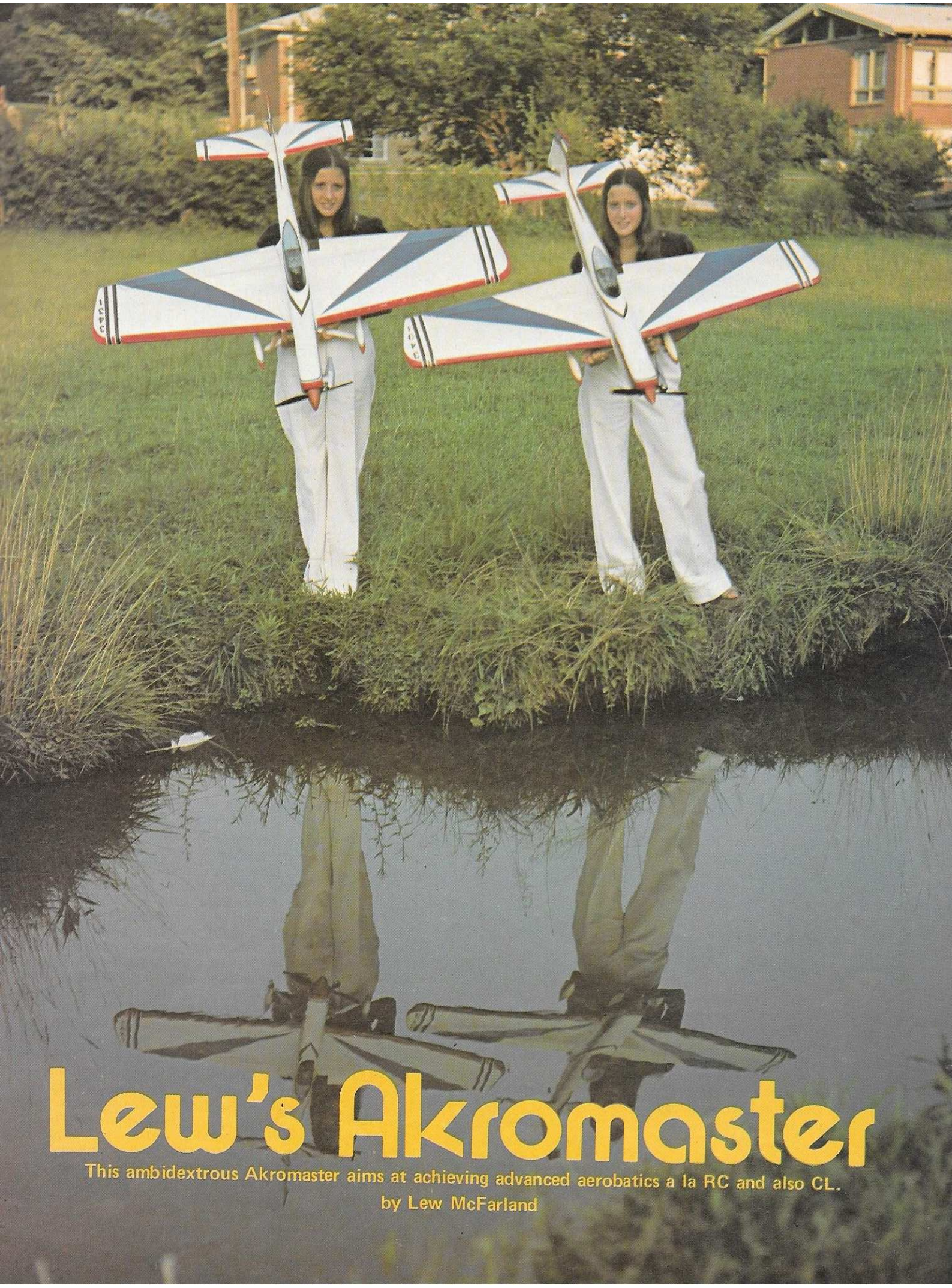


Lew's Akromaster

This ambidextrous Akromaster aims at achieving advanced aerobatics a la RC and also CL.

by Lew McFarland

Stand-off Scale is the likely domain of the Akromaster. To the left is the CL version, while the RC machine is on the right.

