26" DUCTED MIG 15 AND F86-SABRE

Sometimes in your life it nice to have a little nostalgia trip with gentle stole down memory lane and my latest offering for this year's 2018 RCM& E Special has taken me back some 26 years and the days to the early 1990s. Those seasoned modellers among you may well remember the Westfield range of 'Jet fun fighters', that I designed, manufactured and had distributed by J Perkins to all good model shops…ahhh.well that's of course when we had model shops… happy days….

The first four models in the Westfield range were the DH Vampire, the P80 Shooting Star, the MiG-15 and the F86 Sabre. Out of the four aircraft the main battling duo were of course the MiG and the Sabre and to be honest, they were the best flyers out of the range too and also my own personal favourites.

So when our esteem editor suggested doing a jet dog fight double for this years free pull out plans, I had a pretty good idea of what the subjects were going to be. During those heady Westfield days, when kits were king, power was generally restricted to those prop driven noisy IC things; electric was still very much in its infancy and electric ducted fans were incredibly rare. I remember at the time thinking that one day, hopefully in the not too distant future, these models really will be able to fly as jets…..well it may have taken quarter of a century to get there, but I think we may have just made it…oh Happy Days.

In 2015 when the 42" EDF Hawk was published to the readership of the RCM&E, it proved to be a great success especially when I made the ducted fan installation a lot simpler and did away with the fan intake ducting which could always over complicated a scratch built ducted fan model.

In recent years ducted fan design has offered the inlet bell-mouth as a standard feature and this effectively does away with the need for a smooth moulded intake. As a consequence it allowed for a simpler installation of the EDF unit into the fuselage and only requires the fitting of the discharge tail pipe to the back end of the EDF.

Now I will admit that the smooth intake ducts with a non-bell mouth, are still generally found on most ARTF designs as they do provide a more efficient installation. But when it comes to designing a traditional balsa wood design, the intakes have always been something that makes the design over complicated and adds a level of additional weight that could be avoided.

The simple analogy is; as long as you make enough holes in the front of the fuselage to allow the fan to breathe, you will have a ducted fan model that will work without the faffing about of trying to make smooth intake ducts.

In recent years, the fans and in particular the fan blade technology has improved immeasurably. The motors are incredibly powerful and the invent of high discharge Lipo batteries has been a revelation. Put this all together and suddenly we have ducted fan set ups which delivers almost turbine power performance.

When I decided to develop these two models the idea option was to keep them relatively small and light and plumb for a really cheap 50mm fan unit. As cost was really important, I managed to find a really cheap fan unit from AEO on the Hobbyking web site. The stated thrust was around the 380g or around the 14oz mark so the ideal all up weight should ideally match that. (Now-a-days look for the PowerFun or FMS units as these are mmuch better quality and provide more power!)

When the first Sabre prototype was produced, I was expecting mixed results and the first attempt of get the model into the air resulted in a rather prolonged powered glide with full up elevator being applied. It turned out to be a very forward CofG and not enough elevator authority but as I always say….forward C of G is a safe place to start from! The second attempt proved much better and I managed to get a few circuits out of the model but the turn of speed I have to say was disappointing….The point I made earlier about having enough of an opening in front of the fan to allow it to breathe properly, was the key to understanding the reason behind this disappointment. So realising that the air feeding the fan had to wind its way passed batteries, and all manner of wiring etc, it was not surprising the fan was being strangled and the performance poor. So to overcome this, a couple of cheat holes were cut into each side of the fuselage, just upstream of the fan. The next attempt saw the Sabre scuttle away like homesick angle…..those holes really did make quite a difference!

So there's a potted history of the highs and lows leading up to the finished prototype.

So its decision time…. which one you are going to go for. What I would say is the MiG15 dose have the slight edge as it is easier to grip for hand launch and a 'tad' more stable on the launch.

To assist the builder, I have once again made available a VAC form canopy and complete CNC/wood pack for those who wish to make the build a little easier. These will ONLY be available though Tony Nijhuis Designs Ltd (TND) and not Myhobbystores. The plan itself will only be available in this edition of the magazine with future copies again only being available again through TND Ltd.

A few other points to note, the 3s-50mm AEO fan units and cheap 30amp controller, were sourced through a Chinese distributor. 4-MAX in the UK should be able to provide these too. The battery was a 3s-1500mah 30c Lipo and servos were cheap and cheerfully 4.5g-6.0g 0.5kg/cm torque nano servos.

Lastly and possibly the most important, a photographic build log is available as a free download to print out from www.tonynijhuisdesigns.co.uk. These photos will be invaluable and I would suggest downloading these so you can familiarise yourself with the build before you start.

