Ripmax

acro·wot Mk2 XL

BY CHRIS FOSS

A Chris Foss Design

Instruction Manual

The Designer

Chris Foss outside his factory in 1990

Chris Foss

The fascination of flight captured Chris's imagination early on in his life when he started building, from kits and plans, simple free flight gliders and rubber powered models. By his early teens, Chris was already experimenting with his own designs, several of which have been featured as constructional plans in various aeromodelling magazines.

It wasn't long before his fiercely competitive nature started to show itself, with Chris channelling his energies into competing at national level with his own high performance free flight gliders.

In due course, Chris became tempted by the affordability of simple and fairly reliable radio control equipment, so by 1967 he had already designed, built and flown his first radio controlled glider. By 1976 his career in the architectural profession came to an end when he decided to channel his knowledge and experience into a full time kit manufacturing business, 'Chris Foss Designs'. It soon developed into one of the UK's most successful and respected R/C model businesses, offering a range of stylish and quality products.

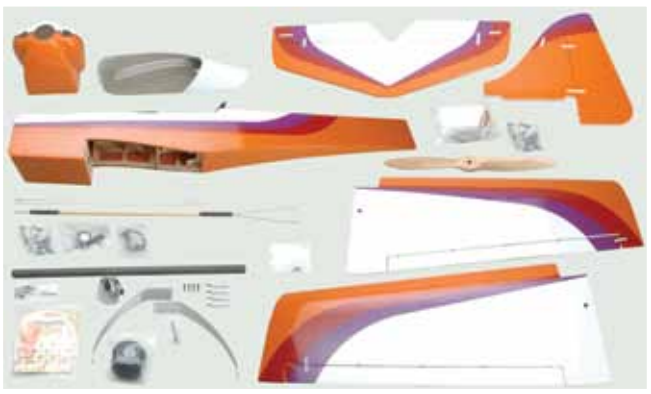
With the advent of reliable and advanced radio control systems, Chris was able to expand his competition flying with considerable success. His competition highlights include becoming 1977 British National Thermal Soaring Champion, 1986 British National Scale Champion, placing 4th at the 1986 World Scale Championships in Norway, placing 6th at the 1992 World Scale Championships in the USA, and winning both 1992 and 1993 'Radioglide' National Thermal Soaring Championships.

In the late 70s Chris joined the local gliding club and achieved his ambition to actually fly himself! A few years later he expanded into powered flight and qualified for his Private Pilot's Licence. By 2007 Chris had accumulated 2000 flying hours in a wide variety of light aeroplanes, including a vintage Piper Cub, Jungmann aerobatic biplane, various glider tow planes and his favourite, a Vans RV8 American aerobatic kitplane.

Introduction

Congratulations on your purchase of the Acro Wot XL Mk2 ARTF - the first Almost Ready to Fly large version of Chris Foss' classic low-winger. Its unbeatable combination of great looks and superb flying performance make it a must-have sports model!

Assembly is quick and easy, but before commencing construction, please ensure that you read these instructions in their entirety.



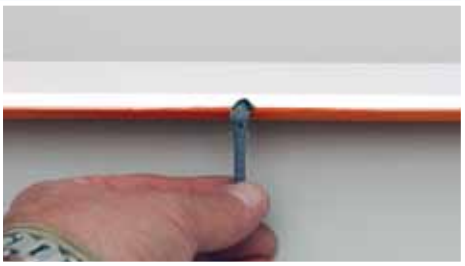
Assembling the Wing

STEP 1

Check the fit of the aileron to the wing panel. If there is any misalignment the holes in the trailing edge of the wing can be slotted as required for the hinges. Mix up enough epoxy for all of the hinges on one aileron and run some into the holes in the aileron.

STEP 2

Carefully apply epoxy to one end of the hinge, having first brushed a little oil on the pivot pin, ensuring this does not run onto the main parts of the hinge. Slide the hinges into position, then wipe away any excess epoxy before it cures. Use a solvent such as Cellulose Thinners to clean the epoxy from the covering material - take great care when using this or any other solvent.

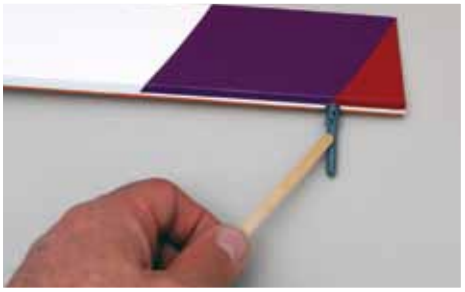


STEP 3

When the epoxy has cured, mix up more and run into the holes in the trailing edge of the wing panel as shown.

