then tap the hole with your 3mm tap and test fit. The tip can be removed at this point and installed later for good. We will talk about how to install the tip light later.



- f. Repeat these steps for the other wing.

## 5. Mounting the Wing.

- a. Locate the large G10 plate, the 4mm blind nut and bolt as well as the wing and fuselage.
- b. Insert the G10 plate into the slot on the fuselage so that it looks like picture one, then draw a line on the G10 plate on the outside of the fuselage.



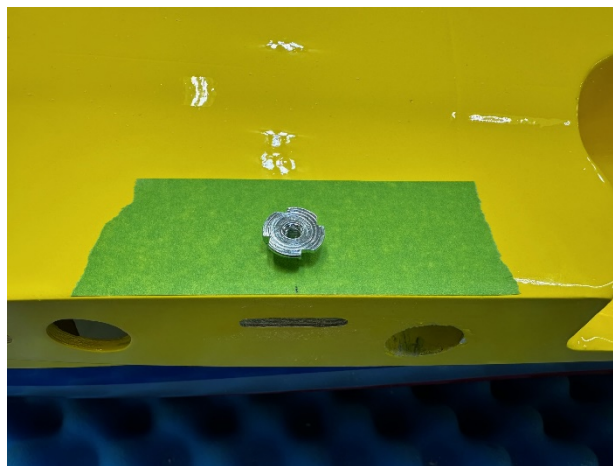
- c. Scuff up the top and bottom of the G10 plate that will be epoxied into the wing. Then glue them into the wing. Slide the wing back onto the tubes



and line up the G10 plate so that it is supported on the side to the fuselage as well.



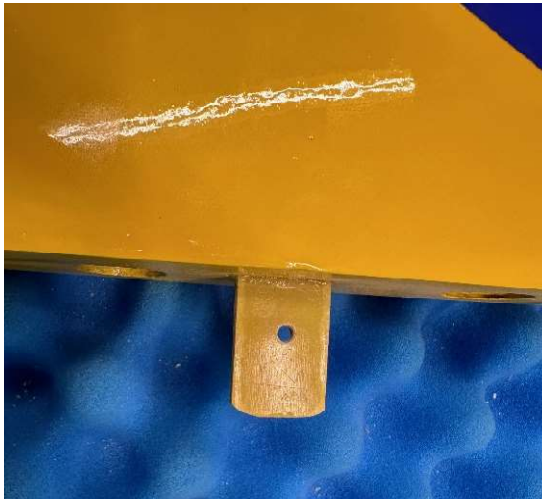
- d. Putting the blind nut into the fuselage is next. Flip the fuselage over and put a piece of tape on the belly and mark the middle of the plate as seen through the slot, then place the blind nut on the belly on the center line and mark where you should drill.



- e. Drill the hole for the blind nut with a 5.5 mm drill bit, then insert the blind nut inside the fuselage and pull it into the plywood.



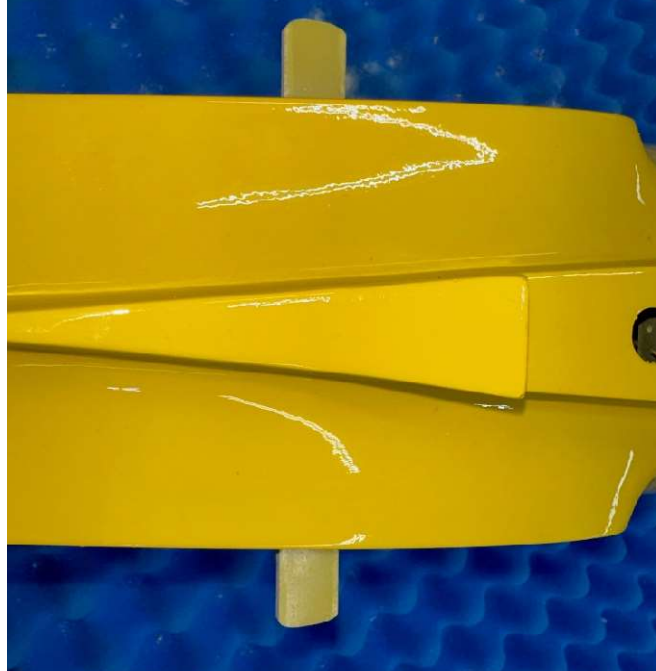
- f. Slide the wing into place and hold it tight against the fuselage, use a 4mm tap and mark the G10 plate. Then drill the mark with a 3.5mm bit. Then tap the G10 plate.



- g. Repeat on the other wing.

