

# **HIGH-END TECHNOLOGY** **RC**

## **F4 Phantom for twin ducted fan**



First we want to thank and congratulate you with your decision in buying one of our Kits.

The Phantom puts together very easily so there is not much explanation needed.

Just look carefully at the pictures .

This is not a plane for beginners, and you should have some experience with putting together ARFs.

### **DATA:**

Wingspan: 810 mm

Length: 1224 mm

Weight: 1750- 2200 gram

Ducted fans 2 x 72mm

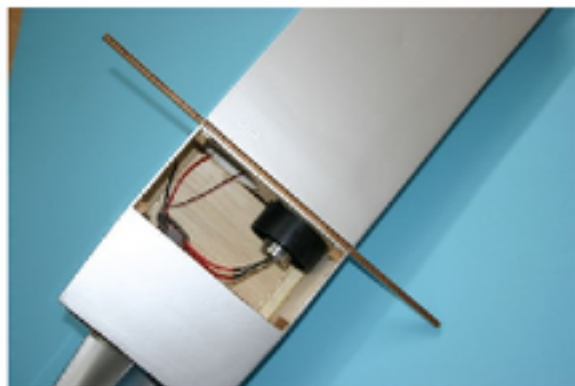
Items needed to complete:.

4 ch. Computer Radio system w/ 3-4 servos.  
2 Electronic brushless speed controllers  
2 fan-units 6904 HETFAN or MF480.  
2 480 size brushless motors e.g. EDF 2W , 3W, 4W or 2W20  
Lipo batteries  
5 or 30 minute epoxy  
CA Glue w/ accelerator  
Velcro.

Standard tools:  
Drill or Dremel tool  
Plyer/cutter  
Scissor  
X acto Knife  
Soldering iron.

Suggested building sequence:

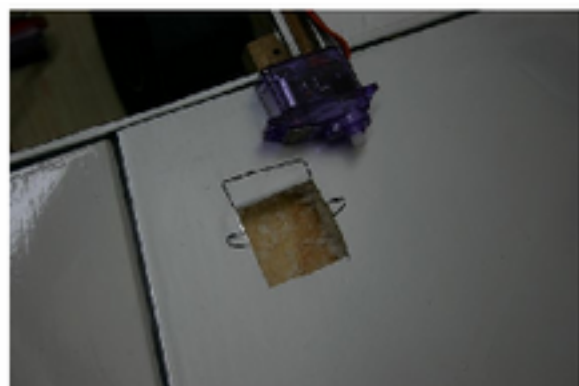
- 1.Start with applying the decals. Page 9.
- 2.Glue the main wing spar in the fuselage.
- 3.Glue the wings in place.
- 4.Install the wing servos.
- 5.Start with the elevators.
- 6.Glue the hinges for ailerons and elevators in place.
- 7.Install the elevator servos.
- 8.Install the elevator Bowden tubes.
- 9.Make the pushrods fit.
- 10.install the pushrods and glue the control horns in the control surfaces
- 11.Install the motors in the fan-unit and attach the ESC.
- 12.Make the trust tubes.
- 13.Install fan-units and trust-tubes.
- 14.Install the bungee hook.
- 15.Make the Canopy.
- 16.Glue the nose cone and exhaust-dummies in place.
- 17.Glue the vertical fin to the fuselage.
- 18.Receiver and battery installation.
- 19.Check CG and throws of the control surfaces.



Start gluing the spar in the slot in the fuselage the straight side of the spar should be on top make sure the spar aligns. Now mark the outline of the wing on the fuselage and trim out the covering approximately 2mm offset from the marked outline.

Wing incidence is 10 mm ( nose should be raised 10 mm) So first mark 10 mm press the front wing dowel against the fuselage leaving a dent. Now drill a 4 mm hole in the dent for the dowel. Glue the wings in place, do one side at the time, use 30 minute or 5 minute epoxy. Remove excess glue with cleaning alcohol. Leave the fuselage bottom on a flat surface (building board) and the trailing edge of the mid panel should be level with the building board surface.

Attention: Keep the 10 mm incidence; do not glue the wing with its bottom flat on the building surface. When you remove the covering you see a laser cut hole, just ignore this hole.



Place your servo ( 1.5 KG/cm torque minimum) over the pre-cut hole of the wing. Leave room for the control horn of the servo. Mark with a marker the out line of the servo as on the picture above. Cut the through the covering and balsa and remove the foam.