An article in **AAM** (February, 1970) on the Spinks Akromaster rekindled a desire to produce a semi-scale stunter. The full-scale aerobatic plane was designed by Charlie Hillard, under the sponsorship of "Pappy" Spinks, for the sole purpose of winning the World Aerobatic Championship for the U.S. Charlie came close in 1970 with a third, but retired the Akro in favor of the Pitts Special to win the big one in 1972.

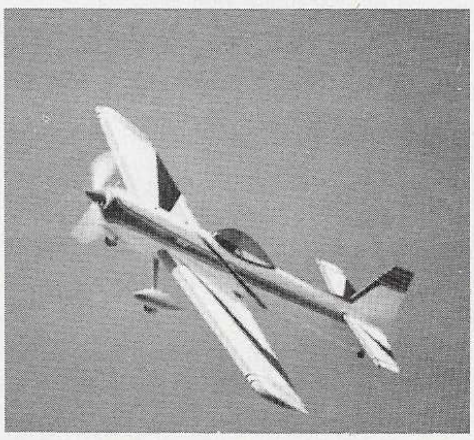
The Hillard/Spinks Akromaster looks much like a big model, and has proportions that are comparable to many good CL stunt ships, while approximating an RC pattern ship. I claim to be one of the world most frustrated modelers in that I like Scale, Stunt and RC—and this plane can supply all three. My Akromaster can stand at the top of the class when it comes to versatility. You can tailor your own Akromaster to do just what you want, whether it be CL Stunt Competition, Stand-Off (Sport) Scale, RC Pattern, or just a plane to fly for fun.

My first project was a 6 ft. semi-scale RC ship which still flies well, but lacks the finesse and agility of the present model.

The CL version got its first real test in the 1971 FAI finals, in which I had to settle for a respectable seventh. I would describe the model in much the same way a British expert did. "It is a sheer delight to fly," because of its simple, uncluttered lines and colorful paint scheme, he declared, calling it "one of the most beautiful airplanes I have seen."

Staying in the usual rut of most competition stunt fliers, a new model was finished just before the 1972 NATS. After a feverish trimming and last minute practice, it garnered a fourth. My cohort Randy Hancock came up with a fifth in Senior Stunt flying with an Akromaster. Randy repeated his fifth-place standing in 1973, but I fell to tenth trying to trim another new plane and harness the power of an HP 40. The HP is a fine engine, but don't try to work one into a stunt engine when you have limited time. I have had best results with the ST 46, but I'm still searching for the right 40, so that .015 lines rather than .018 can be used.

A hybrid RC and/or CL Akromaster was created just to prove a point and satisfy my own curiosity. The plane was flown CL for the first 15 flights. It showed full acrobatic capability and was trimmable for competition. The flaps were fixed in position, an RC unit installed and away it went, much to my pleasure. The RC flight characteristics were good and fast. I am sure the full potential of the plane was not demonstrated because of my lack of expertise.



Airborne, the RC Akromaster has a touch of class and sleek style all its own.

During the Mint Julep meet, Dave Brown (RC pattern expert) did a Figure M with my Akromaster even with the low power caused by the exhaust-off tube (which I later removed) and wrong prop size.

The next day at the Mint Julep I flew the Akro in my first, last, and only RC meet, for a ninth in Stand-Off Scale. The plane did its part, only five points behind the top score on the ground. However, in the air my stick capabilities let it down and we settled for ninth out of some 20 entries. The big thrill of the flight was when I found my Akromaster stacked above a real plane that had been waved off due to the closed runway. I applied full throttle, the real plane was left behind, and I went ahead and made a left turn out. *(Maybe you lost some flight points for not flying at scale speed, Lew!—php.)*

This plane is basically simple, but the novice should first look elsewhere for the fundamentals or have experienced help. For this reason, I shall not go into the usual "glue A to B" sequence of construction. Pick your poison, be it CL, RC, or Stand-Off Scale, and let's go at it:

CL Precision Aerobatics Version: Even here a chance for plenty of versatility presents itself, and the quality of the final product is up to you. Select wood as if you were using an 049 for power. You will need to decide the type of motor mount set-up preferred. I like the Kraft-Hayes because of its flexibility. Note that a 1/4" firewall replaces the 1/8" plywood used in conjunction with hardwood beams when a radial mount is used.

The model under construction utilizes a tank inserted through F-3 into a compartment specially built between F-3 and F-1, which is quite similar to the RC method of tank installation. Both vents come out inside the cowl and engine compartment; one is for muffler pressure and the other is plugged after the tank is filled. This method of removable tank becomes impractical if you choose not to make the wing removable.

