Rod Thwaites Rod Thwaites/Chris Bowler

SK61 BULLDOG

COVER STORY

Rod Thwaites reviews this 62" span military training aircraft from the new scale series by VMAR

The S. A. Bulldog (SK-61) was originally developed from the successful Beagle Pup and when Beagle Aircraft went into liquidation in 1970 the project was taken over by Scottish Aviation. The prototype Bulldog first flew on 19th May 1969 at Shoreham Airport and the first order was for 58 aircraft for the Swedish Air Force and 20 for their army. The RAF ordered 130 for the University Air Squadrons and it became their primary trainer, replacing the venerable DHC-1 Chipmunk.

'well protected from movement and damage during transit'

Box art and all items as included in the kit

VMAR Version

This new ARTF model from VMAR is a 61" span sport scale interpretation of a well-loved British aircraft designed for either .46 -.62 two strokes or .60 - .90 four strokes. It features steerable tricycle undercarriage and optional flaps for five-channel control, with seven servos. It also offers the modeller a choice of colour schemes for either a camouflaged Swedish Air Force trainer or an RAF University Squadron trainer. The only difference in model specification, apart from colour, appears to be that the RAF version has two pilot figures and a large conspicuous radio antenna behind the cockpit canopy.

The review kit is the Swedish version and I might just add the prominent antenna feature myself. There is quite a substantial box with colour photos of both aircraft emblazoned upon the top. On opening the box you are presented with cardboard partitioned sections each protecting their own individual component. The fuselage dominates half the box and this is the first item to grab your attention. Every major component is plastic wrapped and well protected from movement and damage during transit. Unfortunately the pilot figure, together with his seat, had become detached from its proper location on the left cockpit floor and was now lying face down in the passenger foot well! As the cockpit area is factory sealed there is no easy access to be able to recover the pilot. If the pilot has become dislodged in transit, how will he survive the odd heavy landing? It was rather fiddly to gain access and reposition him!

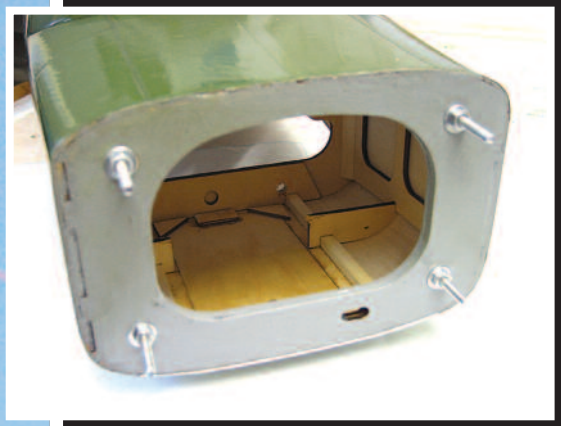
There is a 16-page A4 sized assembly and operation instruction manual – which on the face of it is relatively easy and straightforward to follow – but there are a number of errors including one which could cause frustration during the motor installation - more of this later. The need is stressed throughout to use 30-minute epoxy glue for all major component joining.

Check First

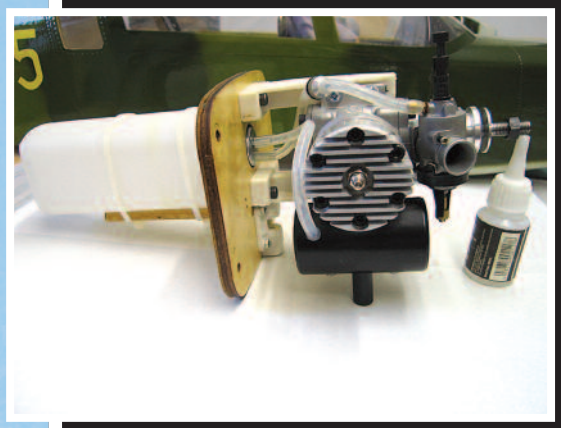
Firstly check that the box contains all the parts referred to in the manual. There is a large bag of all fittings needed to connect the control surfaces to the servos. Wire pushrods to the tail are preinstalled and wire pushrods are supplied for the nose gear steering

