

Hobby Bam's



# Curare

*RIC* Contributing Editor Bob Aberle tries his hand at an all-out Pattern ship in glass and foam. It uses an OS .61 for power aided by a Mac's pipe and manifold and sports Sonic System's pneumatic retract gear.

For the past seven years I have been writing product reviews for Ft. YIN MODELS. My basic charter as Contributing Editor is to review all the latest *RIC* equipment and accessories. During that time span I did manage to also design and publish approximately a dozen original *RIC* models. In my design work I try to vary the subject matter each time to maintain reader interest. As such my designs to date have included everything from a Cox .010 powered, two-channel model to a large eight-pound *RIC* seaplane. I have been asked quite often why I don't fly pattern. Well I did, as a matter of fact, fly pattern years ago. My last pattern model was the Bridi Kaos which I flew up to 1973. This

past winter I decided that it was about time to try pattern once again, if only to maintain credibility as an "all around *RIC* modeling author". I decided to select some of the latest "state-of-the-art" equipment for my review. Was it easy to get back into pattern? Has the technology changed? Read on, you might be surprised about some of my comments and experiences during this project.

This review will actually cover four products (the airplane kit itself; the engine; tuned pipe and retract system). In addition I will comment on the performance of the radio system (in this specific application); on finishing techniques and how everything was integrated into an "*RIC* pattern aircraft

system". All of the items reviewed were solicited by me. Or, stated another way, they were all my own personal choice. For the aircraft I decided on the Curare design of Hanno Prettner. It is probably one of the best examples of current "state-of-the-art" pattern competition models, and is recognized throughout the world. In searching for a kit I decided that I wanted to try my hand at fiberglass fuselage/foam wing construction. I was also looking for a designer approved kit which reflected the original Curare design (as close as possible). My selection zeroed in on the Quality Line Kits as manufactured and distributed by Hobby Barn. For the engine I wanted something very powerful in a .60 displacement with a precision type carburetor, but at my choice I did not want a pump system. I decided on the new World Engines OS Max .61 FSR. For the tuned pipe system I selected the items manufactured by MAC's Products. Finally came the choice of the retract landing gear mechanism. I was quite undecided between an air operated system or an electric. My final selection was the new air system manufactured by Sonic Systems.



### Hobby Bam Curare Kit

At the time this kit was obtained Hobby

Barn, P.O. Box 17856, Tucson, Arizona 85731 was offering the standard (or original) Curare design. As close as I can tell it is identical to Hanno Prettner's design which was published in the December 1976 issue of *Model Airplane News*. The only difference being that Prettner used an all balsa fuselage while the Hobby Barn kit features a molded fiberglass fuselage. For general information the Hobby Barn Curare specifications are as follows:

- Wing Span-64 inches
- Wing Area-695 sq. in.
- Airfoil-Symmetrical 16% thickness (constant)
- Length (overall)-56 inches
- Optimum Dry Weight (no fuel)-8.0 pounds
- Wing Loading at Optimum
- Weight-26.5 oz. 1sq. ft.
- Engine Size--a strong .60 preferably

with a tuned pipe  
 Hobby Barn offers the Curare kit in two versions. One is a deluxe kit with all the necessary balsa and a special hardware package which sells for \$96.99 (plus postage). A basic kit is also offered which contains just the fiberglass fuselage and the



foam wing/stab cores, for a list price of \$59.99 (plus postage). For the purpose of this evaluation I chose the deluxe kit. This kit includes all the wing and stab balsa sheeting material; aileron stock; elevators; rudder; pre-shaped 1/8-inch plywood firewall; hardwood blocks and wire struts should you decide to use a fixed landing gear system; wing hold down bolts and blocks; control surface hinges; control horns and the necessary material for constructing the optional drag flaps. The difference in price between the basic and deluxe kit is \$37.00. The \$37.00 gets you all the extras described above. From a purely value standpoint it is well worth getting the deluxe kit. But in all honesty if I had to do it again I would have selected the basic kit. Why? Well I'm very fussy when it comes to balsa selection. The wood provided is certainly good quality with even grain (not a rejected piece in the lot). But it was a little heavier than I would have personally selected. The hardware provided is definitely adequate, but not particularly my choice. Over the years I have settled upon my own favorite items of RIC accessory hardware. Since I was going to use a retract system, all the wire landing gear struts and mounting hardware supplied with the deluxe kit was unnecessary. So for those reasons I should have selected the basic kit and bought the balsa and hardware on my own. Since the completion of my Curare I have learned that Hobby Barn will be offering soon a Super Curare kit for approximately \$10.00 more in price. I have no details on this new model but suspect that most of the comments made here will apply to the Super Curare as well.