STEP 4

Apply epoxy to the exposed part of the hinge as shown.

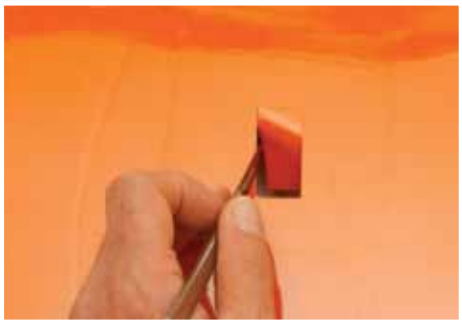


STEP 5

Carefully fit the aileron to the wing panel, again wiping away any excess glue. Ensure a good fit with no excessive gaps, and use tape to hold in place until the glue is cured.

STEP 6

Use a sharp knife to cut away the covering over the servo apertures in the underside of the wing.

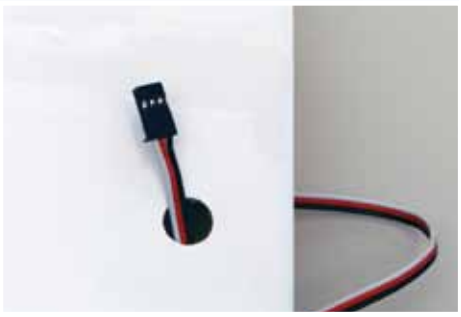


STEP 7

Prepare your aileron servos by connecting a suitable extension lead to each. It is a good idea to use a lead-lock, a turn of insulation tape or heatshrink tube over the joint for additional security. Tie the end of the extension lead to the pre-installed cord in the wing panel.

STEP 8

Use the cord to pull the servo extension lead through the wing panel. Carefully cut away the covering over the servo lead hole in the upper surface of the wing panel at the root and feed the extension lead through this hole.



STEP 9

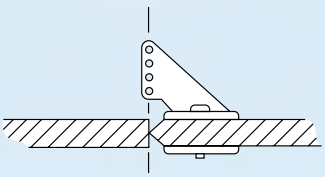
Fit the aileron servo into the wing panel, then use a hole centre tool or similar to drill the pilot holes for the servo mounting screws.

STEP 10

Screw the aileron servos in position using the mounting screws, rubber grommets and ferrules supplied with your radio. Note that the output arms face towards the front of the wing.

STEP 11

Prepare the aileron pushrods by screwing on a metal snap link and fuel tube keeper. Locate the aileron control horns. They are screwed in position on the ailerons in line with the aileron servo's output arm. Align the row of holes in the horn with the hingeline. Mark and pilot drill two mounting holes then screw the horn to the aileron. The screws thread into the moulded horn plate on the top surface of the wing.



STEP 12

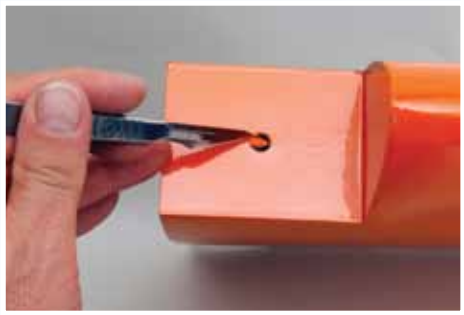
Do not overtighten the control horn mounting screws - you don't want to crush the aileron. Turn the model over and trim off any excess thread using side cutters.

STEP 13

The complete aileron linkage is shown here, note the use of fuel tube keepers on both clevises for security, Do ensure that the locking nuts are firmly tightened against the clevises to avoid the pushrod unscrewing itself due to vibration.

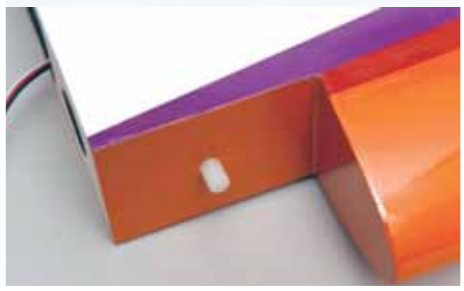
STEP 14

Carefully trim away the covering material over the front wing dowel hole.



STEP 15

Epoxy the wing dowel into place, ensuring that only 12-13mm of the dowel is left exposed, it may be necessary to lengthen the hole in the panel to allow the dowel to be correctly positioned. Repeat all of the above stages for the second wing panel.