Wings

Following the sequence specified in the manual, begin with preparation of the wing joiner (dihedral brace) and the two locating dowels needed to align the wing panels. The dowels are fitted to preformed holes in one wing panel and super-glued to secure in place. The laser cut plywood wing joiner is epoxied into the preformed slot in the wing. Test fit the second wing panel to ensure proper alignment and snugness of fit then epoxy it in place. Once the glue has set, the wing joint is firmly taped with supplied self-adhesive clear tape.



Front former showing power pod attachment points and general laser cut ply construction of fuselage



This is the power pod assembly with engine and fuel tank attached. Note my cable tie modification to secure the tank – more durable than the supplied rubber bands

Dihedral brace and alignment dowels in position in port wing. Note tube and access hole for aileron and flap servo wires

and throttle linkages. The clevises appear to be of a reasonable quality aluminum material drilled and tapped for a screwed pin to secure them to servo arms and control horns. It is important to remember to use a thread locking fluid on all the pin screws before flying.

Also included are the two Dural main undercarriage legs preinstalled with axles and wheels, and the nose-gear assembly ready to be fitted in the prefixed mounting on the firewall. A split arm type plastic engine mounting is also supplied together with all necessary fixing bolts. A 10 oz size plastic fuel tank is included and this is supplied rubber banded to the back of the firewall - also more of this issue later. To complete the motor installation a good quality black painted aluminum spinner is also included.

Engine

Whilst the wing epoxy was curing I checked out the motor installation, with its interesting 'power pod' type fixing to the fuselage. This consists of a separate plywood firewall to which the engine, fuel tank and nose-gear is fitted. The whole assembly is then mounted on the fuselage with four threaded studs already fitted to the front of the fuselage. I was concerned that neither the front fuselage member nor the firewall appeared be fuel proofed so I gave them a couple of coats of 'Clearcoat', just to make sure.

The firewall is pre-marked for the engine mount fixing holes and you should check what spacing your particular engine needs to ensure that you drill out the correct set of holes. VMAR recommend their own .52 but I had a spare SC61A looking for a home and as distributor MacGregor's web page for this model recommends a .61 for best performance, I thought that this engine would be a suitable choice. Drill out 4 mm clearance holes to the firewall where indicated and then the separate engine mounting arms can be bolted on with the 3.5 mm hex head bolts and washers provided. The nuts are not of the self-locking type; so do use thread locking fluid.

On test fitting the firewall to the fuselage I encountered a problem – the engine mount fixing bolts are too long and the top pair foul against the fuselage front former, preventing the firewall locating in its proper position. Cut off the excess bolt threads, flush to the nuts, to allow the necessary clearance. Cut off all four bolts, as the bottom pair will interfere with the fuel tank fixing. At this stage test fit the firewall on its fuselage mounts and temporarily secure in position with the nuts and washers. Ensure that it is fitting flush and square and then test fit the moulded pre-painted fibreglass cowl in position over the front of the fuselage and adjust to its final position.

Once happy that it is sitting square and symmetrical, carefully mark the extent of the cowl edges on the fuselage with a thin marker pen, for future fitting reference, and then measure the distance through the cowl from the firewall to the front face of the cowl. This will be a reference dimension to ensure accurate engine location on the bearers. Remove the cowl and the firewall assembly.

'only one clunk supplied'

Engine Fitment – CAUTION!

Temporarily clamp the engine in position on the mounts 115 mm from the firewall to the BACK of the engine's prop driver, NOT the front as indicated by the instructions! Carefully measure the distance that from the firewall to the front of your prop driver and check that this is greater, by 3 or 4 mm, than the distance that you previously measured through the cowl to ensure spinner clearance. If you follow the VMAR instructions you will be in trouble when you come to fix the cowl as you will find the prop needs to be fitted back inside the cowl!

