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## Change your T-Rex into a nice SA315B Lama

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REVIEW

WORDS/PICTURES: JON TANNER

# Vario

## Lama T-Rex 700

CHANGE YOUR T-REX 700 INTO A NICE SCALE SA315B LAMA



**I** rather like the Lama so I was really interested when I saw that Vario were extending their range of scale models using Align T-Rex 700 mechanics to include the Lama. I first saw the prototype at the 2014 Vario Open Door Day and thought it had the making of a nice stand off scale model that would be a 'sensible' size for an 'everyday' scale model. I particularly liked how the T-Rex battery tray was retained and the whole canopy slid off to give access, thus the model was clearly very usable. I soon ordered mine from Vario Helicopter UK Sales, however John White

advised me that production samples were quite a way off – no problem, as I needed to find a T-Rex 700 to use as a donor machine.

I decided I would be happy with a second-hand model, so my first port of call was the BMFA Classified Ads, but no luck there so I sent out a 'round robin' wanted Email and was lucky. Kevin Lever had a T-Rex 700 FAI gathering dust so a deal was struck and at the autumn Charmouth money changed hands and so did the ownership of the model complete with plenty of dust!

The T-Rex 700 FAI was ideal for this project

because, as its name suggests, it was designed for smooth flight with good hovering stability for FAI F3C competition. The rotor head has a flybar and its Align RCM BL700MX 470KV motor means the rotor head can be run slowly, making it ideal for a scale model. Kevin had confirmed this and as I bought it complete, bar a receiver and LiPo, I expected a model that would make a nice scale machine.

For this application the flybar rotor head would be good too, as I wanted a simple model that would hover well in windy conditions, making it

a true everyday scale machine. As an aside, the standard F3C uses a 12T pinion gear driving the 112T main gear, so a quick calculation showed that with a 12S LiPo pack, the max rpm would be 1900 rpm and I should be able to run it as low as 1400 rpm or less.

I set about checking the model over finding nothing amiss other than the fore mentioned dust! The model is fitted with the standard Align servos and a Castle Creations ICE HV120 ESC plus a Spartan gyro. Kevin used a 4-cell NiMH battery to power the radio gear so all I needed to do was add a receiver, I chose a JR RG831B to use with my JR XG14 transmitter.

It didn't take long to set up the model going through a straightforward routine of checking servo directions, pitch range and setting the gyro for my set up. I set the ICE 120HV to governor mode, changed the battery connections to my chosen XT90 connectors and I was ready for a test flight.

This took place a couple of weeks before Christmas, everything went as planned, although the tail wasn't too good and it turned out the pushrod was stiff – I thought I'd checked that but clearly not very well! With the sticky dust cleaned off the tail improved considerably. I reduced the head speed but couldn't go as low as I hoped as the disc became a bit unstable. The fitted SAB FAI blades were fine, so the chances were the head dampers needed replacing. So with a short list of things to check on the model, it was retired to wait for the Lama kit.

Christmas came and went and then John White told me the kits were available, and as the lattice tail is supplied bare, would I like mine powder coated before he shipped it to me? Yes please said I, which added another week and some more money... I received the kit in late January...

### What You Get

The lattice tail is a one-piece item that includes the front section housing the mechanics. John had had it power coated white at a very reasonable cost for me. The large cabin seems



Vario supply the lattice tail 'bare', mine has been powder coated



Other parts on top of the laser cut plywood – note the dummy fuel tank covers



big and was nicely moulded with the separate doors being an excellent fit. As is usual the window and door openings needed to be cut out and the large vac formed windows would need cutting out too. The included tank covers are also moulded, as are the tail stabilisers.

A moulded dummy engine is included, which I believe is from the Alouette II kit. The u/c is also included as are the aluminium side panels. A large sheet of good quality laser cut plywood and the necessary hardware complete the contents – not forgetting the typical Vario Building Instructions!