## 6. Mounting the Horizontal Stabilizer

- a. Gather the long G10 bar, as well as the stab tubes, stabs, fuselage as well as your 3mm tap and 3mm bolts.
- b. Test fit the G10 plate in the fuselage so that you have just about 20mm on each side of the fuselage and mark that.

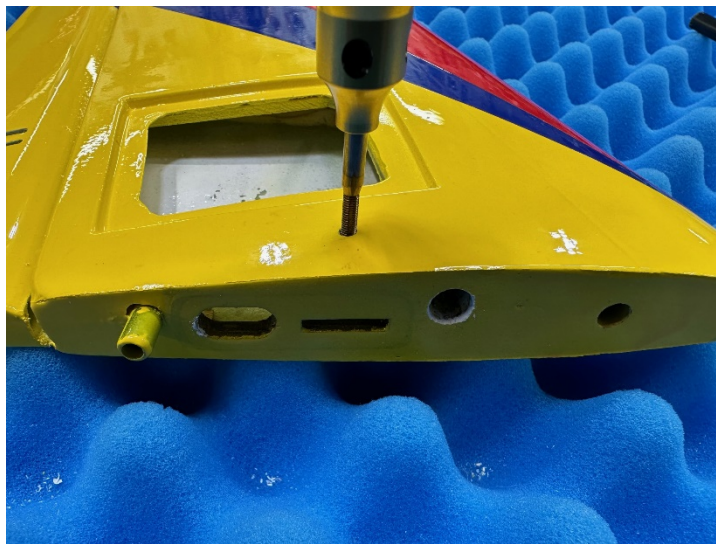


- c. Test fit the stab to make sure everything lines up and the stab fits flush against the fuselage.

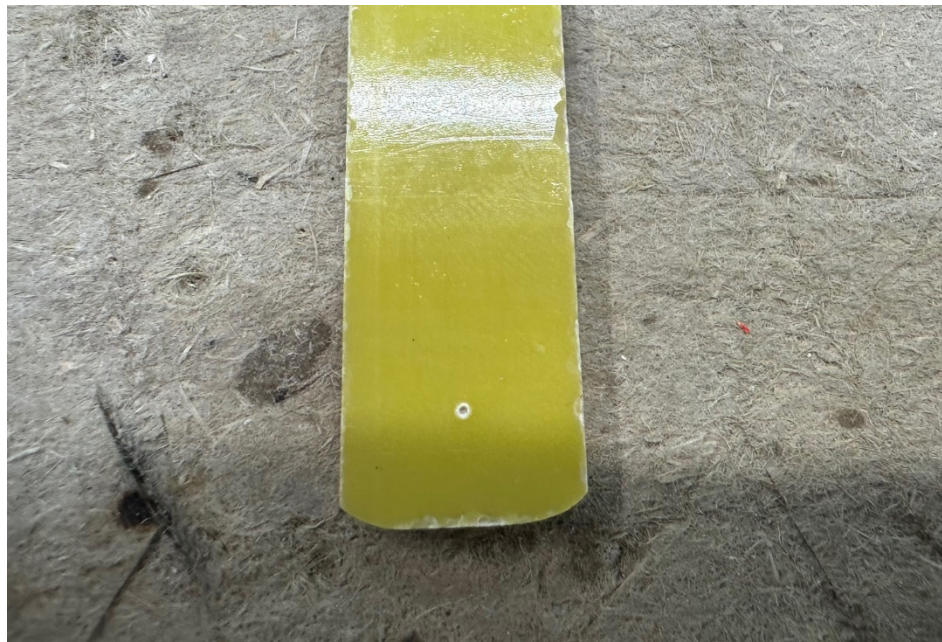
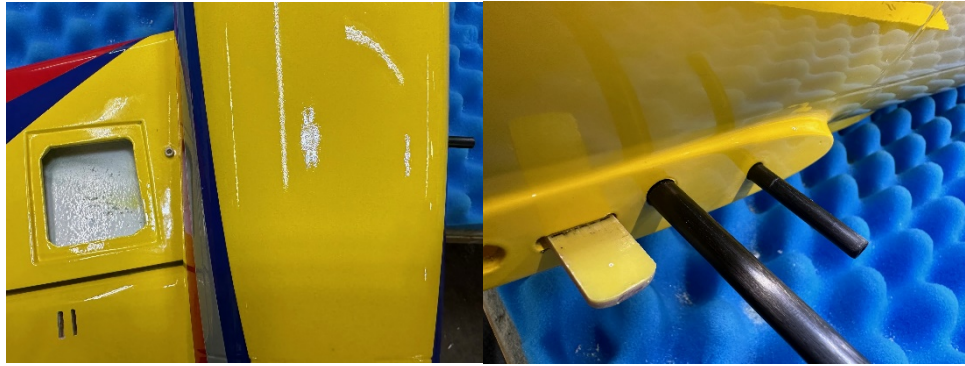




- d. Using the 3mm tap make sure that the blind nuts in the stabs are cleaned out.



