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## 23" F-16 FALCON

So, this is the final model in this latest Mini Jet series. I think it may be safe to say, they probably won't be the last. So, expect a little break while I have a think about what else would make popular subjects. No doubt I'll have plenty of suggestion from the wider modelling community and very appreciated they will be of course.

Now out of this current series of mini jets, the F16 is a modern era jet, as it is still in service today, even though the design is approaching 50 years old....that is pretty incredible?.

Notwithstanding this, I have to be honest and say, the F-16 is my least favourite model, out of this latest series. Well, I guess something has to come bottom of the list, but that's only a personal opinion. As a design however, I'm really pleased with the simplicity and the way it went together, so it gets top marks on that front.

So looking forward, what can be expected to fill the void before another round of mini jets comes along?.....well you won't be disappointed and have to wait too long before some new twin 50mm 'midi' jets, will be racing onto the scene!...so just to whet your appetite, there will be a TSR2, a BAC Jaguar, a Gloster Javelin and a Panavia Tornado with swing wings! and to cap it all off and one of my favourite aircraft of all time...the Blackburn Buccaneer ...I said you won't be disappointed!

So getting back to the F-16, the model was tested on a 4S FMS fan unit. I really didn't think it was worth going the 3S route as the model needed to be powerful enough for its potentially high wing loading. As a result, the model is quite quick, so it's not really for the faint hearted. Having said that, on a calm day the model will fly very slowly.

Strangely, the expected wing loading when the model was finish and weighed, was only 22oz/sq feet....that was less than the Panther and comparable to the Cougar.

A few other points to note, the FMS fan units can be sourced either from [www.4-MAX.co.uk](http://www.4-MAX.co.uk) in the UK. The batteries used were a 4S-1800mah 60C LiPo. The servos were a cheap and cheerful 6g to 8g, (1kg/cm torque) micro type.

For the ESC, I suggest you buy a 40amp 2 to 4S unit. One thing you will need to do is set the ESC timing to 'high' and the low cut off voltage to "Low". It is easier to do this with a program card. This will suit the EDF motor and should give better performance.

To assist the builder, I have once again made a vac formed canopy available.

To complete the package, a CNC/wood pack is also available for those who wish to make the building process a little easier and quicker. These parts will only be available through [www.TonyNijhuisDesigns.co.uk](http://www.TonyNijhuisDesigns.co.uk). The plan itself will only be available in this edition of the magazine with future copies of the plan only being available through the TND website.

For this model and the final design, a full set of decals and pilots will be available our website.

Lastly and possibly the most important thing to say, is a photographic build log is available as a free download to print out from [www.tonymijhuisdesigns.co.uk](http://www.tonymijhuisdesigns.co.uk). These photos will be invaluable and I would suggest downloading these so you can familiarise yourself with the build before you start.

## Wings

The wing parts are made from 6.5mm ( $\frac{1}{4}$ " ) medium density balsa sheet and the wing is made of 3 parts. Now glue the wing parts together to form a complete wing panel. Note that one of the front pieces 3, should only be tack glued as this will need to be removed later to allow for insertion into the fuselage.

Where indicated on the plan, highlight using a pen, the location of the area of balsa to be profiled. An indicative guide to shaping the wing is shown on the plan. With the wing panels flat on the building board, use a razor plane to profile the wing panels to the first stage of completion as shown on the plan. Now either continue with a plane or with a sanding block, begin the second stage of profiling. Now turn the wing over and repeat the process exactly, so the wing is fully symmetrical. Use one of the fuselage sides to make sure the profile is correct at the wing root. When happy, use a medium grade abrasive paper to finish both wing panels, to a smooth flowing profile.

To finish, use fine abrasive paper to round off the leading edge and the wings are done!

## Fuselage

Begin cutting out the fuselage side pieces 4, 14, doubler 5, and all formers 6 through to 11.

Mark the location of the formers onto the left and right hand side of each fuselage side.

Tack glue 6A to 6 in order to make a complete former. This former is made in two parts just in case the fan should ever need replacing.

Check that the fan fits correctly through the hole in 6/6A. For the 50mm Power fun EDF unit, the opening in the former will have to be opened up slightly to accommodate the unit.