The fuel tank is of approximately 10 oz capacity and is supplied rubber banded to a pair of softwood dowels that protrude from the back of the firewall. The instruction sheet states that a pair of clunks is supplied with the tank to facilitate an unorthodox fuel filling and venting system. In this particular kit there was only one clunk supplied and you will have to provide sufficient silicon fuel tubing to make up the tank fuel feed in the normal fashion. This was another frustration, the clunk had to be drilled out, as it had only been part drilled through.

There are three outlet pipes supplied, two of which will require slight bending to vent to the top of the tank. Be careful with the bending, these are quite brittle and fracture easily, so gently does it. Once made, the tank can be installed on the dowels with the feed/vent pipes protruding into the engine bay between the mounting arms. As previously mentioned make sure that the bottom engine mount fixing bolts are shortened otherwise they will foul the fuel tank, risking wearing holes through the tank. I question the longevity of thin rubber bands holding the tank in place and could just imagine a full tank moving rearward, particularly on take off, to upset the C of G, so I substituted a couple of plastic cable ties, which should be more robust and durable.

Ailerons and Flaps

I used standard Futaba S148 servos, which fit snugly to the inside of removable panels that screw in flush to the wing surface. A standard mid-range servo horn protrudes just sufficiently to enable the fitting of the pushrod clevis. There was no drama in installing the servos and pushrods, but you will have to carefully widen the jaws of each clevis to ensure that the control horns swivel freely. Thin wall plastic pipe is built into the wing to allow servo wire to feed back to the wing centre section. I elected to make the flaps operational and by jumping forward a number of stages in the instruction sequence I thought this would be an opportune time to also install the flap servos.

If you have not fitted flaps to a model before please beware that the instructions are vague with misleading photos. Initially you are asked to choose to have working flaps, or not, and if not you are instructed to secure them in their neutral positions. There is no advice on how to do this. Probably the easiest way would be to install the control horns and pushrods in the usual way and then secure the wing end of the pushrods firmly and immovably back to the wing structure, making small adjustments on the clevises to align the flap surfaces with the wing roots. In this way if you decide to make working flaps later you can.

If using operational flaps, then be aware that the servos in each mounting position must face the same way, which means that one pushrod will be closer to its flap end than the other. Each flap has two preformed holes for the control horn fixing but you will only use one and you must make sure that you cut the covering from the correct one. Before cutting any covering for horns do install the servos on their wing mounts, as you did for the ailerons, and then test fit the servo mounts in their locations, remembering that one servo top will face inwards towards the wing centre and the other must then face outwards, towards the wingtip.

I found a problem with this on my first try due to the proximity of a wing rib to the servo, meaning the hatches would not fit. If I reversed the installation with both servos facing the other way then I could obtain a better fit. Make sure that your servo installation is sorted before cutting holes in the flaps for the control horn fitment otherwise you could end up with two sets of holes in each flap! I found that the push rods as supplied were too long. I ran a die up the rods to extend the threaded section and then cut the surplus off to suit. If you do not have a suitable die then you will need to cut the pushrods and bind and solder them back together at the correct length. Make sure the joint is robust enough to hold the flaps firmly in position.

Tail Section

The fin and tailplane are supplied with rudder and elevators pre-installed and all control surface hinges have been pinned. Simply test fit to the fuselage to check alignment and squareness and mark the surfaces with a light pen to give guides for removing the covering on the glue area. This process is well described in the instructions and to complete the tail section, install the control horn assemblies in their preformed holes through the control surfaces. The elevators, incidentally, are controlled independently with separate pushrods which are then joined together back at the servo tray area. Once the tail feathers are fully glued in position make the clevis to control horn connections in the usual fashion.

