

# TORNADO



## Specifications

<b>Wing Span</b>	<b>63in.</b>
<b>Wing Area</b>	<b>1007.5 sq in.</b>
<b>Flying Weight</b>	<b>14.3 lb.</b>
<b>Fuselage Length</b>	<b>76.8 in.</b>
<b>Engine</b>	<b>12lb.-18lb. Thrust Turbine</b>
<b>Recommended Engine</b>	<b>Jet Cat P60SE</b>

## **Warning!!! This is not a toy.**

The TORNADO is designed for maximum performance. If you are not familiar with the operation of turbine powered aircraft please seek the advice of an experienced modeler. Operating this model without prior preparation and experience can cause injuries.

# **Before You Begin**

- 1. Read through the instruction manual thoroughly before beginning construction**
- 2. Check all parts supplied with the kit for defects, and missing parts. Dry fit all parts that will be glued for proper fit. If any parts are found to be defective please contact local dealer for assistance.**
- 3. Use proper adhesives for assembly, It is imperative that all glue joints be very strong for best results and safety.**

## **Adhesive Required:**

- 1. Hysol or 15 Min epoxy with micro balloons**
- 2. 30 min epoxy**
- 3. Medium CA**
- 4. Zap-A-Dapa GOO or Automotive Goop**

## **Required Parts for Final Assembly**

- 1. Turbine 12lb-18lb thrust**
- 2. TX and RX with a minimum of 7 channels**
- 3. 4- mini servos with a minimum of 65oz torque for Empennage**
- 4. 5- Standard size servos with a minimum of 120oz torque for Ailerons, Flaps and Nose wheel steering**
- 5. 1- Standard servo for retract valve**
- 6. Electronic Brake Valve or Mechanical Brake valve**
- 7. UAT**
- 8. RX battery with a minimum of 2,200 mah 6v**
- 9. 2 5/8 Wheels and Brakes for Main Gear, 2/14 Nose wheel**
- 10. A minimum of 3/8 struts for Mains and Nose**
- 11. Pull-Pull cable for steering**

# PARTS LIST



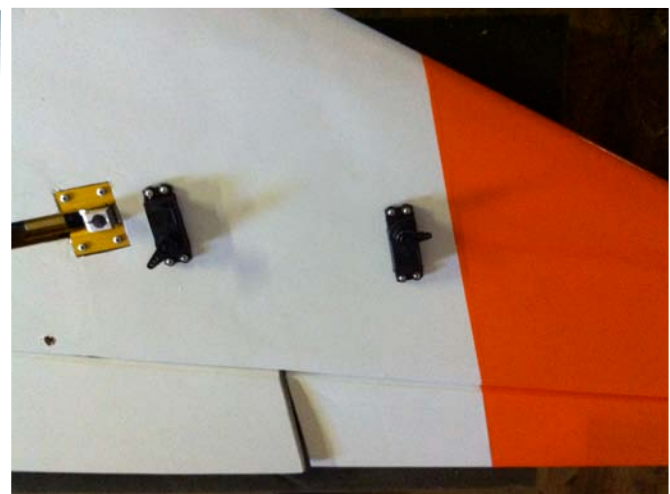
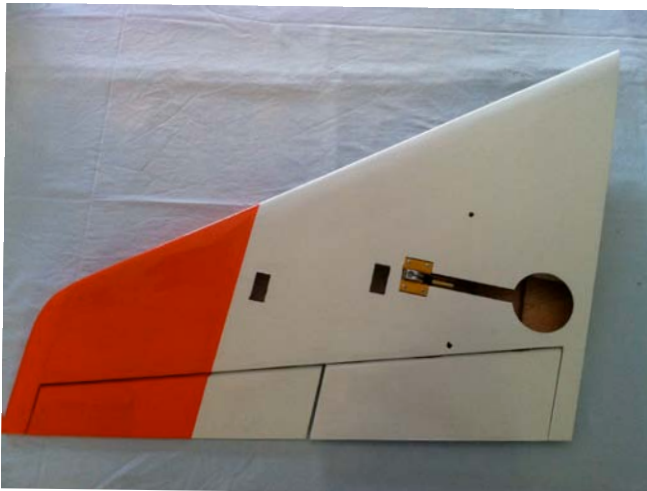
1. Fuselage
2. Main Wing 1 pair
3. Stabilizer 1 set
4. Rudder 1 set
5. Canopy
6. ABS Canopy Tub
7. 80oz Composite Fuel Tank
8. Composite control horns 8 pieces
9. Aluminum Engine Mount
- 10.4 Aluminum Boom Bolts and Washer
11. 2 Aluminum wing bolts
12. 4 Aluminum Elevator Bolts
13. 8 Control Clevis
14. 8 Pushrods
15. 8 Ball links
16. 2 Aluminum Wing Tubes
17. 1 Set Spring Air Retracts