Note the difference in wing position between the removable and fixed versions. The dihedral in the removable version, in effect, produces the same aerodynamic position. The 1/16" plywood

doublers stop at F-4 on the fixed-wing version, but extend to F-7 on the two-piece plane. When using dihedral, I install two control horns (one on each flap) and attach dual pushrods to the sides of the regular elevator pushrod.

The original (still my best airplane) and all other removable-wing versions used adjustable steel, 2-56 X-Cell clevises on the flaps and an overside 4-40 clevis to connect the elevator pushrod to the bellcrank. Several people have had sad experiences using clevises in CL Stunt. I suggest a band made from neoprene tubing as a retainer to prevent clevises from opening in flight (this caused the loss of my RC version). In the Akromaster we have the clevises acting to stabilize each other, and some 500 flights have been trouble-free.

The pushrod must be rigid for the removable version to allow it to drop down and be accessible for hook-up, yet not flex as an unguided piece of 3/32" wire will do. A Sullivan RGR-4 Fiberglass Rod (1/4" OD, 12" long) is modified by inserting a metal control horn into the shaft and pinning in place with 1/16" wire and epoxy. A 3/32" wire of sufficient length is attached to the aft end to permit conventional attachment at the elevator horn.

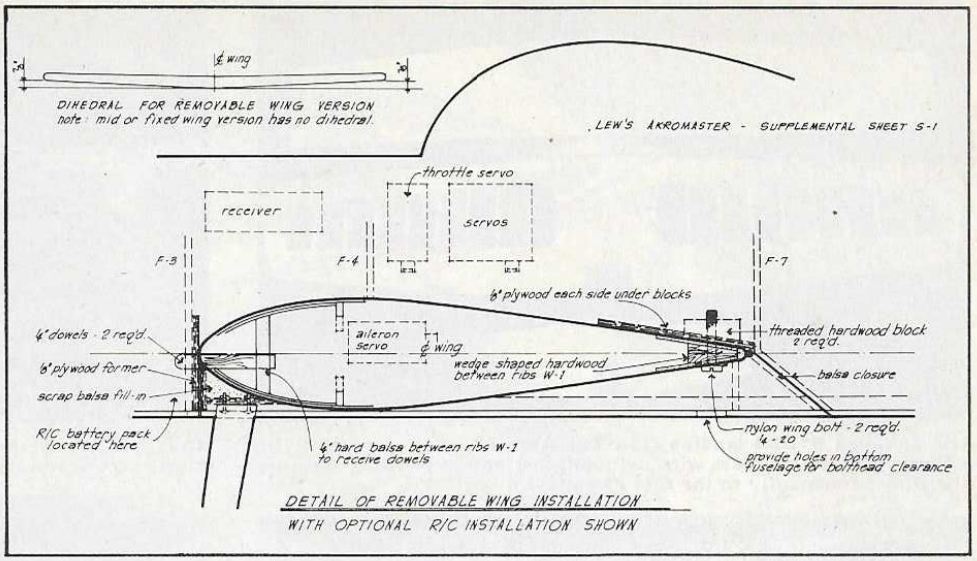
The Rabe asymmetric rudder is a feature which I take no definite stand on, although the original and best plane utilizes Al's brain child. Without doubt, the movable rudder is needed to get optimum performance on certain designs. It is very easy to fix a 2-56 clevis (threaded end only) to the bottom of the stabilizer next to the fuselage. Then you can convert to and/or try the rudder in any position.