STEP 16

In a similar manner glue the wing alignment dowel into place.

STEP 17

Carefully cut away the covering over the wing bolt holes on both the upper and underside surfaces.

STEP 18

When the wings are fitted to the fuselage the load spreading plate should be positioned as shown.

Fitting the Undercarriage

STEP 19

Locate the aluminium main undercarriage, wheels and wheel mounting hardware (axles, washers, nyloc nuts and collets). Pass the axle through the undercarriage leg then install the nyloc nut and tighten securely. Fit the wheel using the collets to secure, it is recommended that a threadlock compound is used on the screws, and that a flat is ground on the axle where the outer collet fits to avoid this being forced off the axle during crosswind landings. Repeat for the second undercarriage leg.

STEP 20

Carefully cut away the covering over the undercarriage mounting holes in the underside of the fuselage.

STEP 21

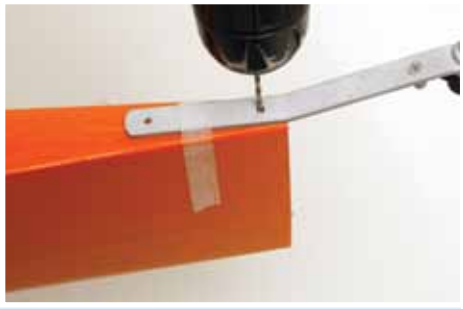
Locate the undercarriage mounting bolts and washers. Screw the undercarriage in place noting that the undercarriage legs rake forward. Use a drop of threadlock on each for security.

STEP 22

Install the tailwheel on its axle and retain with a collet. Ensure the wheel spins freely and that the grub screw is tightened securely. Fit the tail leg as shown with collet and steering arm, Grind a flat on the shaft where the screw for the steering arm is positioned to avoid the tail leg twisting within the steering arm. Use threadlock for extra security.

STEP 23

Hold the tailwheel bracket in place with tape as shown, then drill pilot holes for the mounting screws.



STEP 24
Screw the tailwheel assembly into place as shown.

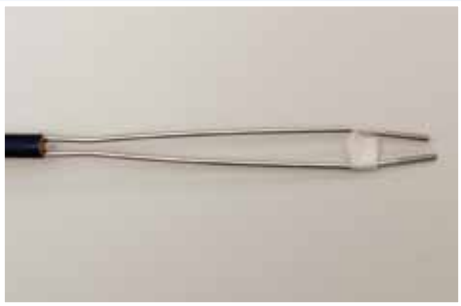
Assembling the Fuselage

STEP 25
Using a sharp knife, carefully remove the film from the slot in both sides of the fuselage where the tailplane will mount.

STEP 26
Trim away the covering to expose the slots for the elevator pushrod and rudder closed loop exits.

STEP 27
Carefully remove the film from the slot in the top of the fuselage where the fin will mount.

STEP 28
Use a single wrap of masking tape to pull the twin elevator pushrods together as shown.



STEP 29
Carefully slide the elevator pushrod down the rear fuselage as shown.

STEP 30

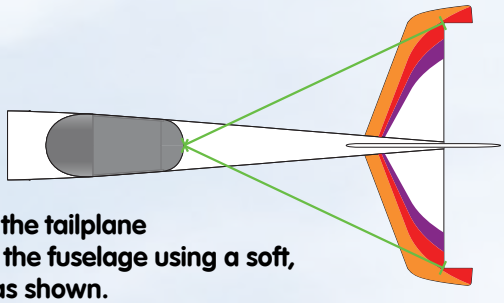
When the twin pushrod ends are visible in the tailplane slot cut the masking tape to allow the pushrods to spring apart.

STEP 31

Use a small screwdrive or allen key to position the pushrod ends in line with the pushrod slots in the fuselage and gently ease the pushrod ends out of these slots.

STEP 32

Slide the tailplane into its pre-cut slot in the rear of the fuselage. Ensure that it is square to the fuselage and centred in its slot using a long ruler or string as shown in the diagram on the right. Install the fin and then mark the tailplane on the top and bottom where it enters the fuselage using a soft, water-soluble pen. Repeat for the fin as shown.



STEP 33

Remove the tailplane and carefully cut through the covering just inside the marked lines. IMPORTANT: Ensure that only the film is cut - not the tailplane - as this will seriously weaken the structure.

STEP 34

Carry out the same process with the fin.