Note that you will need to make two long cuts; the first being between the wing and tailplane slot; the second being from the front leading edge of the wing slot, to the point marked on the plan. These cuts will allow for the 'sharp' bending against the top part of formers, 6, 7, 8 and 11.

Add strips of 12.5mm and 9.5mm triangle along the bottom and top front edges of each fuselage side, as shown on the plan.

Now fit the formers 6/6A & 7 to one side of the fuselage. Now add the other fuselage side.

Now add the remaining formers 8, 9, 10 and 11. If you have a SLEC Ltd building jig, it would be worth using this when adding the remaining formers, so the fuselage will remain straight and true. Note that saw cuts will be needed in the front and rear triangle to aid bending of the fuselage sides

Now make up the thrust tube. I have shown on the plan a cut outline of the thrust tube, before it is rolled. The tube is made from 140micron thick acetate. You will be able to source an A4 sheet of this on either EBAY or from a stationary's....it is basically the thin clear plastic material, used on the front of report covers etc. The easiest way to make the tube is to roll the end of the acetate around the fan unit as tight as you can. Make it a straight tube and then secure with a small piece of scotch tape at the fan casing.

At this point, it is advisable to fit the fan unit into former 6/6A. As suggested on the plan, I used a couple of dabs of silicon or hot glue to secure this; you don't need anything more than that. A point

to note here is the new FMS fans have been made from a different type of plastic and hot glue does not adhere well to it. I would suggest you key the glue areas on the fan casing with sandpaper.

Now slide the rolled tube in from the rear of former 11. You will have to fold the tube in on itself but as it slides through, it should pop round again. Gently ease the tube over the fan unit by 12mm or so, making sure the motor wires are exiting smoothly through the slot you have made in the tube. If you have positioned the wiring slot correctly, the tube seam should run along the bottom of the fuselage.

Finally run a piece of tape along the joint length, making sure the tube is pressed hard against the inside edge of former 11. Use a couple of dabs of hot glue; one on the top and one on the bottom to secure the thrust tube to the fan casing....again it doesn't need any more glue than that!

I would suggest at this point you loosely fit the ESC and check the fan motor rotation is okay. Also add the taileron extension leads through former 6.

With the fuselage still in the building jig, begin to roll the tops of the fuselage sides, up the sides of formers 6, 7, 8 and 11 and glue.

Now sheet the front fuselage underside with 3.2mm balsa and sand the top edge of the fuselage sides, flush with the tops of the formers.

Sheet the top of the fuselage with soft 6.5mm balsa in three sections. Note the additional piece of 6.5mm balsa on the top between former 8 and just past 7.

The Next step is to add the nose block (made from 12.5mm balsa sandwich) to the front of the model.

Now for the front and top fuselage 'shaping', so make sure your razor plane has a new blade in it.... Plane and spare blades are available from 4-Max.

Please remember that there is a lot of shaping around the nose and the triangle balsa is there to be cut into, to create the smooth flowing curves of the F16 so don't scrimp on the shaping. Use the razor plane to start profiling and then progress on to using a sanding block.

Now make up the intake chin using parts 14, 6.5mm balsa sheet, 12.5mm balsa sheet and 9.5mm balsa triangle. There is a template shown on the plan indicating the top 6.5mm piece of the chin. This piece should be shaped and blended into the side pieces 14, as detailed on the plan.

The chin can now be attached to the fuselage and the rear fuselage bottom sheeting added.

Using your trusty razor plane, shape the chin and the bottom of the fuselage to the profile shown on the plan.

Mark out the fin slot and cut this out in the top fuselage sheeting.

### **Fin & Tailplane**

To make up the fin, use parts 18, 19, 20 and glue them together. Profile the fin leading edge. Now profile the top /side edge of 21 and glue this to each side of the fin. Put the fin aside and only glue into position once the model is nearing completion.

Make up the tailplane, using parts 16 and 17. Round off the tailplane leading edge and chamfer the elevator 15 leading edge, ready for the hinges to be fitted.