As is always the case with Vario kits, some 'extras' were going to be needed such as the Fittings Set #301/5 that includes the door handles and hinges. I later added the cockpit kit #307/29 that includes the floor, seats and consul; then I added the joystick set #31/31 and finally the scale accessories for the Alouette II #300/8 that includes the u/c supports and turbine hot air ducting.



The kit includes the Align 800 tail drive shaft and carbon tube for the tail pitch



The cabin is supplied as shown; the doors were taped in place and fit perfectly

### Choose Your Subject and Starting Out

Before starting any scale model, it is a good idea to have a subject in mind, i.e. the machine yours will emulate. A favourite model of mine is the Starwood Lama, which I built and reviewed in 2011, it's still flying very nicely, so why not emulate that?

I expect most readers will be familiar with Vario Building Instructions; either first hand or by reputation... The Lama T-Rex is no different providing basic CAD drawings and not much more, so there is plenty of room for the builder to provide their own input!

First job shown is the undercarriage, which is a good example... The diagram shows how the eight aluminium tubes are joined with plastic mouldings using epoxy and screws. What isn't shown is that in order to accurately set the distance between the cross struts, you need the aluminium side plates and 'U' clamps that the u/c fits to... The 'L' moulds that connect the cross and vertical tubes were supplied with a saw cut so it would open up to accept the cross tube, which was a bit disappointing as it would show on the finished model. I assembled it as shown, but did add screws to the 'L' moulds as a bit of insurance.

The side plates screw to the T-Rex mechanics, which raises the frames, but note there are two sets of holes and you need to use the appropriate ones for your T-Rex or the height will be wrong! I first removed the tail boom and rotor head and then the tail rotor assembly from the boom making it nice and compact before adding the side plates, which gave it a stable base.



Dummy turbine with the tail stabilisers

**VARIO LAMA T-REX 700**



As I'd chosen the colour scheme, I could start painting the parts as I went, so the u/c was the first to get a couple of coats of paint. I'm not very good at painting, but using Halfords spray cans, I could get a reasonable result...

**Tail Drive**

The lattice tail is, I believe, from the Alouette II kit that uses a standard Vario tail rotor gearbox, and a short section of 20 mm tube is welded to the end of the lattice to fit the gearbox onto. However the T-Rex tail gearbox is made to fit Align's 21.5 mm tail boom! To overcome this, you need a short piece of Align boom to glue over the 20 mm section, with the T-Rex gearbox attached to that.

Vario include the T-Rex 800 tail drive shaft so the mechanics need to be accurately positioned and then the tail tube is inserted in the standard drive adapter and from that you can work out how long a piece of boom you need – it's about 40 mm, but double check this! The drive couplers have plenty of depth so a bit too long is OK, but you don't want the drive shaft compressed.

My donor model had a black aluminium boom, so the off-cut was painted before gluing in place. The T-Rex uses a tail gearbox securing bracket that locates in a hole in the boom, so I opened a corresponding hole in the inner 20 mm tube to help secure it safely.

Vario provide two bearing holders to carry the tube drive and these are glued to the lattice cross rails. I painted these first; a moulded pushrod support glues to the front bearing holder, while the rear one can be cut down to look neater. With the mechanics in place, I found the rear bearing support was a little high and so had to cut the inner face away to let it sit lower, after which it lined up perfectly with the tail gearbox.

The tail servo remains in its usual place on the mechanics, so making up the carbon pushrod is straightforward, although I used a longer threaded rod at the rear so I could bend it to line up with the ball on the pitch bellcrank (this may not be necessary if you use Align's later tail gearbox).

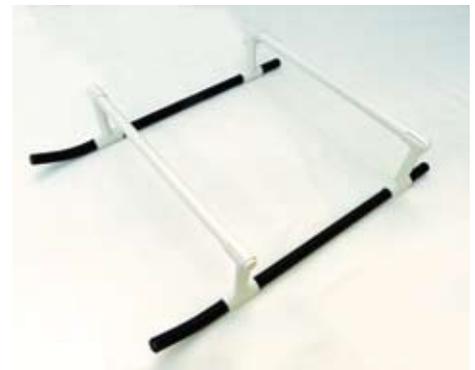
Earlier on, I had noticed that the tail drive felt a little rough and close inspection showed the



The Lama u/c is much bigger than the donor skid set; note the saw cuts in the 'L' moulds...