STEP 35

Remove the film between the cut lines of the tailplane, on both bottom and top surfaces. Repeat this process of the lower section of the fin, below the cut lines.

STEP 36

With the covering removed, the fin and tailplane are ready to be installed. If necessary, use a warm covering iron to ensure the edges of the film are firmly adhered.

STEP 37

Slide the tailplane into place and check alignment - once happy run thin cyano glue along the edge of the tailplane/fuselage joint. Ensure that adequate glue is used, but do not use too much, which can result in runs. Allow to cure then repeat for the underside of the tailplane/fuselage joint.

STEP 38

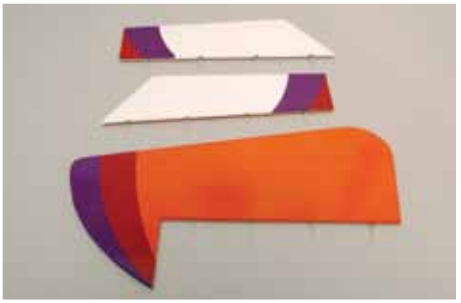
Smear a generous amount of epoxy inside the slot for the fin & on the base of the fin so that it will glue firmly to the upper surface of the tailplane.

STEP 39

Slide the fin into place, check alignment and when satisfied run thin cyano around the top of the fin slot.

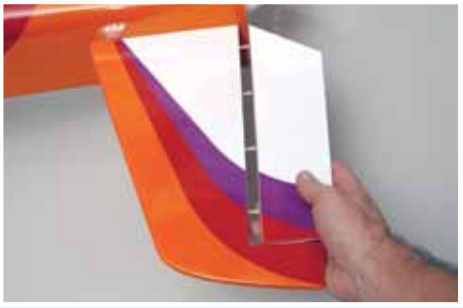
STEP 40

Check the fit and alignment of the hinges in the tail surfaces and adjust if required.



STEP 41

In a similar manner to already described for the ailerons/wing, glue the hinges into the elevator halves and then in turn glue the exposed hinges into the tailplane, ensuring that the elevator/tailplane gap is minimised.

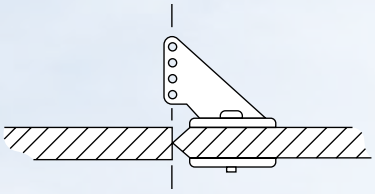


STEP 42

In a similar manner to already described for the ailerons/wing, glue the hinges into the rudder and then in turn glue the exposed hinges into the fin and rear fuselage, ensuring that the rudder/fin/fuselage gap is minimised.

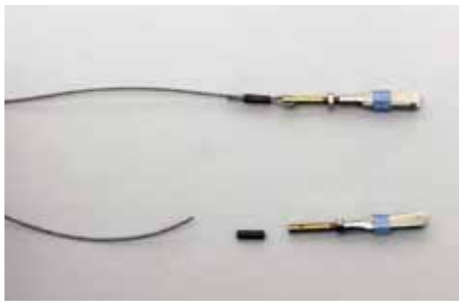
STEP 43

Install elevator control horns in a similar manner to those fitted to the ailerons. Fit clevises, locking nuts and keepers and connect the clevises to the control horns using the outermost but one hole.



STEP 44

Cut the supplied single piece of closed loop wire into two equal lengths, then fit a clevis and locking nut onto the closed loop adaptor. Now loop one piece of the closed loop wire through the adaptor, and slip the brass tube supplied over the join. Securely crimp with pliers. Repeat for the second length of wire. For additional security we recommend a drop of cyano is used on each crimp.

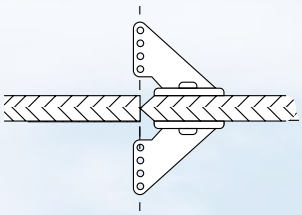


STEP 45

Now connect one of the clevises to the rudder servo and feed the wire down the corresponding guide tube in the rear fuselage and out of the exit. Repeat for the second wire on the alternate side of the servo horn and second guide tube.

STEP 46

Install rudder control horns in a similar manner to those fitted to the ailerons - note that the horns fit base to base.



STEP 47

Fit clevises, locking nuts and keepers and connect the clevises to the control horns using the outermost but one hole. Note that the front of the control horn may require trimming to clear the rear fuselage side when the rudder is at full deflection.

STEP 48

Centre the rudder and connect up the closed loop wires to the adapters in a similar manner to that use on the servo horn ends of the wires.