Detail of the tailplane and elevator horn installation. Note cut away covering for gluing to the fuselage slot area

Undercarriage

The main undercarriage consists of two separate Dural legs supplied ready fitted with axles and wheels. Three self-tapping screws fix each leg to preformed and drilled sockets on the wing. I wondered if that will be robust enough, but we will see. The nose gear is installed into its bracket on the firewall and the steering control arm is secured with a grub screw. The supplied Allen key was too small to fit the grub screw and you will have to find the next size up. Steering is by wire pushrod running in a plastic snake.

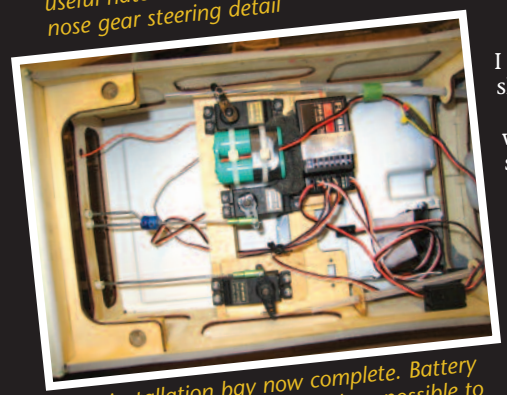
Flap servo and hatch in position with the supplied push rods being obviously too long. See text for note on modification. Also note undercarriage fixing point and wing bolt location with ply reinforcement.

Referring to the text on the issue of the servo tray this indicates where I have had to cut out the tray for the rudder servo and also where I have marked out the tray to also cut out for the throttle servo. Note proximity of cabin floor plastic moulding that prevents use of the switch mounting

Radio Installation

A laser-cut ply servo tray is ready installed in the fuselage for three standard servos for rudder/steering, elevator and throttle. There is also a formed cutout in the tray for the on/off switch. The position of the tray relative to the plastic cockpit floor creates a further predicament to overcome as the floor moulding encroaches upon the servo mounting area and if you look at the relevant photo you can see the problem that you may also have to overcome. The centre mounting area for the elevator servo is fine and that has been prepared properly. The outboard areas of the tray required modification to enable servo fitment. I firstly determined how much of the tray would need to be cut away to allow the servos to fit in and with careful use of a small jigsaw I cut out the tray as shown.

Forward underside of the fuselage showing useful hatch cover with spring held catch and nose gear steering detail



Radio installation bay now complete. Battery and receiver moved as far back as possible to help counter nose heavy condition. Still needed 95 g of lead in the tail to balance

Once happy that there was now room for the servo to fit, I made an extended tray from scrap ply, which is glued on to the original ply allowing the servo to be screwed down securely. You may have to do this for both the throttle and rudder servo. The switch mount wasn't used as it is fully blanked by the cockpit moulding. Had the manufacturer flipped the tray 180 deg. and then moved it 10 mm rearward it would all have been perfectly useable without any modification!

There is no provision for routing the receiver antenna wire so I made a small hole in the rear of the fuselage on the right hand side just in front of the stern post, under the tailplane and gently threaded a length of piano wire through the hole and up through the fuselage to the servo area. Temporarily tape your antenna to the piano wire and draw both back down the fuselage and out of the hole at the back. There is a useful removable hatch, secured by a spring loaded catch, in the lower fuselage under the fuel tank area, which makes installation of the battery and receiver very easy to arrange.

Cowl and Spinner

The cowl is a very good fibreglass item with panel details moulded into it. Take time to measure accurately then neatly cut out the necessary holes for needle valve, exhaust, nosegear, etc. I found it easier to measure for and cut the clearance slot for the nose-gear without the engine in place. Once you are happy that the nose-gear has sufficient room to rotate without fouling the cowl then you can reinstall the engine and measure for the exhaust outlet, needle valve access hole and, as in my case, the cylinder head protrusion.