You need the 'U' clamps and side plates to correctly assemble the u/c



The u/c painted using Halfords aerosol spray cans



This is the 20 mm tube to take the Vario tail gearbox, but the T-Rex boom is 21.5 mm



Here I have painted a short off-cut of the Align boom that slides over the Vario tube



Tail gearbox finally in place



Tail drive tube support bearings that glue to the lattice rails

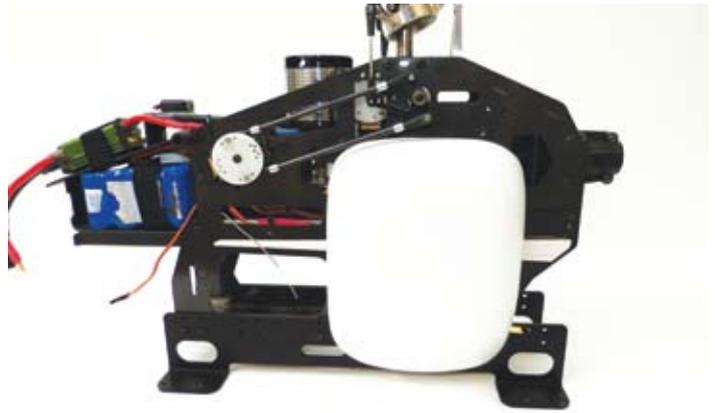


Tail tube support with the pitch rod support below

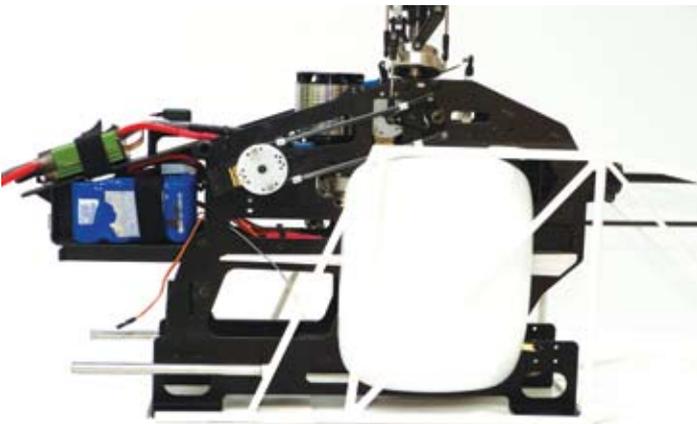
gears were a bit worn so I decided to replace the tail drive gears. This in fact ended up with me upgrading the gearbox to the newer version that has a larger hub and new blade grips! I then noticed the front bevel gears felt a bit rough too, so these were replaced and while I was about it, I replaced the rotor head dampers!



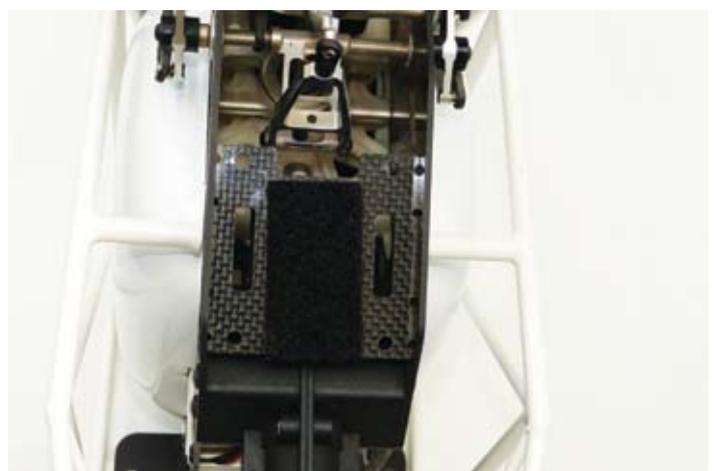
On the left is a tank cover as supplied, on the right is my modified version complete with brass fixing brackets that are glued to the inside



