37” JET PROVOST

For those of you who have built and flown the 50mm edf version of the Jet Provost we launched in 2019, you will hopefully agree it was a super little model. I always thought a 70mm edf version was always on the cards if a 4s version became available and was both cheap and powerful enough. Sure enough both FMS and PowerFun have produced a 4S unit that would really suit a scaled up version of the Jet Provost.

So this is the third and last model in the Midi Jet series and if I’m honest, this is probably the prettiest and best looking out of the bunch so far.

One of the key elements I really wanted to achieve on these new ‘Midi’ size of model, was to keep the wing loading down to less than 30oz/sq’ and around 3lbs in AUW.

Unlike the Hunter, which was scaled up by 140%, I decided to scale up the smaller 50mm edf Provost by 132%. This was because the smaller size could still easily house the 70mm fan and would also keep the power to weight ratio closer to ‘one:one’. Notwithstanding this, the Provost, at 37” span, did come out a tad over 3lbs, so not too bad. At this weight, the model is still very hand launchable, either by the pilot or a trusted helper.

So, this new ‘Midi’ jet has been tested using the 4S FMS 70mm fan unit which gives around 2.75lbs or 1250g of thrust. Also available is the 4S PowerFun unit (both units available from 4-max.co.uk)……these units will give another 200g or so of thrust, over the FMS version and are considerably cheaper too. Some of you may be tempted to use a 6S version of either fan, but there really isn’t a benefit to this unless you already have a stash of 6S 3200mah LiPos kicking around.

You may have seen George Worley version of the Provost on Essential RC….He built the model last year from a prototype plan I printed for him, and powers the model with a 70mm PowerFun 4S unit and by all accounts, loves the model to bits.

So after the Jet Provost, and just to whet your appetite, there will be a couple of new twin 50mm EDF models in the pipeline for later this year…these will be a Larger TSR2 and a BAC Harrier….and before you get too excited, No it won’t be a VTOL…lol

To assist the builder, I have once again made available a VAC formed canopy and side intakes and a CNC/wood pack, for those who wish to make the building process a little easier and quicker. These parts will ONLY be available through Tony Nijhuis Designs Ltd (TND) and not Myhobbystores. The plan itself will only be available in this edition of the magazine with future copies only being available again through TND Ltd. At the time of writing this article, we are once again experiencing yet another shortage of light grade balsa wood, so please check our web site for availability of the CNC/wood parts.

The battery used in the prototype, was a 4S-5000mah 30-60c LiPo and servos were metal geared 10g, 2.2kg/cm torque and 17g 3kg/cm servos. For the ESC, buy a 60-80amp 4S units as it will be lighter and hopefully have none of these unnecessary programming features…..you want a simple switch on and go.

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.

Wings

The wing parts are made from 8mm (5/16”) medium density balsa sheet and each wing panel is made of 4 parts. Weigh 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 which 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 joined together and the 6mm birch ply wing spar fitted. To add a little extra strength, cut a 50mm wide strip off 50g/m^2 glass cloth and wrap the wing join top and bottom. Secure the cloth with PVA glue.

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 6/7 and all formers 9 to 14. Note the wiring and elevator push rod hole in former 11.

Mark the location of the formers onto the left and right hand side of each fuselage side. Add strips of 18mm triangle along the top and bottom edge of the fuselage as shown on the plan. Add the 3mm lite ply wing seat doubler 8 to the inside of the fuselage sides.

The top and bottom edge triangle will require some saw cuts at regular intervals to allow the triangle to easily follow the tight curved edge of the fuselage.

Now fit the formers 9 to 11 to one side of the fuselage. You will note that former 12 is slotted into former 11 to create the fan mounting former. Former 12 should not be fitted to 11 yet at this stage. Also, former 11 is glued at a set angle. Use the template shown on the plan to achieve the correct angle

Now fit the other fuselage side and add the canopy edge reinforcement pieces 15 to the inside edge of the fuselage.

Using scrap 6mm lite ply, make up the fan mounting plates and glue these to the fuselage sides, just behind former 11.

The remaining formers 13 and 14, can now be added. You will need to add a reinforcement strip of lite ply along the top of former 10 to avoid this breaking when pulling the fuselage side together at the nose. You will also need to wet the outside of fuselage side to assist with bending and dare say, a fuselage Jig will also be an invaluable tool too.

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 A3 sheet of this on EBAY or from a stationer….it is basically the thin clear plastic used on 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, making it as a straight tube. Then secure with a small piece of tape at the fan.

The fan can now be secured with screws to the mounting plates. Now tack glue 12 to 11 in order to make a complete former. This former is made in two parts just in case the fan should ever need replacing

Now slide the rolled tube in from the rear of former 14. 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 wire is 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 top 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 14. Use a single dob of hot glue on the bottom to secure the thrust tube to the fan casing. Then a single dob against former 14… it doesn't need any more glue than that and allows easy removal of the thrust tube, should you ever need to.

I would suggest at this point you loosely fit the ESC and check the fan motor rotation is okay.