- e. Slide the stab onto the tubes and G10 plate and hold in place and mark where to drill the hole, we use a sharpened 3mm bolt to mark the center of the G10 plate. Then remove the G10 plate and drill the hole.



- f. Drill and tap the hole and put the G10 plate back in and secure the stab and now do the same on the other side.



g. Now glue the G10 plate in through the tail of the fuselage and let dry.

7. Glueing in the control horns.

a. Gather the control horns, 2mm bolt and nut, ball link, masking tape and epoxy/Hysol.

b. Assemble the control horn with the two halves then the ball link in the middle and the 2mm bolt and nut then slide the base plate on.



c. Slide the control horn into the surface and outline with low tack masking tape.

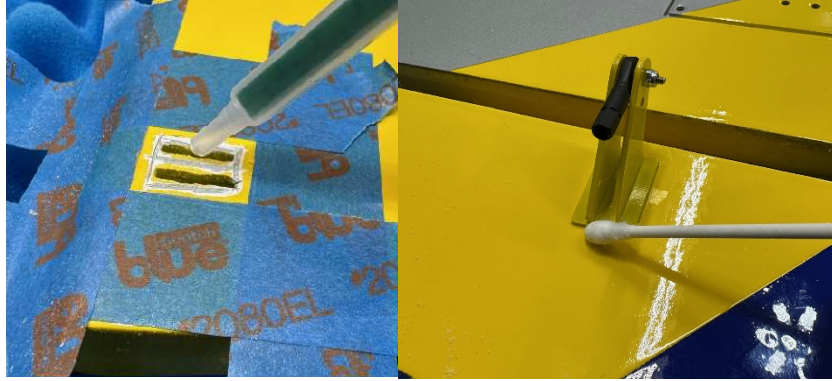




- d. Remove the control horn and scuff the portion that will get epoxied/hydroxylated into the surface as well as scuff the section under the base plate.



- e. Clean all the surfaces with isopropyl alcohol and let dry to prep for glue.
- f. Put glue in the slots and on the surface, then insert the control horn and press firmly. Once in place, remove the tape and clean with isopropyl alcohol and a Q tip.



8. Installing the Aileron and Flap Servos and the pushrods.

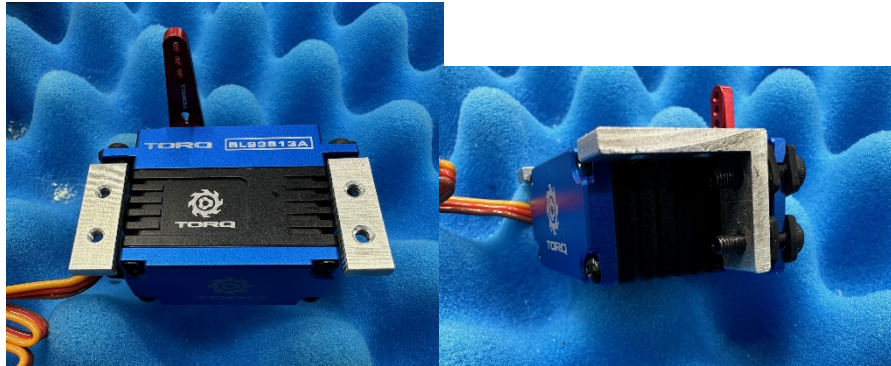
- a. Locate the four pushrods that are 80mm and out the ball links on them all.