It needed trimming to fit over the side plates and the white battery tray guide



The tank panels are positioned about right and cover the main gear



This shows there isn't much room between the cut down panels and lattice

### Tank Covers, Side Panels and Stabilisers

Before starting on the cabin, I decided to work on the other parts so that I could have the main assembly work finished. The fuel tank 'covers' are nicely moulded in epoxy/glass and fit to the sideframes covering the main gear and setting off the model well. The mechanics sit inside the front of the lattice with the side plates resting on the floor that's welded in the base and these then sit on the u/c with the retaining saddles holding it securely. A pair of spacers is welded to the top of the lattice that are screwed to the mechanics securing the top.

With the mechanics in position, there did not seem to be enough space between the sideframes and lattice for the tank covers. A couple of small spacers were supplied to fit between the upper spacers and the frames that would spread the lattice outwards, but these would not make enough space. Once again John White came to the rescue by saying he found the same and sent me his details on how to cut the outer lip off the covers, then trim them to fit flush to the sideframes and add a couple of small brackets to fix them in place.

So I set about this and with careful positioning, they completely cover the main gear without touching it! I have to say even if they had fitted as shown by screwing the lip to the frames; the cut down version looks far better!

In the meantime I had asked Nigel Cartwright to produce the decals for the Lama. He had drawn up the originals for the Starwood Lama

and still had the files so it was a matter of down sizing them to fit. While I talking to him, and having applied a basecoat of paint to the mock turbine engine, I realised my skills were not up to finishing it and Nigel was happy to oblige!

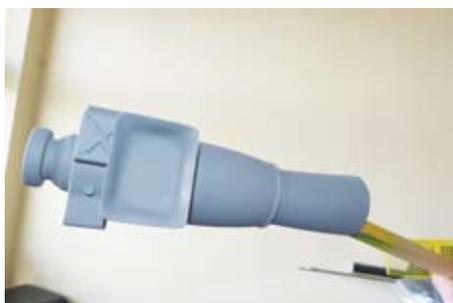


The aluminium side panels as supplied, I trimmed them a little

The aluminium side covers are supplied pre cut and bent and are secured using metal clamps that wrap round the lattice tubes. Comparing the panels to the Starwood Lama, I saw they were a bit over size so I trimmed them to match. The tail



After much effort, they are now waiting for the decals to be applied



The limit of my painting was the undercoat!



Nigel's painting skills...

## VARIO LAMA T-REX 700

stabilisers are hollow epoxy/glass moulding; two tubes are welded to the boom and a pair of 3 mm bars run through to secure the stabilisers.

At this point a lot of rubbing down, painting, masking and more painting took place.

I then received a box from Nigel containing the decals and painted dummy engine, so I decided to learn how to apply the decals... All I'll say is that I'm very glad I had plenty of spares because they are very, very thin and are very easy to mess up! I managed an OK job, but I should have taken up Nigel's offer to apply them for me!

It didn't take long to assemble the model and the photos show progress to this point.

