Kalt 'Enforcer ZR' up-date plus EZ 'Black Shark' fuselage.

This kit review is slightly different in that it combines an up-date on the 'Enforcer ZR' with the fitting of an 'add-on' fuselage to that machine.

History and Justification

The Kalt 'Enforcer ZR' is the American version of the 'Space Baron S'. The only real criticism was of the main blades supplied with the kit (knowing that those supplied with the British kit were different) and a certain amount of distrust of the additional blade flexiplate's ('bump stops') which are a feature of the rotor head of the 'Enforcer', Since then, the additional plates have been removed, converting the head configuration to that of the 'Space Baron' and several different types of blades have been tried, including those supplied in British 'Space Baron' kits.

At an early stage, it became clear that the use of weighted GRP and carbon fibre blades were producing a situation where not all of the collective pitch changes that were being commanded were actually reaching the blades due to losses in the swashplate mixer (washout unit). Various 'cures' were tried to eliminate this problem.

The original clutch worked beautifully and no problems have been experienced with vibration from the clutch/fan/starter cone assembly. However, the starter cone has a very shallow angle, which seems to 'grab' the starter rubber and caused some shaking when the starter was applied. It was decided to try a 'True-Spin' fan, which has a different starter cone arrangement. This was done with some misgiving due to a natural reluctance to change something that didn't really need fixing.

We had been told by the supplier that the ST 'G34H' should be run on 'straight' fuel and could not be set up on fuel containing more than 2% nitro. Other people had suggested that problems can occur when using the Weston pipe with this engine - specifically running rich in the mid-ranges.

We would have liked one of those very nice Kalt GRP 'Aggressor' fuselages, but price and availability ruled that out so it had to be one of the EZ range. Looking at the available choices it was concluded that, of the 'scale' subjects, the 'JetRanger' had been done to death, likewise the '222' (which needed retracts anyway), and the 'Squirrel' simply didn't look like a 'Squirrel'! That left us with the 'Black Shark', which I rather like - despite the resemblance to 'Sting Ray'!

First things first

Back to those flexiplate's. Their removal produced a slight, but definitely noticeable improvement in smoothness, which became even more marked when switching to glass or carbon blades. Both NHP carbon fibre and G-Blades in tinted epoxy glass were tried and it was difficult to find any real difference between them (both sets weighed virtually the same). The NHP blades are a little better at the bottom of an autorotation, because they are rather more progressive during the flare part of the manoeuvre. G-Blades rev a little faster at a given pitch setting (they have thinner tips) and seem to have a little more 'bite' in some situations. One little characteristic of the actual set of G-Blades that we used was that there was no 'wobble' during the spin-up process. All blades do this as a general rule, but this particular set didn't!

After the amount of work that was needed to get the original wooden blades to run smoothly, both the carbon and glass/epoxy blades were notably free from any balance or tracking problems and it was possible to swap from one set to the other without any need to adjust the tracking - full marks to both Dave's! J Perkins (Distribution) sent along a set of the blades that are included in the 'Space Baron' kits. These are made by K&S as are the 'Enforcer' blades. Both the blades themselves and the plastic root cuffs are different. The dense laminated portion of the blade extends further back and the cuffs have been changed so that the fixing bolt bosses take away far less of the structural part of the blade. Having said that, however, there was still a considerable difference in the span-wise CG position of the blades and some adjustment was needed to get them to track. These blades weighed no less than 125 grams!

Overall, removing the extra flexiplate's and using either NHP or G-Blades produced a smooth high-revving machine. A set of NHP tail blades has softened the tail response slightly without reducing the tail power. I look forward to trying a set of the new G-Blades tail blades mentioned in the January issue of 'MHW'.

When using the original wooden blades, I noticed that the top-end pitch setting was quite critical to obtain the maximum climb rate and I remember that this was the case with the original 'Space Baron' (even more so, as that had less power and tended to 'load up'). When using the carbon or epoxy/glass blades, there was a marked difference. It seemed that more pitch was needed to obtain the same climb rate.

Adding still more pitch didn't seem to make any difference and there was no tendency at all to 'load-up'. In fact, the motor seemed to be able to 'pull' an unlimited amount of pitch.

This was something that I had experienced earlier with the original 'Space Baron' when I tried an early set of G-Blades and it was fairly clear that the pitch travel demanded simply wasn't reaching the blades, due to flexing and lost motion in the mixer unit, particularly when the motor was 'on-pipe' and had the bit firmly between its teeth. This is something of a vicious circle, since more power means more RPM, which means more blade stability, which means that less pitch actually reaches the blade, which means more RPM, which...

Obviously, this is a common problem since several sources came up with add on metal mixing arms at around the same time. Eric Power went a bit further and produced both a metal mixer body and a metal clamp for attaching the aileron and elevator bell cranks below the swashplate.

