

Assembly Manual

AVIATION DESIGN

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INTRODUCTION

If You love speed ?.....
If You love the futuristic design
Then This jet is for you.

Diamond is the new generation of futuristic sport jet from Aviation Design. Just created from the Eric RANTET imagination, it is a combination of Star Wars, Flash Gordon, and the 1950,s first jets from French Leduc and Russian jet and the Gee Bee racers
With a futuristic/ old design, Diamond features stunning shapes and flies like a space ship.

Designed for high speed, the Diamond can also fly very slow due to his studied aerodynamics and large landing flaps.

Diamond has been entirely CAD designed with Catia software and all toolings are CNC machined on our large 5 axis milling centre.

Diamond is of course fully composite and moulded in our new CZ factory. It is delivered in ARF version, pre-built and painted in the Mold with art work fitted.

The landing gear is made by Behotec and uses trailing link legs for the best performance on any kind of runway.

Diamond is designed for 16 to 22 kg thrust turbine. A light turbine is required to easily obtain the centre of gravity due to the rear engine position. The radio batteries and turbine battery are located in the nose .

Diamond has the ability to be fully dismantled for an easy transportation.
The fuselage length is just 2.00 m and the nose is removable for batteries access.
A sidewall engine hatch allows engine operation, the tailpipe is factory installed.
The main gears are screwed in the wings and the wing tip tanks are removable
The fin and the 2 stabs are also removable for transportation.

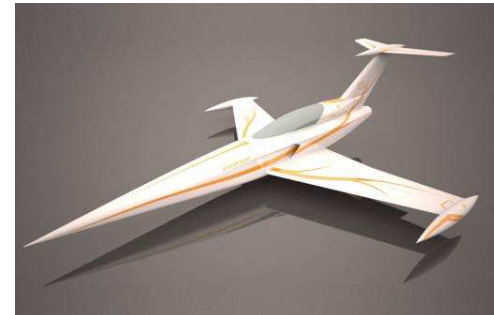
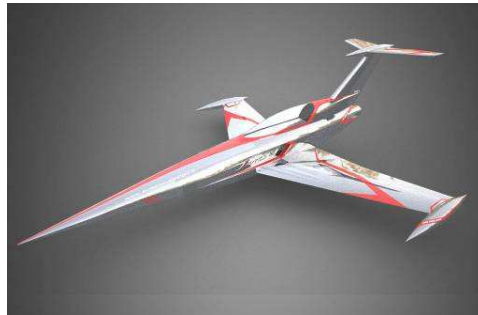
All necessary hardware are included in the parcel.
Assembly require only few hours to fit engine and radio.

Diamond ARF includes :

- High quality epoxy-glass fuselage painted.
- All plywood and wood parts premounted.
- Fully molded wings, stabs and fin painted
- 2 High tensile aluminum wing joining tube.
- Access hatch and canopy requiring no additional framework.
- All hardware (screws, servo cover, ...)
- Instructions in English with pics.
- Stainless steel tailpipe already installed.

Available versions :

- All grey version
- White with gold strips
- Metallic grey with red strips
- Blue Racing version
- Red Racing version
- White Racing version



Parts required to complete the kit :

- 2 kevlar fuel tank, 5 litres capacity.
- Or 2 kevlar fuel tanks with UBT



- 4.2 litres kevlar tank.
To be used only if cockpit with pilot is not fitted
- Or 4.2 liters tank with UBT.



- Deluxe retractable landing gear with special CNC oleo legs and wheels set on bearing + brakes
- Or Deluxe gear + 2 electrovalves for gear and brakes



- Deluxe retractable electric landing gear with special CNC oleo legs and wheels set on bearings + electric brakes. Delivered with control box



- Electric wiring set, already adjusted to the correct length, ready to be installed and to be fitted in the Powerbox system.



- Aluminium servo covers set.
Can be exchange with the plastic covers.



- Clear canopy + instrument cover.



- Composit pilot seat.



- LCD instrument panel with speaker (with control tower).



- Plastic instrument panel.



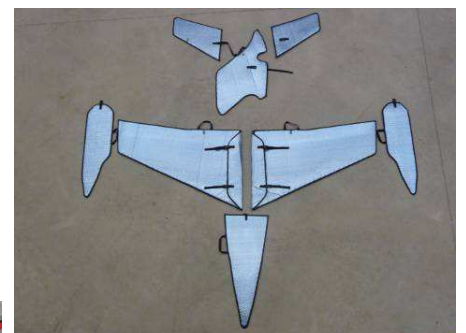
- Plastic 1/3 scale pilot.



- Super scale 1/3 scale pilot



- Protection covers for wings, rudder, nose, stabs, wing tip tanks.



- Fuselage protection cover.

- Sun protection cover.



- Futaba servo pack including 6 servos 16 kg torque and 2 servos 30 kg torque.



DISCLAIMER

AVIATION DESIGN assumes no liability for the operation and use of these products.

The owner and operator of these products should have the necessary experience and exercise common sense. Said owner and operator must have a valid Model Airplane licence and insurance as required.

Assembly Instructions

Installation of the radio equipment

Components need:

Elevator: 2 servos 16 kg torque

Rudder: 1 servo 16 kg torque

Ailerons: 2 servos 16 kg torque

Flaps: 2 servos 30 kg torque

Steering nose wheels: 1 servo 12 kg torque

Receiver and switch

We strongly recommend the use of a Power box system for the big number of high torque servos

2 lipo batteries 4000 mah will be necessary to obtain the correct CG

Stabs

Elevator control horn :

Protect the border of the hole with tape to have a nice gluing.
Sand the border to increase glue adhesion.
Sand the bottom of the carbon control horn for a good glue adhesion.
Glue the control horn in the elevator with 5 minutes epoxy. Take care to insert enough glue in the slot.



Servo :

Screw the servo on the servo cover (you can also secure it with silicone glue or double face tape).
For the aluminium servo cover, just screw the servo on the pads.



Use a plastic servo control horn. The steel link will be at 14 mm from the servo axis.

Drill a hole in the stab between the spare and the rear pins for the servo electric wiring.



Glue the 2 aluminium pins in the stab with cyano.
Pins must overtake for about 10 mm.



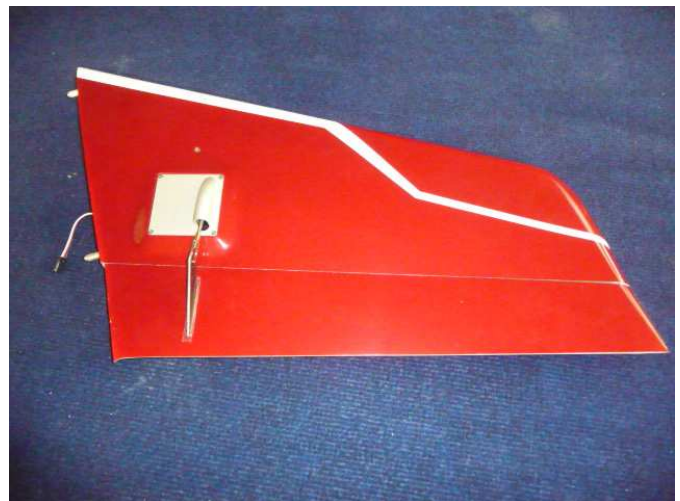
Put the servo cover on the stabs.
Drill 4 holes 1 mm diameter in the stab for the screws.

