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STARWOOD MODELS SA315B LAMA

THIS GORGEOUS LARGE SCALE
LAMA IS SUPPLIED
SEMI-ASSEMBLED



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REVIEW

WORDS: JON TANNER PICTURES: JON TANNER & DENIS STRETTON

STARWOOD MODELS SA315B LAMA

THIS GORGEOUS LARGE SCALE TURBINE OR ELECTRIC POWERED LAMA IS SUPPLIED SEMI-ASSEMBLED AND SO NEEDS LESS WORK TO GET IT FLYING

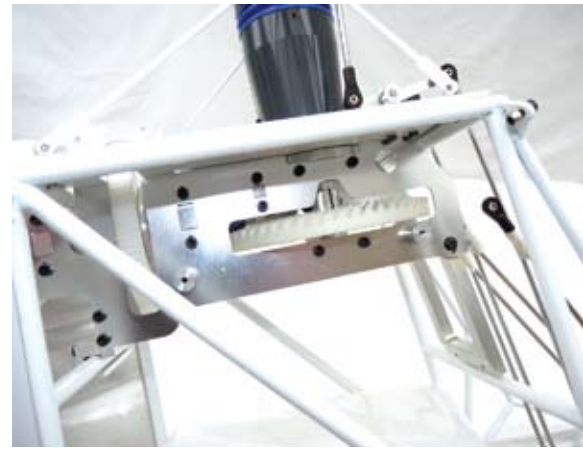


The Aerospatiale SA 315B Lama, what a machine it is, originally certificated in France in 1970, it uses the Turbomeca Artouste powerplant and rotor from the Alouette III in a reinforced Alouette II airframe and was first designed to operate in hot and high conditions for the Indian army. Perhaps it is best known for its SAR operations in the Alps and the 1972 world height record of 12,442 m (40,814 ft) it achieved, which still stands. This record making machine, piloted by Jean Boulet, ceased its ascent because the engine flamed out, which led to the highest and longest autorotation, so you could say the flight achieved two records for the price of one.

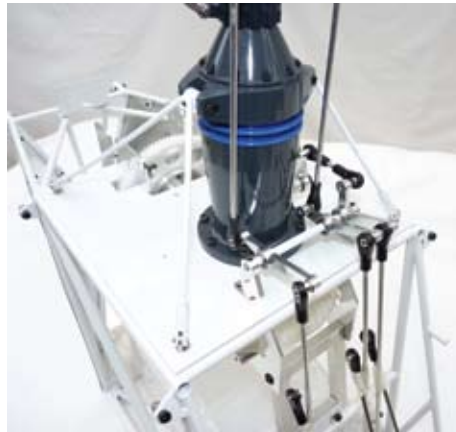
The Lama is used in many countries for a wide variety of operations including military, observation, photography, air/sea rescue, transport and ambulance duties. For a single engine machine, it is a real workhorse and can carry underslung loads up to 1135 kg (2,205 lb). While researching this synopsis of the full size, I was surprised to discover that in 2010 the Indian army placed an order for 20 'Cheetals', which is a variant of the Lama produced under licence by state-owned Hindustan Aeronautics Limited (HAL) and fitted with the more powerful TM 333-2M2 engine. A total of some 447 Lamas have been produced.

THE SPECIFICATION OF THE SA315B LAMA IS:

CREW:	1
CAPACITY:	4 passengers or 1,135 kg (2,500 lb) slung payload
LENGTH:	10.24 m (33 ft 7¼ in)
MAIN ROTOR DIAMETER:	11.02 m (36 ft 1¾ in)
HEIGHT:	3.09 m (10 ft 1¾ in)
MAIN ROTOR AREA:	95.38 m² (1,026 ft²)
EMPTY WEIGHT:	1,021 kg (2,251 lb)
GROSS WEIGHT:	2,300 kg (5,070 lb)
POWERPLANT:	Turbomeca Artouste IIIB Turboshaft, 649 kW (870 hp) derated to 410 kW (550 hp)
PERFORMANCE:	Maximum speed: 192 km/h (119 mph)
RANGE:	515 km (320 miles)
SERVICE CEILING:	5,400 m (17,715 ft)
RATE OF CLIMB:	5.5 m/s (1,080 ft/min)



The mechanics are so very compact



Support tower is ready painted and look at the control levers



Here is the layshaft with the spur gear mounted on the auto unit

The Model

The Starwood SA315B Lama is the result of the dream of the manufacturer and Starwood Scale Models to bring to the market a realistically priced large scale helicopter that is largely pre-assembled and so relatively quick to finish and have flying. The collaboration started a couple of years ago with both turbine and electric powered prototypes being flown and improvements being made.