These all make an improvement, particularly the metal mixing arms, but the basic problem lies in the assembly of the mixer unit. All of the standard plastic arms are double ball-raced arid pivot on 3 mm bolts with a spacer between the ball-races. The purpose of this spacer is to allow you to tighten the bolt down without locking up the ball-races. By sheer luck (?) one of the original spacers was lost and a replacement was made from brass tube. When examining the assembly at a later date, it was very clear that one of the arms had considerably less play in it than the others and - you guessed - it was the one with the custom-made spacer.

There is a lot to be gained from careful assembly of the mixer, paying particular attention to the spacers and the tightening of the bolts. By this means, you can considerably improve the performance of the standard assembly. The same applies to the use of metal mixer arms, but this is less critical.

Engine and fan

Changing to a 'Tru-Spin' fan produced a noticeable increase in draught below the engine and produced the anticipated smoother start. There was no other improvement, however, as I had been lucky with the original item (well, I did balance it before use).

I can find no noticeable difference between running the motor on 'Duraglow straight' or 'Duraglow 5%', using a Super Tigre 'Blue card' glow-plug. I take this to mean that the compression ratio on this particular motor is not excessively high. I can visualise a situation where a higher compression ratio might give problems with 5% nitro but, in my experience, this is rarely a problem with Super Tigre engines.

The matter of rich running in the midranges, which appears to bother some people is solely due to the fact that the Weston silencer actually does what it claims and works like a tuned pipe. When the motor comes 'on-pipe' it needs more fuel and the main needle has to be set to cater for this, rather than the mid-range. The only real cure for this is to use idle-up to keep the throttle above the point where the pipe stops working. One advantage of this is that the motor never 'hangs' on the pipe because it goes rich when you close the throttle.

With the approach of colder weather it takes longer for the pipe to get up to working temperature and you can actually lift off and hover with the motor well below normal RPM and throwing out lots of smoke. After a few seconds the revs rise rapidly and everything returns to normal. For the rest of the flight, the motor works normally. These are classic tuned pipe characteristics. After three gallons of 'Duraglow 5%', the motor is still getting better and there are no signs of varnish. What's more, I haven't touched the needle setting since the second tank of fuel.

One interesting aspect of all this is that I would never have considered using this fuel (only 15% oil) if the motor supplier had not insisted on it! Neither would I have used a tuned exhaust system. My views on the use of castor oil are probably well known by now, and they still stand for other forms of modelling, but I have to admit that the situation in quite different in helicopter applications.

More flying

Having discovered the need to keep the revs up to keep the motor on the pipe and the tendency to 'lose' pitch travel, I soon realised that here was that rarity of the model helicopter world - an

overpowered helicopter! Certainly the model is pitch sensitive in forward flight, and awesomely fast. The rate of climb depends on the blades fitted and the amount of pitch being used and it is easy to get a situation where the revs seem to go on rising indefinitely in a vertical climb.

I pointed out in the original review that I could not obtain the same symmetrical (equal plus or minus) set-up that I did on the original 'Space Baron' and I still have not discovered why. For this reason, I have done very little '3D' flying with this machine. However, I feel that the fitting of a fuselage will make this irrelevant.

Coincident with fitting the fuselage I took the opportunity to fit one of the new G-Blade carbon rod tail drives - never make more than one change at a time - remember!

The fuselage

This consists of a number of vacuum formed mouldings in the usual white ABS based plastic. The two main halves are already joined along the lower seam, and around the nose. They are also joined immediately behind the removable upper hatch, with the top of the boom left unjoined. A separate moulding covers this join after completion, giving the appearance of a tall drive cover similar to that fitted on many full-size machines. Two more mouldings are supplied which make up the rear of the boom and the upper and lower fins. Another two mouldings can be fitted outside the fins to cover the tail gearbox on some machines.

Finally, there is the upper hatch moulding which is already trimmed to an almost perfect fit on the body. Also included is a ply plate to fit in the bottom of the body under the mechanics and a host of screws and small fittings.

The instructions are in Japanese with a typewritten translation. As with most kits of Japanese origin, the diagrams are so good that you can get along without the instructions.

It is very clear that the intention is that the fuselage should be assembled around the mechanics, leaving them virtually trapped inside. To this end, coloured trim material is supplied so that painting is unnecessary. Patterns for the 'official' colour scheme are not supplied, but the trim lines are embossed into the fuselage material; the intention being that you apply an oversize piece of trim and then cut it to match the lines on the body. The hatch is attached by means of metal clips on the body which accommodate the fixing screws. These screws are large and rather obvious for my taste.

I decided immediately that I would paint the fuselage, since I felt that this would be rather less tedious than the advised method.