When satisfied the cowl will fit neatly in position with the necessary clearance for the prop driver as mentioned previously, mark and drill the holes for the fixing screws to secure the cowl, ensuring that they fit into the ply framework and not just the balsa cladding. With the engine in place and the cowl fitted it only remains to fit the supplied aluminium spinner and, of course, a propeller to complete the construction.

Forward view of cowl and spinner, both after modification to fit the engine

As a point of interest it is important to note that the spinner components are machined to suit 1/4" UNF prop shafts. If your engine has a 5/16" UNF shaft like mine then you will need to drill out the back plate to suit and also to drill and re-tap the prop/spinner attachment nut. For the small, added cost perhaps VMAR should provide alternative parts with the spinner to allow the modeller a greater choice of engines without having to resort to an engineering solution.

'judicious use of the throttle allowed it to settle nicely'

Flying

Once the control surfaces have been checked for smooth slop-free movement, all adjustment to throws made as recommended by the instructions, it's time to fly! I asked clubmate Harry Curzon to do the first flight honours and the model tracked straight before lifting off easily. There was plenty of power and the bulk of the flight was done at half power. Slight trim to right rudder and right aileron and the model was flying steadily. Harry suggested that the ailerons were a little sensitive and went to low rates and this proved more than adequate. The elevator was the same and the throw will be reduced to make it more manageable. On the stall test it dropped the port wing, but gave adequate warning, losing height quickly. Not to be attempted at low level!

All the usual manouevres were performed with ease, and the landing with flaps was fine. It settled into an approach and judicious use of the throttle allowed it to settle nicely. Harry suggested that more expo on the ailerons and elevator would make it easier to handle with 'softer' feel at the stick centres. The darker colour

Waiting for the first flight

scheme sometimes made orientation difficult but that should not be such a problem with the RAF version. All in all a very satisfactory first outing.

Conclusion

This model is bound to appeal to a large number of modelers, though I suspect the RAF version will be the most popular. Whilst the model could not be called true scale, it is a very good likeness to the full size. It is well built, acceptably finished and is accurately assembled with a good parts fit, especially the cowl. There are a number of errors and omissions in the assembly instructions that I am assured will be referred for amendment. If they can also address the servo tray installation issue and consider including alternative parts for the spinner fitment then the model will prove to be even better value for money.

Nicely banked top show shows the clean lines

Up and away; the vast canopy shows up well with the pilot now paying attention!

Turning away showing the light coloured underside

Camouflage scheme shown to good effect against the trees

This is not for beginners, but anyone wanting a predictable sport scale model for spirited performance, particularly with a bigger engine, will not regret buying the Bulldog, particularly with flaps providing a further dimension to the flying experience. Should disaster happen and you need of replacement items, then a full range of spares is available for the aircraft – very reassuring for us less than perfect pilots! **RCMW**

Contact Details

MacGregor Industries Ltd
www.macgregor.co.uk
01628 760 430

SPECIFICATION

Model Information

Name:	SK-61 Bulldog – Swedish version
Manufacturer:	VMAR Manufacturing
Distributor:	MacGregor Industries Ltd
Product Code:	VMA0806(RAF) or VMA0807(Swedish)
Price UK:	£84.95
Model Type:	Sport scale
Motor:	SC61A two-stroke
Prop:	12" x 6"
Radio:	Futaba FF7
Construction:	ARTF: built up balsa and ply, Polycote covered

R/C FUNCTIONS

1: Ailerons (2 servos)
2: Elevators
3: Throttle
4: Rudder and nosewheel
5: Flaps (optional, 2 servos)

SPECS

Wingspan:	62"/1571 mm
Length:	1300 mm
Target Weight:	850 g
Engine:	.46 - .62 cu in two-stroke; .60-.90 cu in four-stroke

TEST

Dislikes
Servo tray position
Pilot figure
Inaccurate and inadequate instructions

Likes
Cowl and spinner quality
Overall build quality and general finish
Comprehensive fittings included
Choice of colour scheme
Value for money
Full range of spare parts available