

# **Fei Bau 1/6<sup>th</sup> scale F 15-Eagle**

Developed and written by Luke Cullen



The following instructions are developed based on using twin turbines. The ARF kit can be optioned from the factory for either twin or single turbine. This kit included mounts for 2 engines, 2 thrust tubes and tanks with the capacity for 2 turbines. The build for the single engine is similar so the twin version will give you the general idea for your single engine build. Think of the build as working from the back to the front which makes it seem easier. Every step focuses on easy maintenance when the need arises.

## **DISCLAIMER:**

**THIS IS NOT A TOY; it's a high performance model capable of high speeds and damage to persons and or property if not used responsibly. The manufacturer and its distributors cannot control how you assemble this model, what type of equipment you use, or how you fly it. FB can assume no liability whatsoever for any damages that may occur when you fly your aircraft. By assembling this model, you are agreeing to indemnify and hold blameless the manufacturer and/or his agents from any and all torts and liability associated with the use of this product. Please inspect all parts before beginning assembly. If any parts appear to be missing or suspect, contact your dealer or the manufacturer for repair or replacement BEFORE you begin. Once you have assembled the aircraft, you are the pilot in command and assume any and all responsibility for the use of the model and any damages that might occur by flying or attempting to fly this aircraft. R/C model jets require a high level of skill in both their assembly and their flying. If you do not feel confident in either your building or flying skills, PLEASE seek assistance from more experienced modellers. It is advisable no matter what level of skills you have to have a second experienced modeller go over your installation after assembly. This is advisable during the build to use the inspector who will do the final turbine inspection. A second set of eyes may spot a problem you have missed. If you have not flown a model like this before, it is HIGHLY recommended that you get an experienced turbine pilot to do your maiden flight. Very often, the first few seconds of a maiden flight are critical until the aircraft is trimmed out, and having an experienced pilot at the controls can make the difference between a wrecked aircraft and once that enjoys many hundreds of flights. Be sure to select a suitable open field for flying...take the time to find a large paved runway if at all possible, especially for test flights, until you feel comfortable getting the aircraft in and out of smaller grass fields.**

## **BEFORE YOU BEGIN:**

**Keep this in mind as you proceed:**

**Look at EVERY assembly step you finish, double check what's done and make sure it's correct. Even the smallest component is important and can cause the loss of your airplane, so take the time to do things accurately. Correct problems if they are wrong. Careful work will result in a long-lasting plane that gives you years of pleasure, one loose component could result in the complete loss of the aircraft and all the components inside it, and someone can even get hurt. Use quality digital servos and alloy servo arms to increase strength and durability. Also this decreases the chances of slop in surfaces which is important to avoid flutter with such a fast model.**

The FB F15-E as it comes from the factory includes the following parts:

### **Accessories included:**

- 2 x Stainless steel double walled thrust tubes
- 2 x wooden engine mount spacers for Jet cat engines
- 2 x large 2.7 litre fuel tanks with plumbing hardware
- 1 x large 4.6 litre fuel tank with all plumbing hardware
- 3 x coils of coloured plastic airline
- 1 x brake valve
- 1 x retract valve
- 1 x bag of air Y connectors
- 1 x bag of 4 way air connectors
- 1 x bag of fuel Y connectors
- 1 x bag of fuel plugs
- 8 x servo linkages
- 2 x small air tanks
- 2 x large air tanks
- 1 x bag of servo mounts and hardware
- 1 bag of steering cable parts including wire and crimps
- Multiple named bags with socket headed mounting bolts

### **Airframe parts included**

- Fuselage section
- Nose section
- 2 x detailed cockpit
- 2 x rudders
- 2 x elevators
- 2 wing panels
- Plywood formers and trays
- Ordinance for the wings and fuselage
- Control horns



## **Servos used in this build**

**Ailerons x 2 Spektrum 6030 20kg**

**Flaps x 2 JR 8911 24 kg**

**Rudders x 2 Spektrum 6030 20kg**

**Elevators x 2 JR 8911 24kg**

**Steering x 1 JR 8231**

**I have used SWB alloy arms for all of the flying surfaces to increase the integrity of all the controls. They are 25mm arms which is ample for the amount of movement you need.**

**I have tried to arrange a construction sequence that will allow you to keep moving forward, rather than standing around waiting for glue to dry before you can proceed to the next steps**

### **Introduction:**

**You have chosen a model that represents the pinnacle of ARF technology. While there is not a lot of building to do, there is enough to keep you busy for a many hours. Even if you have assembled other ARF jets, we highly recommend following our assembly sequence and procedures anyway. Chances are it will save you a lot of time, prevent you from running down dead ends, and perhaps remind you of a few small things that might end up saving your aircraft.**

**Just because the model is almost completely built does not mean you can rush through the assembly. You need to employ fine craftsmanship every step of the way, turbine models need critical care and attention.**