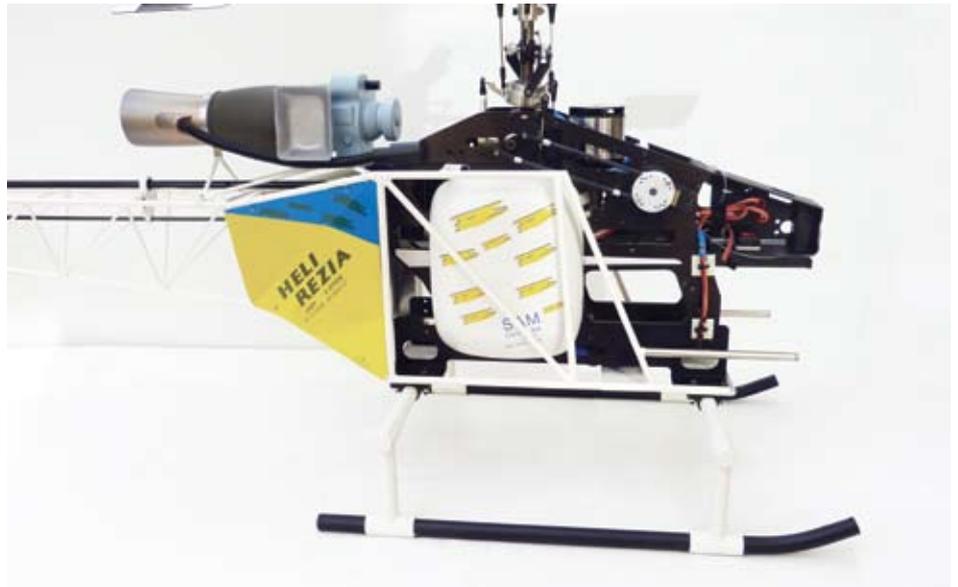
### Cabin Time

The large epoxy/glass cabin is very nicely moulded with only a few pinholes along the join line – excellent. As mentioned all the windows and door openings need to be cut out, the windows sit inside recesses, so I ran some 5 mm tape around the recess lip to act as a cutting line. The rear of the cabin also needs to be opened up so it will slide over the mechanics, however no guidance is given on how big the hole should be cut. Luckily for me John White had already done this and he sent me dimensions and a sketch that I could use!

Bearing in mind the substantial wood frame needed to be installed, I decided to first cut out the doors and top middle windows followed by the back. This was to retain the shape of the cabin, however I was pleased to find that cabin structure was very rigid with reinforcing material moulded in around the openings.

The plywood is neatly laser cut and the pieces fitted together well to form the support frame for the cabin. Two tubes are glued to the frame and these slide over the extensions on the lattice frame. Strong magnets are installed in both tubes to stop the cabin moving in flight. Two more magnets are used at the top of the woodwork with their pairs in a plastic holder that you fit between the T-Rex frames. Vario also suggest you remove the T-Rex front Rx moulding and supply a plastic spacer to secure the roll servos.

Gluing the wood frame to the cabin with the fore mentioned tubes in place is a bit nerve wracking! First I bolted the mechanics in place



*I was pretty pleased with my efforts at this stage*



*The dummy turbine is supported with short tubes*



*And the tail – I painted the supplied hoop tubes*

and put the cabin tubes over the trellis tubes. Then with the wood frame in the cabin, I offered it up and carefully checked its alignment and positioning using clamps and supports to hold everything in place. I then used 30 minute epoxy to tack glue in place.

When set I rechecked everything and then used Loctite 9466 Hysol to finally fix the frame in place. 24 hrs later I checked and all looked

good, although the bottom on the cabin touched the u/c cross tube, so I made up some 5 mm spacers to fit between the u/c saddles and the frame to increase the gap.

Then it was time to cut out the rest of the windows and glue in the supplied plywood hoop that runs round the cabin that a cabin floor sits on. This hoop did need some sanding to shape, but not overly much.



*Tape used as a cutting guide leaving a lip for the windows*



*The back was cut out using John White's measurements; I didn't cut out all the windows as I wanted it to stay rigid, I need not have worried as you can see the reinforcing strips round the windows and doors*



*The plywood frame*

The windows all need cutting out – they have very faint cut lines, but I prefer to cut each out oversize, lay it over the cabin and mark the final cut lines. The plastic is difficult to sand for any required adjustment, but I found Dremel make sanding discs for their SpeedClic system that are discs of 60 Grit or a fine 240 Grit emery paper – these are brilliant!