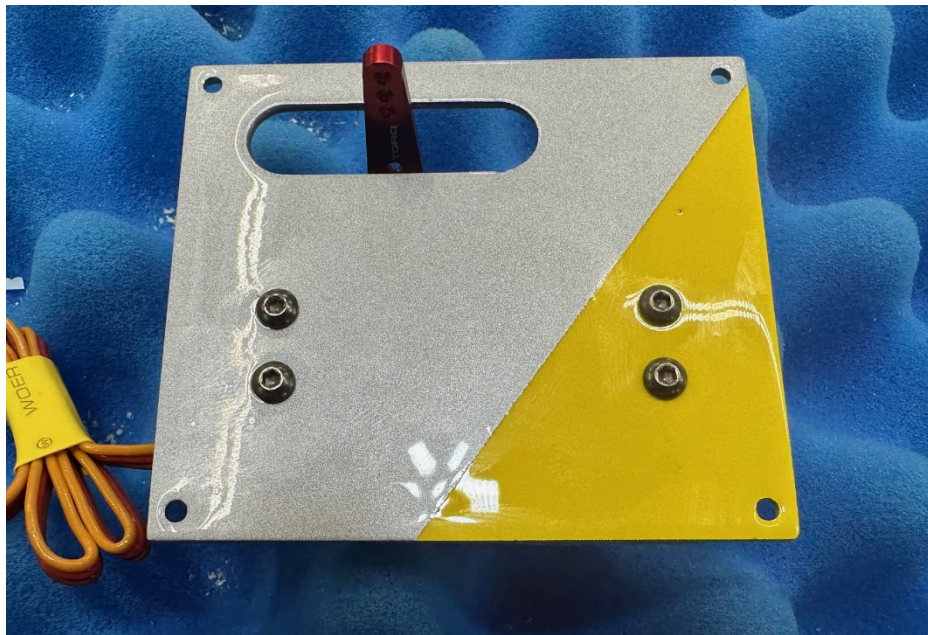
- b. Aileron pushrods will be about 112mm and the Flap pushrods will be about 105mm.



- c. Mounting the servos, locate the “L” brackets and bolt the servo to the “L” bracket with the 3mm bolts, remember to use locktite here, center servo and put on the servo arm.



- d. Use the 3mm Phillips head screws to secure the servo to the servo hatch, make sure to use locktite.



- e. Test fit the servo into the bay and drill the holes for the servo hatch screws and tap them. Then put one drop of CA in each hole and let air dry.





- f. Do the same on the other wing and then run and install the servo extensions for the ailerons and flaps.

## 9. Installing the Landing gear

- a. Put the wing on the fuselage and bolt it on so its secure and in the correct location, the test fit one landing gear and get it centered in the mounting blocks and make sure the wheel is centered in the wheel well.



- b. Using a 2mm drill bit drill one hole at a time and thread in the counter sunk Phillips head screws. Remove and take the landing gear out and put a drop of thin CA into the hole to harden the thread.

- c. Test fit and center the nose landing gear into the fuselage. Once centered use the 2mm drill bit to drill the 4 mounting holes and tap. Then One drop of thin CA to harden the threads.



- d. Do the same for the other side, then re-install and run all the wires for the gear and brakes.
  
  
  
  
  
  
  
  
  
  
- e. Test fit and center the nose landing gear into the fuselage. Once centered use the 2mm drill bit to drill the 4 mounting holes and tap. Then One drop of thin CA to harden the threads.



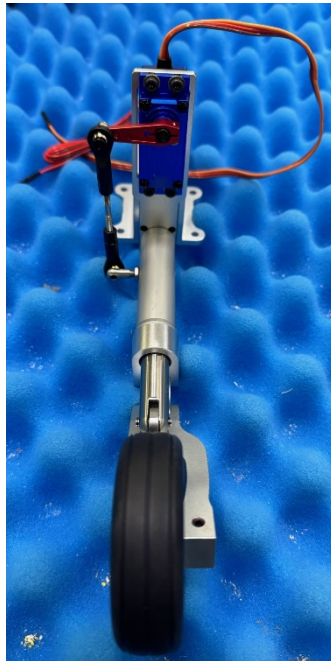
## 10. Installing the Nose Wheel Steering Servo

- a. Mount the servo to the Nose Wheel, spline away from the strut and then center your servo arm on the left side. Use locktite when screwing the servo to the mount plate.