**Keep this in mind with everything you do, every part you install...look at the work you just did, evaluate it critically, and ask yourself "is this going to potentially crash my airplane?" If there is any doubt about the work you have done, back up, and re-do it properly.**

**Adhesives: The correct adhesive to use for all procedures is Loctite Hysol 9462. This is a very strong white epoxy that is thixotropic. "Thixotropic" means it does not run at all, but stays only where you put it. It is infinitely superior to regular epoxy, even slow-setting epoxy, for our purposes, because of this characteristic. Regular epoxy will run downhill with gravity as it dries, taking it away from where it is intended to be.**

**A good example is in the hinges...using regular epoxy, a good portion of the glue will migrate down away from the hinge into the inside of the wing as it dries, and you won't even know it is happening. Hysol stays where you put it. The downside of Hysol is it takes overnight to dry properly, but I have tried to arrange things to keep you busy while waiting for glue to dry. I also highly recommend that you only use a proper Hysol dispensing gun with the long-type mixing nozzles.**

**The short nozzles do not mix this glue enough and only a thin nozzle and gun will let you fill the hinge and control horn holes properly with glue, you can't do it mixing your Hysol on a flat surface and trying to get the glue in the proper place by a brush or stick.**

You can buy a complete Hysol setup including a mixing gun, nozzles and cartridges of glue from your local hobby supplier. Consider it a great investment, the glue is the best you will use. Two cartridges will be plenty to assemble your F-15E

#### **AIR SYSTEMS:**

The F-15E uses pneumatic brakes and retracts so follow the steps and you should have very reliable leak-free operation. Neatness counts so all airlines should be secured to the airframe to keep them from flopping around or getting kinked. I used plastic clips to keep all the wiring and airlines both neat and away from heat. The other very important thing is to cut off the end of each airline dead square before installing it on the nipple. This is VITAL. You can either purchase a professional tubing cutter from your dealer Intairco or similar, or you can make up a jig to hold the airline and keep a sharp, new razor blade perfectly upright as you cut. Either one works, just ensure that all ends of all airlines are cut off dead square. Make sure all airlines are pushed ALL THE WAY onto their nipples. They should not need to be secured otherwise, but you can add fine wire safety wraps if you like. Make sure all left and right matching airlines are the same length, particularly the brake lines, or you will get uneven retraction or braking action. It's worth taking the time to get everything pneumatic right the first time, as having your landing gear fail to retract is not that bad, however having it fail to deploy can really ruin your day and the paint on the bottom of your model.

#### **FUEL SYSTEM:**

The F-15E has a very simple fuel system, 2 x 2.7 litre tanks in the ducting area and a 4.6 litre main tank that fits in front of the main ducting. There is heaps of room for a UAT or similar header tank. There is not much to go wrong, but like the pneumatic system it does need to be done right the first time, with some careful craftsmanship.

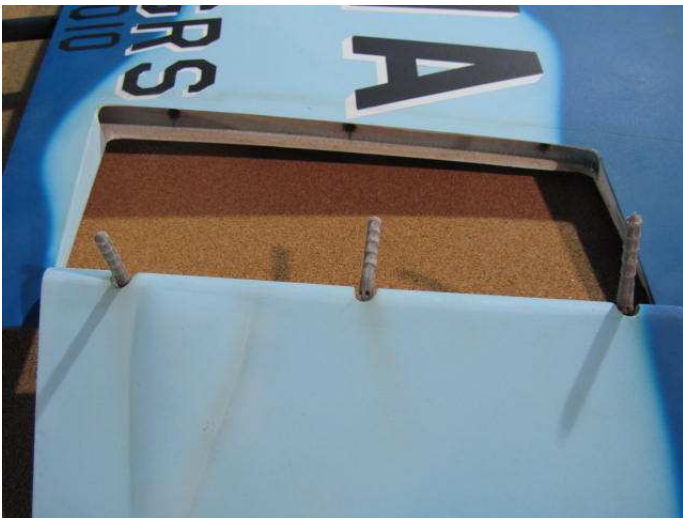
As with the airlines, all fuel lines must be cut off square. I have used all Festo fittings for all fuel lines or tie wire where Festo fittings are not available. The UAT's I have used are from INTAIRCO and provide all Festo fittings. Everything needs to be dead clean including the inside of all the fuel tanks.