The method of attaching the fuselage to the mechanics varies depending on which of the '30' size machines you have. For obvious reasons, we will concentrate on the 'Space Baron'/'Enforcer' series here. This machine has a different undercarriage fixing to all the others (separate left and right halves, which are bolted to the side frames) and needs a slightly different method of fitting in a fuselage. The previously mentioned ply plate has four right-angled metal brackets bolted to it. These bolts also serve to attach the plate to the bottom of the fuselage. The metal brackets fit between the undercarriage struts and the helicopter side frames.

This means that you have to cut holes in the fuselage, just above the bottom, and drill holes in a suitable position so that you can tighten the fixing bolts. The holes don't need to be big enough to clear the head of the bolt. The size and positioning of these holes is something that can only be determined by fitting and cutting, fitting and cutting, etc. This is a 'fiddly' operation which I rather like, but many don't...

The resemblance to a colander is an illusion

Having got your holes positioned, the fitting procedure is to insert the undercarriage halves from each side, add the fixing bolts, insert the mechanics, squeeze the side frames inside the metal brackets, position the undercarriage halves and tighten the bolts. Simple, if you have three pairs of hands! Oh yes, if you are using a Weston pipe, it needs to be fitted before inserting in the fuselage, so that's two more holes to position in advance. This all looks rather intimidating in the early stages, but reducing the width of the lip around the fuselage opening helps considerably and the mechanics will go in. The biggest problem here was the outlet pipe on the silencer, and I seriously considered shortening it.

Fortunately, this is not as fiddly as it might sound, because the positioning and alignment of the side frames/brackets/undercarriage halves is assisted by the fact that the metal brackets are sized so as to fit neatly inside the moulded recesses on the side frames which normally accommodate the undercarriage. That's a very long sentence, let's try to simplify it. The side frames have moulded recesses which accommodate the undercarriage struts. The metal brackets mentioned earlier fit inside these recesses very closely and automatically align with the holes for the undercarriage bolts. Like I mentioned earlier, you are obviously meant to close the top of the rear fuselage with the model inside it. It didn't take long to find that it is possible to remove the boom and refit it from the rear of the fuselage as there is clear access to the boom fixing bolts. Obviously, you must remove the tailplane and you need another support for the tail control wire, all of which will slide down the boom without problems.

The length of the fuselage is set for long '30' size machines, but a cut-out is needed between the fins to take the tail gearbox on the 'Space Baron S' because the original fin fixing screw bosses won't go inside the rear of the boom. If you use a shorter helicopter, you will need a bigger cut-out and extra mouldings are supplied to cover this cut-out and reinforce the fins. Unfortunately, these extra mouldings taper down towards the rear, which means that you could not slide the tail gearbox out (not on a 'Space Baron' anyway) and it would again be 'entombed'. I would suggest that the easy answer to that one would be to up-grade to the longer boom while fitting the fuselage.

Cutting a recess for the tail box means that the fins become rather floppy. I fixed this by cutting a piece of balsa to fit inside the root of each fin and fixing with our old friend 'Stabilit Express'.

Having sorted that little lot out left me with the problem of access to the starter 'cone'. The simple solution would have been to use some form of starter 'wand' through a small hole in the fuselage top. However, this would have restricted the cooling air intake, so there was nothing for it but to cut a hole the same diameter as the starter cup. In fact, this did not spoil the appearance as much as I feared, as it resembles the sort of intake used on full size machines. Only when viewed from directly above does it look wrong? The hole already cut for the mainshaft is well positioned, but needs enlarging to clear the mixer.

Glow-plug supply was taken care of by fitting a 'phono' socket in the bottom of the fuselage, with an extension lead which plugged into the existing socket on the side frame. In a similar manner, one of those very useful JR charging sockets was fitted alongside, with another extension to the existing socket.

Access to the tank and needle valve was taken care of by cutting out a side window. Another hole was needed in the floor to allow the tank vent to exit without topping up the fuselage. If you use silencer pressure, this won't be necessary.

A 'loop on a stick' which fits around the switch slider allows the radio to be switched 'on' through the same window. An index finger is long enough to switch 'off'.

This left me with a fuselage which seemed to be riddled with large, odd shaped, holes. However, once all of the mechanics were fitted it didn't look too bad at all (sigh of relief).

Painting

The fuselage instructions stated that any type of paint could be used on the material used, which is true. However, there may be an adhesion problem, so read on.

I intended to use Holts 'Dupli-Color', which normally works well on this type of material, but needs fuel proofing. In order that the white parts would look nice and clean, the first move was to spray the whole fuselage white. When I started to mask off the other areas I soon found that the masking tape pulled off the white. Not too worried at this stage, I proceeded to spray the window areas. Here again, parts of the edges of the paint tended to come away with the masking, but I managed to patch that with a bow pen full of the appropriate colour.