Starwood Scale Models is the worldwide dealer for the model and, as they are the US agent for Jakadofsky Gas Turbines, can also supply and support the gas turbine engine. Al Wert of Starwood went a step further by arranging for a special Jakadofsky 'Starwood Edition' engine to be produced with a very smart grey finish, which is specifically for the Lama. The extra benefit of this engine is that it is designed specifically for large scale models where economy and quieter running is more important than outright hp. Having said that, the Starwood Edition Jakadofsky is capable of producing over 4 kW (5.5 hp) of power and so is more than up to the job of powering this Lama.

The Lama is delivered with much of the model pre-assembled and importantly the metal parts, including the impressive lattice tail boom, mainframe assembly and undercarriage are powder coat finished. The side panels and mechanics top plate are also finished to match the frames. The cabin is supplied with the window and door openings cut out for you,

'assumes you have experience in building model helicopters and some modelling skills'



*The main rotor head and tail gearbox are ready to fit
LEFT: The main frames arrived like this*



A huge box contains these boxes...



...that contains this

SA315B LAMA

as are the doors themselves. The 'glass' bubble is supplied in halves and only need cutting out before screwing to the cabin. The instrument consol, seats, control levers and other scale parts need finishing, as does the wooden floor panels etc.

Most impressive is the scale 3-blade rotor head, which as you will see is a very good reproduction of the full size and is supplied literally ready to fit; yes it is painted. Equally impressive is the main shaft support tower, which again is supplied fitted and painted. The swashplate and linkages were also finished and fitted are all as per the full size. The tail rotor gearbox with it 3 blade rotor is also supplied pre painted and ready to fit to the boom.

The mechanics are remarkably compact with a layshaft driven by a spur gear mounted in an auto hub and driven by the clutch pinion gear on the engine. On the front of the layshaft is an 11 tooth spiral cut bevel pinion gear driving the 55 tooth spiral cut main bevel gear, while a tail drive adapter is fitted to the other end ready to drive the tail tube. The whole mechanics set is installed under the top plate.

Prep and What You need

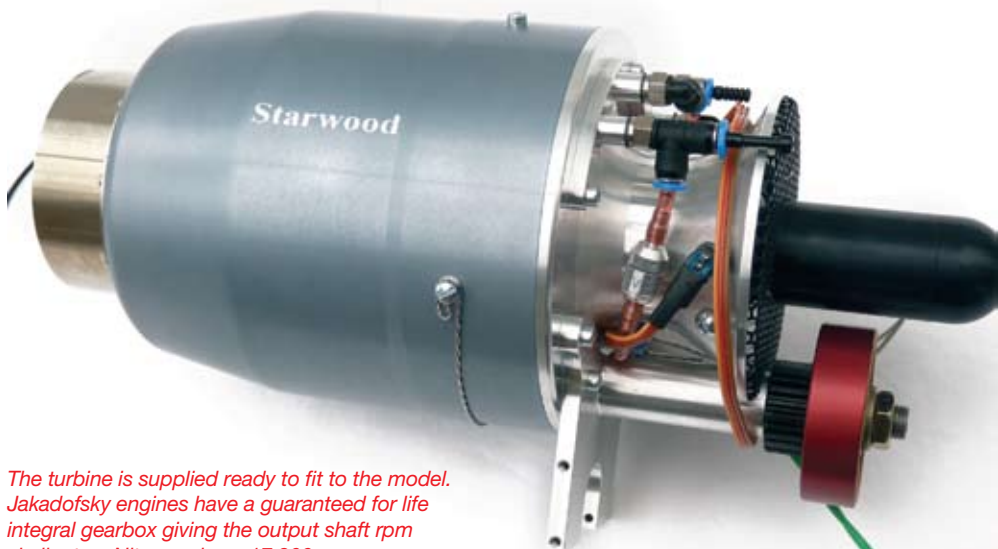
The 'prep' starts with deciding what you want from the model and by that I mean, do you want a fully scaled model, possibly to enter competitions with, or a day-to-day model that looks good, or like me, something between. Whatever you choose I highly recommend buying the optional working scale fuel tank with scale filler from Starwood Scale Models; the kit comes with a simple rectangular tank, which simply looks and is wrong. Another optional extra is the exhaust extension, it's not necessary but adds to the finished model, and I have that as well.

As I have the turbine version, I bought the Starwood Edition Jakadofsky turbine, which is supplied with the correct clutch pinion gear and so is ready to fit. All Jakadofsky engines are supplied ready to run and include everything you need to operate the engine (in the case of the Starwood engine it excludes turbine oil). These latest engines include the new PRO ECU that is produced by Jakadofsky, as opposed to previous engines that used the Orbit ECU.