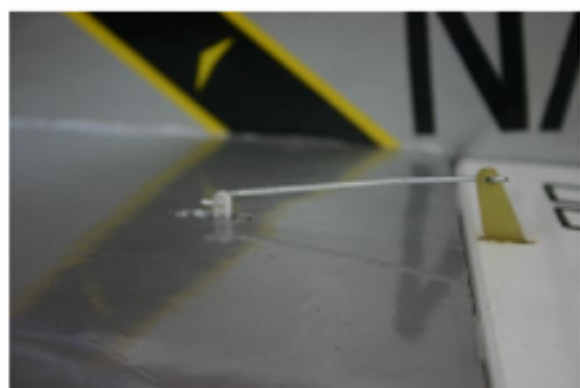
Trial fit the servo. Cautiously make a small incision through the top covering. This is where slot of the control-horn will be cut.



There are four plywood control-horns supplied in the kit , 2 for the ailerons and 2 for the elevator. Look for the small incision you made and mark with marker the position for the servo control horn slot. Also mark the hole for the control horn slot in the aileron. If you would draw a imaginary line through both slots this line should be parallel to the fuselage side. The slot for the servo control-horn should be approximately 18 mm long and 2.5 mm wide. **Wait before you glue the aileron control-horn in place, first make the pushrod. Also before you glue the servo in place you can put heat shrink tube around the servo.**



See text on the previous page.



**Before you install the servo make sure the control horn is placed in the middle position. Do this with your radio and receiver.**

The push rod you see here is made with a z-bend on each end. How to make a Z-bend is explained on the next page. If you don't want to make a Z-bend you can solder a Clevis on one end.

Glue the hinge in place with thin CA glue from the bottom side look at the above picture. In the picture the elevator is shown, but the aileron hinges are glued in the same manner.

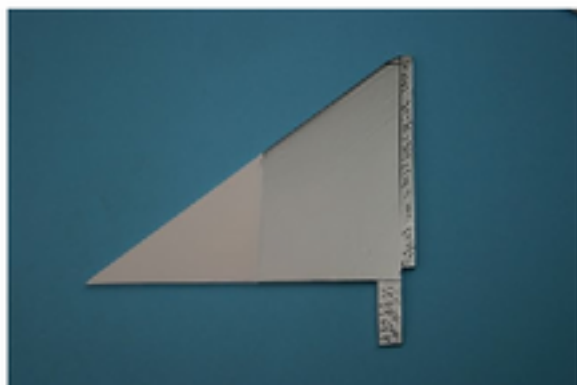
### **Important:**

**Before you glue the plywood control horn in place with 5 minute epoxy treat the surface and holes of the plywood control horn by "soaking" it with thin CA glue. This will add additional strength to the control horn. This applies for all 4 plywood control horns.**

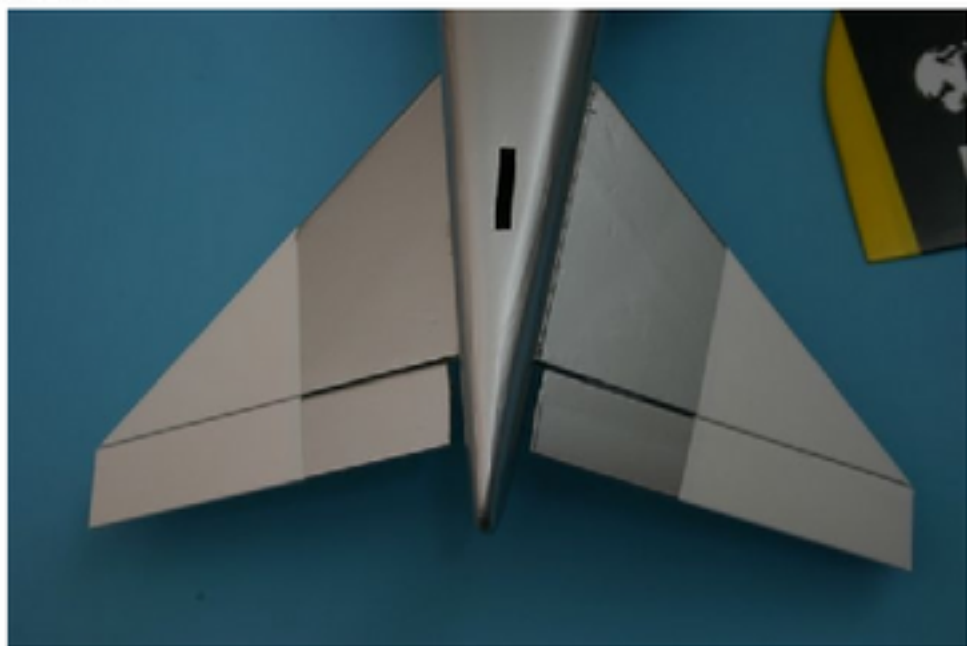


This picture shows the steps how to make a Z-bend.  
Steps are from left to right. You need 2 ordinary pliers.  
Practice first on a scrap steel rod.

