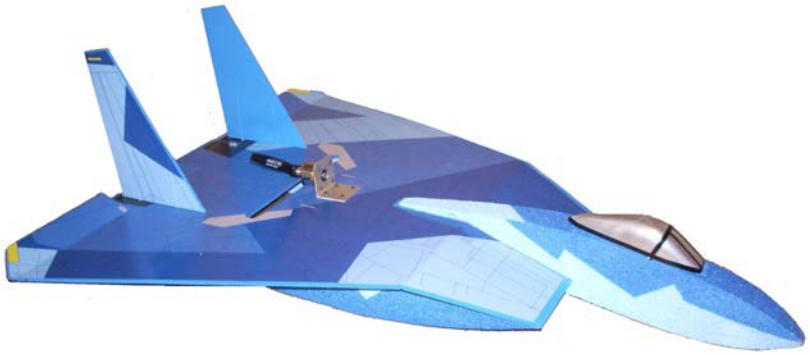
TOUGH JETS™

T-14



INSTRUCTION MANUAL

Specifications

Wingspan.....31in	Weight.....2 lb
Length.....41.75in	Radio.....3 channel
Wing Area.....615 sq in	Motor.....Brushless
Propeller.....9 x 6	Battery...11.1v 2200mah 25c

KIT CONTENTS

(1) Wing

(1) Fuselage

(2) Nacelles

(1) Battery box spacer

(2) Vertical stabilizers

(1) Canopy

(1) Canopy hinge

(1) Motor mount

(2) Rare Earth magnets

(2) 14 Gauge wire

(1) Carbon Fiber Shaft 30 inch

(4) 3mm X 12mm Bolts

(4) 3mm X 14mm Bolts

(8) 3mm Lock Nuts

(4) Flat washers

(4) Control horns

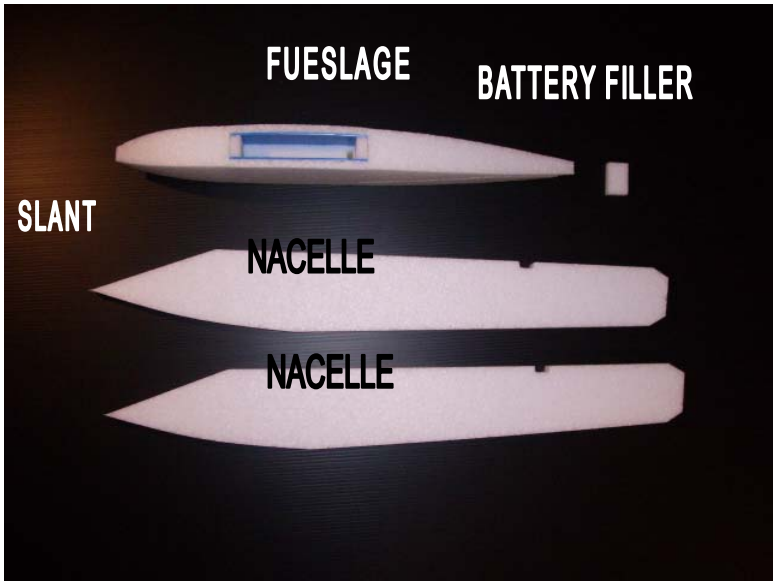
(4) Clevis

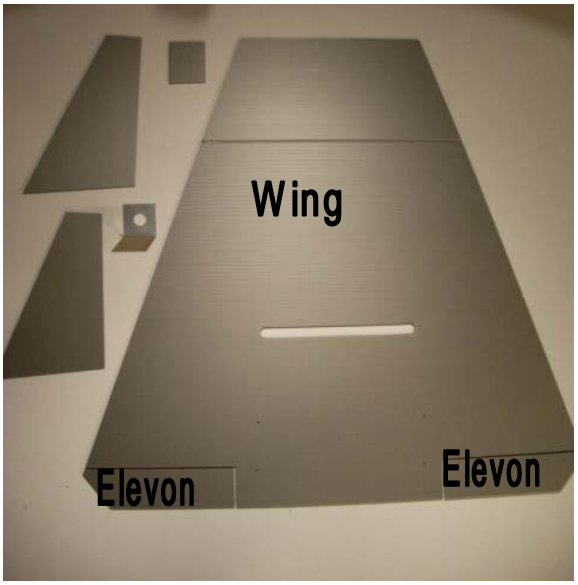
(4) Push rods

(4) Push rod keepers

(1) Coroplast® motor mount stiffener

(4) Wood dowels





BEFORE YOU BUILD

WARNING!!

This kit is not a toy.
This model is intended for the competent builder and RC pilot aged 14 years and older. It is the responsibility of the modeler to ensure the model is airworthy before attempting to fly it.

Always ensure that any glue, paint or solvents used to build this kit are compatible with the materials contained in this kit. Some glues and paint can melt Styrofoam and plastic that is contained in this kit.

Before gluing any parts together, we strongly suggest trial fitting the parts without glue first; to ensure that all the parts align and fit properly. This will ensure the airplane is built straight and square.

ABOUT THE TOUGHJETS T-14

The ToughJets T-14 was designed by life-long RC modeler Wayne Roberts to be the highest performing fun scale RC propjet on the market. You'll find the T-14 has an enormous flight envelope. It's capable of 60+mph, it's highly aerobatic, yet it lands at near zero ground speed in the slightest of headwinds.

TOOLS AND SUPPLIES REQUIRED

5 Minute Epoxy

CA glue

Electric Drill

Assorted Drill Bits

Needle nose pliers

Small screw drivers

Allen wrench 2.5mm

Hobby knife

Wire Cutters

Scissors

Clear Packaging Tape

Pencil

Rubbing Alcohol

3M Type 77 Spray Adhesive

ADDITIONAL EQUIPMENT REQUIRED

3 channel radio with mixing (Minimum)

2 micro servos (HI TEC HS-55 or equivalent)

2, Y servo cords.

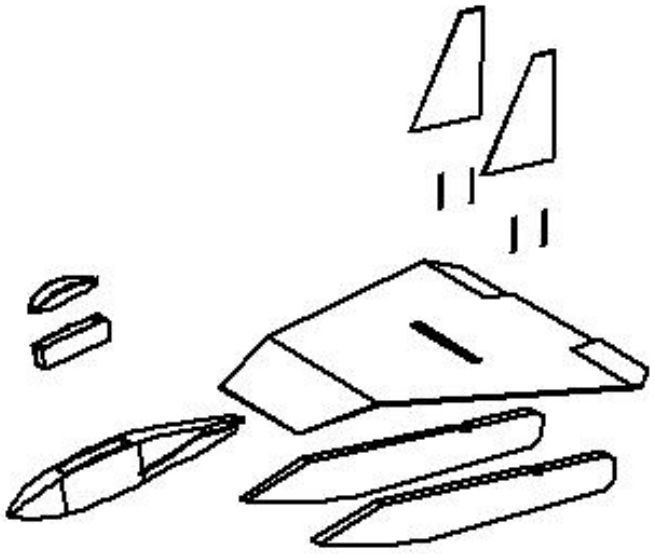
Brushless outrunner motor (BPhobbies # BL-A2814/6 or equivalent)