With the deadline for photos fast approaching, I decided to play safe and finish off with the stick-on material supplied (alter all, I could always peel it off later and paint if desired) Guess what? Any attempt to remove and reposition the sticky material pulled off the white paint and ruined the stickiness.

At this point the only answer was to take a tissue pad loaded with cellulose thinners and clean off all the white - carefully avoiding my airbrushed windows. Strangely, this worked quite well (but messy) and produced no ill effects on the fuselage.

If the result looks a little lacking in trim, you now know why! The stick-on material works quite well, but there is a definite limit to the amount of compound curvature that it will negotiate. The instructions suggest using soapy water to help matters, but this stops it from sticking well enough to pull it around the curve.

I still think that a satisfactory painted finish is quite possible, provided that you break the surface of the plastic beforehand (try a 'Scotchbrite' pad). Who knows, I may try again.

Even more flying

So, it came to pass that one bright, cold, day in early January we ventured forth to the flying field to take some photos and fly the machine for the first time with a fuselage fitted. Filling the tank through the side window is no problem and you can see how full the tank is by tilting the fuselage.

Everything worked and it started first time!

It was even in trim in the hover (surprise) and it was soon being posed against a large, leafless, tree to please our art director. The particular alignment of sun, wind and tree meant that the model had to be hovered almost tail into wind, with lots of rudder held on. It was only later that I realised that the original piano wire tail drive would have made this very difficult, but the carbon rod drive gave a very steady tail. I will return to this elsewhere! After all the fiddling about with paint and sticky covering and hoping for the right weather at the right time, this was the ultimate anticlimax and, with three rolls of film used, there was still enough fuel left in the tank to explore the forward flight characteristics.

In pod and boom form, the 'Space Baron'/'Enforcer' series all tend to be nose heavy. With the fuselage fitted, the C of G is almost spot on the mainshaft. Although the difference is not noticeable in the hover - not in a gusty wind, anyway - there is a marked change in forward flight. It seems likely that the sponsons have a lifting effect too.

In autorotation's, there is a very marked tendency to lift the nose and I was applying lots of forward stick to make headway. This is all a matter of getting used to it and making the necessary trim changes. For the first tank of fuel through a new (fuselage) model it's very encouraging. There is no noticeable change in the performance, no doubt due to that fact that the fuselage is very light at thirteen and a half ounces all-up. After deducting the weight of the original pod and tail feathers, that gives an actual weight penalty of just over seven ounces.

Conclusions

The 'Space Baron' series is pretty well established on the scene and you either like them or you don't. There are many up-dates available, all of which have some improvement to offer, but the basic machine is still very practical and usable. Adding a fuselage to a pod and boom model can have drastic effects on the performance, but the EZ series add very little weight and are very practical. In standard form, as supplied, they provide a very easy route with the possibility to 'make a proper job' of them with a little more effort and perseverance. The added advantage here is that you don't need to make any changes to the original machine, whether it be standard or fully up-rated. In short, adding a fuselage this way adds much more appeal without any penalties or disadvantages.

Summary of items currently in use

Engine:	Super Tigre 'G34H'
Silencer:	Weston pipe
Main Blades:	NHP and G-Blades
Tail blades:	NHP
Mixer base and arms:	Eric Power
Tail drive:	G-Blades
Gyro:	Quest
Radio:	JR 'PCM10'
Servos:	JR 'NES-517'
Fuel:	Model Technics 'Duraglo 5'

Specification

Product:	Kalt 'Space Baron S'/'Enforcer ZR'
Manufacturer:	Kalt Sangyo Co. Ltd., Itopia Roppongi SO3, 2-2-2 Roppongi, Minato-Ku, Tokyo, Japan. Tel: 0188 550-3-8181. Fax: 0188 550-3-8180.

UK Importer:	J Perkins (Distribution) Ltd., 90 - 96 Greenwich High Road, Greenwich, London. SE10 8JE. Tel: 0181 692 2469.
USA Importer:	Horizon Hobby Distributors, 4105 Fieldstone Road, Champaign, IL 61821, USA. Tel: (217) 355-9511.
Main rotor diameter:	49.25 in. (1.25 m.)
Overall length:	42 in. (1.067 m.)
All-up weight (dry):	6 lb. 5.75 oz. (2.9 Kg.)
Main gear ratio:	9.75:1
Main to tail gear ratio:	1:4.9
Control requirements:	5 servos and a gyro
Power requirements:	'28' to '36' engine

Product:	'Black Shark 30' fuselage'
Manufacturer:	EZ
UK Importer:	Irvine Engines Ltd., Unit 2, Brunswick Industrial Park, Brunswick Way, New Southgate, London. N11 1JL. Tel: 0181 361 1123.
Overall length:	45 in. (1.143 m.)
Weight of fuselage only:	13.5 oz. (0.38 Kg.)
Weight of complete model:	6 lb. 13.25 oz. (3.1 Kg.)