As mentioned, the doors were a very good fit and I used the hinges and handles from the Fittings Set #301/15. I also fitted 4 mm magnets to help stop the corners vibrating in flight.

**First Flights**

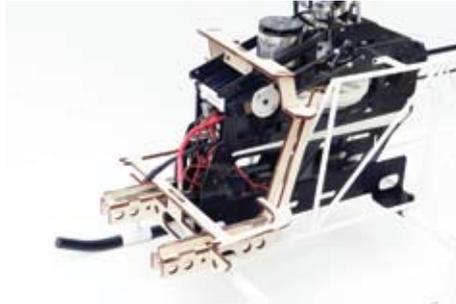
These took place on a beautiful day and were completely uneventful! The Lama just flew well looking very scale in the air and looking great against the blue sky! I managed to slow the rotor head down (thanks I think to the new head dampers). At this point I hadn't fitted the doors, windows or any scale detail, so I needed to get busy for it to be ready for its first public outing the following week!

**Adding Some Scale Detail**

I now had the Cockpit kit #307/29 to help bring the cockpit to life. The plastic floor is supplied in two pieces; these needed a bit of sanding to get them to fit, using screws to hold in place. The consul is two moulded parts that need gluing together; the seats are also moulded and you have to bend 3 mm steel rod to make up the



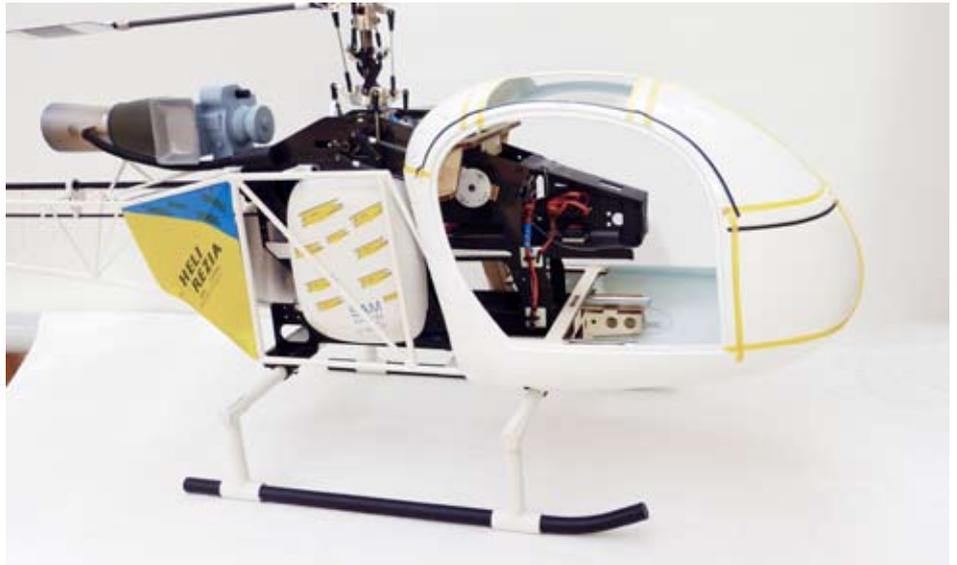
*This is the Cockpit kit, which after a bit of work...*



*This is how it fits; you can see the upper magnets in front of the motor*



*The canopy tubes fit over these and are glued to the wood*



*Looking good although I needed to increase the gap between the u/c and cabin using 5 mm spacers*