50 amp electronic speed control

3 cell lipo battery 11.1 volt 2200 mah 25 c

9X6 Master airscrew standard nitro prop (**NOTE:** not pusher prop)

EXPLODED VIEW

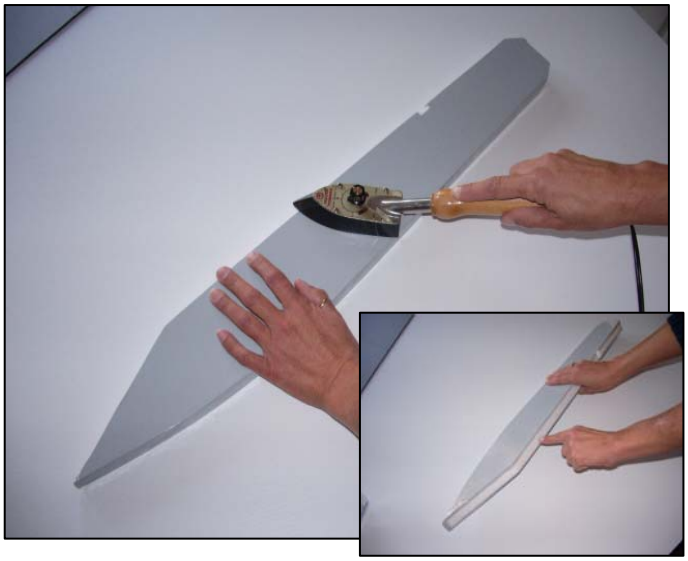


Use this exploded view to help guide you through the assembly of the major components of your ToughJets T-14

LET'S BEGIN BUILDING

It is strongly suggested you review the drawings, photos and captions to familiarize yourself with the design and construction of the model.

Before beginning construction, you will want to decide whether to paint or cover the foam parts with heat shrink film such as EconoKote, or packaging tape. You may also choose to leave these parts uncovered. If you choose EconoKote, or packaging tape, spray the surfaces to be covered with 3M Type 77 spray adhesive prior to covering. Allow the adhesive to set for 5 minutes prior to applying the covering, this will improve the overall adhesion of the covering to the foam. When covering the nacelles, do not apply covering material to the surfaces to be epoxied to the wing.



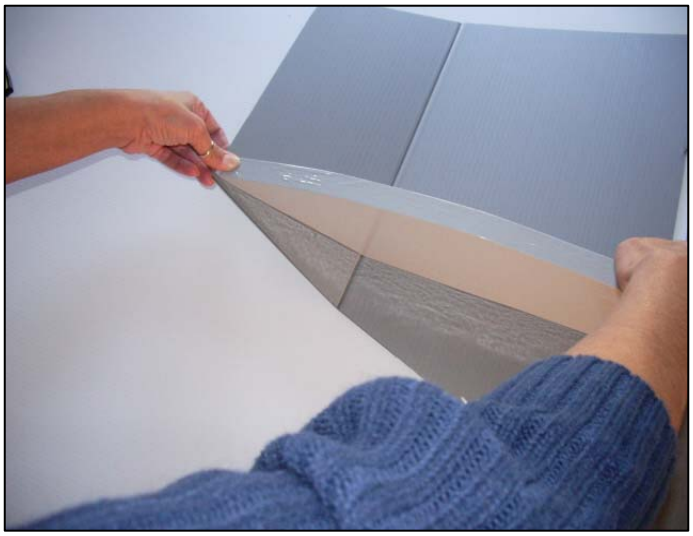
It is highly recommended to apply the covering material prior to assembling the model. Do **NOT** apply covering to the top edge and slant of the nacelle (see insert)

WING / NACELLE / FUSELAGE ASSEMBLY

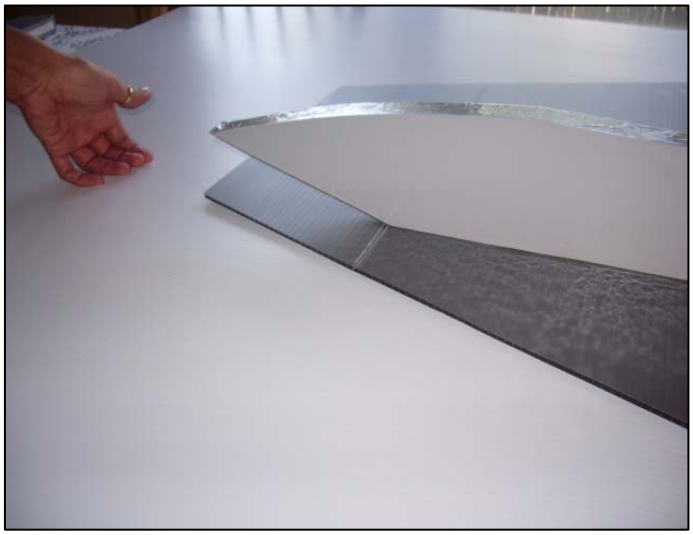
Lay wing on a flat surface, bottom side up. This is the side with the hinge slots and crease.

Clean the bottom of the wing with rubbing alcohol before gluing

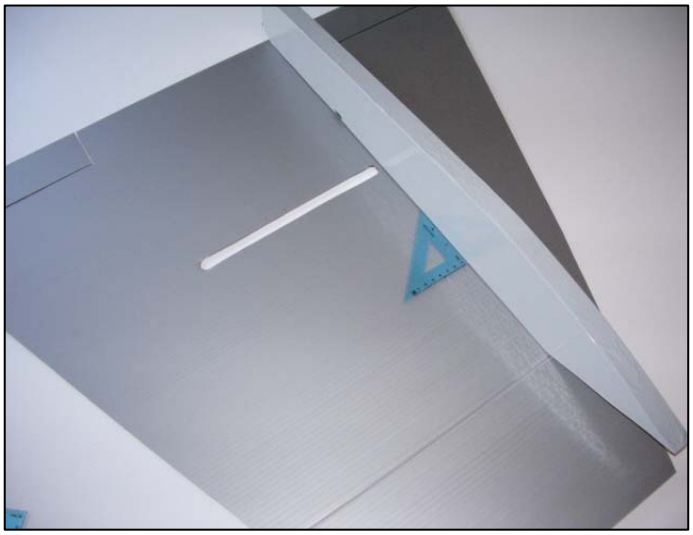
Apply 5 minute epoxy to top of nacelle on flat section only. **Do not** apply epoxy to slanted section at this time.