1.



Locate the plastic hinges with pin and fit into slots that are cut into the wing panels, trim slot as necessary. Hinge the Ailerons and Flaps on each wing panel using Hysol or 30 min epoxy.

2.



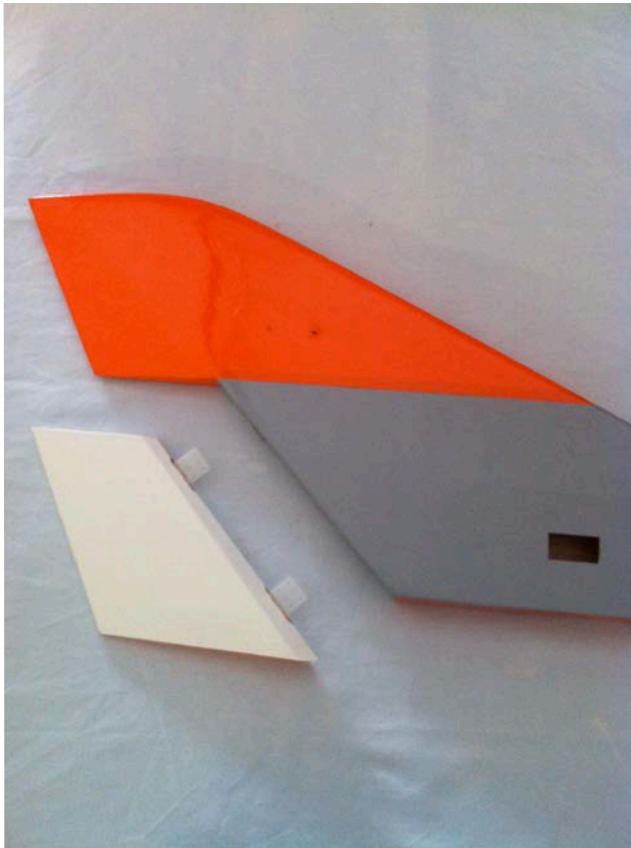
Check the control surfaces on each wing panel and ensure that the glue has cured and the control surface is secure. Locate the servo openings for the ailerons and flap's and install the servo's using wood screws on each wing, ensure the servo's are facing in the correct direction as per the above illustration

3.



Locate 4 composite control horns and cut a slot in each aileron and flap for the control horn. Use 30 min epoxy or hysol to secure horn in place and let cure. Assemble a pushrod using one clevis and ball link and secure to servo. Pay close attention to have a slop free surface, any excess movement can cause flutter during high speed flight.

4.