The PRO ECU is packed with features, many of which you won't be using in this model, but importantly it controls the whole start up procedure, includes an improved governor that better handles changes in load, and is designed with economy in mind, however it is quite a big box so you'll need to plan its installation. The turbine includes the fuel pump, fuel valve, gas valve, on board replaceable gas bottle, 2S LiPo battery with heavy duty switch, auxiliary LED and associated wiring, fuel tube and connectors. Also included was the small, on board EDT that gives easy access to all the setting and stored data in the ECU, so this can be installed in the model.

Other things you will need are three high spec. servos for the 3 servo 90° eCCPM control system, a high power/speed tail servo (power is more important than high speed), a minimum of a 7 channel receiver, adequate receiver power supply (ideally a regulated supply), a tail gyro and while not absolutely necessary, a flybarless rotor head stabilisation system (Stability Augmentation System), which could include the tail gyro.

I say the SAS system is not an absolute necessity because I first flew the Starwood demo model without a stabilisation system fitted and found it very controllable in the mild wind conditions. However, when considering the UK weather, I recommend fitting one! An important point that needs considering is that the 90° swashplate is offset by 45° and it



The turbine is supplied ready to fit to the model. Jakadofsky engines have a guaranteed for life integral gearbox giving the output shaft rpm similar to a Nitro engine – 17,800 rpm



Everything you need to install and run the engine is included – just buy fuel and turbine oil



The scale fuel filler was produced using a 3D printer and adds to the finished model

Option working scale fuel tank – a 'must have' really



The exhaust extension is not necessary but looks the part and deflects the hot exhaust away from the tail



The Jakadofsky Starwood Edition turbine engine was shipped ready for any amount of mishandling



The new PRO ECU manages everything to do with the engine, the governor and load management is improved and it offers gas and kero starting

is best to set the swashplate to pitch lever rods vertically, which means some swashplate phase offset will be needed. This can either be done with the Tx or within the SAS.

Then there is the amount of scale detailing you want and of course the colour scheme, although you could simply fly the model as it comes and it will be very nice... I decided to base the model on a full size, but didn't want 'yet another' SAR version. After quite a lot time surfing the Web looking for a machine with a white boom, I eventually found HB-XMC operated by Heli Rezia in Switzerland (<http://www.helirezia.ch/>), who used it for multiple roles



The cabin is very strong



Alignment of the wooden frame is very important, here the servo tray is as far back as possible making room for everything else

including passenger transport, load carrying, film work and water drop etc.

The scheme is different, relatively easy to reproduce (by Nigel...) and looks good as well as standing out in flight. The machine has since changed ownership and is currently owned by Elirotor Sagl, operated by Heli-TV SA and has a very different colour scheme. I contacted Heli Rezia via a Swiss friend and they gave permission for me to use their scheme. As to detailing, well the kit includes everything you see (apart from the mentioned scale fuel tank and exhaust extension) but I decided to add some lighting supplied by Starwood.

Assembly

It is fair to say that the Assembly Manual assumes you have experience in building model helicopters and some modelling skills – it is supplied on a CD comprising of photographs and building notes. You



Here you can see the wood blocks and spacer plates I used to centre the cabin, plus the retain-angle bracket

will also find helpful photographs on the Starwood Scale Models website: <http://www.starwoodmodels.com>

I decided to assemble the model before disassembling it so I could hand the parts needing paint to Nigel Cartwright for him to work his wonders. The first job is to remove the 3-side/ bottom panels and mount the mechanics to the power-coated undercarriage. Four pairs of clamps are used with a pair of large 'O' rings acting as dampers. A useful tip here is to use a little soapy water to help centre the clamps. The next stage is to trial fit the u/c struts; these were pre-drilled and would need painting so I put them in a box marked 'Nigel'. This is a big model and adding the 4 feet long tail boom would take up a lot of room, so fitting the entire tail section was also left until later.

Attention therefore turned to the cabin, which is a big and very strong epoxy moulded 'bubble' finished in white. Included in the kit is a set of plywood formers that need to be securely glued together using a flat surface to ensure alignment. Do cut plenty of holes in the formers, which are later used to route the cables and tubes etc. The frame is glued into the cabin with the top edge of the formers accurately lining up with the door openings. The manual shows how this should be done, and makes the point that the formers are not a precise fit along the cabin floor saying not to worry about this.