## **Rudders:**

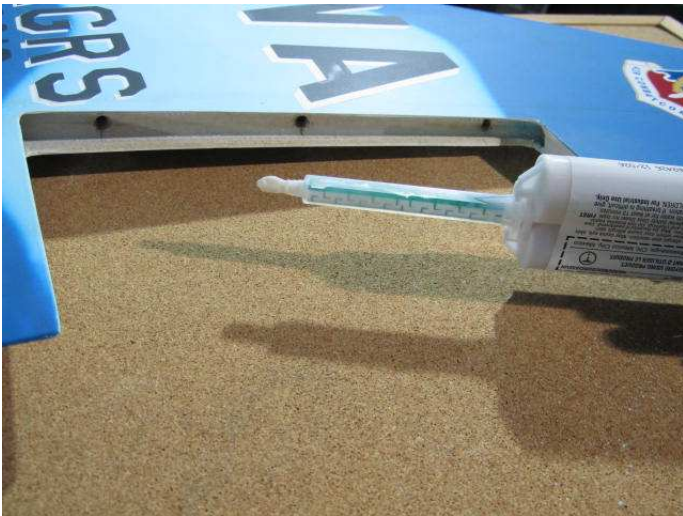
- 1. Remove the screws holding the servo covers from the rudder servo bay. Keep the orientation of the servo cover correct, do not flip or rotate the servo covers, as there may be slight variations in the screw holes and they may not fit perfectly if you rotate the covers.**
- 2. Mount the plastic brackets as indicated then mount the servos to the brackets.**



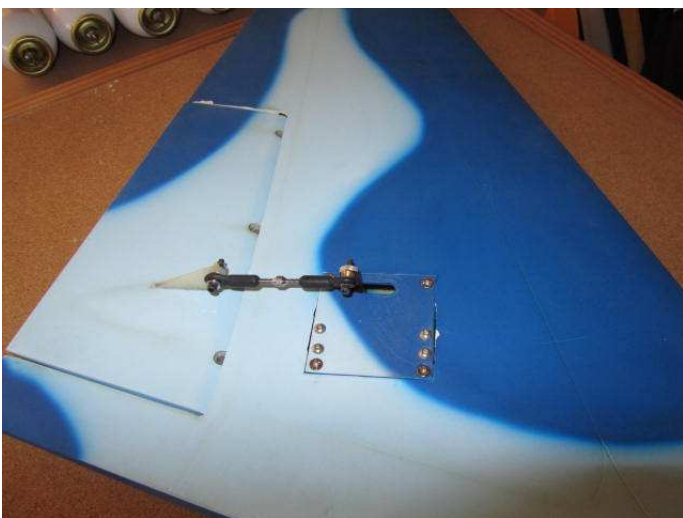
- 3. Do not over tighten and strip the screws. Do not use any grommets or other servo hardware. Vibration isn't a problem for jets which is why you don't need to use the rubber grommets. Secure the screws with Loctite**
- 4. Check the depth of the servo mount with the servo. Relieve if needed with a sharp exacto knife.**
- 5. Feed the wires for the servo to the hole provided that goes through the fuselage.**
- 6. Rough up the rudder horns and check the depth where they sit on the rudder. Check the positioning as the hole in the horn should be directly over the hinge point.**
- 7. Hysol the control horns to the rudder.**
- 8. Rough up all the hinges with 60grit sandpaper before gluing them into the surface to ensure a good glue joint.**



**Hysol tips work well getting glue in the hinge holes.**



**9. Mount the rudders on the fuselage with the screws already fitted inside the model.**



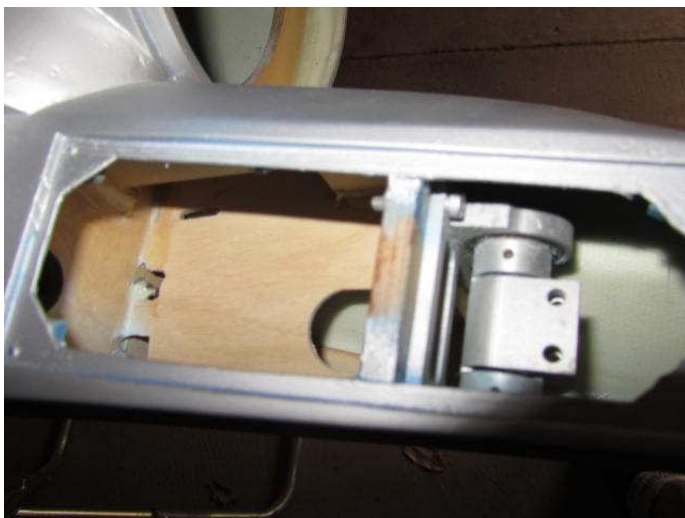
**10. Tighten both rudders after assembly.**