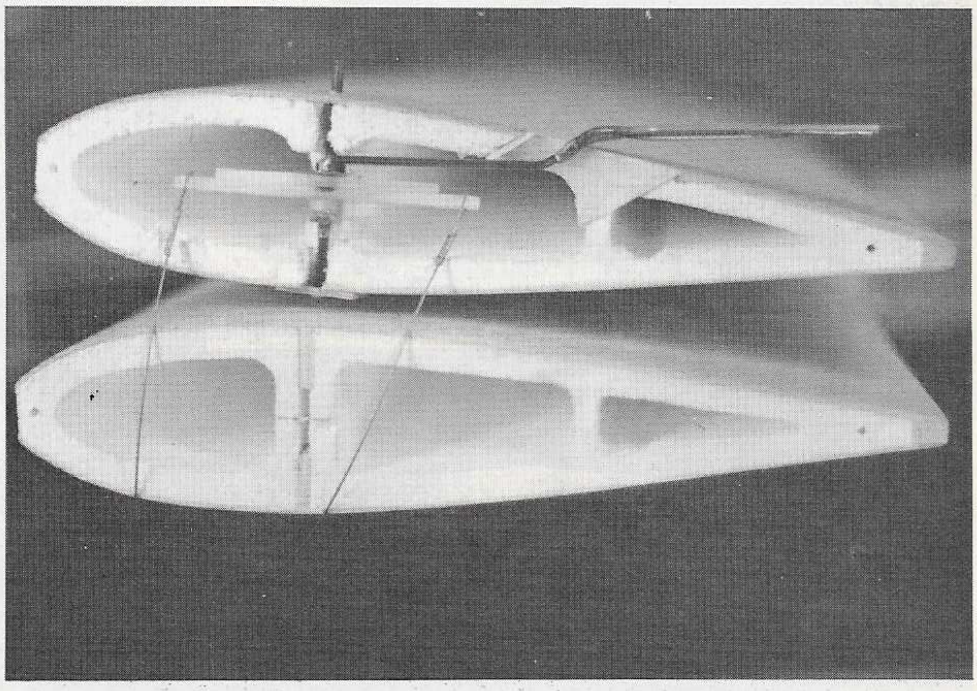
The gear position shown on the plan is standard, but I intend to try a position 1/2" further aft in hopes of getting more landing consistency. The Gieseke (long) tail wheel is no accident, thus we have the only stunt plane that admits to a "Rabe Rudder" and a "Gieseke Tail Wheel."

A variety of wings have been used with equal results: built up, Stott's Foam Flite, and currently X-CELL's (a la Bob Hunt) Cored Foam. The cutout and lamination of the stab is not necessary, but many cannot find 3/8" stock that is light enough.

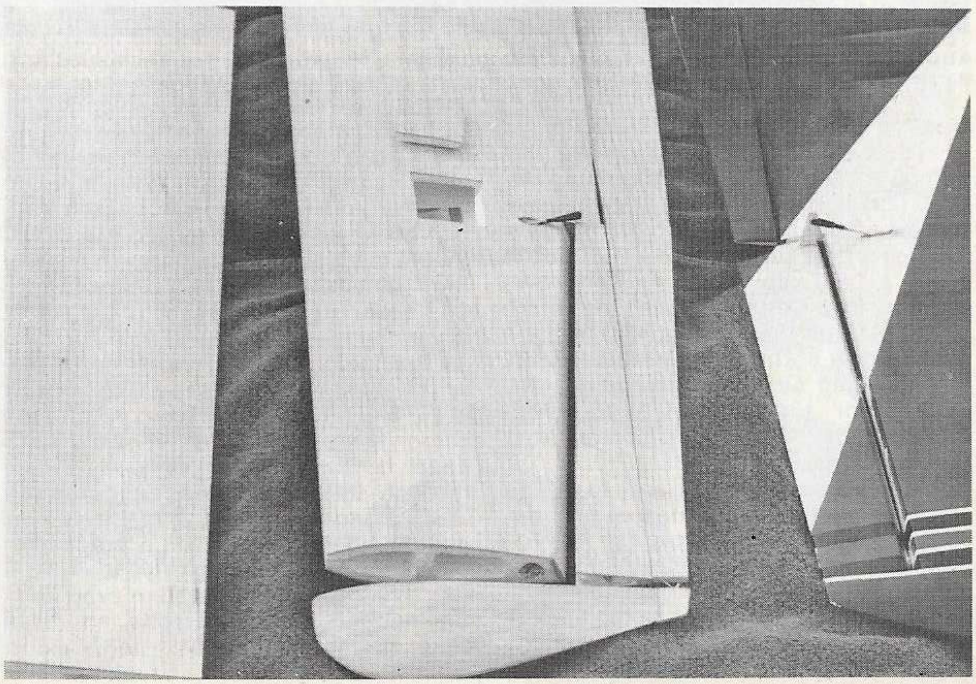
A note on cowling: A tight cowl which forces air around the cylinder is necessary for proper engine operation. If you do not get good flow, you may need to resort to a wrap-around of tin stock from 2 o'clock to 10 o'clock, with an outlet 3/16" wide to the rear of the cylinder. I have narrowed the fuselage width on more recent versions but, as previously stated, I still do not have a plane superior to the original.