Connect the servo with 2 x M3 links and threaded rod.

Screw the servo cover in the stabs with 4 parker screws.

Connect the servo to the fiber horn.

Apply threaded lock on the link.



Rudder

Drill a hole on the top of the rudder for the electric wiring in front of the stabs location.



Cut a large hole in the rudder root for the electric wiring.



Rudder control horn :

Protect the border of the hole with tape to have a nice gluing.

Sand the border to increase glue adhesion.

Sand the bottom of the carbon control horn for a good glue adhesion.

Glue the control horn in the rudder with 5 minutes epoxy. Take care to insert enough glue in the slot.

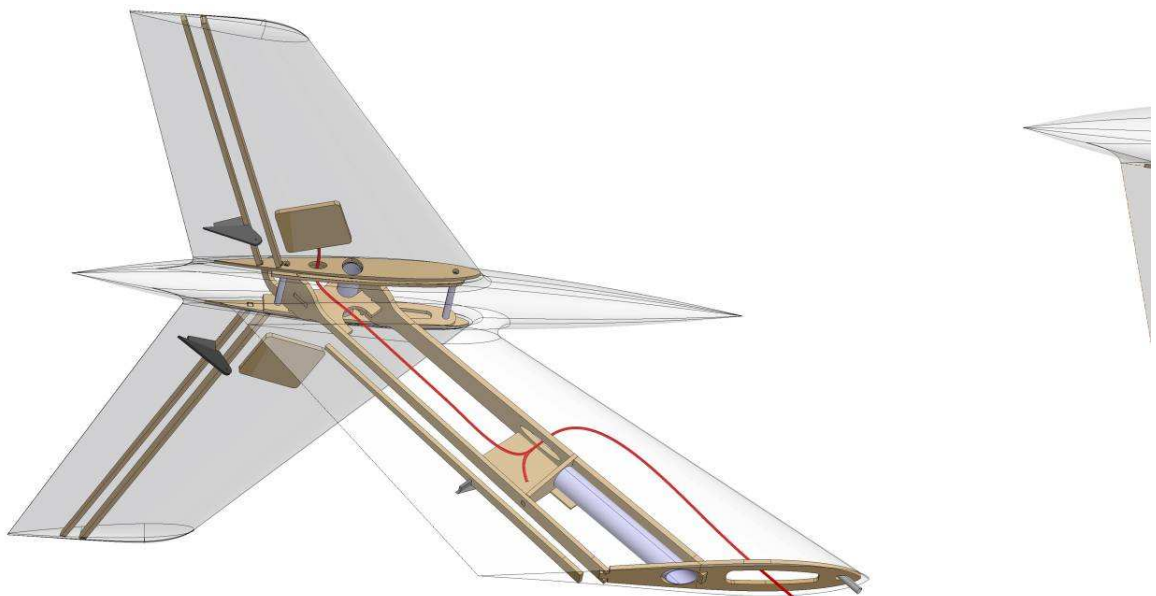
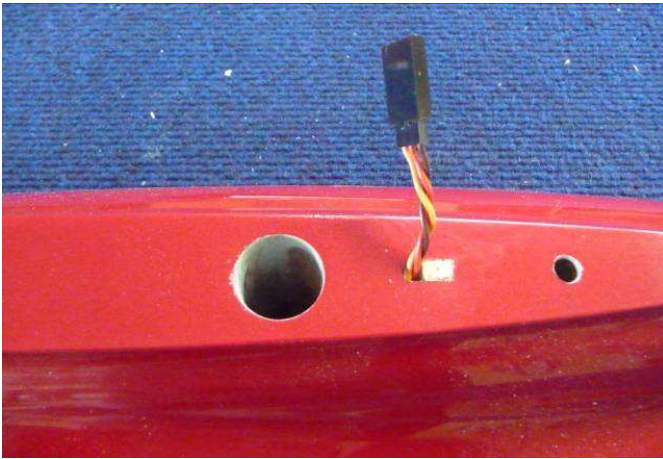
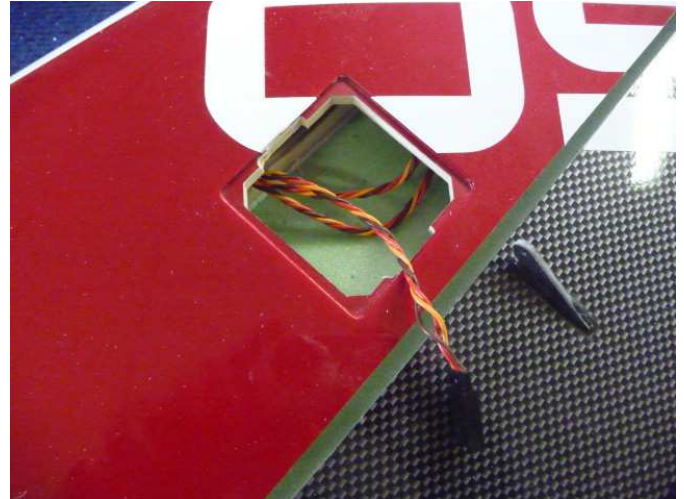


Electric wiring :

Insert the wiring in the rudder. Insert the wiring through the plywood spare.

Put the 2 servo connector outside the rudder through the hole (use a flexible wire to guide them).

We recommend to fill the hole so that the connector can't fall in the rudder.



Servo :

Screw the servo on the servo cover (you can also secure it with silicone glue or double face tape).
For the aluminium servo cover, just screw the servo on the pads.

Use a plastic servo control horn. The steel link will be at 14 mm from the servo axis.



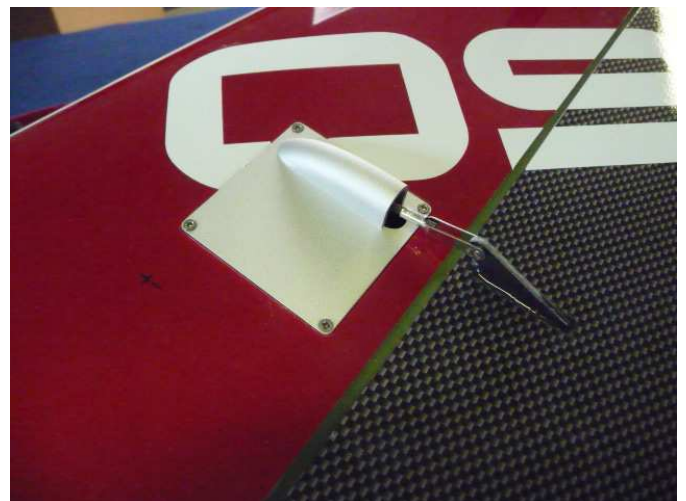
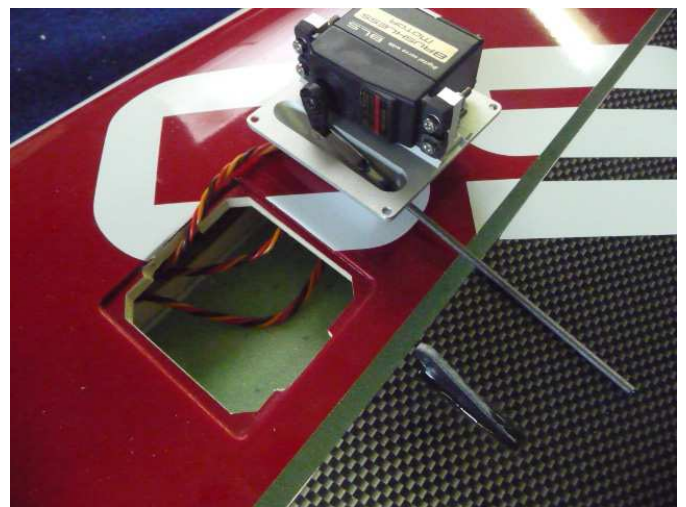
Put the servo cover on the rudder.
Drill 4 holes 1 mm diameter in the rudder for the screws.