## **Elevators:**

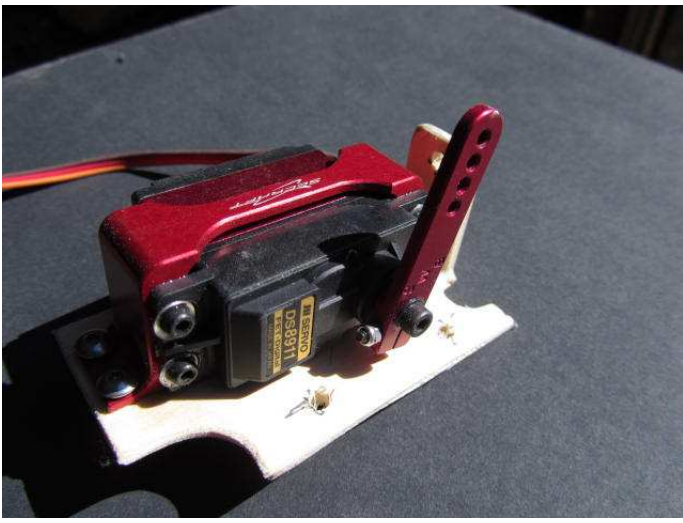


The elevators are an all moving piece with a pre-installed pivot. The servos are mounted inside the area provided. Some trimming may be required to use an alloy mount for the servo as I did.

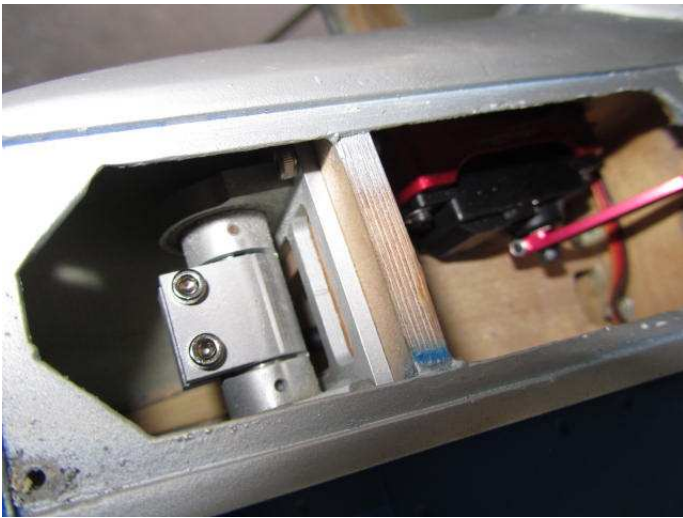


Check the position of the alloy arm to provide clear movement of the servo and linkage

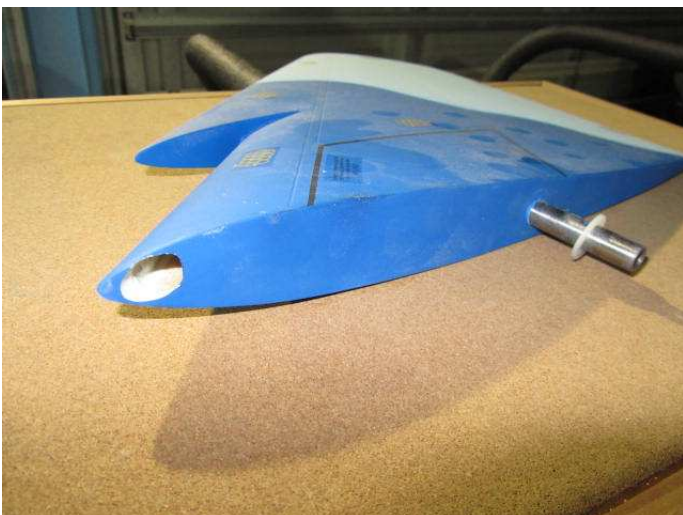




**Loctite the 3mm socket screw to locate the tailplane. Be sure to put the nylon bushes between the tailplane and fuselage.**



**Before mounting the servo to the tailplane it needs to be mass balanced. I had to add 80grams to the leading edge. I used a carbon tube that I filled with lead. I then capped it with plywood keep the tailplane free and add weight till it holds being level. This is to make the servo more effective and less chance of flutter.**



**Hysol the carbon tube in the tailplane for the counterweights..**

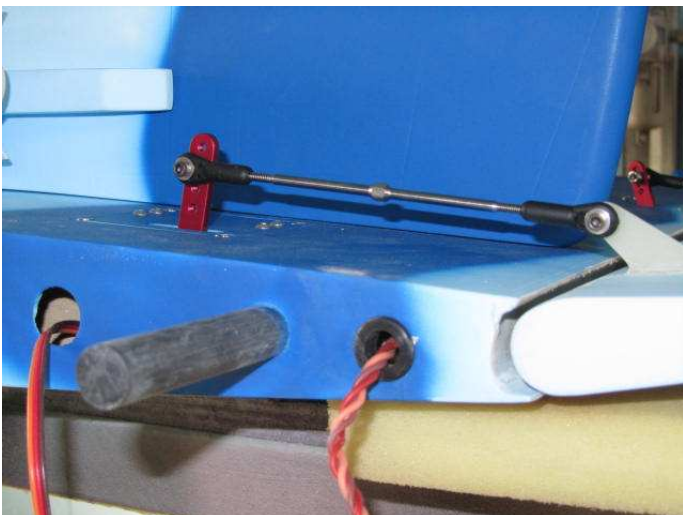


## **Wings:**

The same methods are adopted for the servos and linkages for the ailerons and flaps. Keep in mind the position of the control horns; they have to be directly over the hinge line. Make up extension leads for the aileron as they need to be longer.