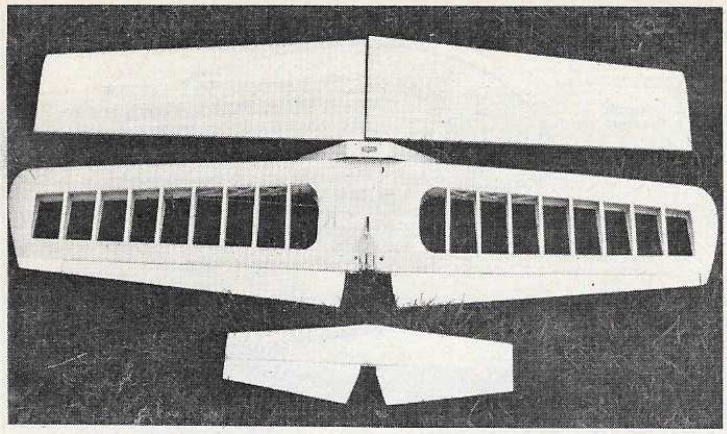
RC Pattern Version: I'll go out on a limb and say that this plane can hang in there with the best (given proper modifications and power). I suggest the following, in addition to having the proper expertise: (1) use a 3/4" top block; (2) move wing forward 1/2" or lengthen tail moment 1"; (3) use HP40 or engine of equal power; (4) reduce elevator chord by 1/2" as shown on plane; (5) side-mount engine (optional); (6) make



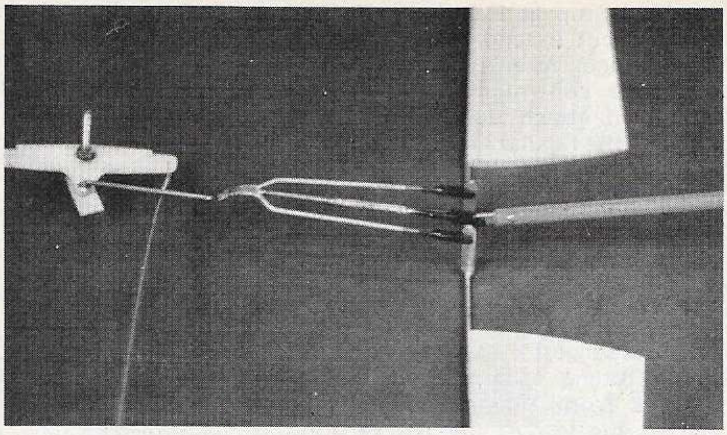


ABOVE: An oversized bolt and two plywood plates secure the bellcrank in the foam core. BELOW: The barn door ailerons for the RC Akromaster are quickly cut out and balsa-faced. The wing on the right has a built-up structure.