Connect the servo with 2 x M3 links and threaded rod.

Screw the servo cover in the rudder with 4 parker screws.

Connect the servo to the fiber horn.

Apply threaded lock on the link



Secure the elevators :

Insert the carbon spare in the rudder. Check it is correctly in the center.
Glue the carbon spare in the rudder with some liquid cyano.

Insert the 2 stabs on the carbon spare.

Drill a 2 mm diameter on the lower surface at about 100 mm from the root.

Secure the 2 stabs with 2 x parker screw 3x10.



Wings

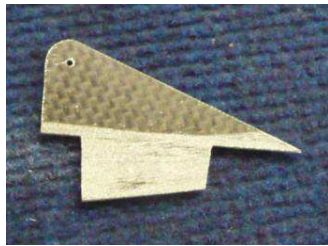
Aileron and flap control horns :

Protect the border of the hole with tape to have a nice gluing.

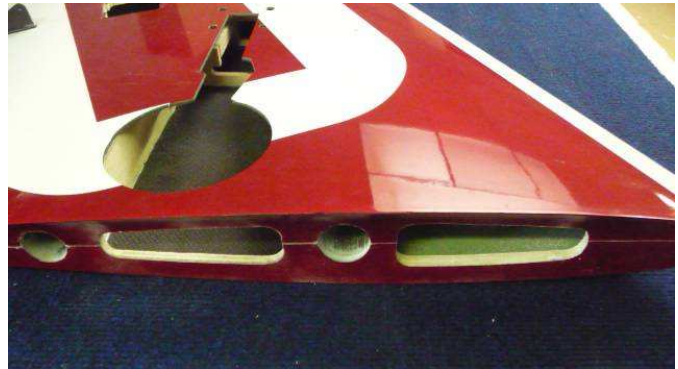
Sand the border to increase glue adhesion.

Sand the bottom of the carbon control horn for a good glue adhesion.

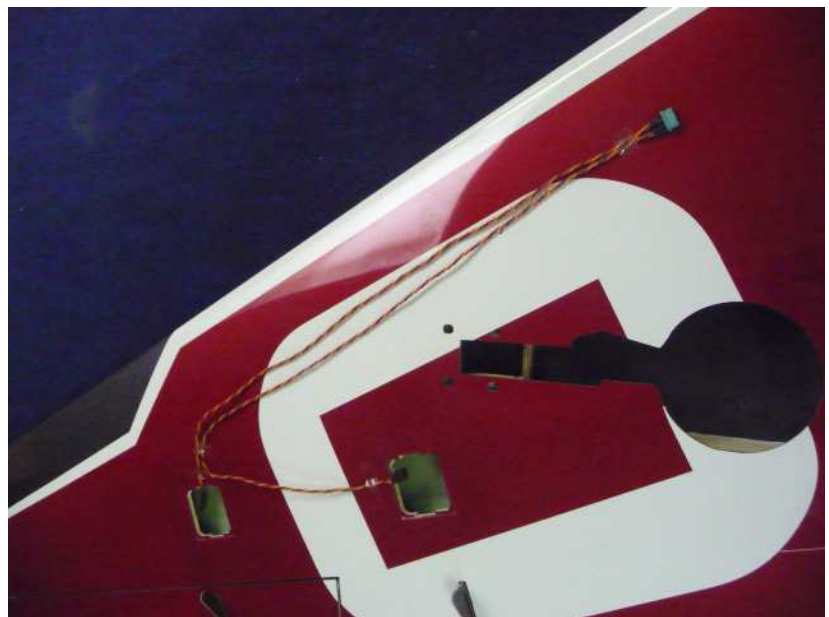
Glue the control horns in the wings with 5 minutes epoxy. Take care to insert enough glue in the slot.



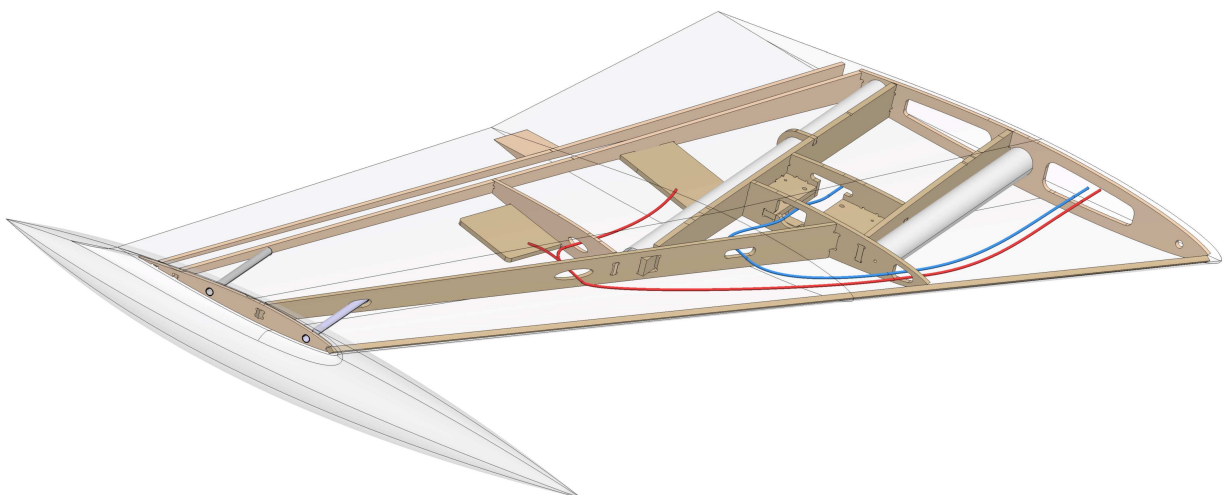
Drill a large hole in the wing root for the electric wiring and gear tubing.



Insert the electric wiring in the wing :
The flap wire must pass through the aileron servo location to come back to the wing root (see pics).
Holes in plywood spare are already done.



The electric wiring is drawn in red on the following drawing.