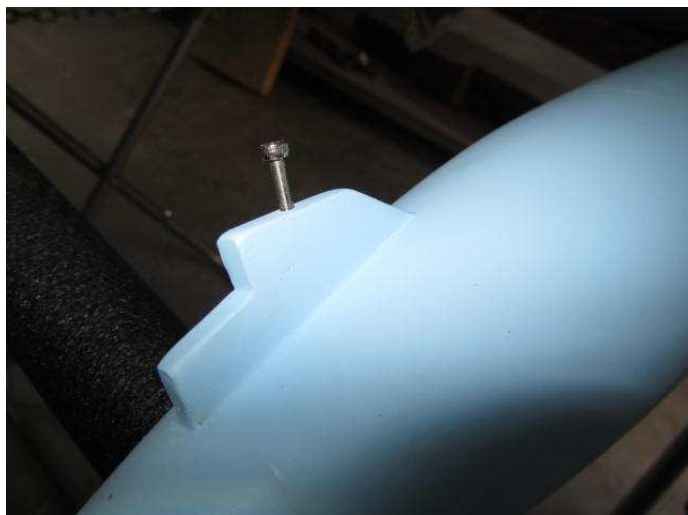
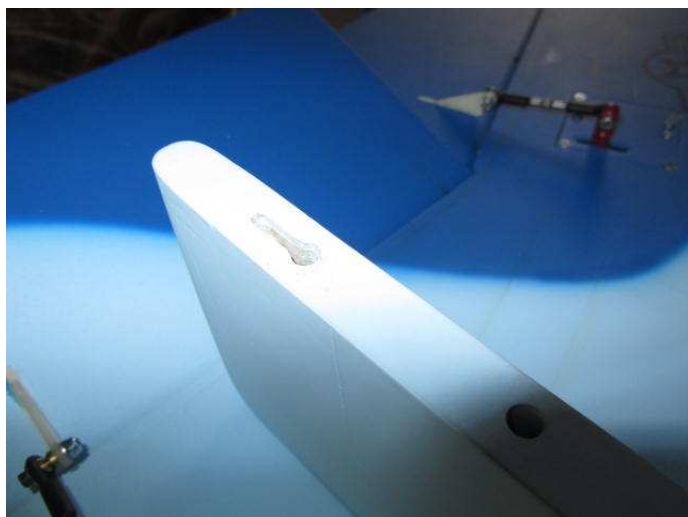
Where possible I used rubber grommets to protect the servo wiring.

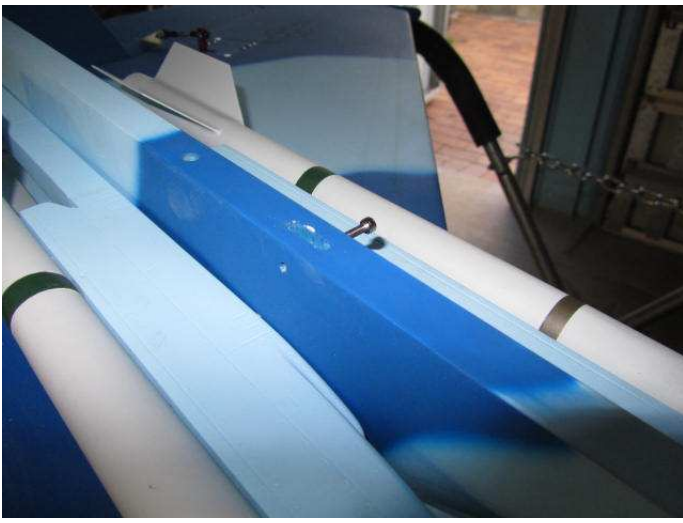


After all the flying surfaces are finished I bolted all the rockets and tanks on with the hardware provided.



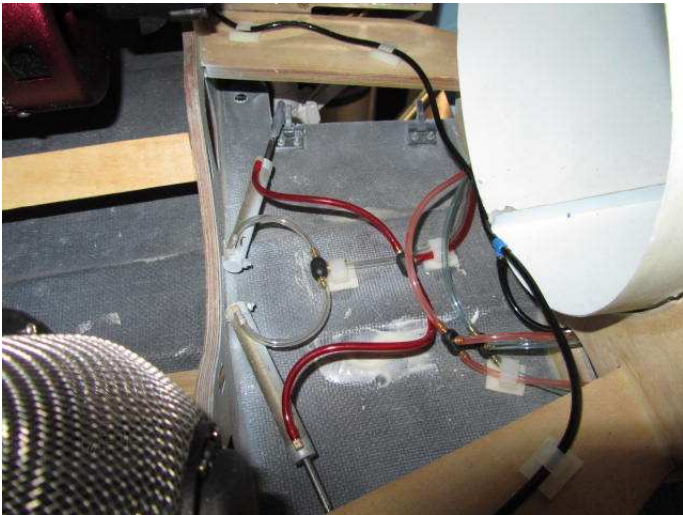
The wing tanks mount with a 3mm socket head bolt on one end. You may need to file the hole so the bolt slides easily. The other end has a 3mm socket head that goes through the entire piece and has a nyloc nut to retain it.