You do need to key the cabin surface where the frame is glued; I used cyano to tack in place followed by slow set epoxy. The cabin slides over the extended lower rails of the main frame and smaller pieces of ply and wood blocks are used to centre the cabin and set its height. There are two threaded extensions on the mechanics whereby M3 screws hold the top of the cabin in place with spacer tubes setting the position, while a pair of 'L' brackets secure the frame to the u/c mounting plates. This sounds a bit of a fiddle but wasn't difficult, although it is important that the cabin floor is parallel with the top of the mechanics.

The cabin does need a bit of trimming to make room for the pushrods and bellcranks and a template is supplied for this. The cabin floor is supplied in several parts, but Starwood kindly included a simpler two-piece floor, which needed a little sanding to get a really good fit. I glued some fixing blocks to the frame so the rear floor is screwed in place. I also added a cross brace to the servo tray to prevent it flexing when the servos are under load.

Optional Fuel Tank

The optional fuel tank is supplied with fittings including a felt clunk that doubles up as a filter. The left diagonal brace on the mechanics is removed by releasing a couple of dome head screws providing side access to the tank bay. To fit the scale tank, a bottom brace also has to be removable; couplers are supplied so it is a matter of cutting the section out, shortening it and gluing in the couplers. I used the white off cut as tube spacers for the upper cabin mounts.

The front mechanics brace has to be removed and then the tank can be gently squeezed into place with the main gear sitting in the well of the tank. With the mechanics brace and two tubes in place, a carbon tube support holds the tank forward and a shaped plywood plate is glued to the bottom of the tank locating it between the two bottom rails – the photos shows how it works, and it works very well.

Once satisfied with its installation, I took it out, fitted its fittings, glued on the dummy filler and put it in the 'Nigel' box.



The 'O' rings are split so as to fit them to the cross struts

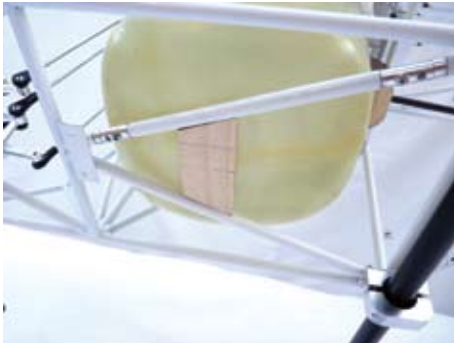


U/C struts were set aside for painting

SA315B LAMA



This shows the carbon tube brace that holds the tank forward...



...While the plywood plate holds it laterally and prevents it going too far forward

Scale Bits and Nigel's Box

I was impressed by the amount of scale parts included in the kit, all of which was heading for the Nigel box, as they would need painting. These included the instrument consol with the dial mouldings, cyclic and collective levers and peddle sets. The two front seats and bench seat are assembled from moulded parts; the air intakes with filters, oil tanks, navigation and dome light housings all went in the box plus the floor. The epoxy/glass tailplanes were added, as were the tail rotor blades and side panels by which time it was pretty full!

I'd sent Nigel pics of the full size and after a chat, we realized the tail boom, undercarriage and cabin all needed some paint – what was intended to be an 'easy' scheme was becoming more complicated... The complication increased because I was advised that some of the grey paint was a bit thin and easy to scratch off. The main shaft support tower was a case in point, as were the blade grips. I decided the tower needed repainting but I could live with the blade grips, so in due course, Nigel and I met up, I handed over the box and other parts and waited...

A While Later

And I had the main parts back from Nigel and very good they looked too, the wait was worth it and I could start the final assembly.

The main mechanics were mounted to the newly painted white u/c cross braces and I fitted the boom, which is so simple, three joiners on the long rails slide into the main mechanics and three screws hold it in place. The fully assembled and painted tail rotor gearbox is interesting in itself... It is a good scale representation both with its shape and the three tail blade grips, which are fitted with flap hinges. The pitch change mechanism is outboard with its actuation rod passing through the output shaft and operated by a pivoting mechanism – very scale like!

A tube tail drive is used supported in 7 ballraces mounted in very neat aluminium holders that slot over the trellis cross members and retained with



Instrument consol supplied ready to be finished



These are the front seats parts; seat covers are also supplied



Controls with the instrument panels below



Anti collision turret and oil tanks ready for painting



Air intakes need painting and brackets are supplied to fit them



These are the navigation light housings with the door hinges



The tail pitch change rod connects to an actuation lever that rotates about a fixed link, thus as the lever is pulled/pushed, it moves the pitch rod



Very neat bearing holders for the tail drive tube; you can just see the 'O' rings that are used to limit the end float

epoxy. The drive couplers have 'O' rings to adjust the endplay. With the boom fitted you place the drive in place and then offer up the tail gearbox – I removed one 'O' ring to get a small amount of end float. The bearing holders are then glued in place checking alignment as it sets.