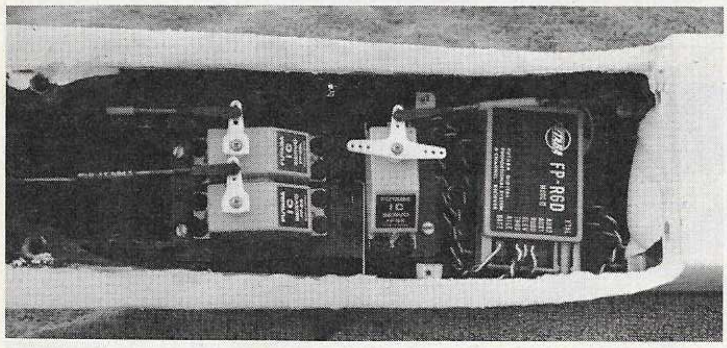




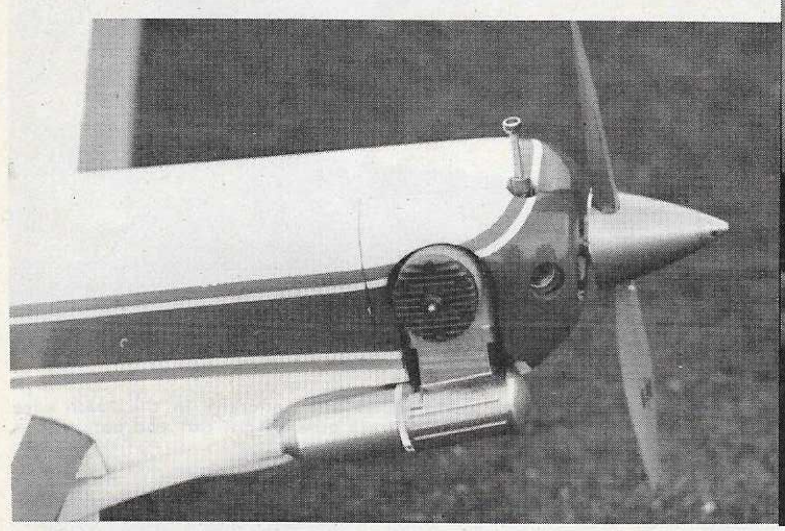
Use a Hallco B105-4 landing gear. The Akro offers the versatility of either a built-up or foam wing, with another option of either securing the wing permanently to the fuse or bolting it on.

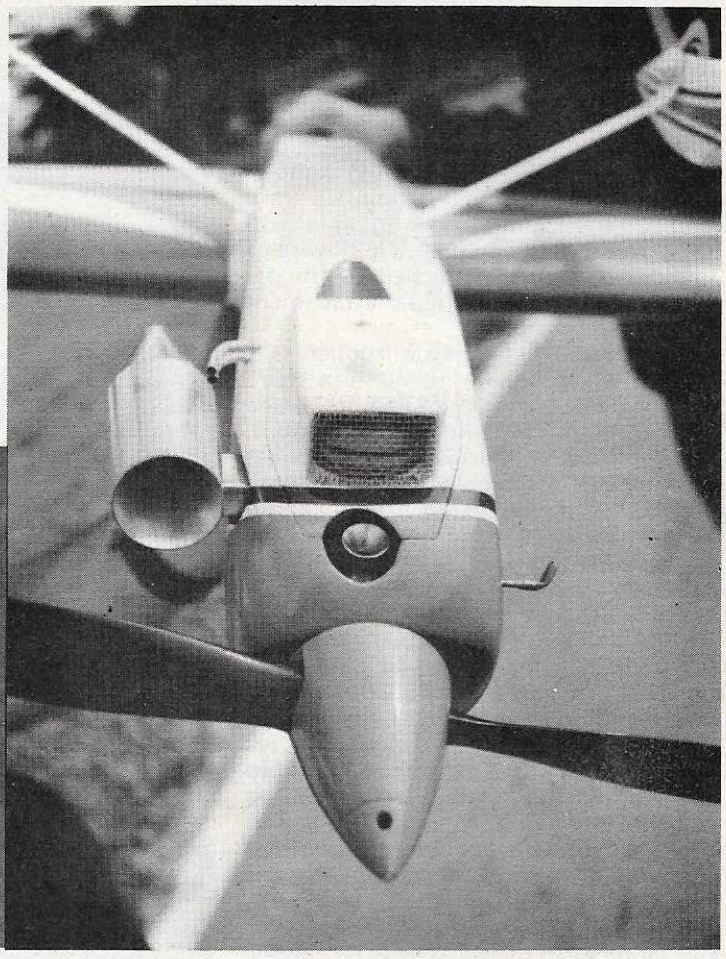


The unusual coupler system for the removable wing makes for a quick disconnect of the elevator pushrod.



While the Akromaster has a slender fuselage, there is still plenty of room for a comfortable radio installation.





ABOVE: The Webra 40 on the right has plenty of power for RC aerobatics. The option of side-mounting the engine might be wise for easier starting. RIGHT: The HP 40 works very well for CL Stunt. Note the tight fitting cowl for proper cooling.

fuselage 1/4" narrower.

There is a lack of detail on the plan to prevent clutter, but the barn door installation is conventional. They are simply whacked out and boxed in with 1/8" sheet. Be sure to take a "V" out to allow a 1/4" gap for closure on down aileron as a result of the top hinge point. As for the built up RC wing, a point worth noting is the need to use 2" wide trailing edge sheeting on the RC version for additional strength, particulary in the R-10 and R-11 area after the aileron has been cut out.