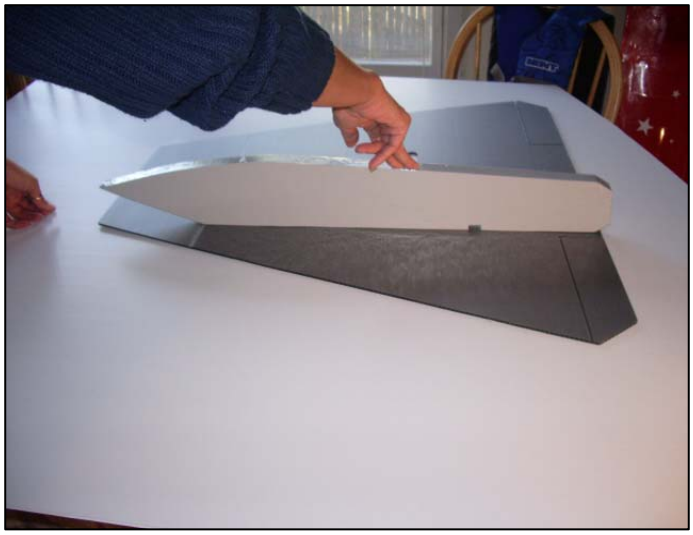
Carefully align nacelle with leading edge and crease on the bottom of the wing.



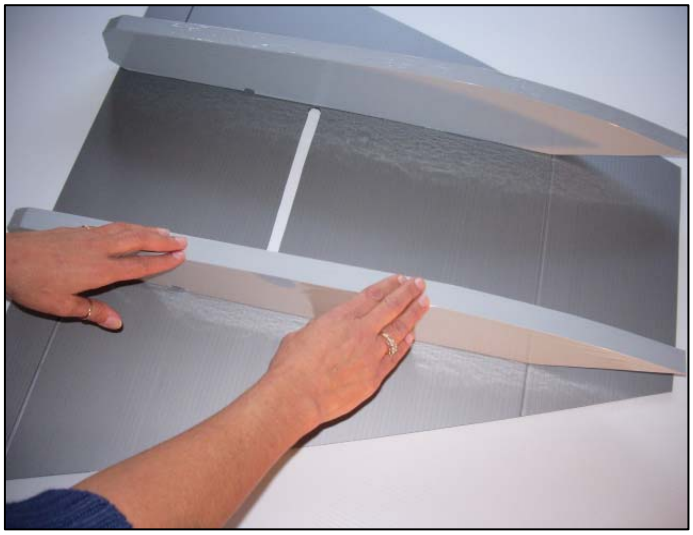
Be sure that the nacelle is properly aligned with crease



Ensure the nacelle is parallel and 90 degrees to prop slot in wing. You have some time to make slight adjustments before epoxy cures but move quickly.

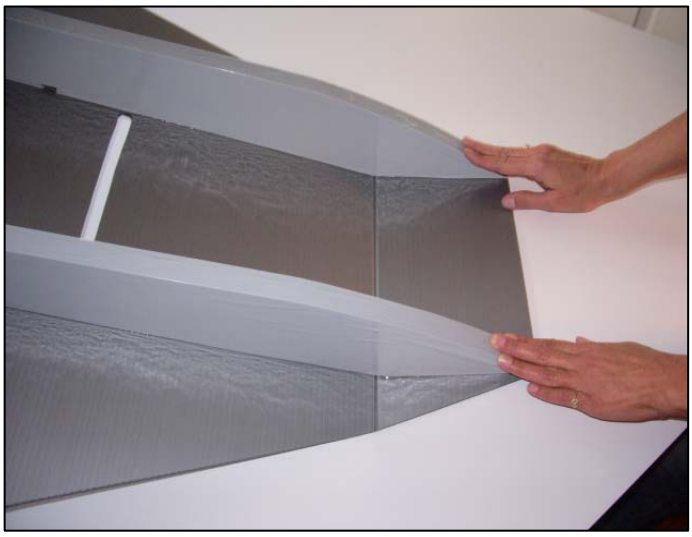


Hold the nacelle in place until the five-minute epoxy cures, check that nacelle is aligned with leading edge, crease and centered on Vertical stabilizer dowel holes on wing.

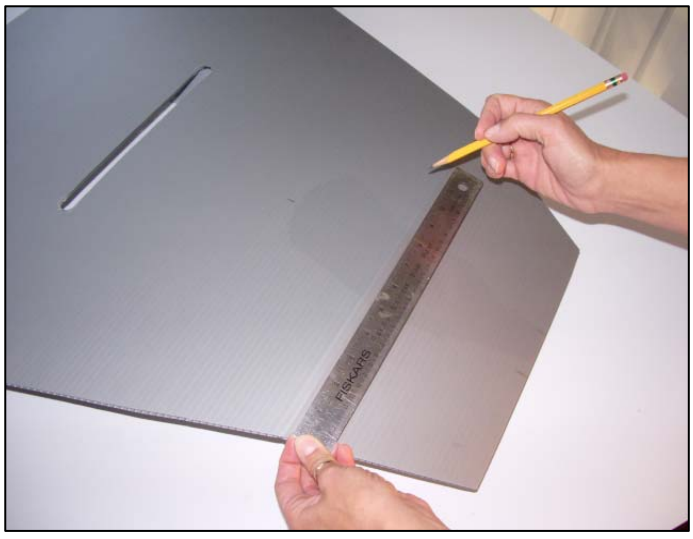


Repeat the steps to attach the second nacelle to the wing. Nacelles should be straight and parallel

Now apply 5-minute epoxy to the slanted sections on both nacelles.

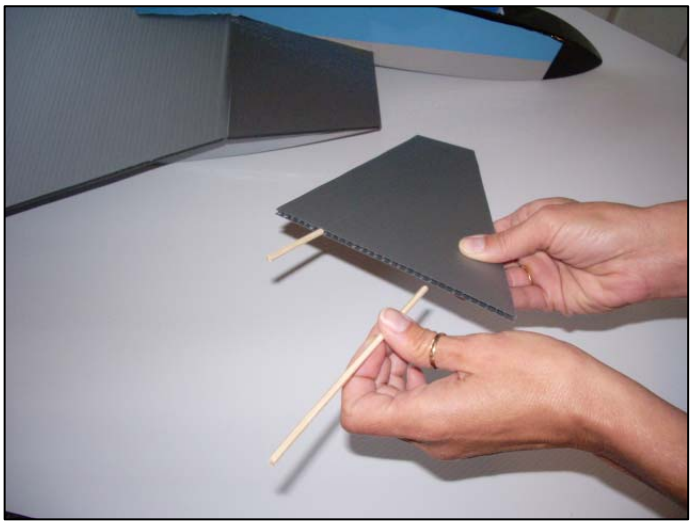


Press both nacelles to leading edge of the wing applying pressure on a smooth flat surface for 5 minutes until the epoxy cures