Due to limited space in this article, I won't be detailing the build of both models, instead, I shall be concentrating on the Mig-15 as this is the slightly more complicated model, but I shall refer to the Sabre if there is anything noteworthy to relay. In reality, the builds are very similar so don't be put off building the Sabre just because there's less detail in this article… it really is very easy to build….

So assuming you have decided which model to go for, let's crack on with the build.

Wings

The wing parts are made from 6mm (¼") medium density balsa sheet and each wing panel is made of 3 parts. Weight the individual parts and interchange them in order to achieve an equal balance wing. Now glue the wing parts together to form a left and right hand panel.

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 wings panels to a smooth flowing profile.

Now cut out the ailerons remembering to mark which one fits to what wing. You may have gathered that as the wings are shaped fully symmetrical, it doesn't matter which one is the left or right.

The wings can now be joints together and the 3mm birch ply wing spar fitted.

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

Fuselage

Begin cutting out the fuselage side pieces 10 and all formers 5 through to 9.

Mark the location of the formers onto the left and right hand side of each fuselage side. In the case of the Sabre, add a strip of 9mm triangle between 5 and the wing root leading edge and a strip of 4.5mm sq balsa along the bottom edge of the fuselage between the wing trailing edge and former 9.

Now fit the formers 5, 6 & 7 to one side of the fuselage sides Former 7 is the fan support so make sure the fan fit through this (with the wiring) before gluing. Also make sure you drill the two small elevator cable holes in the position shown on the plan.

Now fit the other fuselage side and add all the remaining formers 8 & 9.

At this point, it is advisable to make up and tape into position 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 A4 sheet of this on EBAY or from a stationary's. Now fit the fan and secure to former 7 with hot glue. Roll the tube

and slide it in from F9. Finally run a piece of tape along the joint and use some Evostick adhesive to secure the tail of the cone on to former 9.

You also may wish to solder on the ESC to fan motor and check rotation at this point. For the Sabre, you will need to sand the edge of the fan bell-mouth slightly where the top fuselage sheeting rolls into former 7.

Now fit the 4.5mm x 6mm sq stringers to the top and bottom of the formers and 4.5mm sq stringers only to the sides of the formers.(Sabre only uses 4.5mm sq stringers).

The top and bottom fuselage side pieces are made from 2.4mm balsa sheet and can now be cut trimmed and fitted. (Sabre only has the top pieces). Using a razor plane, trim the fuselage edges flush with the top and bottom of the formers and then test the fit of the top and bottom 4.5mm sheeting against the formers. When happy, glue the sheeting into position and trim to shape….Note on the plan the extent of the 'edge rounding' on the corners of all the formers, to achieve a smooth flowing curve…..don't scrimp on the shaping as it will make the difference to the look of the model…

The next thing to tackle is the nose section. On both models, this is a 'shaping' exercise so make sure your razor plane has a new blade in it….start by fixing into position side piece 20 to the angle as shown on the plan (Sabre are fitted perpendicular). If you have bought the CNC pack, note that these pieces are made from laminates of 6mm sheeting to from a 12mm thick piece. This is only done for ease of manufacture. If you are 'scratch' building them I suggest you use 12mm balsa sheet instead.

Now add the top and bottom pieces using 12mm sheet balsa. Finally using 12mm triangle (Sabre- 9mm triangle), add fillet pieces to the inside corners as indicated on the plan. The shaping of the nose is quite important so use the front nose profile shown on the plan and transfer this to the nose of the model. Then very carefully profile the fuselage into the nose section and onwards to the front edge.

The fuselage fillet extending rearwards from former 9 can now be added using scrap and shaped using a razor plane and sandpaper as shown on the plan.

Mark out the fin slot and cut this out. (Sabre- cut both fin and tailplane slots).

The top fuselage access hatch can now be marked and cut out. Use a small hacksaw blade to cut through the top sheeting to the depth shown on the plans. Then, using a straight edge, cut through the side sheeting on each side. You will need to use the hacksaw blade again to cut across the top of former 6 to free the hatch. When removed I suggest you line the inside cut edge of the fuselage, with scrap 4.5mm sq balsa to give the hatch opening, strength.

To retain the hatch I used one of the small brass SLEC spring catches at the rear of the hatch and a locating pin at the front, as shown on the plans.

Finally, cut away the middle of former 6, again using a hacksaw, to allow the wing to pass through the fuselage.

Fin & Tailplane

To make up the fin use parts 11 to 16 and build the structure over the plan. Now skin one side of the fin with 1.5mm balsa. Trim the tailplane opening between 14 and 15 and

remove the excess sheeting over hang from around the fin.