- 1 Make the straight steel rod.
- 2 Make a 90 degree bend.
- 3 Now make a new 90 degrees bend with about the thickness of the control horn as distance. As in the picture
- 4 Now twist the vertical end horizontal as in the picture and the z-bend is ready.



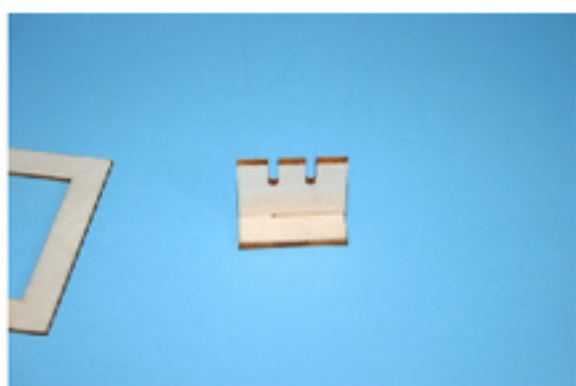
Trim of the back tab of the stabilizer and the side marked (stabilizer root) and a little from the nose. Now fit the elevator to the stabilizer. Now fit the stabilizer with elevator in the slot in the fuselage. Make sure that the elevator can move freely. Mark the outline of the fuselage on the stabilizer. Trim of the covering a little offset from the marked line. Do this for both stabilizer halves.



Glue the stabilizers in place with 5 minute epoxy (only apply epoxy in the slots), remove excess epoxy with cleaning alcohol before the epoxy cures. Check if both stabilizers are on the same angle. When you leave the glued parts to settle you can put a small distance block underneath the tips of the stabilizer. Make sure that the distance blocks have the same height.



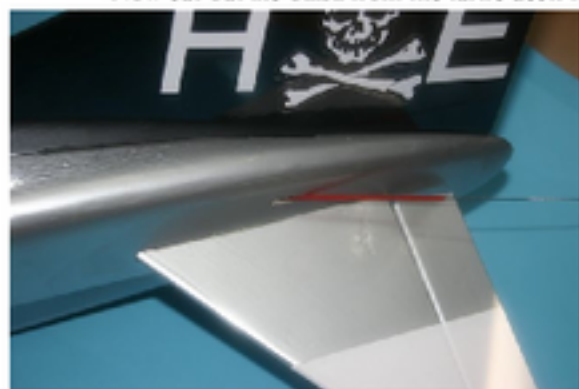
#### Elevator servos installation:



Servo tray and Bowden cable bracket. Assemble the Bowden cable bracket use CA glue. Fit the Bowden tube in the bracket slots, maybe you have to widen the slots a little. You can do this with a sharp knife. Trial fit your servos in the tray and pre-drill the holes for the fastening screws.



Glue the tray underneath the top-hatch on the turtle deck floor (above the fan units). Now cut out the balsa from the turtle deck floor where the servos are going to be located.



Cut the slots for the Bowden tube on both sides at the fuselage end as in the picture. Wait before you glue the elevator control-horn in place, first make the pushrod. Make one Z-bend first (servo side) and insert the pushrod in the Bowden tube. Do this for both elevator halves. After you have finished the pushrod you can glue the elevator control horn in place, first insert the Z-bend in the top hole from the plywood control horn.

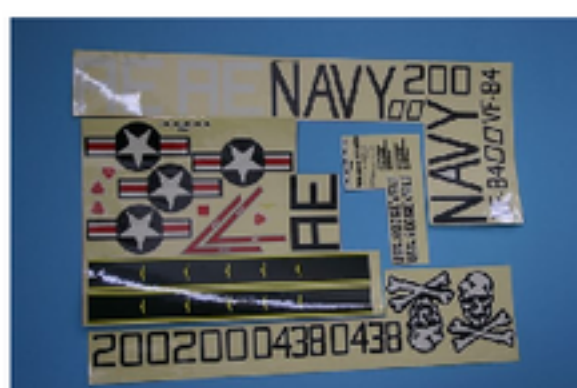




Cut the decal from the decal sheet leave the protective back on the decal. Trim of 10 mm from the protective back.