Servo :

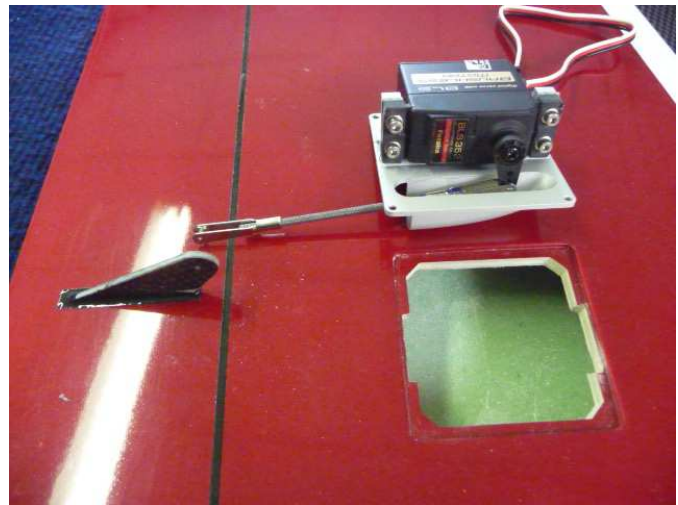
Screw the servo on the servo cover (you can also secure it with silicone glue or double face tape).

For the aluminium servo cover, just screw the servo on the pads.

Use a plastic servo control horn. The steel link will be at 14 mm from the servo axis.



Aileron servo.



Flap servo.



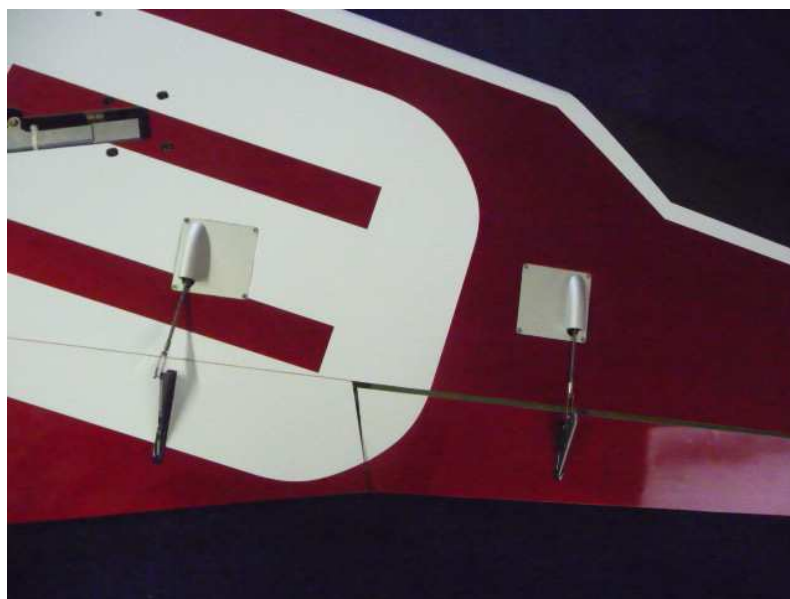
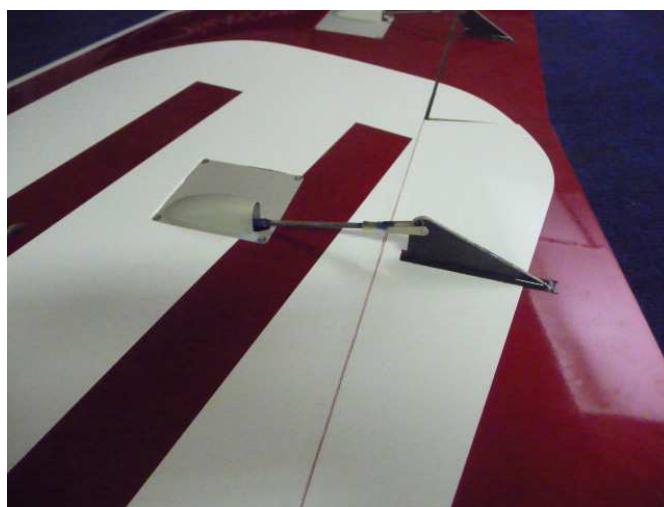
Put the 2 servo covers on the wing.
Drill 8 holes 1 mm diameter in the wing for the screws.

Connect the 2 servos with 2 x M3 links and threaded rod.

Screw the servo covers in the rudder with 8 parker screws.

Connect the servos to the fiber horns.

Apply threaded lock on the link

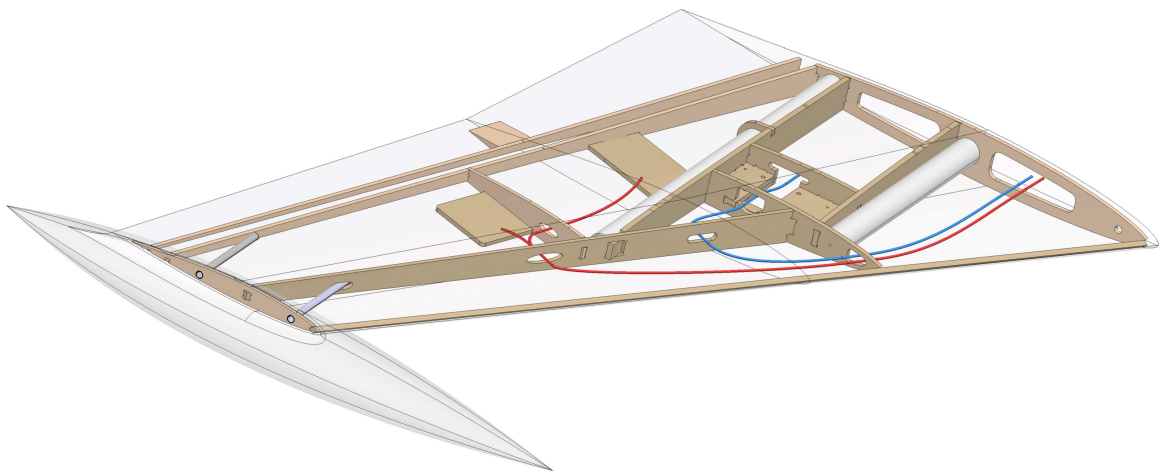
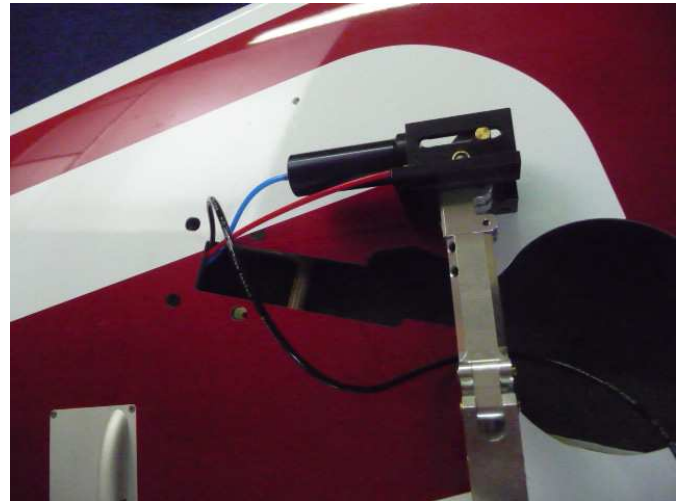


Main landing gear :

Please, use only the oleo legs supply by Aviation Design.

If you use standard oleo, you will have to modify the gear position and gear door position

Connect the gear tubing and brake tubing.
Insert the tubing through the wing (the holes are already done in the plywood spare, tubes are drawn in blue on following drawing).



Attach the brake tube on the legs.



Put the air tubing outside from the wing root.



Insert the main gear on the plywood support.
Screw each gear with 4 screw CHC 4 x 20 mm.