Some problems were anticipated in the construction of barn door ailerons on a foam wing, but it proved to be very simple. Be sure to plan ahead and make installation before joining the two halves. Simply cut out a plug in the bottom of the wing and install a right angle aileron crank. The crank is attached to a 1/16" plywood platform in the conventional manner at an appropriate angle to line up with a nylon aileron control horn. The aileron control horn should be attached to a 3/32" sheet plywood plate approximately 3/4" square that has been epoxied into the foam just below the balsa sheet covering.

Precautions should be taken to prevent flexing of controls in all versions. If 1/16" wire is used to connect the aileron servo to the controls, be sure to insert a 1/16" sheet plywood guide through the center into the cored-out area; otherwise, use a 3/16" dowel or hollow fiberglass rod for a portion of the pushrod to give rigidity. If you are strictly a competition pattern type, then the door is open to retracts, and even trike gear and coupled flaps are a natural.

Stand-Off Scale Version: Here we find a great merger of RC and CL, with such similarity that one can use the same plane for both events by installing a bellcrank and making the radio removable. It would be a challenge to find a plane more suitable than Spinks Akromaster. All of the previous implications apply, but the door is open to all degrees of scale fidelity to meet the individual's desires or needs. Be sure to obtain a three-view, as it will be needed to prove outlines, (available from **AAM** and Aeromodeller) and to help the builder add scale detail. Prove all detail, but make no effort to give proof of detail not reproduced.

The exact color scheme and shades can be produced with Sig dope: white, Miami blue, light red and black. Note that the wing, stab and elevator are white with Miami blue stripes on top,

while the bottom of these surfaces are light red with a white stripe. Caution: Do not try to stripe white over red, but rather paint the whole plane white and mask off the portion on the bottom that remains as a white stripe.

Finish: Lets keep this to a few words, rather than the full dissertation that could develop. The newer epoxy finishes and the already colored iron-on materials are well worth consideration. If they complement your building habits, then by all means use them. I prefer a dope finish and feel that it can be applied to equal any other in appearance, lightness and realism.

Regardless of the type of finish used, the real secret is to use sandpaper through all stages, except the very last coats. I would like to make one point: Never add any material (whether it be filler, dope, wood or paper) if the same result can be obtained by removing unneeded material. The most easily seen example is the filler coat, which can be applied until the balsa has a perfect finish, but is as heavy as oak. Do not make the mistake of trying to fill and get a slick surface after starting to apply color, but rather be sure to have a well-finished base on which to apply the color. Three or four coats of clear (Sig Lite-Cote suggested) sprayed over the final color will give added depth and allow you to rub the plane out with compound.

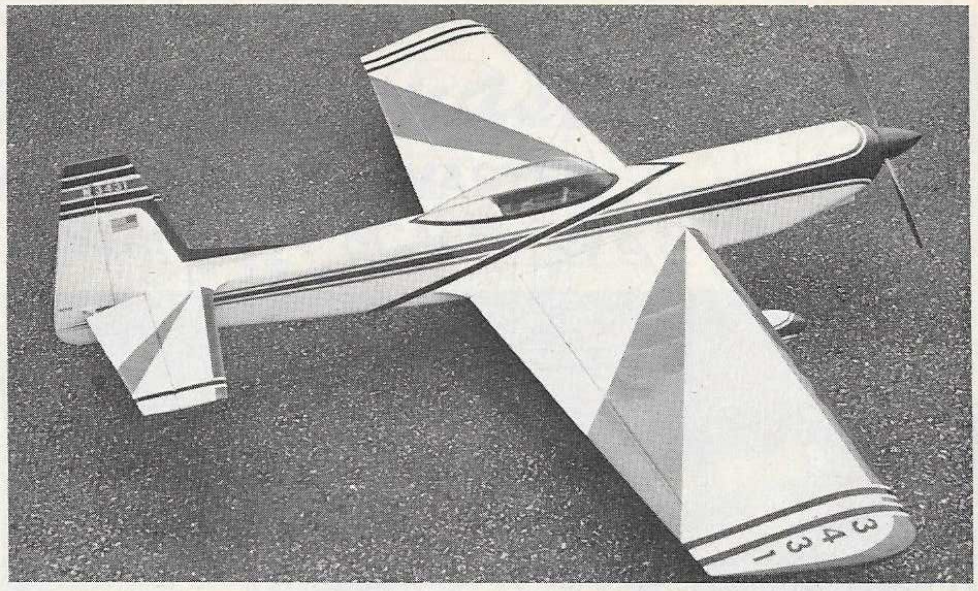
Trimming for Flight: The removable wing version is totally trimmable and makes the extra work worthwhile. Be sure the wing is totally sealed and seated with silicone sealer, since seeping exhaust oil and fuel can be disastrous. Adjustment of flap movement and alignment is a snap. I am convinced that once you have a warp-free plane within weight limits (under 60 oz. for CL) it can be trimmed (adjusted) to fly with the best. Make only one trim change at a time, otherwise interplay may distort the effect.