*The first flight with its clothes on, well most of them!*



*...looked like this*

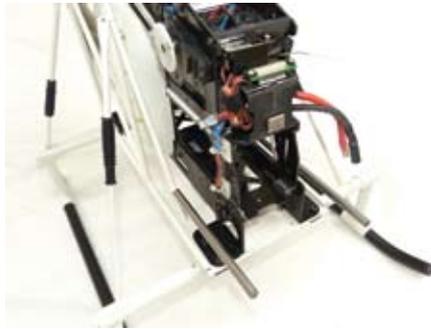


*At this time I was still using the T-Rex front radio tray*

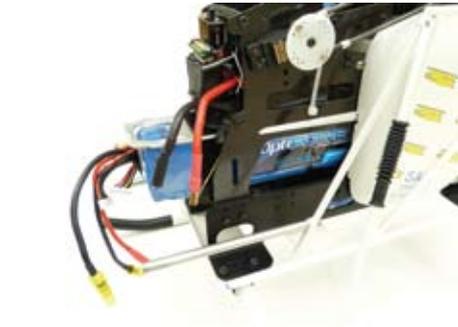
**VARIO LAMA T-REX 700**



*That's better, a pilot with controls!*



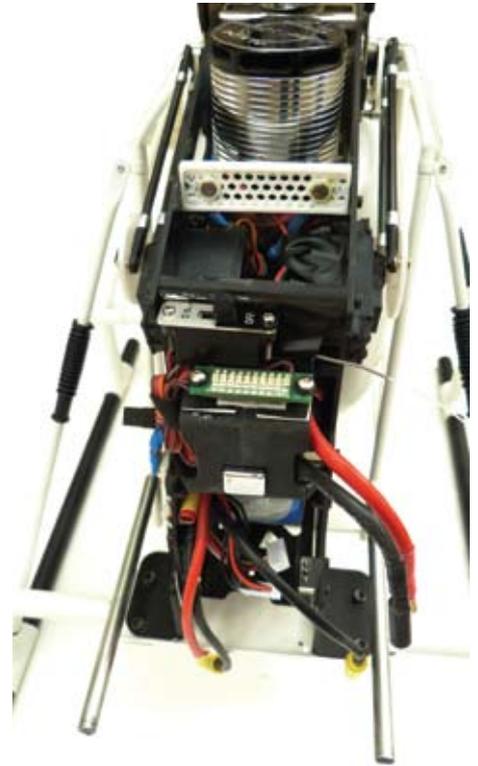
*I cut the middle out of the radio tray to retain the battery tray catch*



*OptiPOWER 6S 4300 mAh packs give a safe 10 minute flight time*



*These scale Spin blades really improved the flying*



*The magnets now double up as electrical contacts for the rotating beacon*

'legs'. It's quite tricky to bend the rod to shape, but a vice and hammer helped... I rubbed down the mouldings and then painted them in grey primer. The kit included some instrument bezels and paper dials which I used these to mimic the full size. The seats and consul were then screwed to the floor.

The following weekend was the Charmouth Spring fly-in, so this was its first public viewing. It was very windy, so it didn't take to the air until later in the day. Kevin Lever was there and he took special interest to see what his old T-Rex had become. Naturally I let him fly it, and had trouble getting the Tx back off him! I found the model tended to drift vertically a little but Kevin said this was how he'd found it as a pod and boom model...

I had a cunning plan for the Sunday, which was to get both the T-Rex and the Starwood Lamas

in the air at the same time. At about lunchtime, the wind abated and I had both models ready. I fired up the turbine, while Kevin was ready with the electric version, Richard Morris was the cameraman and the plan was to have both models in the same photo... The big Lama was furthest from the camera and the idea was for Kevin to form up on that... It's a lot harder than you might think with turbulent air hitting both models, and it sent Richard scurrying around trying to get the photo while Kevin and I tried to form up on each other without getting too close... After what seemed an age, Richard came over saying he had the photos, so with a notable release of tension we landed!

The upshot of that weekend was that the T-Rex Lama was well received by everyone and it flies beautifully and looks great, however it really deserved to have a pilot in it...



*Finished cabin with the rotating beacon*



Looks terrific in the circuit

### And More Detail

So the Lama deserved a pilot and more scale detail. Vario's Joystick set #31/31 and scale accessories set #300/8 were the way to go, but the pilot was trickier. Vario list the model scale as 1:8, but nose to tail is about 1600 mm and the full size is 10.24 m, which is 1:6.4, so the pilot should be to that scale, i.e. about 11 inches tall and I happened to have a 12 inch pilot in the cupboard!