Fuselage

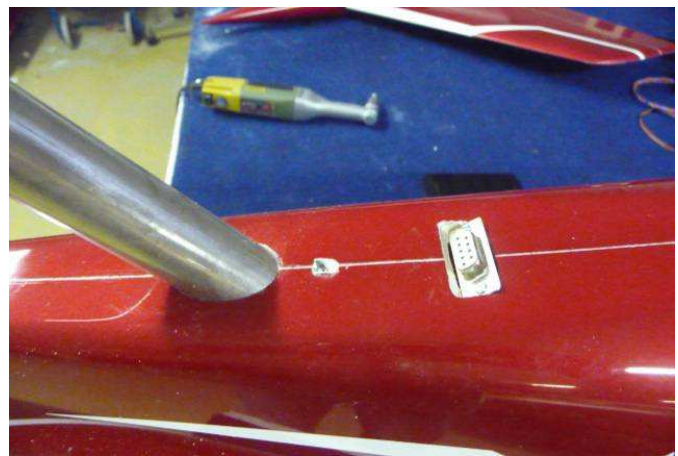
Fit the aluminium rudder tube on the fuselage.
Insert a parker screw through the fuselage and the tube.

The screw can be at 15 mm in front of the tube.

Drill a hole for the electric wiring :
The hole will be at about 50 mm in front of the tube.



Insert the electric wiring in the fuselage.
The wiring must be secured to the fuselage and protected against the engine heat (tailpipe and turbine).



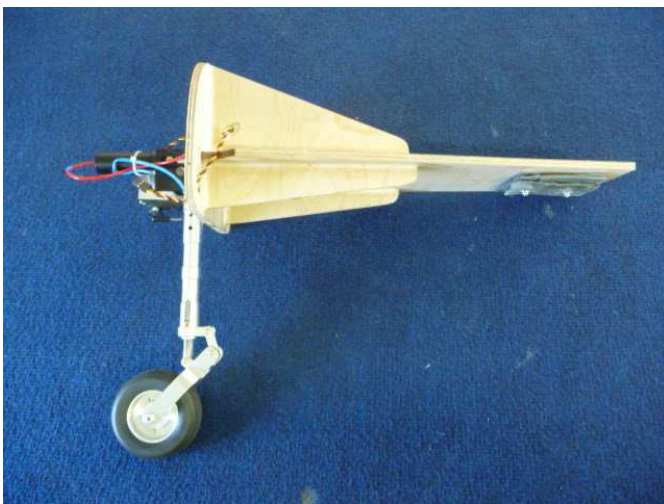
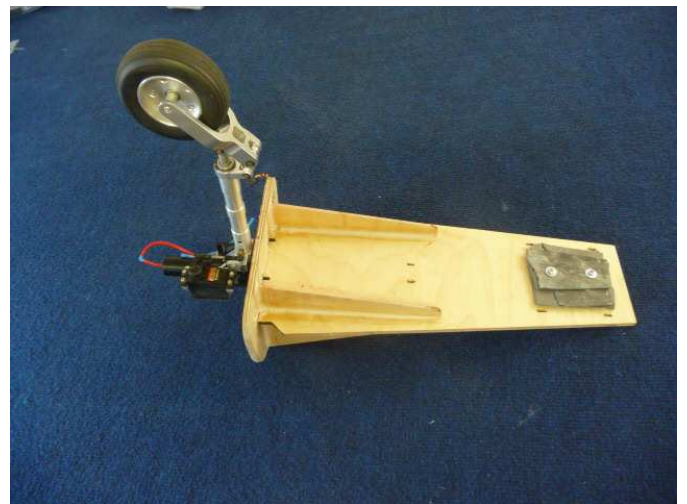
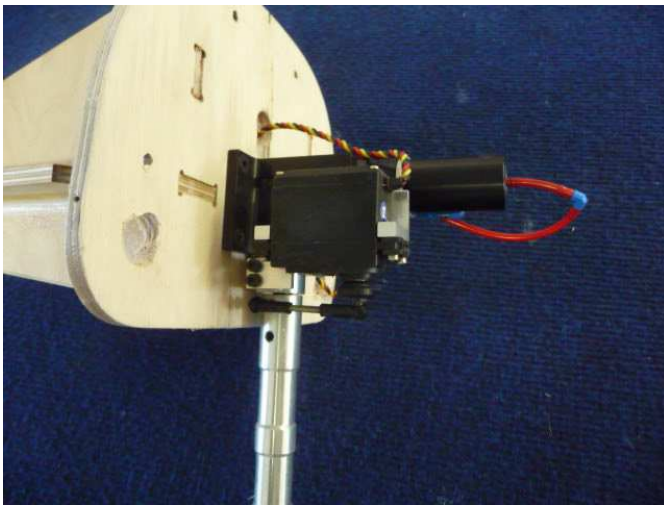
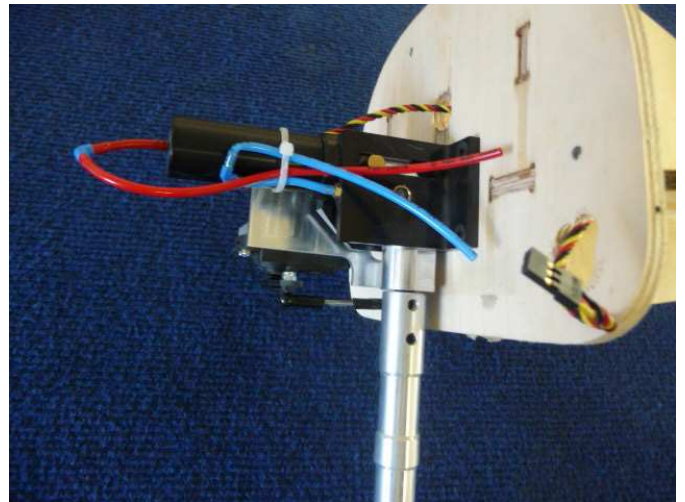
Front gear :

Screw the front gear on the plywood frame with 4 allen screw.

Install the air tubes and the front steering servo.

Retract the front gear.

Insert the full assembly and screw it on the front plywood mount with 4 screws CHC 4 x 20 + 4 large roundels.



Fuel tanks

Connect the fuel tank to the clunk as the photo with brass tube and Tygon tube.

Insert the fuels tanks in the fuselage against the front plywood frame.