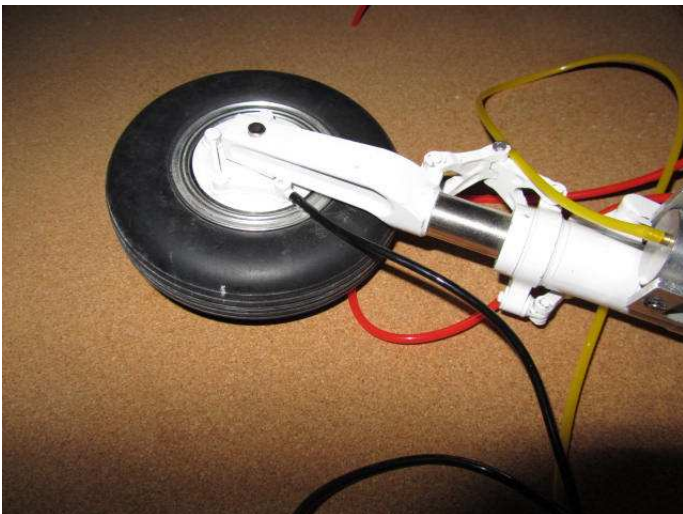


## **Airlines:**

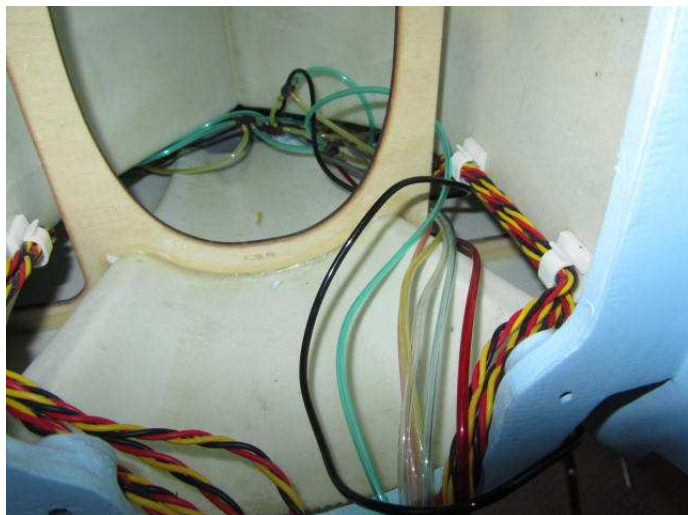
Complete all airlines now so the ducting can be installed at a later step. It is also advisable to run all the extension leads for the rudders, elevators, ailerons and flaps.



Black air hoses are for brakes, keep these identical lengths to keep your braking capacity equal. Clip air hoses to the leg to avoid it being kinked.