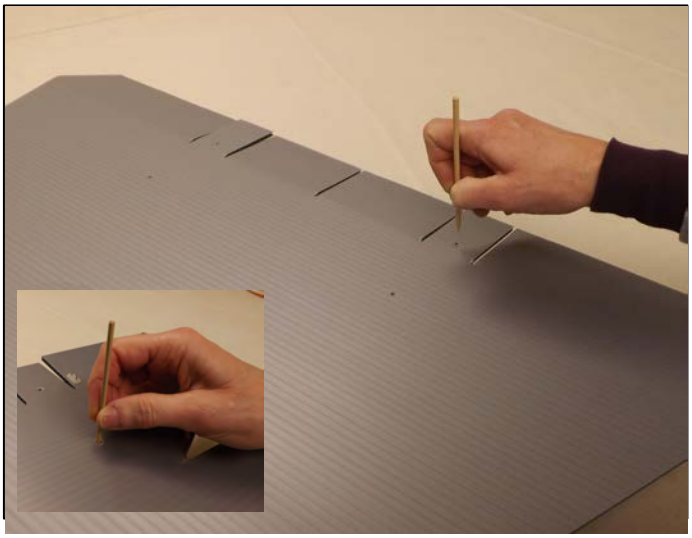


Turn the wing over, measure and mark on the top the center of the wing

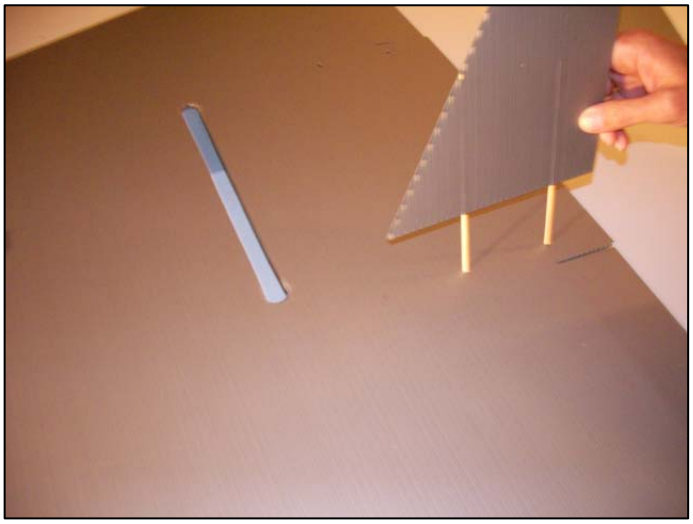
Apply 5 minute epoxy to both side of fuselage wing slot. Slide the fuselage onto the wing. Be sure that the fuselage is centered straight and square to wing.



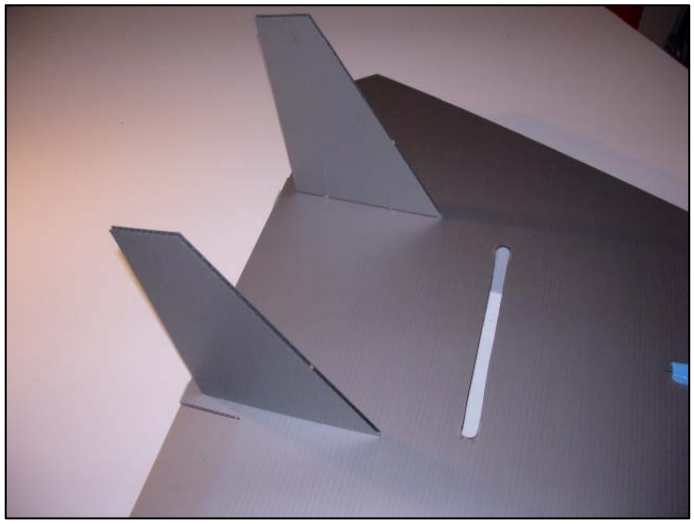
Epoxy 2 dowels into the flutes of each vertical stabilizers. Position the dowels 1½" and 4 ½" from the trailing edge. Leave about 1 ½" of dowel exposed



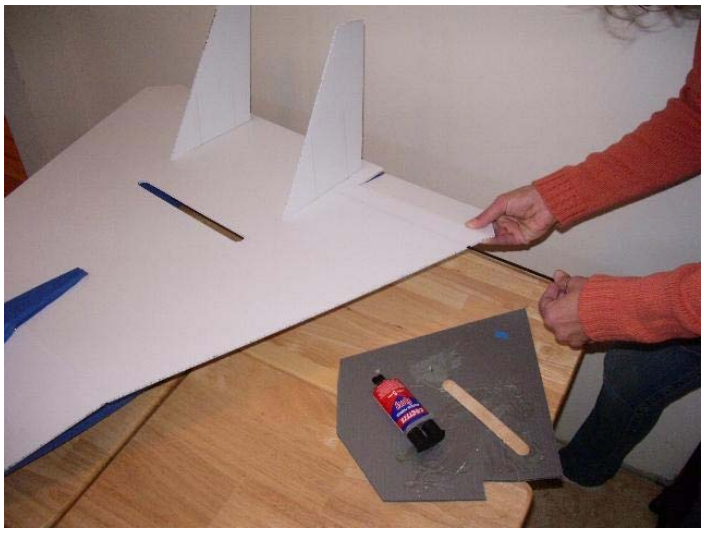
Peirce foam with sharp dowel by pushing it down into Vertical stabilizer dowel holes to clear out foam to for dowels



Insert stabilizer dowels it should be a tight fit not needing glue, remaining removable for transporting.



Repeat steps for other side. It's starting to look like a plane now.

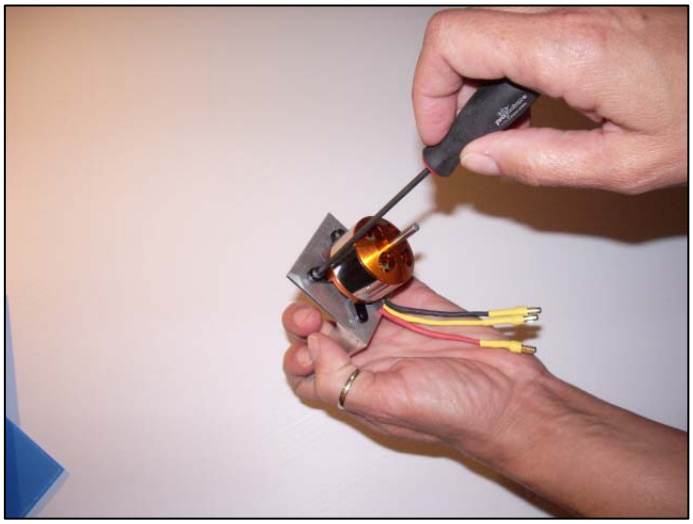


Apply a little 5 minute epoxy to the 3mm carbon fiber shaft, then insert it in a wing flute approximately 6 ½ inches behind the prop slot (see photo)

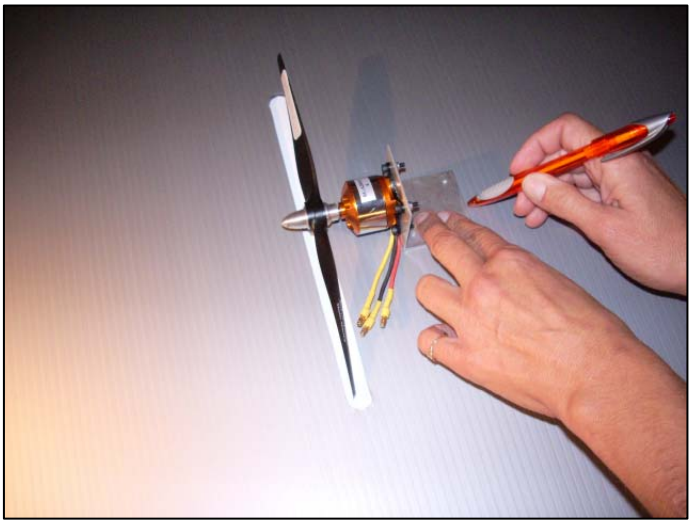
MOTOR ASSEMBLY

Drill holes in motor mount to accommodate your brushless motor.