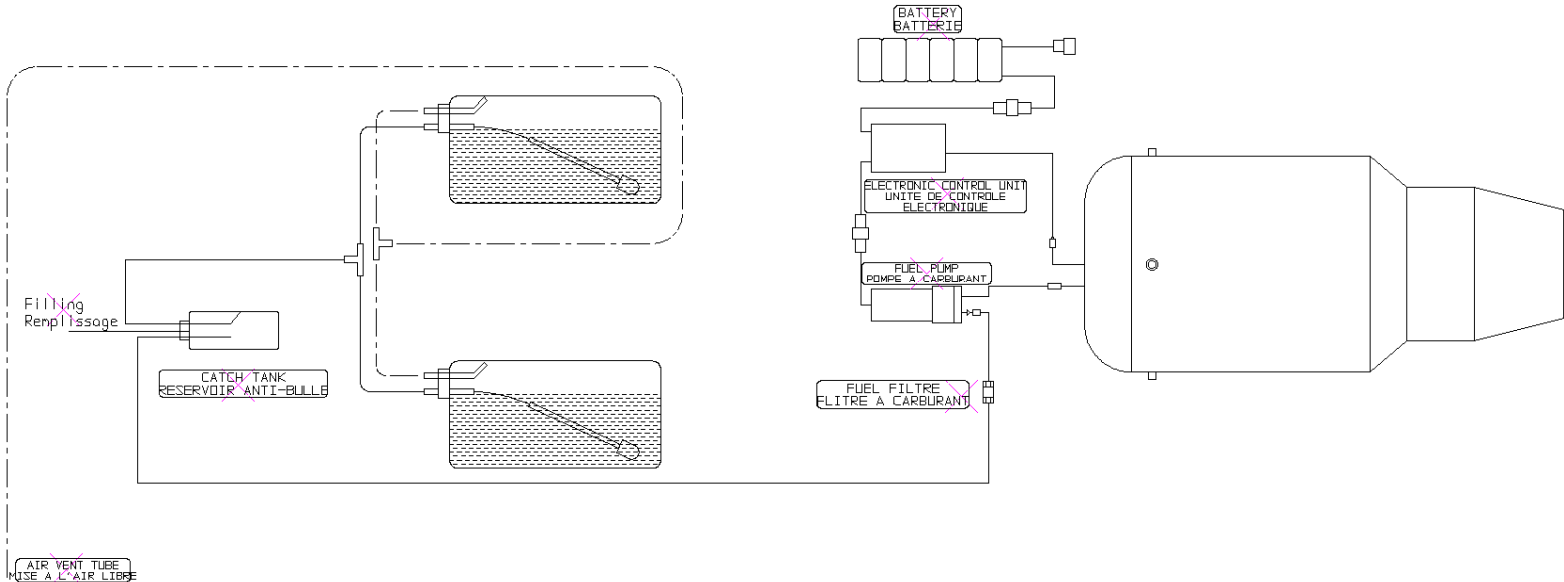
Insert the rear plywood frame to secure the rear of the tanks. Glue it with quick epoxy.

The fuel tank will be locked in the model when the seat will be in place.



The 2 main Kevlar fuel tanks will be connected in parallel with a festo T connector (T PK4). Don't connect them in serial.

Also the fuel vent will be connected together with a festo T connector.



Drill a 5 mm hole in the bottom of the fuselage just in front of the fuel tank for the fuel air vent.

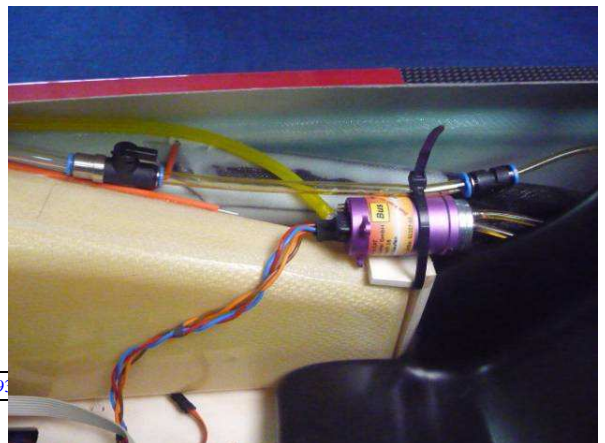
The fuel tank is connected to the BVM UAT to be sure that there is no bubble in the fuel line.

The tubing from the main tank to the catch tank and to the catch tank to the fuel pump must be gasoline tubing (no silicone tubing). Also for the air vent tube.

The BVM tank will be attached to the front frame with plastic T rap



The fuel tank will be attached to the fuel tank plywood frame with plastic T rap.



Filling the fuel tanks :

Connect your pump and fill the system in direction of the tank. It will first fill the catch tank and after the main tank. The main tank will be full when fuel come from the air vent tube.

When tanks are full, close the filling tubing.

Do not close the air vent tube after.

The system is ready for starting.

Turbine installation :

If necessary, cut the edge of the fiber inlet for the electric starter location (depending of the total turbine length)

If turbine is too long and if you are obliged to open the inlet ducting so that the turbine can suck air in the fuselage, you will be obliged to make a small plywood box around the starter to closed the hole in the inlets. Otherwise the fuselage will be in under pressure with turbine running and the fuselage can collapse at full power.



Adjust the position of the engine / beginning of the exhaust tube so the engine exhaust enter for about **20 mm** in the aluminium inlet.

This dimension is very important. If the engine is too much inside the aluminium inlet, there will be some problem of under pressure in the fuselage and some overheat temperature on the exhaust pipe

The engine must be screw with 4 times 3x20 mm parker screw

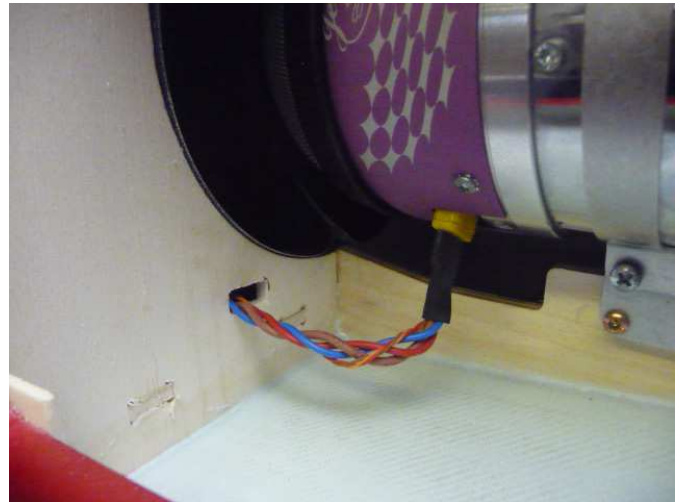
Take care that the engine is perfectly in the middle of the exhaust pipe. If necessary, add some washer under the engine mount to be in the middle of the pipe.

If during flight you have a pitch down effect, you will have to put the engine a little down



Drill a **small** hole for the engine electric cable and tube in the front plywood.

Secure all electric wire and fuel tubing in front of the engine in the fuselage



Note :

For engine form 16 to 19 kg thrust (Jet Cat P160 to P180 RX), you don't have to make any modification on the inlet size. Inlets are big enough for this kind of turbine.