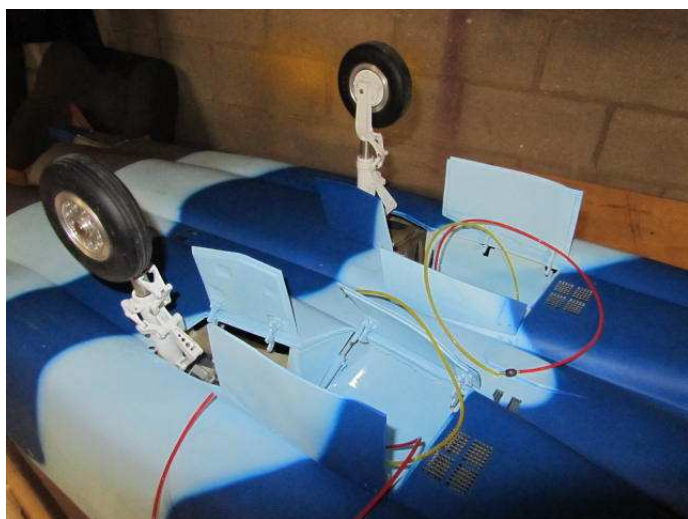


**Plastic clips keep airlines, fuel lines and extension leads neat and safe from excessive heat or kinking.**



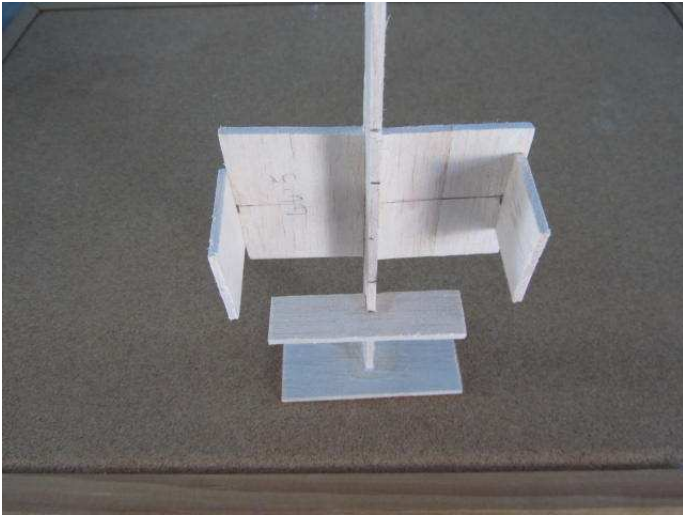
**The rear doors need to remain open when the wheels are down. The other doors close when the wheels retract. Keep this in mind when plumbing the air hoses. Use all the 4 way joiners provided to make this job easier, I used different colours for each operation which are as follows.**

- 1. The main wheels and nose wheel are one system**
- 2. The rear doors on the mains only close when the wheels retract.**
- 3. All other doors open and close.**



## Tailpipes:

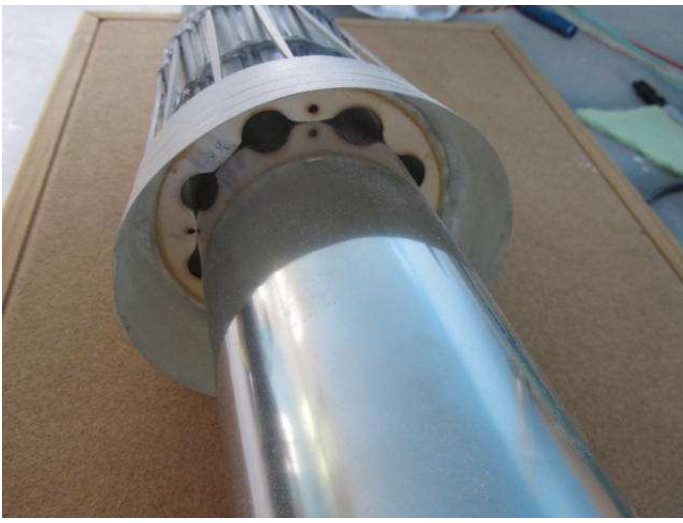
Firstly I mounted my turbines with blind nuts then I made a jig to hold the stainless thrust tube pipes in place. As illustrated the brackets I made make it possible to easily remove the pipes.



This template will vary depending on what turbines you use, I set mine centrally around the exhaust on the turbine with a 19mm gap to the tailpipe. Measure twice and cut once, this is a tedious step but important.



Glue these brackets in place and screw the tailpipes to them.



**Trim the thrust nozzles to suit the pipes so they sit centrally. I hysoled in plywood blocks with blind nuts so the exhausts can be removed.**



**Once the tailpipes are installed you must fit the ducting first before you install your turbines.**



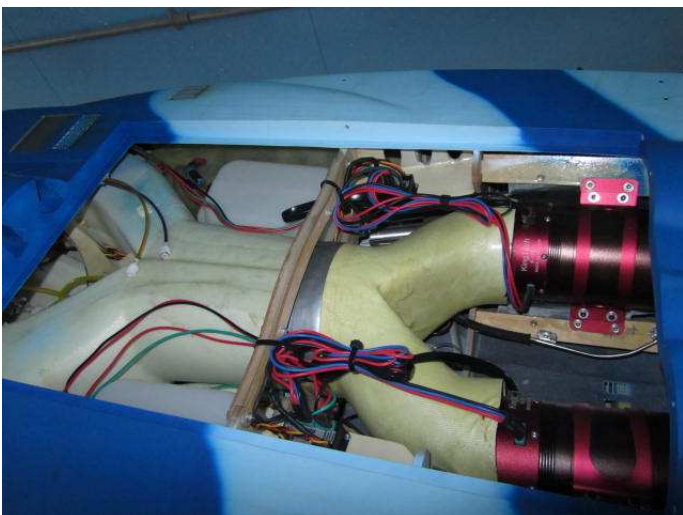
**The ducting will need trimming to suit your turbine.**



**Mount your ECU away from the heat but where practical. I mounted them on plywood plates above the undercarriage. Keep the ECU and fuel pumps away from your receiver.**



**When all the install of the turbines, computers, ducting and wiring is complete clip all wires where possible. Note on the left of this photo the airlines with quick release for the speed brake. This makes it easy to remove the main hatch when starting the turbines.**





## **Fuel system:**

Plumb all the fuel tanks now so you can continue to move forward. I used the supplied outer tanks and Dubro 1litre tanks for the 2 turbines. Use Festo fittings for all the connections. They seal well and make it possible to do maintenance easily.