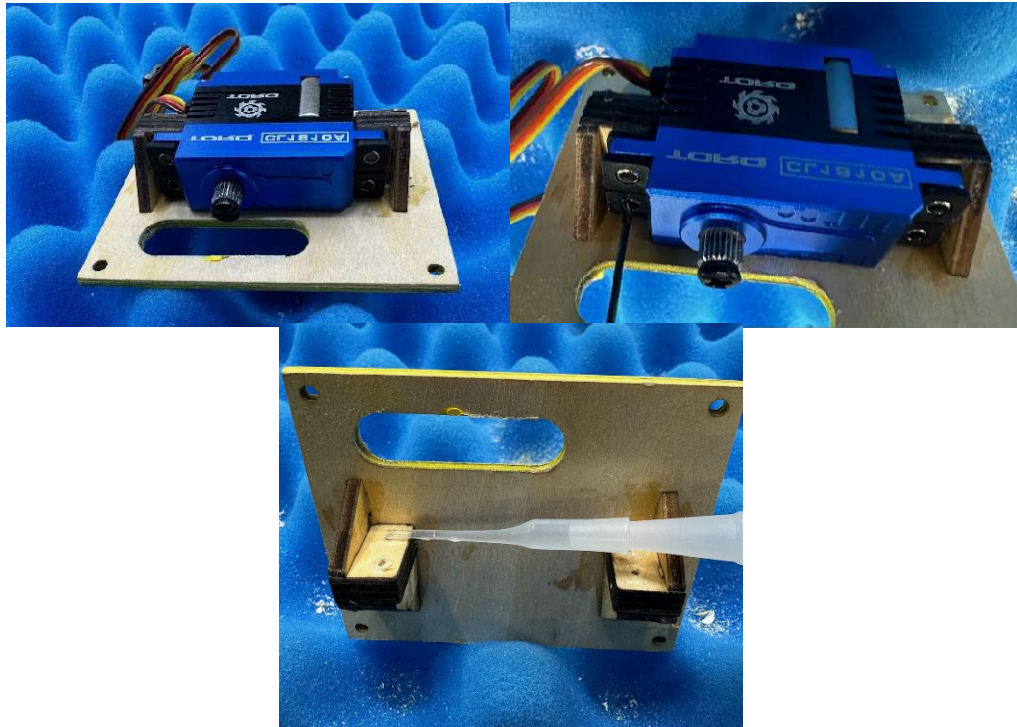
- b. Install the pushrod and pushrod connecting link to the strut. Use Loctite for all bolts here. Then reinstall the nosewheel into the airplane.



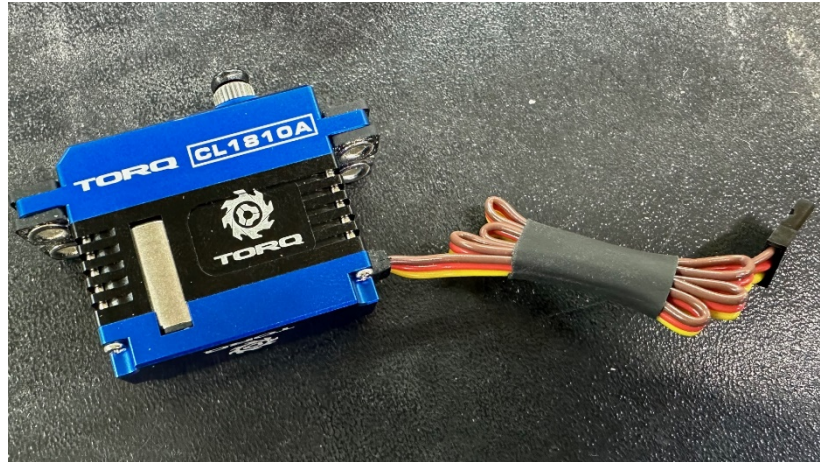
## 11. Installing the Rudder Servo

- a. The mini servo will be used in the rudder.

- b. Assemble the gromets on the servo and remember to put the eyelets on the bottom. Test fit in the pre glued rails, then drill your holes and tap them. Remember to harden the holes with thin CA. Let the CA air dry.



- c. Something we do is to coil up the servo lead to keep it all under the hatch, see the pic.



- d. Test fit the servo hatch into the vertical fin, ensure the slot is to the bottom.



- e. Drill and tap for the screws to hold the hatch on, then remove the hatch.



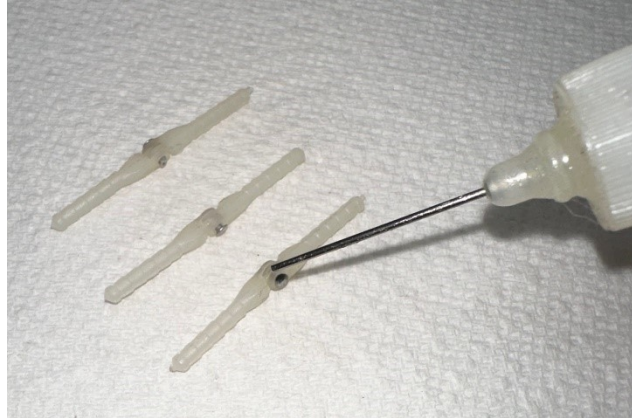
- f. Remove the hatch and put a drop of CA into each hole to harden the threads.