Line out the decal on the area where you want to put the decal. Press the adhesive part. Check if the decal is lined out and remove the rest of the protective back.



Do this for all the decals



Print out the template 2 times cut them out and glue or tape them together. On the CD we have put 2 templates Letter and A4 Format depending on which format of paper you use in your printer. Template is shown on page 12.



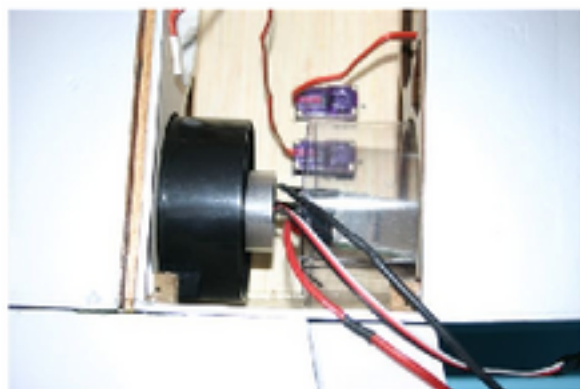
Place the template under the supplied pvc sheet and trace the outline with a marker. Do this twice as there are 2 fanunits.



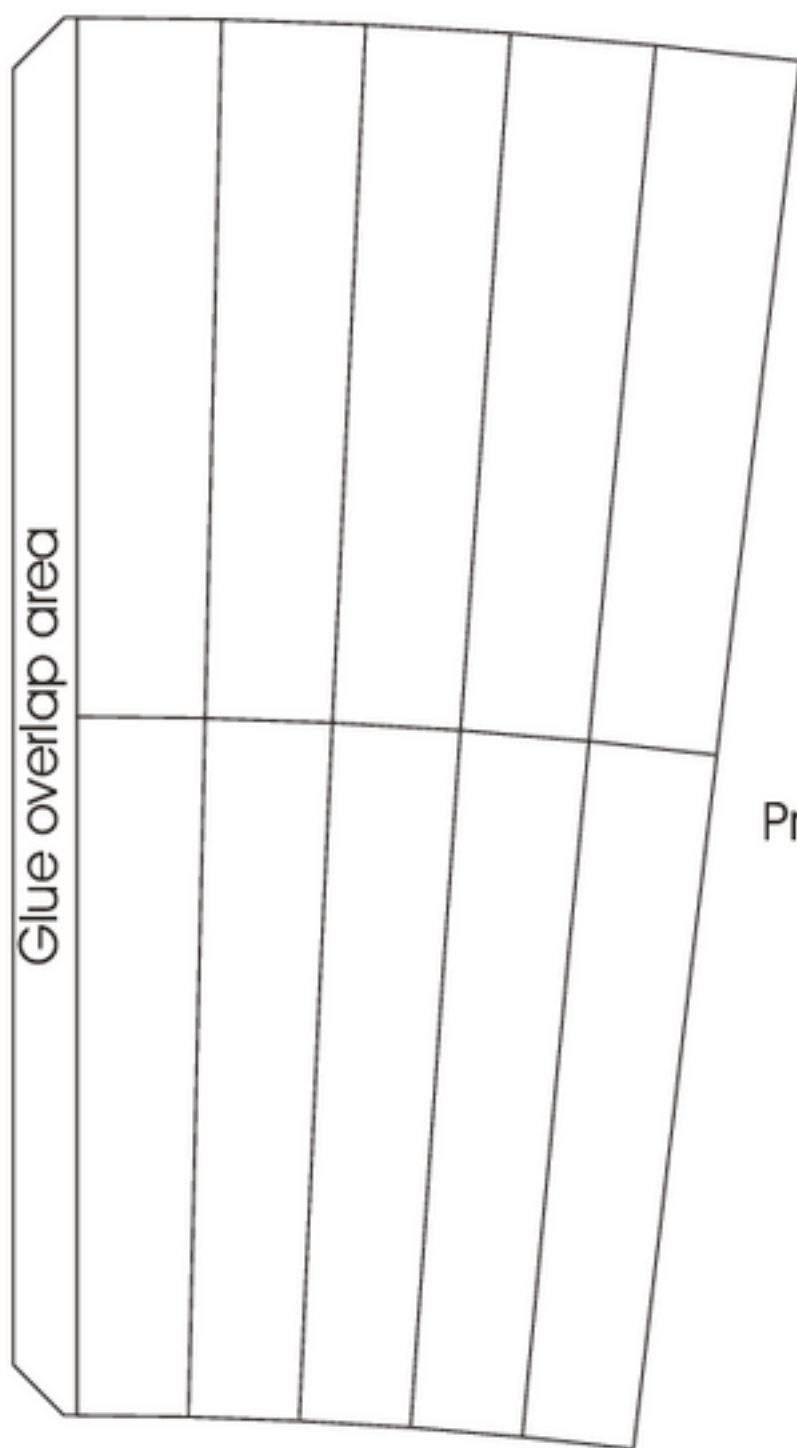
Cut out the unrolled surface for both trust tubes. Put the overlap area inside. Roll the pvc to a tube and apply outside adhesive tape. The Edge should match the innerline of the overlap area. Now you have a perfect conical trust tube.