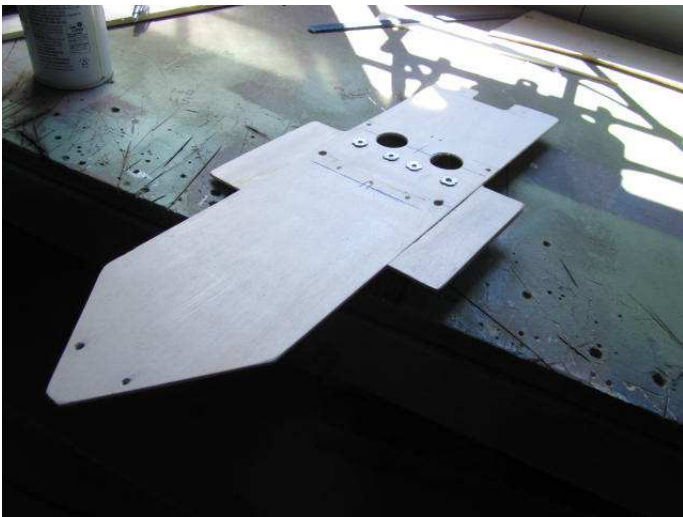


The brass tube supplied works perfectly with 4mm Festo fitting as indicated.

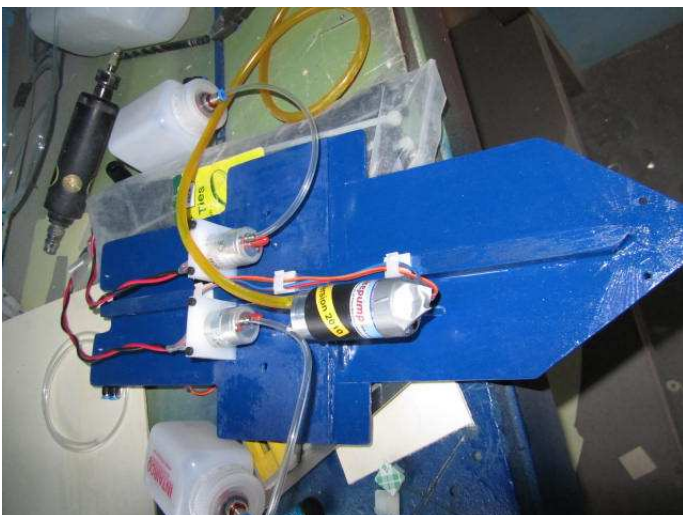




Because I used 2 turbines I didn't use the large tank supplied. I utilised this area for a smoke tank, UAT's, powerbox, fuel pumps and smoke pump. Having all these items on one tray made the build simpler.



All this area needs to be completed before the nose section can be fitted.



I made all the extension leads to suit and got all the radio working before I bolted the nose on.



### **Airtanks:**

I paired the 2 large tanks for the retracts and doors. The 2 smaller ones operate the brakes and speed brake.



I mounted all 4 tanks in the nose section where I joined the former.



Note the alloy bracket for the nose wheel servo.



All hardware is included for the steering. I used a JR 8231 digital as its important to use a positive centering servo particularly because of the length of the nose. You will have to put small amounts of movement on the nose wheel to be practical.



**I did remove the arm from the nose leg to make fitting the steering servo simpler.**



**The factory supplied plywood plate worked well for the battery tray. It fits neatly in the 2 slots provided and screws down from the front.**



**I removed the nose section so all the charge and start necessities are easily accessible. Keeping all the weight as far forward will assist with the balance.**



**Putting all the start ancillaries in the nose means you don't have to open the canopy or the main hatch when starting. All the charging is done from here also.**



**I used an Airpower valve for the wheels, doors, speed brake and wheel brakes.**



The detailed cockpit supplied needs to be trimmed around the air ram supplied to raise the canopy.



The 2 piece detailed cockpit needs to be screwed into place. I used another air ram to lock the canopy after it closes.



This completes the build of the FB F15E, go over the entire model before running the engines. Try taxi testing to adjust the sensitivity of the steering before attempting to fly the model.

## **F 15 E control throws and C/G**

**Ailerons 35mm up and down, 20% expo**

**Elevator 50mm up and down, 25% expo**

**Rudder 30mm left and right, 20% expo**

**Nose wheel servo, 10-15 degrees movement with 50-60% expo**

**Take off flap 12 degrees**

**Landing flap 20 degrees**

**C/G 235mm from leading edge at the root with the UAT's full of fuel.**

**Good luck and now enjoy this amazing model jet from Fei Bau.**