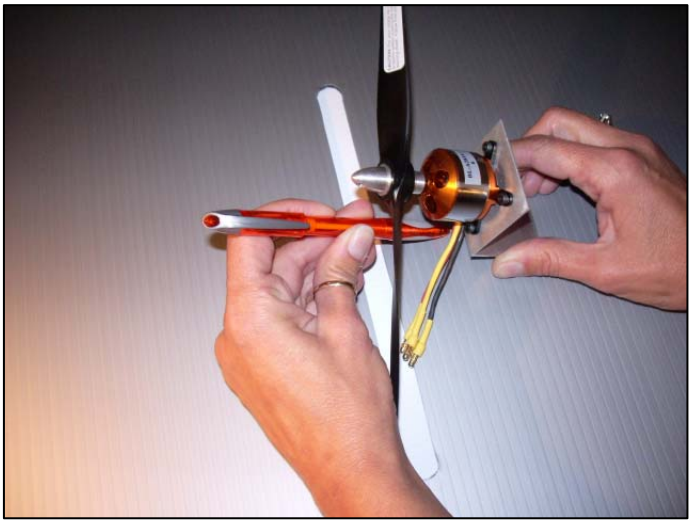
Drill (4) 1/8 inch holes in mount to attach mount to wing



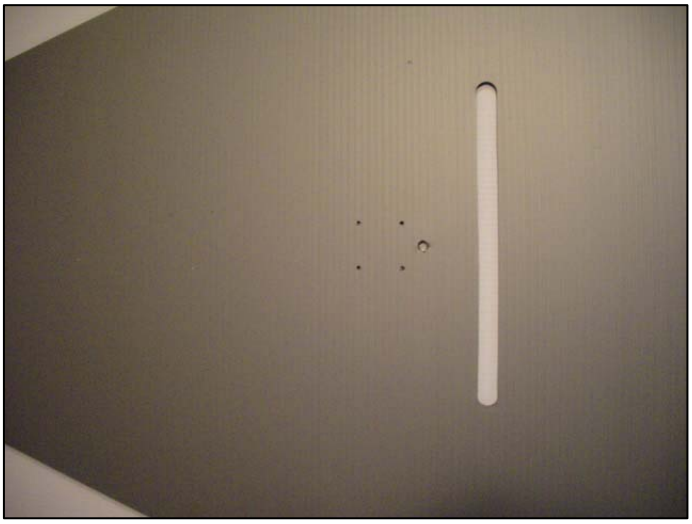
Bolt motor to mount with 3mm x 12mm bolts included. and attach 9 X 6 propeller. **NOTE:** Use a standard 9 X 6 prop facing forward with motor turning clockwise.



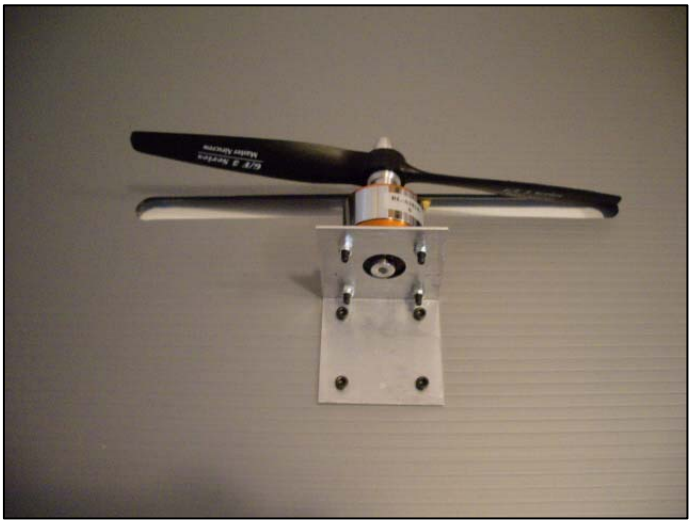
Line up motor and propeller with propeller slot making sure propeller has equal clearance around slot and motor is straight and square. Mark location and drill holes.



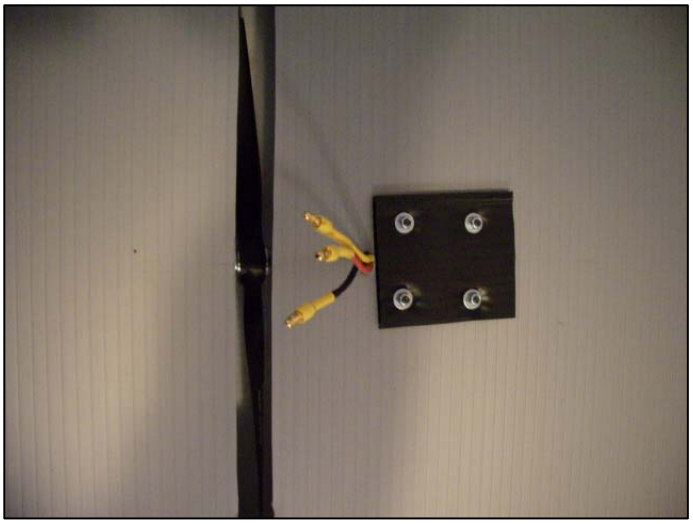
Mark and drill holes for motor wires



Motor mount and wire holes.



Bolt motor in place on wing using 4. 3mmX 14mm bolts, nuts and washers included. Prop slot can be trimmed if necessary. (TOP VIEW)



Bolt mount through wing and Coroplast® stiffener don't over tighten bolts. (BOTTOM VIEW)

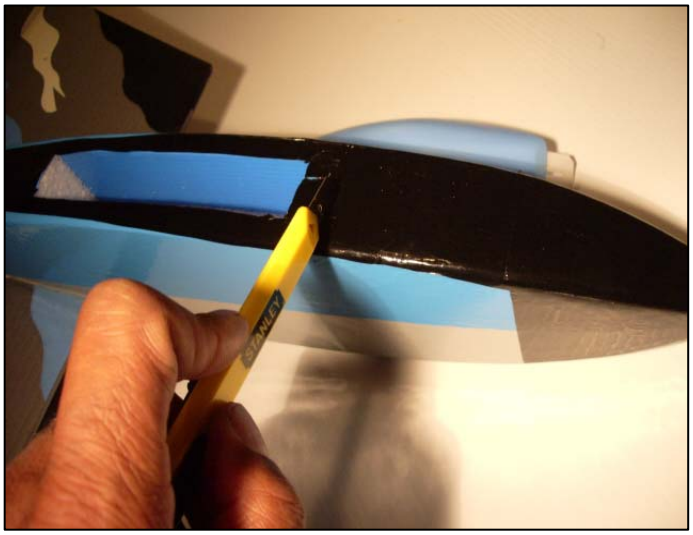
CANOPY / BATTERY BOX ASSEMBLY

Carefully trim the canopy to fit the fuselage.