The tail servo fits to the rear of the mechanics and a long wire pushrod in a tube connects it to the tail rotor. This needs care aligning to keep friction to an absolute minimum and it's held in place using white cotton and glue. I used a JR DS8915 digital servo, which is rated at 12 kg/cm and 0.9 sec/60° and so is powerful and reasonably fast.

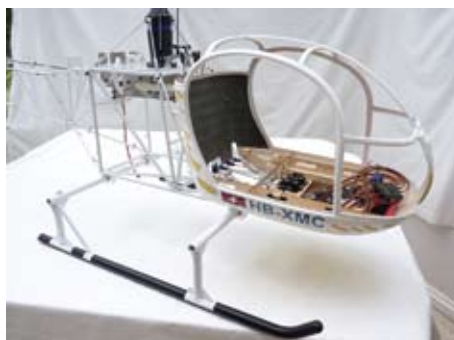
Fitting Out

The turbine is easy to fit with 4 M3 screws at the front and a supporting plate at the rear, alignment and correct gear mesh is important so check and double check! I did find that the gears did not quite line up and had to adjust the holes – this has now been rectified for current kits.

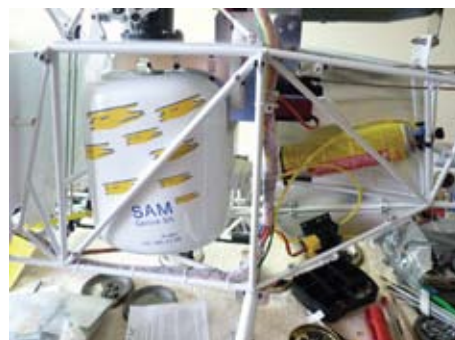
I refitted the cabin making sure the floor was parallel with the mechanics top. Next I fitted the JR DS 8455 servos, I did find the holes in the servo tray did not line up ideally with the pushrods and adjusted the middle one leaving the other for first flights. I had decided to use a Spektrum PowerSafe AR 9100 receiver



Jakadofsky Starwood Edition turbine in place



Cabin attached with servos in place, it's starting to look like the real thing



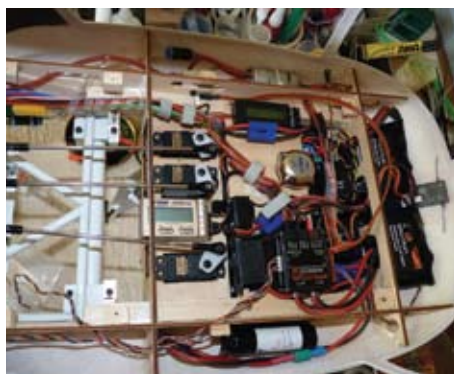
Gas cylinder and valve in place, the fuel tank is super, you can see the wiring loom...