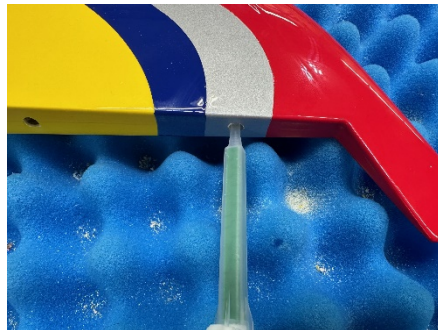
## 12. Hinging the rudder

- a. Locate the three hinges, vertical fin and rudder.
  
  
  
  
  
  
  
  
  
  
- b. Put a tiny drop of oil on each of the hinges at the pivot.





- c. Test fit the rudder to the vertical fin and make sure everything lines up and has free travel.
- d. Using Hysol or epoxy it is time to put some into each of the holes on the vertical fin, then install the hinges. Gently slide the rudder on just a little so as to make sure that everything lines up and travels with no bind. Do not glue the rudder till the vertical fin side is dry.



- e. Once the hinges are dry, test everything one more time and gauge how far in you will push the rudder to ensure you have plenty of travel. We leave a slight gap between the fin and rudder.
- f. Put Hysol/ epoxy into the hinge holes on the rudder and line up the hinges and install, remember that slight gap that is needed to ensure good travel.



### 13. Rudder Pushrod assembly

- a. Locate the 45mm pushrod as well as 2 ball links and associated 2mm bolts and nuts.
- b. Re install the rudder servo and hatch and run the servo lead out the bottom of the vertical fin.



- c. Putting both ball links onto the pushrod, make the pushrod about 75mm long from end to end.
- d. Using a servo centering tool or your radio system power up the servo so that it is centered and install the pushrod and adjust the length to that the rudder is mechanically centered.



- e. It might be necessary to clean the threads on the nylon bolt on the bottom of the fin, to do so use the wing nut that will hold the fin on later on, gently thread a little and then back it off and work it slowly till all the threads are clean and the wing nut goes on easily.

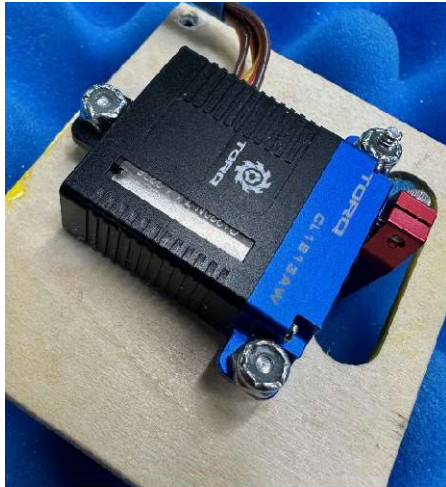
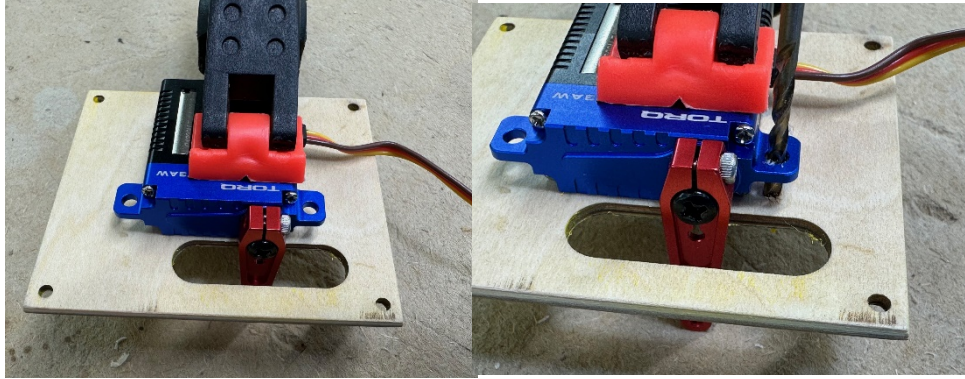


#### 14. Mounting the Elevator Servos and Pushrods

- a. Gather one stab, servo and hatch to get started.
- b. Power up your servo and center it, then put the servo arm on. Using a clamp to hold the servo centered in the servo arm cut out drill the 3x 3mm



holes for the screws to hold the servo to the plate. **\*\*Note\*\*** Drill one at a time and put the screw in.



- c. Fit the servo into the stab, it might be necessary to trim the lip a little bit depending on the servo you have picked to use.





- d. Once fit, drill the holes for the servo hatch screws and then tap, and harden the threads using thin CA.