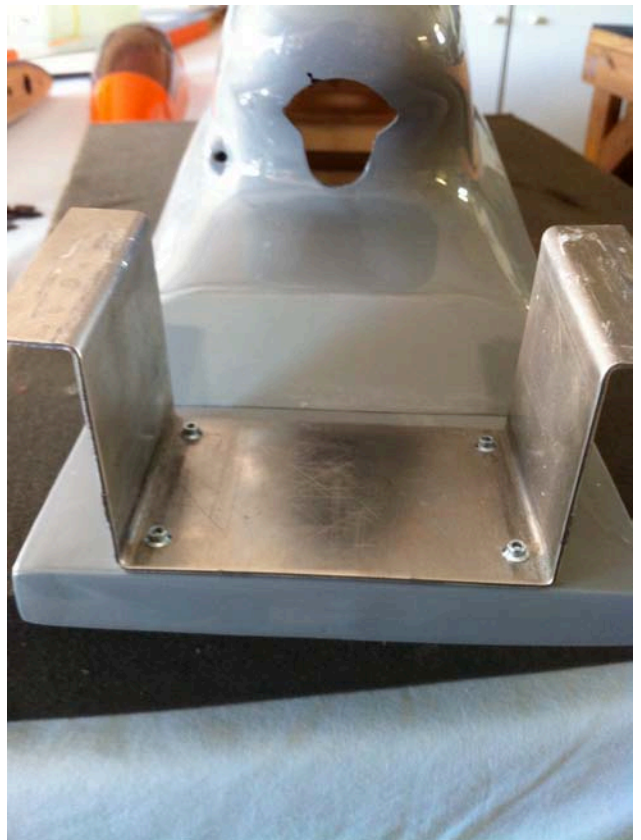
Hinge the rudder using 30 min epoxy or hysol and let cure. Check the control surface after the glue has cured and ensure of a good bond. Locate the servo openings on each boom and install a servo using wood screws. Locate 2 control horns and cut a slot in each rudder and glue in place using 30 min epoxy or hysol.



5.



Locate the fuselage and using a dremel make a hole for all turbine wires and fuel lines. It is very important to make the hole large enough for the starter motor to fit inside without touching the walls of the fuselage or chaffing any of the fuel lines or wires.



6.



Install the turbine as per the manufactures instructions ensure that you move the turbine as far forward as possible for CG purposes.

7.



Drill a pilot hole and then dremel out as to accommodate the wing spars, wing bolt, servo wires and air lines. After this is complete test fit the wing panels to ensure a proper fit.



8.



Hinge the elevator using 30 min epoxy or hysol and let cure. After the glue has fully cured check control surface for a proper bond.



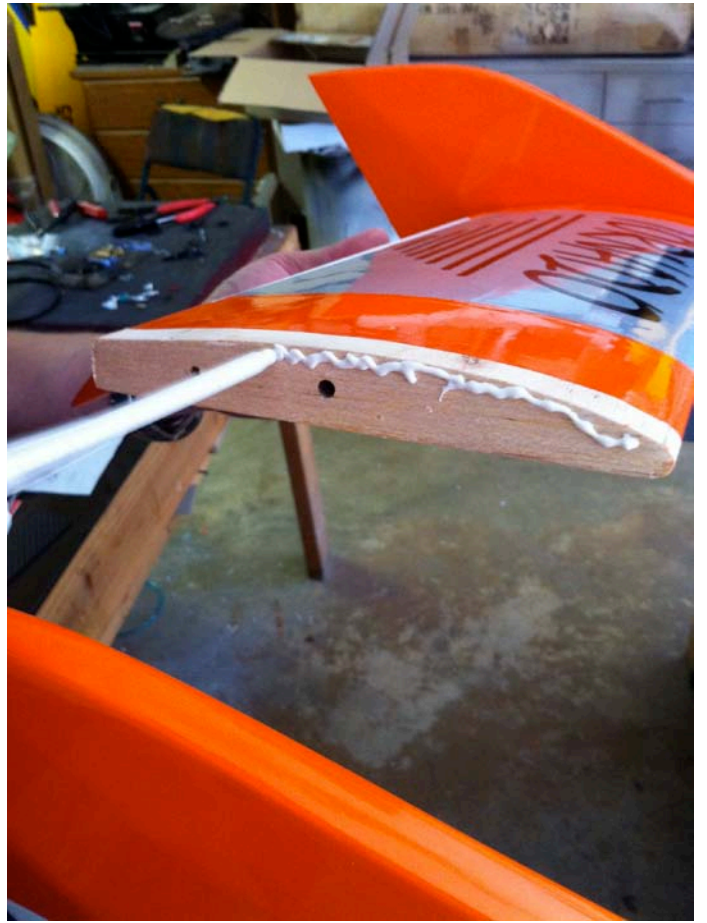
Cut the covering off approximately 1/2 inch from the end of the elevator this part will go inside the booms