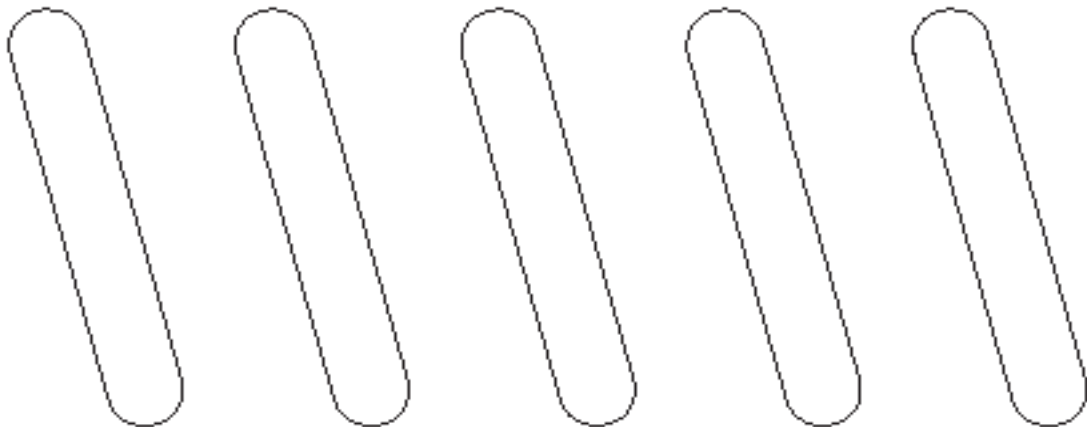
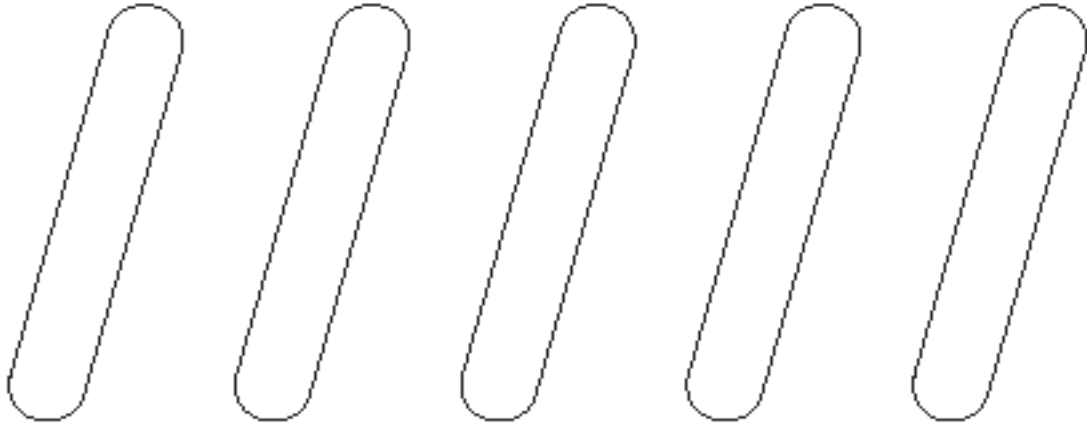
For engine up the 19 kg (19 to 22kg) (Franck Turbine or Behotec engine 22 kg thrust), you will have to cut some additional inlets under the fuselage.

See bottom photos. Template for cutting the hole is in the next page





**Template for underfuselage
additional inlets for 19 to 22
kg thrust engine**

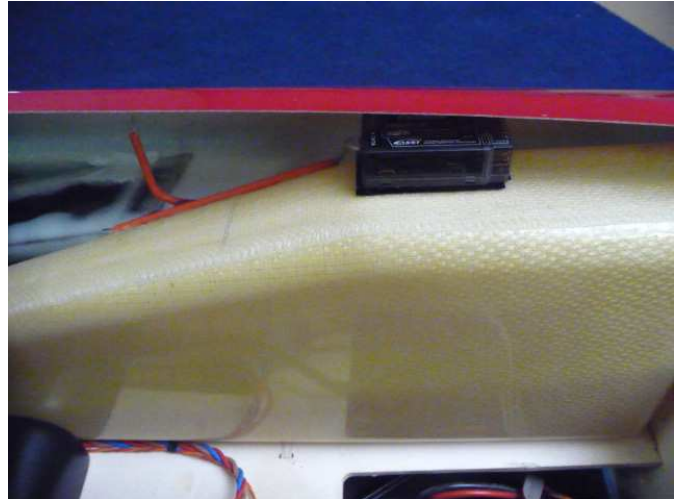


Radio, Powerbox and ECU installation:

Fix the receiver on the fuel tank with double tape velcro.

Attach the antennae at 90 °.

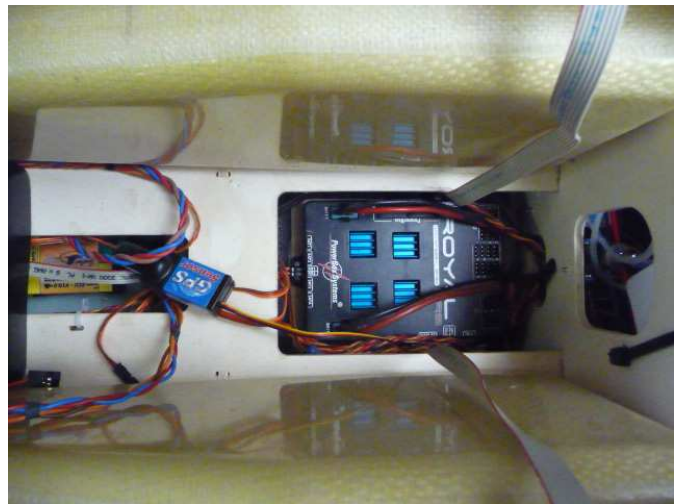
Don't install antennae too closed to the ECU and fuel pump.



We strongly recommend to use a Power Box system. A Champion or Royal SRS Powerbox can be used.

If you want to install a scale cockpit, fit the Powerbox under the plywood floor in the front location.

The LCD screen, air filling valves and manometer can be installed on a top plywood floor.



Install the ECU under the pilot seat.

The air tank will be installed in front of the fuselage secured with light foam.

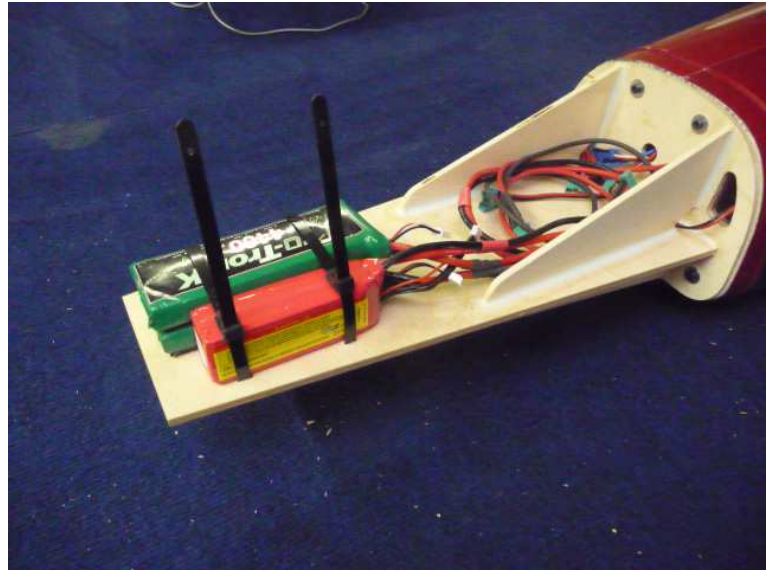


Air valves, batteries, antennae :

The air valve will be fitted in front of the Powerbox.

The 2 radio batteries and the turbine battery will be fitted in the nose, as front as possible to obtain the correct CG. Hold them and secure them with plastic T rap .

Connect all tubings for gear and brakes as described in the Behotec manual.
Hold all air tubing with plastic T rap.



Nose cone:

Fit the fiber nose on the fuselage.