First job was to remove the seats, as they would need lowering to give headroom and moving back to create room for the foot pedals. I managed to adapt the wire seat support so they are now 20 mm from the floor, the pedals went as far forward as possible and I positioned the seats so the pilot would fit – not exactly a scale approach but practicable! Adding the collective and cyclic sticks finished that off. The scale set has the u/c struts, so I made these up adding them after painting.

Moving the seats back meant I had to remove the T-Rex radio moulding – as per the Vario instructions! This means that the flight battery tray would move back and not be secured by the catch, unless I modified it, as John White had! I

cut the latch part off and mated it to part of the rear, so the latch is used.

The last scale part I added was the anti-collision beacon; I happened to have one looking for a suitable home. This is the Vario 'Rotating Beacon' #10/960 that just needs a 4.8 V supply, but how to do that with a removable cabin? I toyed using a separate battery and switch in the cabin, then a plug/socket idea or maybe bullet connectors and then I had a 'lightbulb' moment (sorry...!).

I could use the magnets as electrical contacts! I managed to solder wires to the cabin magnets, and ran wires to their mates on the frames where I removed the plastic end stops and attached the wires there. I did need to readjust the magnet holders to ensure proper contact but it works!

I had decided to use OptiPOWER 6S 4300 mAh packs that I've been using on other scale models for quite a while. They are more compact than 5000 mAh packs yet provide plenty of power and great duration for scale models. I made up two 'stick' packs and positioned them to bring the C of G on the main shaft.

The next flights showed the extra detail was well worth the effort, as it looks great. I then

### Spec

<b>PRODUCT</b>	Lama for T-Rex 700
<b>MARKETPLACE</b>	Stand off scale
<b>MANUFACTURER</b>	VARIO Helicopter GmbH & Co. KG Seewiesenstr. 7, Grafendorf, D-97782 Germany
<b>UK IMPORTER</b>	Vario Helicopter UK Sales 6 Astbury Close, Lowton St Mary's, Cheshire. WA3 1ED Tel: 01924 273888 <a href="http://www.vario-helicopter.co.uk">www.vario-helicopter.co.uk</a>
<b>MAIN ROTOR DIAMETER</b>	1560 mm
<b>OVERALL LENGTH</b>	1580 mm
<b>ALL UP WEIGHT</b>	7.7 kg (17 lb)
<b>CONTROL REQUIREMENTS</b>	4 servo heli radio (3 servo eCCPM) and gyro
<b>POWER REQUIREMENT</b>	700-size motor and ESC

### UK RRP

Lama for T-Rex 700 #3007	£668.81
Fittings Set #301/5	£18.90
Cockpit kit #307/29	£134.15
Joystick set #31/31	£17.64
Scale accessories #300/8	£30.58
Rotating Beacon #10/960	£53.34

swapped out the SAB main rotor blades for a pair of SPIN scale blades. These have a semi-symmetrical reflex section, are quite heavy (215 g) and have a wide chord (79 mm). These had a dramatic effect making the model much, much more stable, and in particular the vertically 'bounce' had gone! Control response smoothed out being positive but smoother; they clearly liked the slow rpm making the model a joy to fly. The overall weight with the OptiPOWER 4300 mAh packs is 7.7 kg and a 10 minute flight leaves plenty in reserve.

Was it worth the effort? Without a doubt yes! I now have a sensible sized model that flies beautifully, looks terrific and replicates the model I modelled it on! And I get 10 minute flights, what more could I want...? **MHW**

### We Used

JR XG14 transmitter, JR RG831B receiver, Align T-Rex 700 FAI donor model with its standard servos, motor and Castle Creations ICE 120 ESC, Spin Blades 710 mm scale rotor blades, OptiPOWER 6S 4300 mAh LiPo flight packs



Nose down and off for a fly around