9. Fit both wings onto the fuselage using the aluminum spars supplied and bolt them in place. Locate both booms and stabilizer and put aside for assembly in the next steps. Attach one of the booms ( your choice ) on to the wing using the bolts and washers supplied and ensure that the stabilizer opening is facing inward. Now locate the other boom and attach it to the the other wing only using the forward bolt and washer. This will allow you to pivot the boom slightly so you can fit the stabilizer in place for glueing.

Locate the stabilizer and temporarily attach it to each boom using the bolts supplied for a test fit prior to glueing. Remove any covering from the stabilizer as to ensure a proper bonding surface. After you are satisfied with the fit remove the 4 bolts and apply hysol or 30 minute epoxy with micro balloons to the stabilizer and the inside of the cavity in the boom. Attach the stabilizer with the 4 bolts and washers and tighten. Screw the last bolt through the wing into the boom and ensure you have 2 bolts on each wing. Now ensure that the stabilizer is parallel to the wing and the booms are properly fit to the stabilizer and let cure over night. After the glue has cured use 15 minute epoxy with micro balloons and fill any gaps that are present between the stabilizer and the boom cavity.



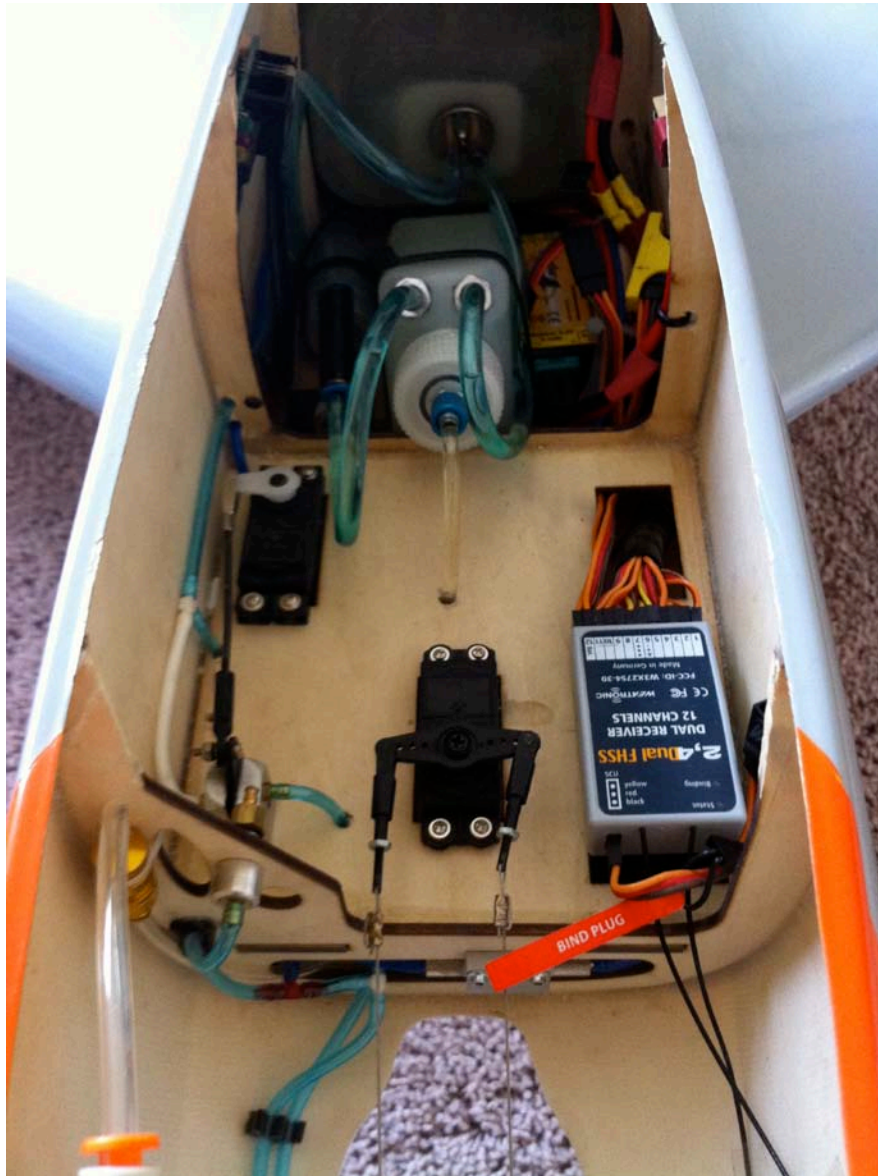




10. Install one mini servo on each boom for the movement of the elevator. One servo has to be reversed so proper operation is attained. Glue 2 control horns in place on the elevator as per the below picture using hysol or 30 minute epoxy with micro balloons at let cure. Install one pushrod onto the servo and control and check operation. Before installing the second pushrod make sure the servo is traveling in the correct direction.



11. Install the supplied fuel tank and UAT making sure there are no leaks present. Use a small amount of Goop on the main fuel tank and UAT so there is no movement during flight.



12. Install a standard size servo and retract valve and connect the air lines as per the instructions supplied with the spring air retracts.

13. Install the nose wheel steering servo and ensure the servo is facing the correct direction as per the above picture. Use pull-pull cables to actuate the nose wheel steering. Do not over tighten the cables since this will cause the nose gear to have problems locking in the down position. using a dremel sand any excess fiber glass causing interference with the pull-pull operation