STEP 49

Slide one of the brass tube crimps over one end of the tailwheel steering springs and make a 90 degree bend in the straight section around 15mm from the end as shown.

STEP 50

Fit the bent end of the wire through the hole in the tailwheel steering arm an the bend it back on itself before sliding the brass crimp over the end of the wire, finally crimping it firmly with pliers. Repeat for the other end of the wire fitting this through the hole in the rudder horn inboard of the rudder clevis. Repeat for the other side ensuring that the steering is straight when the rudder is centred.

Installing the Engine

STEP 51

Offer up the engine to be used together with stand-offs and then mark which of the two sets of laser-etched mounting hole positions are correct for the engine.

STEP 52

Drill pilot holes in the centres of the marked positions.

STEP 53

Enlarge the holes to suit the captive nuts being used.

STEP 54

Offer up the captive nuts to the rear of the engine former, it is possible to position these using a single finger as shown, a small dab of thick grease can be used to hold the nut in position on your finger until it can be pressed into the corresponding hole in the former.

STEP 55

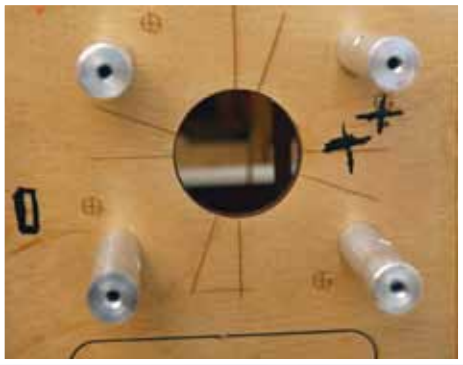
Most petrol engines will require the use of stand-offs to position the engine correctly. The distance from the front of the engine former to the rear of the spinner should be around 175mm. With the correct length stand-offs to hand use one of them, complete with threaded insert, to draw the captive nut fully forward into place in the former, making sure that a large washer is fitted under the end of the stand-off. Repeat for the three remaining captive nuts.

STEP 56

Fit all four stand-offs, making sure that a threadlock compound is used on all the screw threads.

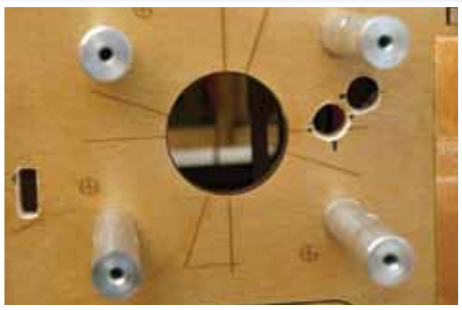
STEP 57

Offer the engine into position and mark the former with the positions of the throttle and choke pushrods.



STEP 58

Carefully drill the holes for the throttle and choke linkages as well as a hole for the ignition lead if required.



STEP 59

It is recommended that the supplied brass barbs are soldered to the fuel tank tubing to ensure security of the fill, feed and vent tubing.

STEP 60

Prepare the fuel tank for fitting by assembling the tank stopper with the feed, vent and fuel pipes. Ensure the clunk tube lengths are cut to allow the clunks to move around the tank without catching on the tank's base. Fit the assembled tank bung and tighten the retaining screw. Take care not to over-tighten this screw. Test that the tank is leak-proof.

STEP 61

The tank is installed in its bay via the radio bay. Fit and identify your fuel tubes, then feed the tank into position, drawing the fuel tubes out through the hole in the centre of the firewall. Note the retaining ring to hold the tank neck centred in the hole in the former.

STEP 62

The fuel tank is retained in place with a section of balsa as shown, which should be tack glued into place, so that it can be broken free if the tank has to be removed at a later date.

STEP 63

Fit engine to the stand-offs and mount the silencer - use threadlock compound on all bolts.

STEP 64

Make up the throttle and choke pushrods and connect to the appropriate arms on the carburettor.

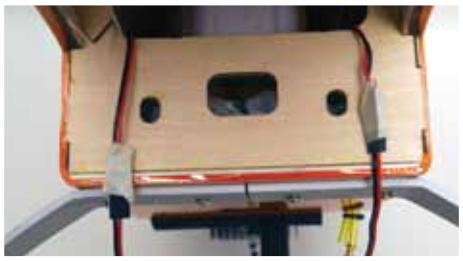
STEP 65

Run the fill and overflow fuel lines to the bottom of the former and retain in place as shown.

Final Assembly

STEP 66

Radio and ignition batteries should be wrapped in foam and then positioned as far forward as possible unless a particularly heavy engine is being used. Note the tape over the connectors to secure them together.