The two control cables that operate each elevator half, should now be fitted. I would suggest you use the Sullivan 2mm 'gold' fine cables for this installation as they give a much smoother control movement and give greater flexibility. You will have to cut away part of 16 to get the cable out of the base of the fin.

With both cable outers exiting the fin as shown on the plan, enclose the fin with another piece of 1.5mm sheet balsa and again, trim the excess overhang.

Put the fin aside and only glues into position once the model is nearing completion.

Now make up the tailplane using parts 17, 18 & 19. Round off the tailplane leading edge and chamfer the elevator leading edge ready for the hinges to be fitted.

Putting together

The wings can now be glued into position and the fin fitted. Make sure you feed the control cables through former 7 before gluing the fin into position.

Now add the tailplane to the fin

At this point it is worth trimming the fuselage to allow the aileron servos to be fitted and cut the crescent shape cheat air scoops located under the wing. These air scoop are available from SLEC and on the prototype, I used the large version on the Sabre and the small version on the MiG-15.

Returning to the Sabre, the tailplane requires dihedral so on the plan is dihedral template. Trace this on to a piece of card and before you fit the fin, use the template to position the tailplane before gluing into position. The fin of the Sabre can now be fitted.

The Sabre underside needs a piece of 12mm sheeting fitted directly under the wing. Make this in two parts to take account of the wing dihedral. Note the cut recesses for the aileron servos. This under piece should now be bended smoothly into the 4.5mm sheeting, in front and behind the wing.

Now make up the under wing hand launch grip as detailed on the plan. This grip is quite important as it not only give you a firm hand launch gripping position, it also protect the aileron servos from damage when the model 'belly lands'.

Covering

The prototype MiG-15 was covered using red and silver Easycoat from J Perkins and chrome Easycoat for the Sabre. The decals were supplied by www.becc.co.uk. This great little company do all kinds of decals in packs so I bought a number of packs which included 75mm Russian and US insignias plus also lots of quirky signage too. Everything you see on these two models was supplied by BECC.

Fit all the control surfaces with flat hinges and secured with glue. Fit all the servos and the all the control horns etc.

The C of G position should be achieved without any ballast. The battery was secure using self-adhesive Velcro so this can be moved to achieve the correct C of G.

The canopy can either be fitted before or after covering. I prefer to detail the cockpit, fit the canopy and then cover the model around the canopy, but it's up to you. Finding a scale size pilot to fit this model will be near imposable….I have looked everywhere!. What I finally used was a small 'split' vac form pilot I had used on one of my old Spitfire designs, and cut it down so literally only the neck and head was left…no shoulders! If you cut a square recess through the top sheeting, as shown on the plan where the pilot will sit, it will just clear the inside top of the canopy.

Flying

So having given you a taster at the beginning of the article, I'll go into a little more depth with the quirkiness of these little ducted fan models.

The first thing to note is the wing loading is quite low for both these models; only 16oz/sq' so hand launching them is remarkably easy. You don't need a javelin type throw just a firm push but make sure it's straight and level. Throwing the model up at a sharp angle will result in possible disaster. The models are remarkable strong and if you don't get it away first time, she'll survive.

Once the hand launch mastered and trimmed for flight, the model will get away with no fuss and very little control input. In fact the prototype MiG was so stable, she flew straight out the hand and remained straight and level with no input what so ever! The Sabre will need a touch of elevator a second or so after hand launching.

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

You'll find the model simply groves and flies on rails especially on a calm day. However if you fly on a windy day, the model will be chucked around a bit! Controllable but not much fun so save this little gem for the calmer flying days.

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, especially the MiG.

Don't be tempted to adjust the C of G. both models have been thoroughly tested and where it is shown on the plan is exactly where it needs to be!

The little 8 bladed AEO fan unit only weigh 60g and for their weight, they do give an amazing punch. The only slight down side is the balance of the fan ….its not great and

at low speed, the fan will resonate. Fortunately the speed where this happens is well below the power needed to fly the model so in reality, resonance is only noticeable on fan start up and shut down.

So all in all these really are cracking little models. The ethos was to put the fun back into aero modelling at a budget that hopeful all will be able to afford.

Enjoy!

Specification:

MiG-15
Wing span- 25.5” (650mm)
Length- 24.5” (625mm)
Wing loading- 16.oz/sq’(3.9kg/m2)
Target Weight- 16oz (0.45kg)
Wing area- 0.1 m

F86 Sabre
Wing span- 25.5” (650mm)
Length- 23.5” (605mm)
Wing loading- 16.oz/sq’(3.9kg/m2)
Target Weight- 16oz (0.45kg)
Wing area- 0.1 m2

Addition Plans, VAC set, combined CNC / Wood pack for either model available from :
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