The RC version is considerably simpler to trim, since all adjustments can be made in the air. The CL model will require more time and application. Make sure that ground tracking is good, so that the plane rolls smoothly on takeoff and landing. The CG should fall close to 2½" behind the leading edge for CL Stunt, and 3" for RC. By all means, make fine adjustments by adding weight (in 1/4 oz. increments) to either the nose or tail (one at a time) until the desired sensitivity is reached. Modeling clay can be useful for this purpose and nose weights are available that will fit inside the spinner.

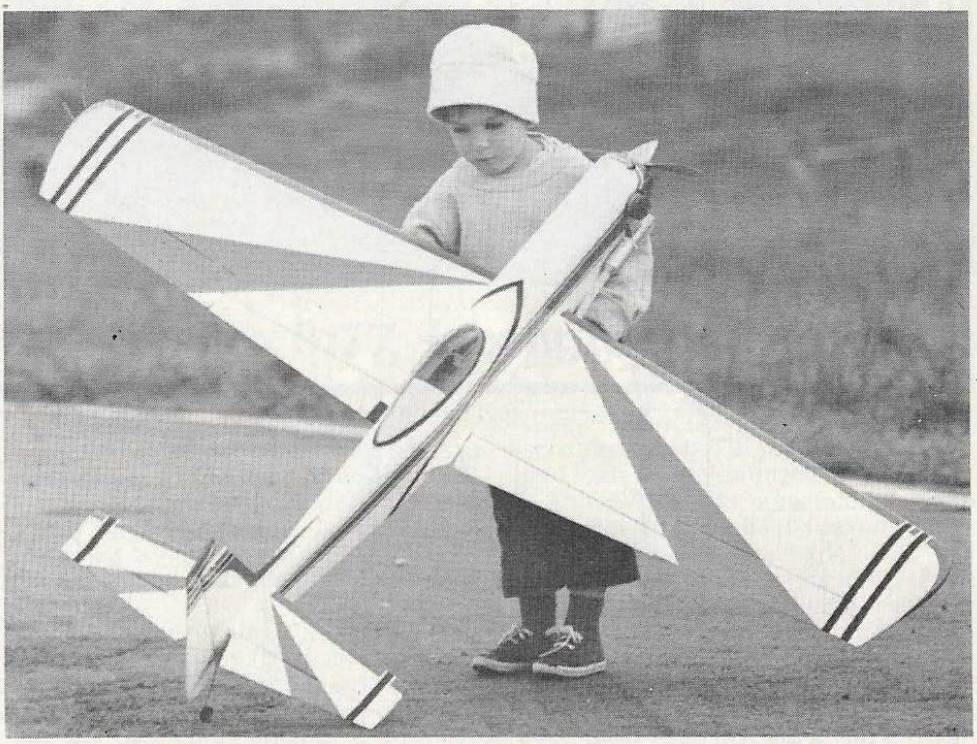
Make fine adjustments to the position of the lead outs and to the offset for line tension and yaw, but remember to vary only one at a time. Don't underestimate the effect of tip weight on yaw and line tension; modeling clay can be used here to find the correct amount of weight.

Now you can create your own style of Akromaster; one that will give back just what you are willing to put into the effort of creation, and one that is a real expression of your individualism.

(Plans on following page)



The Akromaster has one of the simplest, yet most distinctive paint jobs of any aerobatic bird. The visibility in the air is superb. All lines are straight, so masking is simple.



ABOVE: Lew's son Steve ponders the day's flight plan: "When you gonna' crash it, daddy?" BELOW: This photo may explain why the Akromaster is a competitive machine. Its pedigree goes through the Ruffy, Shark and 50 other designs. The Akromaster has won Open and Senior at the '74 King Orange; firsts at Albany (Georgia); Cincinnati, St. Louis and Indianapolis.

Photos by Author