Fit the tube to the fanunit. ( read fanuit installation instructions first) You should have installed the motor and ESC already. Make a hole for the wires from the esc and route them trough the just made hole.. Now take of the tube and insert it from the back by squeezing the tube a little. Leave enough room to install the fanunit.

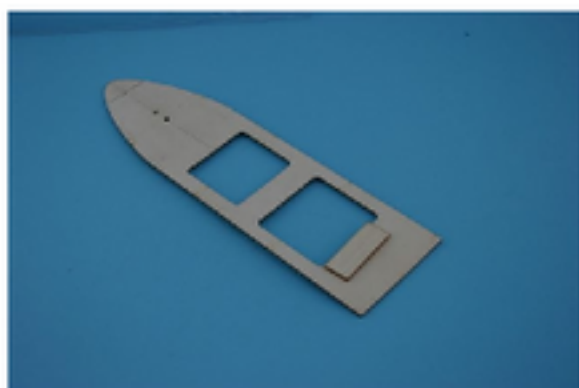
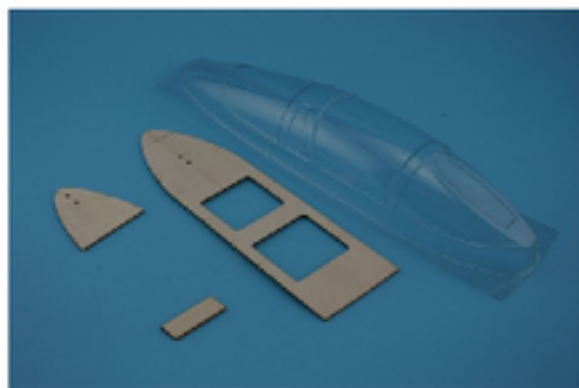


Now install the fanunit. Chamfer the front of the shroud of the fanunit a little with a sharp knife this will make it eassier to install the fanunit inside the duct. Now route the esc wires throug the hole in the trust tube you made.. And slide the Trust tube over the back end from the shroud. Use adhesive tape to attach the trust tube to the fan shroud.



Print out twice





Canopy assembly, trim the edges of the clear abs canopy to size, go slowly you don't want to cut off too much. Glue the small rectangular piece of plywood with CA glue to the bottom side of the canopy floor as shown in the above picture. Then glue the bigger rectangular plywood piece on top of the smaller one. See the Picture below left. This will secure the canopy when you slide it on to the fuselage.



Now you can glue in one of the supplied magnets in the fuselage. Cut out a slot for the magnet and glue the magnet in this slot.



Now you can glue the small parabolic shaped piece of plywood in place. This piece is also glued on the bottom side of the canopy floor and should fit in the canopy opening, this parabolic shaped piece of plywood prevents that the canopy moves back- or sideward during flight.



Before you glue the canopy to the canopy floor put some plastic film (cut open thin plastic bag) underneath the cockpit floor and slide in onto the fuselage. This prevents that the removable canopy will be fixed forever to the fuselage.