### **Putting Together**

Before the wings can be fitted, the tack glued front piece 3, needs to be removed. Now slide the wings into position and securely glue to the fuselage. Replace the front piece 3 and glue this back into position.

Once done, the front and rear wing fillet cores 12 and 13, can be added to the location shown on the plan.

The tailplane can now be glued into the fuselage, using the anhedral template (made from card or scrap balsa) to set the correct angle.

The longitudinally rolled fuselage fillet, made from 1.6mm soft balsa, can now be fitted along the full length of the fuselage. Use lightweight filler to blend the fillet edges into the fuselage, fillet cores and wings.

Finally glue the fin into position.

The bottom battery access hatch can now be marked and cut out. On the plan is shown how to make a magnetic retaining catch. As the hatch is quite thin, add a strip of 3.2mm balsa to the inside face, to strengthen it.

Shown on the plan is a template to make a tail cone. This is made from either plastic or card.

The final and most important of all is the large cheat air intake hole, in the underside just in front of the fan. There are also two cheat vents on the top sides of the fuselage to be cut in. It is important that all the cheat openings shown are cut in the exact positions as shown on the plan. Failure to do this will cause poor thrust from the fan.

On the underside air intake hole, make sure you chamfer and smooth the entry leading edge of the opening. Also, don't be tempted to reduce the size of the opening. It needs to be the size shown.

### **Covering**

The prototype was covered using light grey Oracover from J Perkins. An alternate covering can be obtained from 4-Max

As I mentioned earlier, there is a full set of decals available for this model and these are available from [www.tonyijnhuisdesigns.co.uk](http://www.tonyijnhuisdesigns.co.uk)

Fit all the control surfaces with flat hinges and secure with glue. Fit all the control horns and pushrods for the tailerons servos.

The canopy can either be fitted before or after covering. I prefer to detail the cock pit, fit the canopy and then cover the model around the canopy, but it's up to you.

The battery should be secured using self-adhesive Velcro.

## **Flying**

The first thing to note is the wing loading is surprisingly low for this model; only 22oz/sq', so hand launching it is quite easy. You will need full power and a firm throw. Make sure it is straight and slightly up. I suggest for its maiden flight you get a trusted helper to launch the model for you. The model is remarkably strong and if you don't get it away first time, it will survive.

Once the hand launch is mastered and trimmed for flight, the model will get away with little fuss, but will require a touch of elevator just after hand launching as the nose does drop.

When you get the model airborne and assuming you have cut in the fan breather holes, you will notice how spritely the model is. Once the initial climb out has been executed and the model is fully trimmed, you can easily pull back the throttle to two thirds stick position and enjoy what is a very scale flying performance.

You'll find the model simply grooves and flies on rails, especially on a calm day. However, if you do fly on a windy day, the model will be thrown around a bit so be prepared to fly with more throttle, but I would suggest you save this little beauty for calmer days and winds up to 10mph.

All the classic jet manoeuvres can be done with this model, but you will need full throttle and speed on some as the model doesn't have the momentum to carry through manoeuvre such as big loops etc.....just remember to keep the routine smooth and keep what little momentum it has, going.

Landings are very straightforward and generally you will run out of elevator control before the model will stall. The glide angle is quite flat, even without power.

Don't be tempted to adjust the C of G. The F-16 has been thoroughly tested and where it is shown on the plan is exactly where it needs to be!

The little 4S-11 bladed FMS fan unit, does give an amazing punch and flight times are surprisingly good, so expect a good 4 minute duration, depending on throttle use.

The F-16 is a lovely little model and flies very well indeed, using just tailerons. A cheap model that could be made from what you have in the scrap box, a £42 fan unit, ESC, a battery and a couple of servos, and you instantly have big fun for minimum cost.

Enjoy!

### **Specification:**

Wing span- 23" (584mm)

Length- 31" (789mm)

Wing loading- 22.oz/sq'(6.7kg/m<sup>2</sup>)

Target Weight- 22oz (0.625kg)

Addition Plans, VAC set, combined CNC / Wood packs, pilots and Decal sets are available from:

[www.TonyNijhuisDesigns.co.uk](http://www.TonyNijhuisDesigns.co.uk)

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