Cut the small piece of Coroplast® to fit the rear part of the canopy.

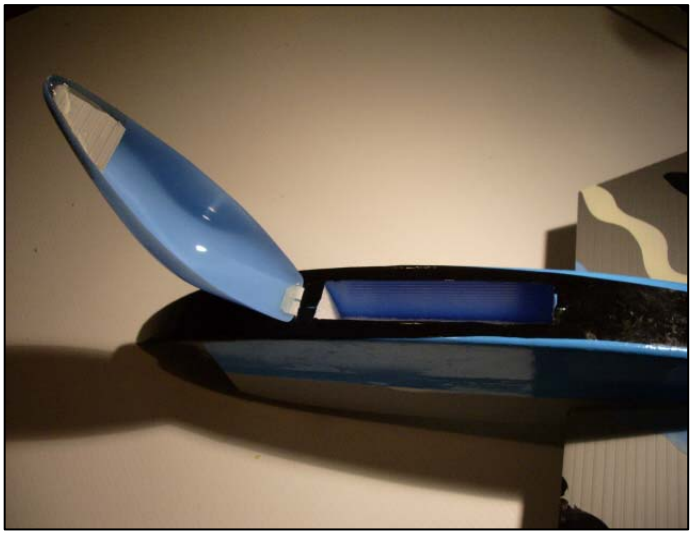
Fit the Coroplast® to the canopy.

Epoxy the Coroplast® piece and CA glue canopy hinge into place to the inside of the canopy, after painting the outside of the canopy.



Cut a slit ½ “ in front of the battery box for the canopy hinge.

Test fit the hinge. Then glue into place.



The hinged canopy will cover the battery box.

Drill a small hole and glue magnet to the Coroplast at the rear of the canopy.

Drill a hole the same size as the magnet near the battery box, position it such that it will align with the magnet on the canopy. Ensure the polarity of the magnet is such that they are attracted when the canopy is closed. Epoxy the magnet in place

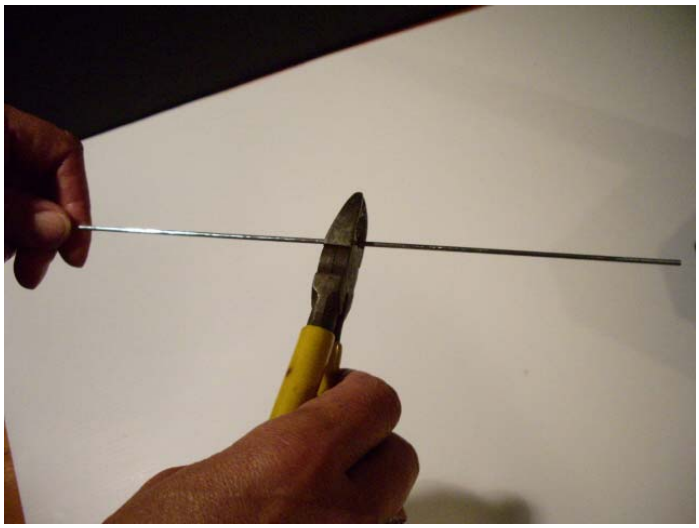
The canopy is now complete.

RADIO SYSTEM INSTALLATION

It may be necessary to trim the servo-mounting hole to accommodate the servos.

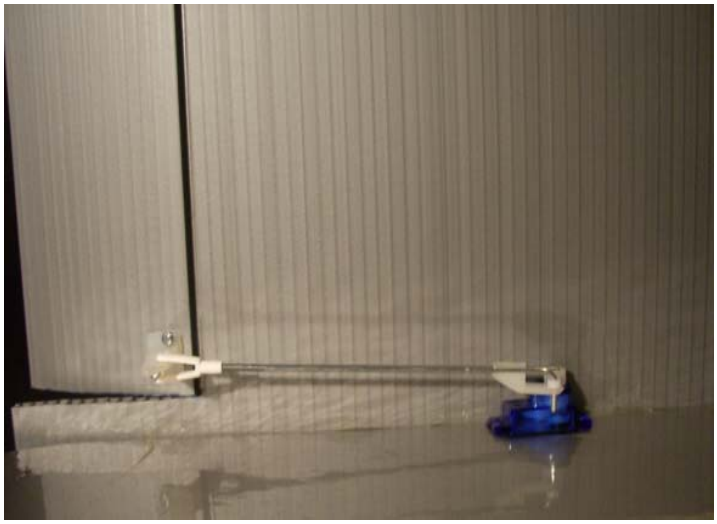
Install the servo into the mounting hole and glue in place. We recommend HiTec HS-55 or similar type servo.

Attach the control horn to the right elevon, don't over tighten.



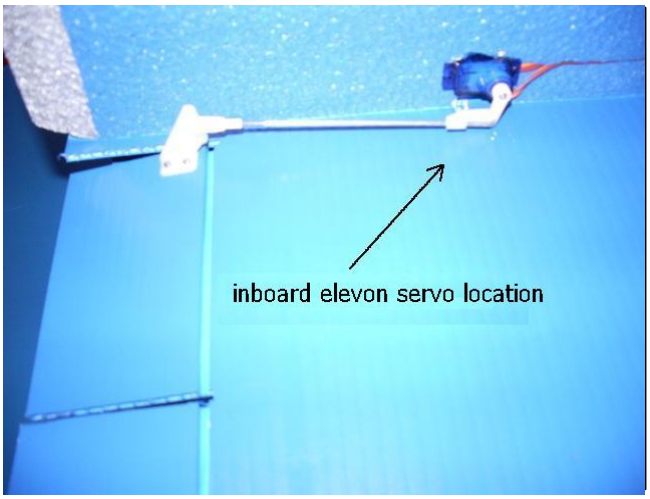
Measure and cut the push rod to fit between the servo arm and control horn.

Bend the cut end to accommodate the push rod keeper.



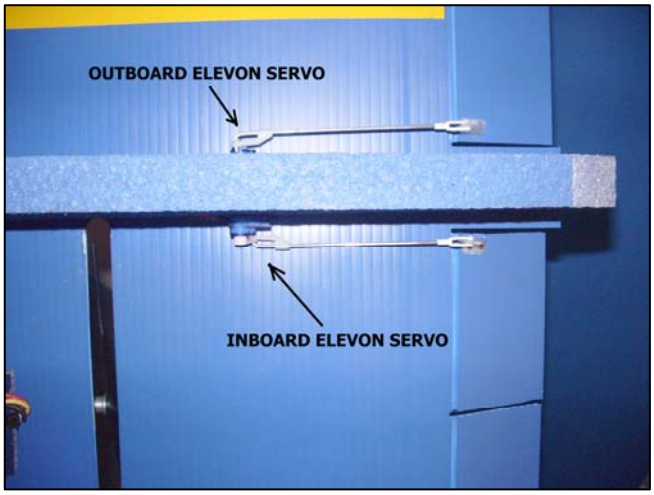
Connect the push rod to the servo arm 2nd hole from end and control horn middle hole. Repeat steps for left side.