14. Locate the Canopy and trim to fit on to the the fuselage. We have supplied you with a molded cockpit tub that is used as the base for the canopy. Trim as necessary to have a proper fit and glue in place with goop or canopy glue.



15. The canopy assembly can be secured in place many different ways. We will show you the method we prefer due to its simplicity and cost.



The Canopy is held in place with 2-56 music wire inserted through the nose of the airplane as shown above.

## 16. Control Throws and CG

Ailerons- 1/2 inch up  
1/2 inch down            measured at wing tip

Elevator- 3/4 inch up  
3/4 inch down

\*\*\* The elevator is neutral when the top of the elevator is flush with the top of the stabilizer\*\*\*\*

Rudder- 1 1/4 inch left  
1 1/4 inch right

Flaps- 2" inch down for take-off  
3 1/2 inch down for landing

\*\*\* You will need 1/8 inch to 1/4 inch up elevator for landing flaps depending on CG \*\*\*

These flap positions have been thoroughly tested, increasing these throws will not slow down the model or make the landing distance shorter. Increasing landing flaps will cause the airplane to have unfavorable stall characteristics.

CG Location- 12 3/4 inch back from the leading edge measured at the wing root, Or you can weigh the nose of the airplane for a more accurate CG measurement. The nose needs to weigh 1.5 lb, how we recommend you do this is as follows. Place the airplane on a level surface and put the nose gear on the scale, ensure that the main wheels are blocked up so when the nose wheel is on the scale the airplane is completely level. \*\*\*\*\* All CG measurements are done with a full UAT and Gear Down\*\*\*\*\*

## FIRST FLIGHT

If this is your first turbine we suggest you seek the help of an experienced RC Jet Pilot for the maiden flight of your model. Before starting the turbine ensure you have all safety equipment in place incase of a fire or other problem.

We suggest you do not use take-off flaps on the first flight. The model uses very little runway even with no flaps. The control throws for the airplane are a starting point and can be changed for your desired flight needs. On our flight testing we used about 15%-20% expo on elevator and ailerons. After you get the airplane trimmed we suggest you extended flaps and slow the airplane down to landing speed. The TORNADO will slow down to about 20MPH with full landing flaps, at this speed the airplane is very stable and maneuverable. On landing do not force the airplane down decrease power to idle and hold the airplane off until it gently touches down. Happy Flying!!!