STEP 67

Switches can be positioned as shown, this example has one switch on each side of the fuselage.

STEP 68

Trim the fibreglass cowl to clear the engine and silencer. The cowl should just overlap the front of the fuselage. Carefully measure the positions of the cowl mounting blocks and transfer these measurements onto the cowl. Pilot drill the cowl and retain with four self tapping screws, two on each side of the model. It is recommended that the screws are fully tightened and that then they and the cowling are removed, after which thin cyano can be run into the holes to harden the wood. Allow the cyano to fully cure before refitting the cowling.

STEP 69

The pre-trimmed canopy is supplied ready to fit using your favourite method. The kit is supplied with four screws to retain the canopy, or you can use canopy glue (or a combination of both) if you prefer. If using canopy glue, carefully apply to the perimeter of the canopy and hold it place with strips of tape until the glue dries.

STEP 70

Fit the propeller and spinner to complete the engine and cowling installation.

STEP 71

Complete the internal installation with the fitment of the equipment tray, which holds the throttle and choke servos as well as the receiver and electronic ignition unit. Connect the throttle and choke linkages to the servo arms using the supplied pushrod connectors. The receiver is mounted using multiple layers of servo tape to provide a degree of vibration absorption. Position the receiver aerials as detailed in your radio instruction manual.

Control Throws

For initial flights, we recommend the following control throws - each measured at the widest point of the surface:

Elevator:	25mm Up (20% Expo)
	25mm Down (20% Expo)
Rudder:	80mm Left (No Expo)
	80mm Right (No Expo)
Ailerons:	18mm Up (20% Expo)
	18mm Down (20% Expo)

Balancing the Acro Wot XL

The Centre of Gravity (C/G or Balance Point) should be 120mm (4 3/4") +/- 6mm (1/4") back from the leading edge of the wing at the root. This should be measured with the fuel tank empty. Support the completed model under the wing either side of the fuselage at this point and add weight or adjust the position of the battery in its bay as necessary to achieve a slightly nose down attitude. A model that is not correctly balanced will not perform as it should and, at worst, be unstable or unflyable, leading to damage to the model or injury to yourself or others. Do not miss out this step in completing your Acro Wot XL!

For best performance, the model must also balance laterally. Support the Acro Wot XL at the base of the fin leading edge and the crankshaft (with the prop and spinner removed) and add weight to the as required to balance correctly.

Pre-Flight Checks

- Completely charge your transmitter and receiver batteries before flying.
- Carefully check your model over to ensure that all screws are tight and everything is well bonded.
- Double-check the Acro Wot XL's Centre of Gravity.
- Check the control surfaces for both the correct throw and direction. Ensure that each surface moves freely, without any binding.
- Check the receiver aerial(s) are correctly installed.
- Ensure the wing bolts are tight.

While the Acro Wot XL is not suitable as a first model, it does make an excellent first low-wing model with reduced control throws and an engine from the lower end of the range. In this case, we recommend that your completed model is checked over and test flown by a competent pilot first. Subsequent flights should also be supervised, and assisted where necessary, by an experienced pilot. Always fly the Acro Wot XL in a safe location at a recognised club.

For further information on flying in the UK, please contact:
British Model Flying Association (BMFA)
Chacksfield House,
31 St Andrews Road,
Leicester. LE2 8RE.
Tel: (+44) 116 2440028 Fax: (+44) 116 2440645
www.bmfa.org

Flying the Acro Wot XL

Chris Foss has managed to take one of the UK's most popular low wing sports models and make it even better! The new enlarged XL version not only has a superb appearance, it has a breathtaking performance too! Its light weight and exceptional power to weight ratio means that the Acro Wot XL has the perfect balance of control; authoritative, but not twitchy and a well-mannered stall when really pushed. With reduced control throws, and an engine at the lower end of the power range, it is the ideal first low-winger and suitable for those wishing to progress onto a fully aerobatic model. But with the recommended throws it will perform all advanced aerobatic manoeuvres with loops, rolls, flicks and spins being well within its repertoire. Limitless vertical performance is available with an engine at the top end of the recommended range - perfect for the most demanding pilot.

Spare Parts and Service

Spare parts are available for the Acro Wot XL ARTF from all Ripmax stocked model shops. In case of any difficulty, any product queries, or to locate your local Ripmax stockist, please write to the address below or visit www.ripmax.com

Always fly responsibly and safely.

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