NOTE: WHEN SERVO IS IN NEUTRAL POSITION, THERE SHOULD BE APPROX. 5/8" OF UP DEFLECTON ON THE FLIGHT CONTROLS TO MAINTAIN LEVEL FLIGHT.



Two more servos are
placed on the inboard side of the nacelles
opposite and above outboard servos as
seen on page 15 and 16.

The servos are
connected with Y cords to outboard
elevon servos.

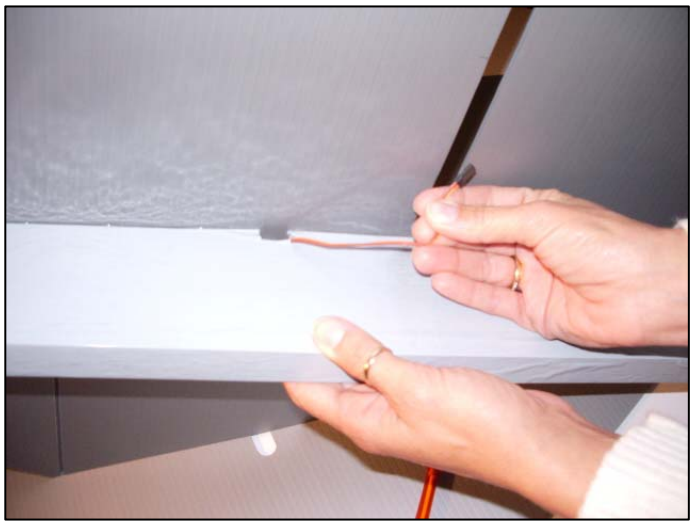


Thrust Vectoring Flight Center
Elevon Control Surface
Throws

FULL UP: about 1 inch up
NEUTRAL: about 3/32 up
FULL DOWN: about 1/2 inch down

For outboard throws (see page 16, 19 and 21)

Center of gravity is still maintained at 11 ¼" to 11 ½" from the leading edge of wing add nose weight if necessary.

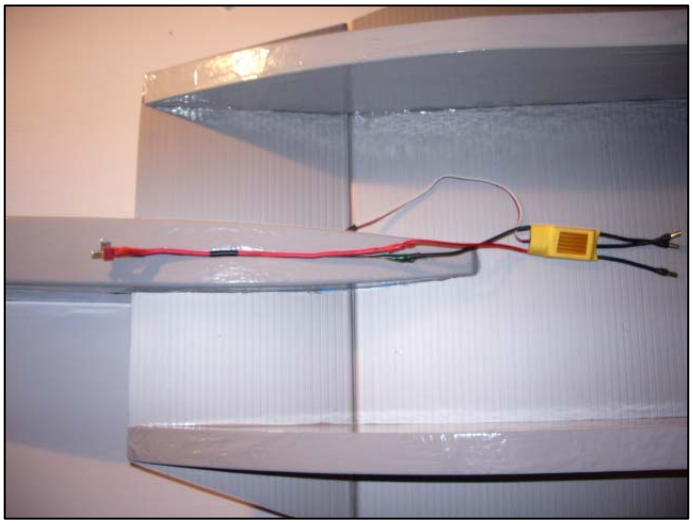


Servo wire exits on inside of nacelle.

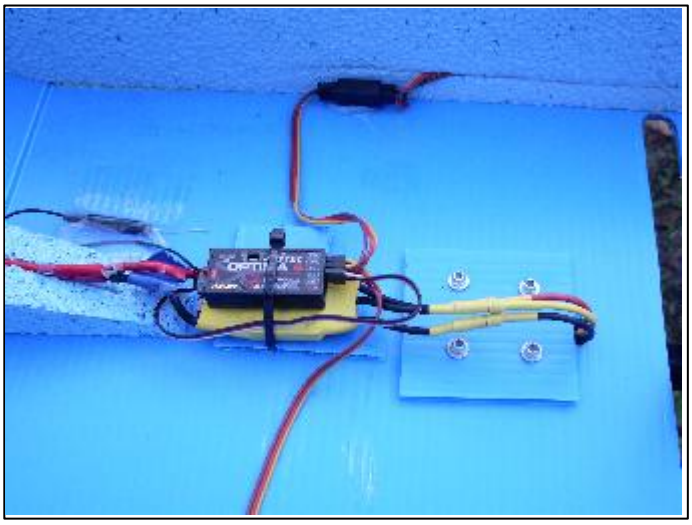
Cut slot in right nacelle for servo wire and extension, single knife cut is sufficient here.

Embed servo wire and extension. Repeat steps for left side.

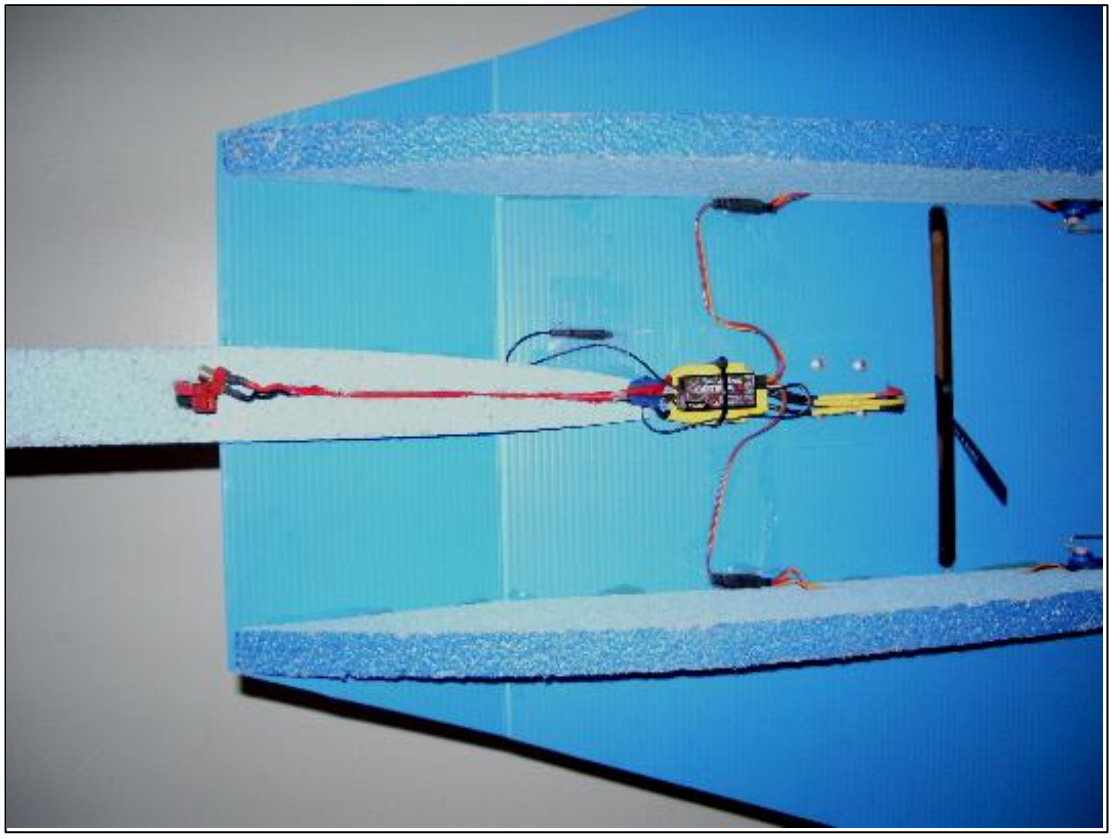
Cut slot for electronic speed control wires, it may be necessary to extend you electronic speed control battery wires in order to reach battery connector exit. Single knife cut is sufficient here, then use flat tip screw driver to open slot.