From 5mm sheet balsa, sheet the underside from former 13 back to the wing leading edge. Now add the top 12.5mm sheeting between formers 13 and 10.

Now sheet the cockpit using scrap 3.2mm balsa from the fuselage sheets. Working backwards along the top of the fuselage, cross grain the fuselage between 15 and where the access hatch starts. Then with a single piece of 5mm balsa, sheet the remainder of the top fuselage, down to the tailplane

Now cut out and fit the cowl cheeks from 12.5mm balsa sheet stock, using the template shown on the plan.

Now install the elevator control cable outer. I would suggest using the 3mm orange tube from SLEC or 4-Max.co.uk.

With one length of 5mm balsa sheet, add the underside decking from the wing trailing edge to the rear of the fuselage.

Now add the top nose section made from 12.5mm balsa and add 12.5mm triangle to strengthen the inside joint edges .

Sand the front nose edges straight and make up the nose block from laminates of 12.5mm balsa. Make sure you cut to the side profile of the nose block as shown on the plan and glue this to the cowl in the exact position shown on the plan. If you do this the correct nose profile will be achieved.

Now for the ‘shaping’ exercise, so make sure your razor plane has a new blade in it….

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

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

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 to release the hatch. The hatch will only have limited use and once the elevator servo and ESC is installed, it can be sealed closed with tape or covering film, after the model is covered.

A second hatch, to provide access to the battery, is cut in the underside just forward of former 10.

To retain this hatch I used one of the small brass spring catches from SLEC/4-Max at the rear of the hatch and a locating pin at the front, as shown on the plans.

Fin & Tailplane

To make up the fin, use parts 19 to 21 and glue them together. Profile the fin leading edge. Put the fin aside and only glue into position once the model is nearing completion.

Now make up the tailplane using parts 16 & 17. Cut a groove into 17 to allow the elevator torque rod to recess into. Make up the torque rod and grease this before inserting and gluing 17 to 16. Round off the tailplane leading edge and chamfer the leading edges of elevator 18, ready for the hinges to be fitted.

Putting together

Now glue the wings into position using PVA. Make up two fillet pieces from 5mm scrap balsa. A template is shown on the plan and these are glued inline with the fuselage sides. Now cut out a piece of 5mm sheeting to bridge between the front leading and rear trailing edges of the wing. You may need to sand across the joint at the trailing edge to blend into the rear fuselage sheeting, if necessary.

Now glue the tailplane and fin into position.

Now mark out the locations of the aileron servos and 'sink' these into the under sheeting, against the wing. Because the servos are glued into position, cut the mounting tabs off to make a neater installation.

Now make up the under wing hand launch grip as detailed on the plan. This grip is quite important as it not only gives you a firm gripping position, it also protects the aileron servos from damage during landing.

The final step and most important of all is the large cheat air intake hole in the underside, and the top of the fuselage. Make sure you chamfer and smooth the entry leading edge of the opening and don't be tempted to reduce the size of the openings. They need to be the size they are.

Covering

The prototype was covered using red (Ferrari red), white and black Oracover from J Perkins. The lettering decals, roundels and pilots are available from www.tonynijhuisdesign.co.uk. The paint used to paint the plastic air intakes was the matching Oracolor in Ferrari red.

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

The C of G position should be achieved without noes weight and just the 4S battery. Do not be tempted to move the C of G back from the stated position!

The battery was secure using self-adhesive Velcro.

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.

Flying

Although the wing loading is relatively high; at 29oz/sq', hand launching the model is fairly easy. You will need a firm throw and make sure it is straight and level. 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, she'll survive.

Once the hand launch is mastered and trimmed for flight, the model will get away with little fuss and very little control input. On calmer days, expect to hold in some up elevator for 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 and the model is fully trimmed out, 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 grooves 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, so be prepared to fly with more throttle.

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.

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

The 4S 11 bladed FMS fan units do give an amazing punch and flight times are surprisingly good. So expect a good 5-8min depending on throttle use.

I have to say that enlarging the Provost as I did with the Hunter, and the Gnat, was always on my agenda. But the outcome has far outweighed my expectation, and dare I say it, it is one of the prettiest and smoothest flying models in my collection. Its small enough to sit in the back of the car, ready to go, but it looks, feels and flies like a turbine model, and dare I say it, sounds like one too!...Because the 4S fan is running slower, you really do have that lovely turbine roar rather than the Dyson whine (other vacuum cleaners are of coarse available). So, all in all the 70mm EDF Provost is a great little model and flies incredibly well. You really will enjoy flying this one!
Enjoy!

Specification:

Jet Provost
Wing span- 37" (930mm)
Length- 34.5" (875mm)
Wing loading- 29.oz/sq'(8.85kg/m2)
Target Weight- 52oz (1.47kg)

Addition Plans, VAC set, combined CNC / Wood pack are available from :
www.tonynijhuisdesigns.co.uk
email- sales@tonynijhuisdesigns.co.uk
Phone- 07563 518159 9am to 4pm