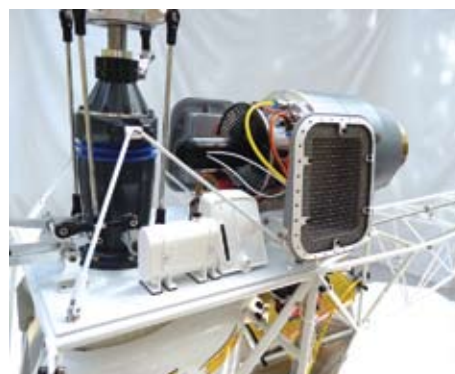
Some of Nigel's handiwork



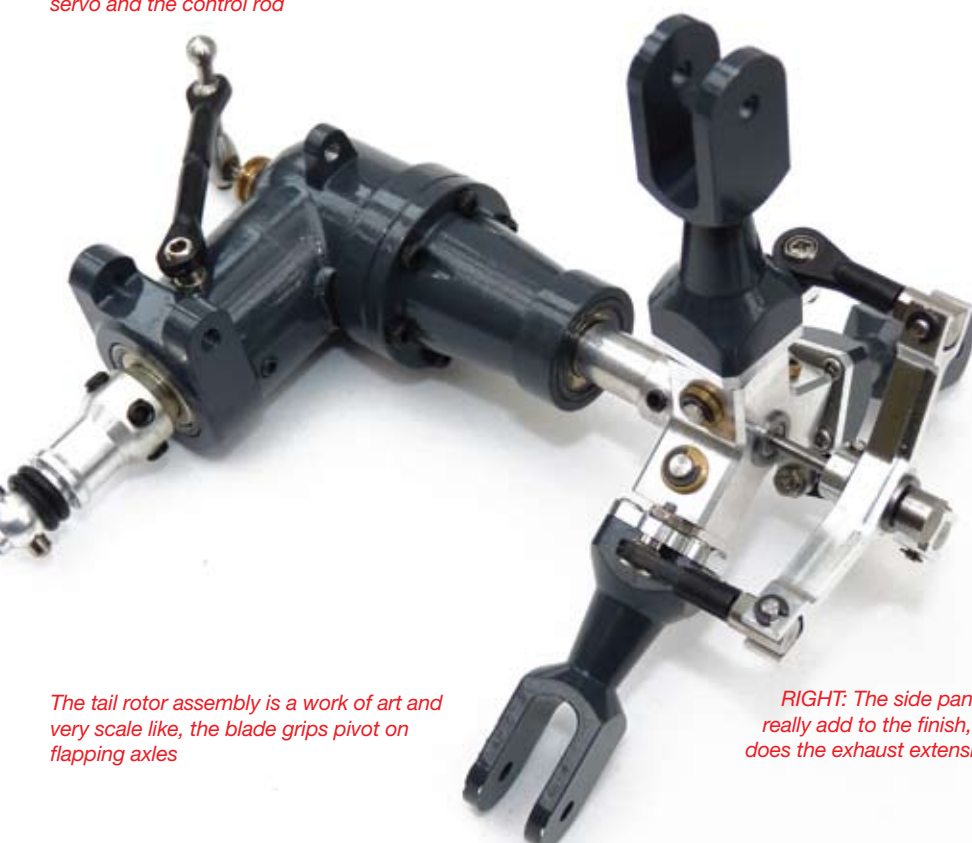
Tail drive is very simple; here you can see the tail servo and the control rod



A lot of gear to squeeze in a small space – I have since rearranged things and a HeliCommand HC3-Xtreme installed



The air filters do a good job of obscuring the front of the turbine



The tail rotor assembly is a work of art and very scale like, the blade grips pivot on flapping axles



I used extra coats of lacquer to balance the painted tail blades



RIGHT: The side panels really add to the finish, as does the exhaust extension

SA315B LAMA

(later replaced with the new AR9110-X) with two Spektrum regulators powered by two, 5-cell 2700 mAh NiMH batteries. Add a tail gyro, a Futaba GY502, plus the turbine ECU and battery etc and there is a lot to install, so careful planning is a good idea.

Rotor Head and Controls

The rotor head is superb, the photos show it in all its glory... all you need do is make up the drag wires and install. A closer look shows that the blade grips are attached to the hub with two pins, the upper pin takes the load and is the pivot point for the flapping



All this is included and just needs painting



The seat covers are also included; the front floor section is easy to remove



Bench seat is simplicity but adds a lot

hinge, while the lower pin is in a damper giving a damped flapping blade grip. The full size grips also lead/lag with limiting dampers and explains the need for the retaining wires on the full size. The model head does not lead/lag case and the dampers are decorative only, as are the wires. The end result is fantastic and it flies well too.

I did later find a little play in one of the pivot pins due to a slightly oversized bush, I fixed this by 'mixing and matching' the three sets. Starwood is aware of this and taking action! The swashplate is also very scale like with its articulated anti-rotation and drive links. There was quite a lot of slop in these, more than I wanted to see, but not enough to put off the test flights.

The pushrods are all 3 mm fitted with large heavy-duty links and balls. I had already centred the servo arms and adjusted the rods so the mixer arms were level. As mentioned the swashplate control is by three servo 90° eCCPM, so your radio has to offer this option. As the swashplate is offset by 45°, this has to be 'corrected' and can be done mechanically or, depending on your radio system, electronically.

The mechanical method is to position the inner swashplate ring such that when fore/aft pitch is applied, a blade positioned directly over the boom does not change pitch. This is a simple and very workable solution, although it means the pitch rods will not be vertical, in this case they will be angled at about 10°-15°, which is quite acceptable.

The other method is to set the swashplate driver so the pushrods are vertical and then use mixes in the transmitter to achieve the same end. Some Tx offer specific aileron to elevator and elevator to aileron mixes; you can use these or set them up using free mixers. It is very important to check that the controls work in the correct direction, right roll should see the pitch of the blade over the tail boom increase and forward elevator should see the right hand blade (at 90° to the fore/aft axis) increase in pitch.

Also check that the trims operate correctly, in some cases the stick trims are not transferred to the mixes, in which case any trim change will have an unexpected result – guess how I found out... I have now fitted a HeliCommand HC3-Xtreme, which accommodates all of this within its software and also stabilises the model making it more flyable.