Embed electronic speed control battery wires in slot. Use double sided tape to hold speed control in place.



you can mount your receiver on top or next to your electronic speed control as shown in photo

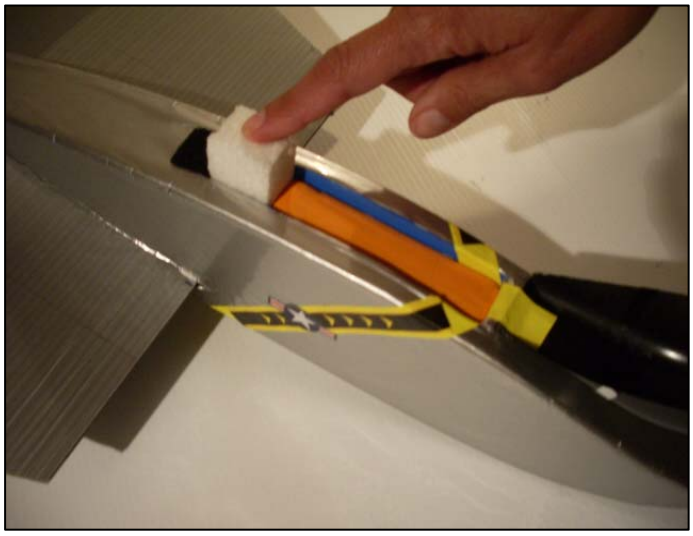


Use servo Y leads to route wires as shown in photo. Onc e wires are neatly placed they can be taped in place in the slots and to bottom of wing with clear packaging tape or vinyl tape to match the color of the wing. Care must be taken that the wires and receiver antenna are do become entangle or severed by the propeller.

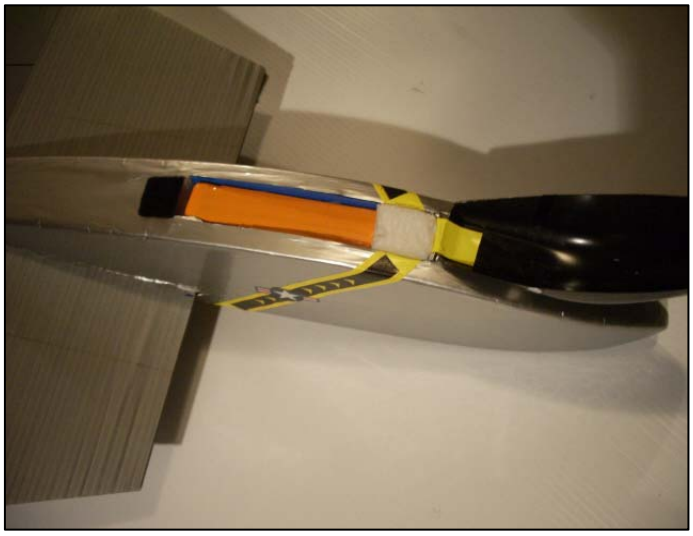
Now you have a complete airplane that can be customized with decals tape or paint to your liking. You may want to cover the exposed flute holes in the leading edge of the wing and tail surfaces with tape. This is not necessary and does not affect the plane's performance.

NOTE: WHEN ELEVATOR STICK IS IN THE NEUTRAL POSITION THERE SHOULD BE APPROX. 5/8" OF UP DEFLECTON (OR REFLEX) ON BOTH FLIGHT CONTROL SURFACES TO MAINTAIN LEVEL FLIGHT.

The battery box located on the front of the plane is designed to accept 3-cell lipo 11.1 volt 2200 mah battery. Measuring 4 inches long, 7/8” wide, 1 ¾” deep.



The foam filler block that is included uses the rest of the space and locks the battery in place. Place it behind the battery for flying in wind. You also may want to use this placement for the first few flights to get used to the plane.



Place the foam filler in front of the battery for flying on non-windy days. You will find if you use the recommended equipment to complete this plane, it will not require any further balancing. Center of Gravity to be 11.25” to 11.50” from leading edge of wing

BEFORE YOU FLY

Now you are ready to fly your pride and joy. I highly recommend that if this is your first RC model, you find someone who will be able to instruct you on RC flight. Check out your local AMA clubs at www.modelaircraft.org to find a club near you.

So now that you are at the flying field with your helper. Perform all necessary radio and equipment checks. (Refer to your radio owner's manual) Turn the transmitter on. Connect the Lipo battery to the speed control, with Deans connector (following the instructions for your electronic speed control). Both elevons should be deflected up approx. 5/8". Moving the aileron stick to the right on your transmitter, right elevon should deflect up 1" and left elevon should be deflected down flush with wing. Moving the aileron stick to the left on your transmitter, the left elevon should be deflected up 1" and the right elevon should be deflected down flush with wing. Now pull back on elevator stick both elevons should deflect up 1" on each side. Now push forward on the elevator stick and both elevons should deflect down flush with wing. Have your helper hold the plane keeping clear of the propeller move the throttle stick slowly forward the propeller should spin clockwise standing behind the plane looking from the tail forward. Check that full power and power off match the stick position on your transmitter.

FIRST FLIGHT

For your first flight have your helper hand launch the plane, tossing the plane at a very slight upward angle with the throttle off. Once the plane is clear of her or his hand apply full throttle and climb to a comfortable altitude to get use to how this plane handles. You will find it's very stable and can fly very slow yet it's very aerobatic. Landing is very simple, point it into the wind throttle back and the plane will settle into a nice comfortable controllable decent.

The T-14 is very rugged and can take a lot of abuse however in extreme heat, the plastic can warp. Avoid leaving it in a hot car or storing it in a manner that distorts the wing or tail. Also in extreme cold this plastic may become stiff and brittle and lose some of its impact resistance.

HAPPY FLYING AND SMOOTH LANDINGS.

TOUGH JETS