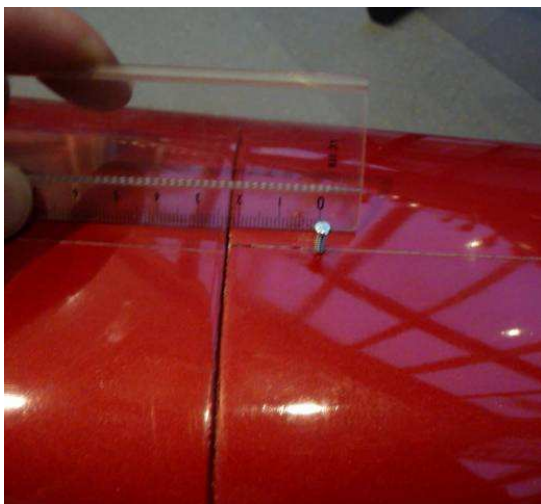
The nose will be secure to the fuselage with 3 parker screws 2.2 x 9 mm at about 120°

Drill a 1.5 mm hole at 22 mm from the border on the top joining line

Insert the top screw

Drill a 1.5 mm hole at 22 mm from the border at about 60° from the top

Insert the side screws



Secure the wings :

Fit the wing joiner tube through the fuselage.

Take care to put it at the center (same length left and right (about 310 mm)).

A pre drill is already done under both wings on the lower surface to secure the tube

Assemble one wing on the tube and against the fuselage.

Make a 2.5 mm hole in the tube

Threaded the wing tube at M3 mm and secure wing with a M3x25 screw

Assemble the second wing on the tube and against the fuselage and check they are perfectly join to the fuselage..

Make a 2.5 mm hole in the tube

Threaded the wing tube at M3 mm and secure the second wing with a M3x20 screw

We recommend to just draw on the aluminium tube the wing limit and a up/down mark to find easily the hole for the wing screw when you assemble the model.



Clear canopy :

If you choose to fit the clear canopy, follow the next steps :

Put the clear canopy on the fiber parts and cut is 5 mm bigger than the clear canopy parts.

Cut the fiber canopy as the pics. Keep enough fiber border to glue the front pin and hatch. It will be necessary to make a step around the canopy hatch



You can paint the interior of the cabin in mat black or grey



Gluing of the clear canopy

Put the clear canopy inside the canopy frame.

Hold it with paper tape and small clamps.

Apply some ZAP canopy inside the frame between the clear canopy and the fiber parts
Let in dry 24 hours



Cockpit kit :

Cut the instrument cover following the engrave line
Glue it inside the canopy frame.

Install the seat and lock it with double face tape(so you can easilier remove it).



Fit the pilot.

Fit the instrument panel. Glue it with ZAP to the fuselage and fuel tanks.

Recommended surface throws

Ailerons

0 mm at wing tip tank

Up : 16 mm Down : 16 mm Exponentiel: 20

Mesurement at aileron root (flap position).

Up : 10 mm Down : 10 mm Exponentiel: 20

Mesurement at wing tip (tip tank position).

Rudder

25 mm left and 25 mm right Exponentiel: 10

Flaps

160 mm down at wing root.

80 mm down at aileron position.

No mixing with elevator are necessary.

Elevator

Up : 15 mm Down : 15 mm Exponentiel: 10

At stab root.

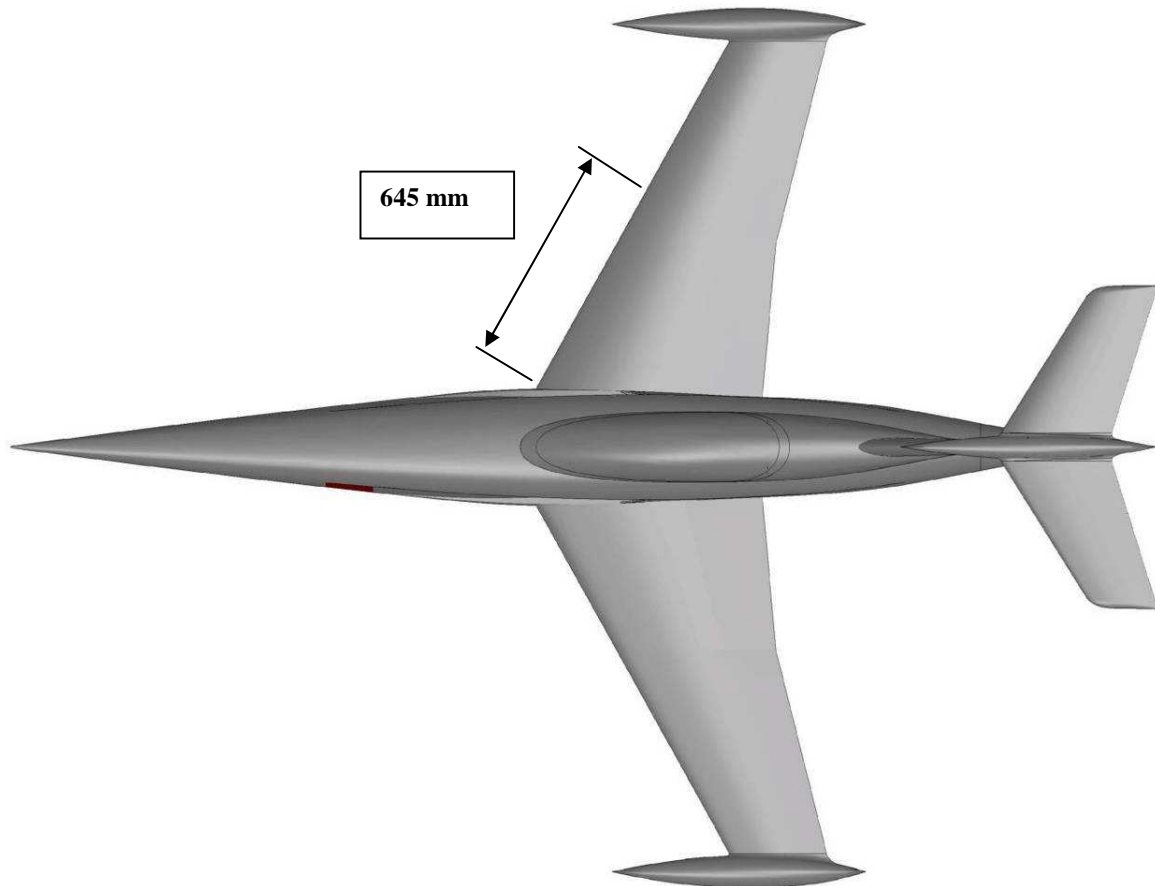
Center of gravity :

You will need 2 x 4400 Mah lipo batteries + turbine battery + about 200 to 300 grams of lead on the nose front plywood to have the correct CG (see drawing).

If you have an additional batterie for the electric landing gear, you normally don't need any lead in the nose.

Note : balance the model with the gear down and the tanks empty.

The center of gravity (CG) must be located at 645 mm on the wing leading edge



You must check it before the first flight, to do this with the aircraft in flight condition but without fuel lift the aircraft in this point, the aircraft must adopt a horizontal attitude. If the tail drops move the batteries forward or add weight in the nose.

In other hand if the nose drops considerably, remove weight from the nose.

Total weight

The total weight of the DIAMOND is 19 kg tanks empty.

Important note : Pay very careful attention to structural integrity. This jet can reach speeds of over 400 KPH - 250 MPH. It is your responsibility to operate it safely.

Specifications may change without notice.