The final jobs, and the ones I'd been putting off, were fitting the 'glass' and doors. A bag of tiny screws is supplied along with a pre-drilled aluminium strip to cover the join line of the plastic window halves. After much drilling and screwing, the cabin glass was attached, and then came the doors.



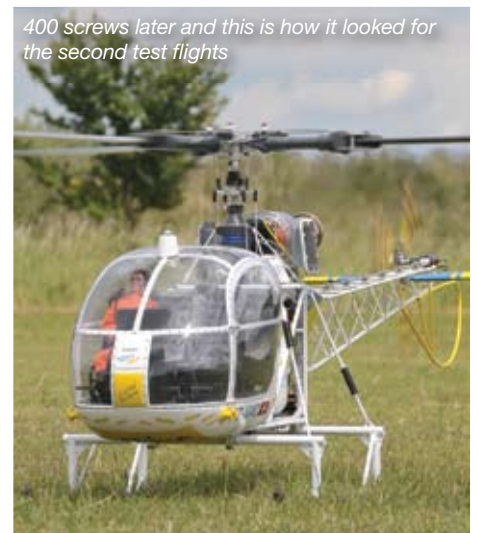
Fantastic scale rotor head, all I did was bolt it on and add the retaining wires



The blade grips pivot about the upper pin, while the lower pin is damped



See the swashplate is offset by 45°; I have positioned the inner ring such that the pitch rods are vertical and phasing is electronically corrected



400 screws later and this is how it looked for the second test flights



Plastic hinges are supplied, but to be honest they are not up to the job and a friend offered to make hinges from thin aluminium for me, plus working door handles. With the doors attached, the glass was added, by which time I had lost count how screws there now are on the model – over 400...

Flights

The first flights were in less than ideal conditions but proved the radio system, mechanics and operating the turbine was effortless. It also suggested that I needed more control throw, as in the windy conditions I did not have enough control authority! I fitted longer servo arms (20 mm) and in calmer conditions, tried again. The turbine just works and soon I was hovering it but it needed some trim, which helped but the model wasn't locking in as I expected and it looked like the slop in the swashplate links was causing some phase shift. In hindsight I certain this was part of the cause but the other problem was stick trim introduced some undesired cross mixing.

I was with Denis Stretton at the time and he offered to take a look at the swashplate links while I waited for the HeliCommand to arrive. The slop in the links was due to the floating 3 mm pins being a loose fit in both parts of the hinge. Denis quickly fixed this by installing 3.2 mm pins and locking them into the centre section, which eradicated the slop completely. The 'problem' and 'fix' was passed to Starwood, who again took it on board...

By this time the model had notched up about 30 minutes flying time and I have to say it looks superb. Then I received an Email from Starwood asking me to check the main gear mesh, wear was noticeable and uneven, and so I was advised to check them carefully. I wasn't best pleased but better to find out if there was a problem now than in the air.

I then discovered that taking the mechanics out is not so difficult and can be done in an hour, Denis was helping me; in his 'real' job he has accumulated considerable experience with gears and meshing etc and so knows what's right and wrong. My gear set was wrong – it seems that during assembly the crown and pinion gears were mixed up... As it happens I had another set to hand – don't ask, they are for another project! This was a proper 'pair' and were soon installed, aligned and meshed correctly and a while later the model was back together.

I then installed the HC3-Xtreme, making space for it by removing the Futaba tail gyro. My intention had always to fit this, which is why I was so careful that the cabin floor was fitted square to the mechanics – a 3 axis gyro needs to be mounted square to the mast in all 3 axis.

With the HeliCommand

Instead of making changes one at a time, a lack of patience got the better of me and the next flights were with the HeliCommand and improved swashplate links. I have to say the latest HC software is very easy to operate and you can choose preset basic settings for your sort of model and how the tail gyro will operate. I chose the 2 m scale settings with the tail gyro set to 'GY 401'.

Once again the engine started faultlessly taking its usual 40 seconds to spool up to its governed rpm, increase collective without any cyclic input and the Lama took flight, as the skids cleared the ground, it edged forward (that would be the exhaust pushing it forward) and then the HeliCommand took hold and the model was hovering easily and very controllably.

Any new model takes some getting used to but I started to feel comfortable with this straight away and was soon flying gentle figure eights and practicing descents, which is a good way of getting



All there is to the mechanics, simple and clever isn't it!