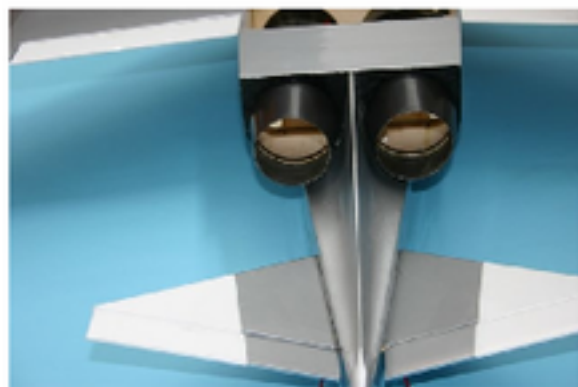
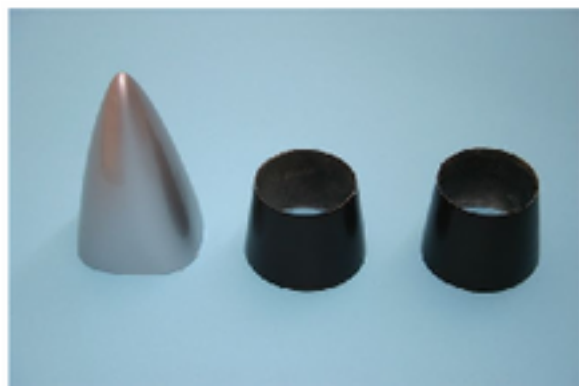
**Attention:** Before you trim the edges from the clear abs canopy trial fit it several times and assure that it has a good seat (fit).

Now you can glue the clear abs canopy to the canopy floor with 5 minute epoxy. Apply only epoxy to the edges of the canopy floor



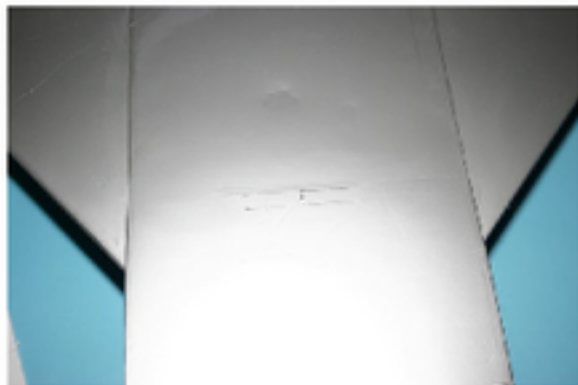
Glue the inlet streamers\* to the fuselage in front of the intakes. Note there's a cooling slot just in front of the inlet streamer.





Now you can glue on the fiberglass nose and the exhaust dummies. To make the plane more appealing you can spray paint the nose white before you glue it to the fuselage see the picture. All these fiberglass parts can be glued with 5 minute epoxy.





Inside the fuselage just in front of the bulk head located between the wing root tips a hard wood block is glued. Locate the hard wood block and drill a 2mm hole for the bungee hook . glue the bungee hook in the fuselage.



Now it is time to install the vertical fin. Mark the outline of the fin on the fuselage. Carefully trim the marked covering with some inner offset.



Glue the Fin on the Fuselage with 5 minute epoxy. Remove the excess glue with A cloth soaked with cleaning alcohol. You could use some pins (needles) to keep the Fin in place while the epoxy cures.

Final step is the Battery tray, we have not included a battery tray as we don't know what set-up you are going to use. The picture shows an example of how I did this in our F20 tiger shark.

Settings:

C.G. 145- 150 mm from the leading edge of the wing.

Elevator throws 10 mm up 10mm down. Use 50% exponential

Ailerons throws 10 mm up 5 mm down. Use 50% exponential.

First Flight.

Use a bungee to start the plane, this plane cannot be hand launched.

Before start is good to use 3 mm up trim. After start level the plane don't attempt to turn, climb and trim the plane. The F4 can be flown very slow with a high AOT But never make turns with a high angle of attack (nose high position) You risk to drop a wing. 2 EDF 3W motors in combination with 2 packs ( 1 for each motor) 4S1P 2500 Mah PQ cells are strong enough to give the plane unlimited vertical performance. Top speed is over 100 Mph.

**Just remember to land level; as to avoid damage to the plane . Happy Flying.**

## **WARNING!**

Although the Phantom is a stable airplane, it is not trainers or first airplane. This airplanes is capable of very high speeds and therefore can cause serious personal injury and property damage. We strongly urge you to seek the help of an AMA approved instructor if this is your first aircraft of this type. Please use common sense

***Fly in suitable areas for a high-speed aircraft such as an AMA approved field.***

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