- e. The push rod to be used here is the 40mm one, thread on two ball links to about 72mm and power on the servo and test fit the pushrod and adjust to the proper length.

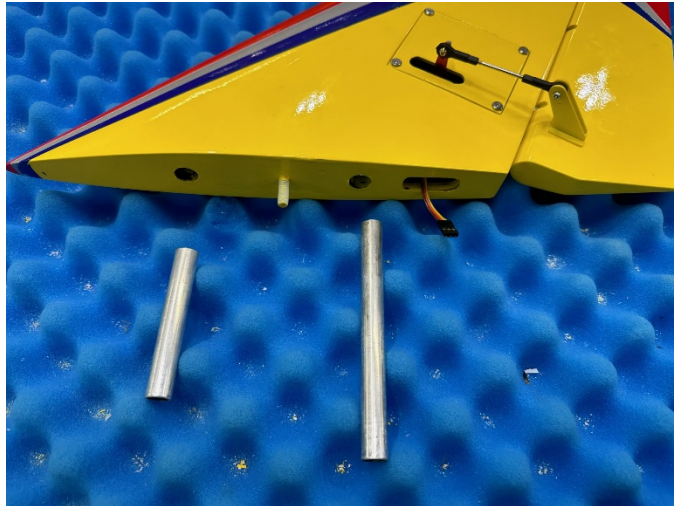


f. Repeat these steps for the other side.

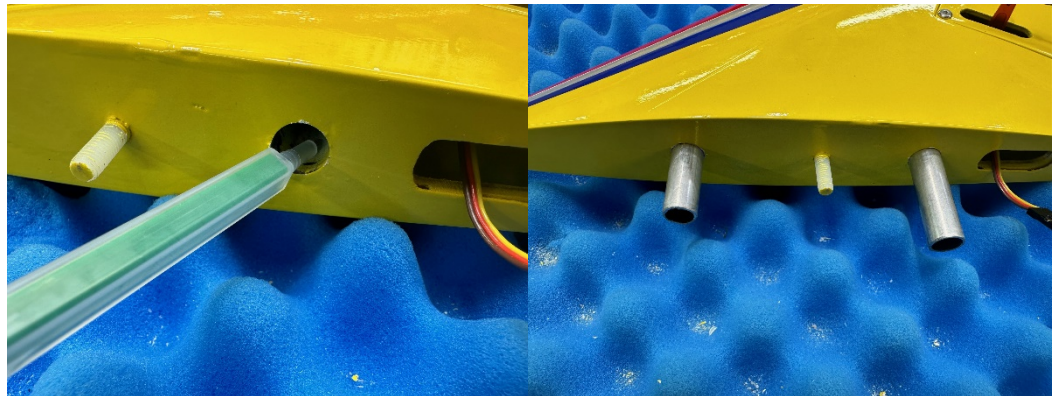
15. Run all of your extensions to the tail now, you will want to do this before installing the thrust tube and turbine so you can work in the tail.

16. Installing the Vertical fin and Fin tubes.

- a. Locate the 2 tubes for the vertical fin, the short one will go in the front and the longer will go in the back. Test fit them and then test fit the fin to the fuselage.



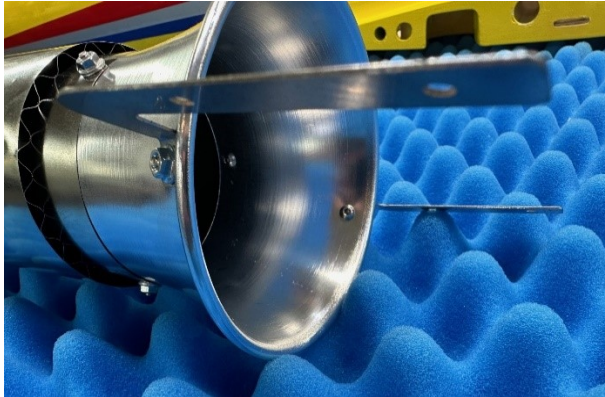
- b. Hysol/ epoxy the tubes into the fin and let dry.



- c. Once dry, install the fin on the fuselage and remember to connect the rudder servo, then thread on the wing nut to hold the fin in place. If you need to remove it later, you will have to remove the thrust tube.

17. Assembling and installing the Thrust tube. Locate the tube and the ears, the screws and nuts are in the bag with the mounting ears.

- a. Mount the ears with the tabs to the bottom and the screw head inside the tube and nut to the outside, only mount one at this point.