Revised layout, the HeliCommand HC3-Xtreme is between the servos that now have 20 mm arms, the yellow box is the electronic switch for the lights

used to the weight and feel of a big model. By the third flight I was going for bigger circuits throwing in chandelles and really enjoying myself, I tried a few sharper descents and fast stops and the way this model sits is superb.

I met up again with Denis and this time took a movie of a complete short flight, showing the start up through to shut down (www.modelheliworld.com). On this occasion the wind was shifting round and swirling over the trees, but the model coped well and at no time did I feel disconnected from it, so the settings in the HC are very good and I'll be comparing these to those in the Bell 430, which doesn't feel as good as this!

More flights have proved the Lama to fly really well, it looks superb and is so easy to operate, and the hardest part is transporting it! Everyone who has seen it has appeared impressed, both by the quality of the model, the way it looks in the air and by how much is done for you. They then ask the price, US\$10,285 excluding shipping (£6,438 at exchange rate at time of writing) including the turbine, scale fuel tank and exhaust extension.

Summing Up

Somehow this large scale Lama is as close as you can get to be an everyday model... Operating it is drama free and with the HeliCommand HC3-Xtreme, it flies well so well and inspires confidence. Yes, you need to get used to flying a large model, yet it feels surprisingly light in the air, and there is so much power from the turbine... In many ways this makes the Starwood Lama an ideal first large-scale model, however flying any large model requires a different approach from flying a 3, 4 or 5 kg model. The take-off weight of the Lama is 17.6 kg and consequently it has a considerable amount of inertia, so flying it around and stopping it takes getting used to. The stock set-up I'm using in the HC 3-Xtreme is certainly very good, and at the moment I see no need to change it.

I have mentioned the production niggles I had, namely the swashplate articulated links, the oversized bush, and wrong gear set. Starwood Scale Models have acknowledged these shortcomings and were already discussing them with the manufacturer, so remedial action has already taken place. In their defence, this kit was the first of the full production kits and this is not the first, and won't be last, example of production kits that have shortcomings the prototypes didn't... The important

point is that the issues have been recognised, rectified and in the case of the gear set, replaced free of charge.

The turbine has worked faultlessly, all 23 starts have been free of drama, no flames, or flame outs, just a solid reliable process that takes about a minute from start to flying rpm and some 2 hours running time. Readings from the onboard EDT have been consistent; the average exhaust gas temp. has been around 432°C, with a max of about 525°C and fuel pump voltage of 3.68 volts, all of which shows the turbine is hardly working at all!

There is not much more to be said, as the photographs simply say it all. **MHW**

We Used

Jakadofsky Starwood Edition Turboshaft engine, kit supplied main rotor blades, HeliCommand HC3-Xtreme, JR DSX12 transmitter with 2 Spektrum 5-cell 2700 mAh NiMH packs to power 2 VR6007 Voltage Regulators supplying the AR9110-X receiver, JR DS8455 servos for the eCCPM, with a JR DS8915 servo for the tail.

Starwood Scale Models Response

Starwood Scale Models are sorry that the review revealed shortcomings in our QA process. The swashplate links have been re-engineered, the tolerances of the blade grip bushes and pins has been improved and the error in production causing the mismatch in main and pinion gears has been traced and rectified. Existing kits have been checked and we are pleased to advise potential customers that these problems have been eradicated.

Spec

PRODUCT Starwood Models SA315B Lama
MARKETPLACE Turbine or electric scale model

MANUFACTURER Starwood Scale Models
P.O. Box 620023, Woodside, CA 94062, USA.
Tel: 001-650-851-9027
www.starwoodmodels.com

Email: sales@starwoodmodels.com

MAIN ROTOR DIAMETER 2,300 mm

TAIL ROTOR DIAMETER 412 mm

OVERALL LENGTH 2,108 mm

ALL-UP WEIGHT (without blades)

13.6 kg (30 lb)

TAKE-OFF WEIGHT 17.6 kg (38 lb 13 oz)

TAIL GEAR RATIO 5:1

CONTROL REQUIREMENTS 6 servo heli. radio and gyro

POWER REQUIREMENT Jakadofsky Starwood Edition Turboshaft engine

US Prices (excluding shipping):

Lama SA315B 1/5th Scale Helicopter for Turbine: \$5,225.00

Lama SA315B 1/5th Scale Helicopter with Starwood Turbine: \$9,805.00

Lama SA315B 1/5th Scale Helicopter for Electric (including motor): \$5,780.00

Lama Scale Turbine 3.5L Fibreglass Fuel Tank: \$285.00

Lama Turbine Exhaust, Single Wall TJ1007: \$195.00

Starwood Edition Turboshaft Gas Turbine Engine: \$4,660.00