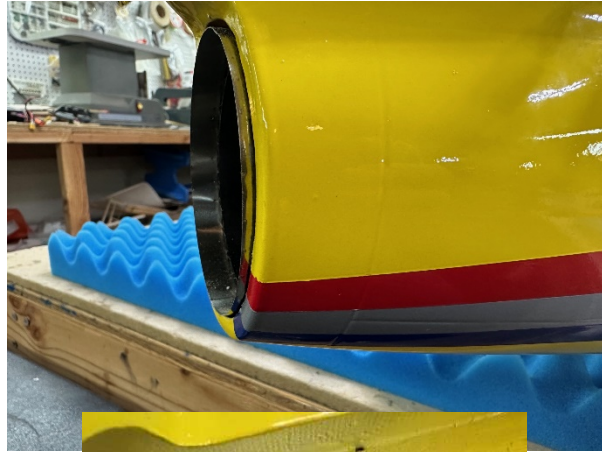


- b. Slide the tube in and then mount the second tab.



- c. Slide the tube into the mounts in the tail and line up the ears at the front end, then screw the tube into position.



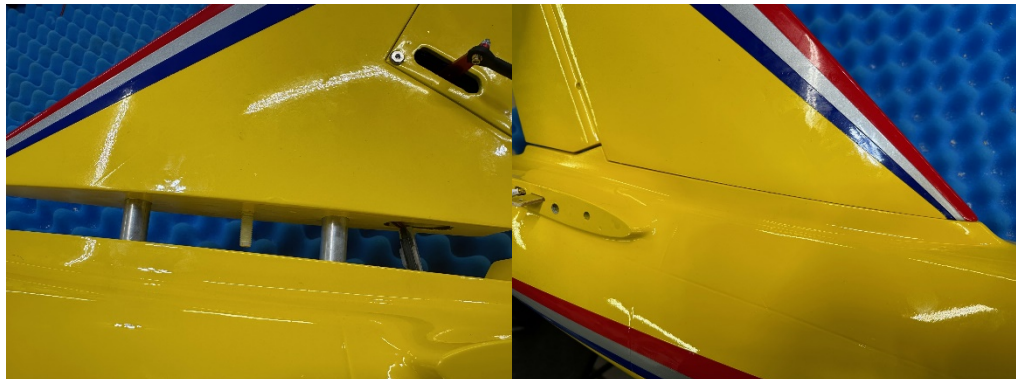


d.



18. Install the Vertical Fin.

- a. Connect the rudder servo extension and secure it.
- b. Slide the vertical fin into the fuselage and secure using the thumb screw from inside.



- c. Once the vertical fin is on, re install the pipe.



#### 19. Mounting the Turbine.

- a. In order for the turbine to fit it might be necessary to trim a little bit of the rails. The turbine should sit so that about 7-10mm of the tail end are just into the bell on the tube.

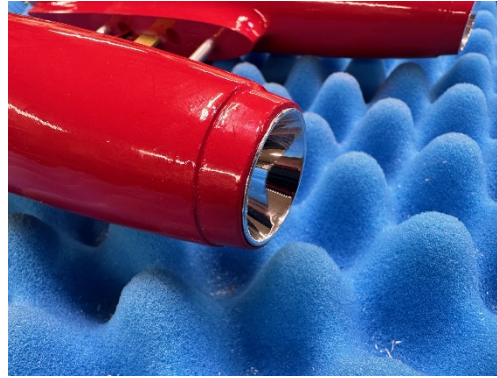


- b. Drill the holes for the mounting screws, make sure the turbine is lined up and is straight down the pipe. Tap the holes and remove screws and put a drop of CA in and let air dry.
20. Optional, lights in tip tanks. We use the Sky Candy Light kit for this that is designed for the Ranger. Locate one tip tank, light and gently open up the tip till it is snug on the light. \*\*Note light shown in backwards for fitting as once you put it in correctly there is no way to grab it to remove.



- a. Once the light fits snugly into the tip tank, connect the extension and run it out the tank and the back hole that will match up to the hole on the wing. Then epoxy/ Hysol in the light and let dry.





b. Test fit the lens covers and trim to size.



c. Once trimmed to fit, epoxy/ Hysol the lens in place. At this point you are done unless you want to paint like we did. Mask off the area you want to paint and then paint.





Now that you have completed the assembly of your Ranger all that is left is to install your components inside the fuselage. Below is a picture of our layout, but not the only way to do it.



Control throws:

Elevator:	15 Degrees up
	25 Degrees down
Ailerons:	12 Degrees up
	16 Degrees down
Rudder:	Max
Flaps:	45 Degrees down