The fiberglass fuselage provided in the kit is actually molded with epoxy resin. I prefer this because you can easily use epoxy cement in the construction sequence. The fuselage itself was about as perfect as you could ever want. I can only hope it was truly representative of the usual kit quality and not specially selected because of this magazine review. The exact weight of my fuselage, as received, was 16 ounces, which is very light (remember the fuselage is 56 inches in overall length). The front spinner ring area is sanded to an accurate pre-determined angle. This permits easy firewall installation regardless of your choice of engine and engine mount. The instructions give a thorough description of this very critical firewall mounting process. An interesting variation of this scheme (authored by Duke Hoeckle) was published in the May 1980 FLYING MODELS

(pages 32-33). Duke did an excellent job on this article which included a great many helpful photographs. I would suggest you look it up or obtain a back issue before starting the installation.

Hobby Barn supplies a special four page set of building instructions specifically written around this Curare kit. A 14 x 22 inch reduced scale set of plans is included. Although quite simplified, the plans contain all the necessary data. If you wanted a full size set of reference plans you could always purchase them from *Model Airplane News* (Plan Set No. 269). Also included is a one page re-print (or what looks like one) of Hanno Pretner's original article covering some de-

sign considerations and flying hints.

I could probably write pages of detailed comments on my new experiences handling both a fiberglass fuselage and foam wing! tail. A lot of it would involve my basic inexperience with this type construction. As such I will just highlight what I think were the most important points. Although the fuselage is molded from epoxy resin I was surprised to find that the epoxy cements did not adhere very well. The fuselage was completely cleaned of mold release residue using Acetone (per instructions). I learned later on when finishing the Curare that the Acetone didn't really do the job properly. In fact, at the suggestion of Bob Pettit of Hohbyoxy



Here is the finished Curare ready to go on the line. Bob used an external radio antenna however now feels that the extra time needed to install it inside the fuselage would be worth it. The design is just too clean to have an antenna hanging out in the slipstream. Bob greases in on a ten foot wide strip at Grumman's RIC field (top left). A low speed fly-by (top right). Bob poses with his new Hobby Barn Curare (opposite page). He liked his first encounter with fiberglass and foam. Note Kraft single stick transmitter.

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Paints, I washed the entire fuselage down with Hobbyoxo thinner. This eliminated the painting problem I had encountered (which I will discuss later on). At any rate, when using either Hobbyoxo Formula 2 or G.M.P. six-minute epoxy, I found it necessary to reinforce every joint with small strips of fiberglass cloth (2 oz. variety). The epoxy cement, by itself, will crack and split away easily without this cloth reinforcement. Be careful when mounting the firewall, wing hold down blocks, servo rails and the stabilizer.

One thing the plans didn't call for was a platform to rest the fuel tank on. If you didn't do this your tank would fall directly on to the retractable nose gear assembly. I added a 1/8-inch thick plywood floor, spaced just enough to allow the nose gear wheel to fully retract. For a fuel tank I was advised to go to a 16-ounce capacity and specifically the Sullivan 8-16 slant tank. This tank sits flat (angled front stopper pointing upward) directly on the plywood floor, supported on the top and sides by scrap pieces of foam rubber.

The plans call for a three-bolt wing mount system (two at the leading edge and one at the trailing edge). I added a second bolt at the rear which, as you will see later, gave me a good attachment point for the back end of the tuned pipe. My choice of motor mount was the Kraft aluminum variety (Model-60R). This was still a little snug for the OS Max .61 FSR and required some extra filing to make the engine fit properly. The larger Kraft 80 mount seemed just a little too big for this application. Although the original didn't use a spinner this kit version does. Quite frankly the design looks a lot better with a spinner. I selected a C.B. Associates 2-inch diameter aluminum spinner which is made well and is relatively inexpensive.

Both the wing and stab foam cores provided with the kit were of excellent quality (good average density and very smoothly cut). If you read any of my design articles in FLYING MODELS you know I'm not a foam wing man (but I may be before much longer). I used Carl Goldberg's Blue Goo contact cement to adhere the balsa sheeting to the cores. In my case 7 of the 8 ounces (from a full can) was used to cover the wing and stab

cores. This particular glue seemed to really soak into the raw foam. In some cases I had trouble with adhesion and had to resort to a suggestion by fellow FLYING MODELS author, Ron Farkas, whereby heat is applied with a Sealectric iron to the stubborn areas. This application of heat did help stick the balsa skins to the foam cores, but be careful that you don't apply too much heat and melt the cores. My biggest problem was that I stacked up the entire sandwich of foam cores and balsa skins on top of my drawing board and weighted everything down. Unfortunately the board was not exactly flat, with the result that a slight curvature developed at the wing trailing edge. To correct this condition I had to fit my ailerons very carefully, adjusting the hinge line as I went along. Afterwards I learned from Dave Brown that he stacks his foam core assemblies on a sheet of 1/4 inch thick plate glass. Since you don't have to push any pins into the building surface, plate glass is an excellent choice for a perfectly flat surface.

The plans did not call for any dihedral braces or spars, which I felt was unacceptable. Pretzner employed three plywood dihedral braces in his original design. I decided to add two 1/8-inch plywood, full depth, dihedral braces (actually they are more like spars) which run out just behind the retract landing gear mounts on each wing panel. These braces are spaced in such a way to permit reinforcement of the landing gear mounts (1/4 inch plywood trays). I think it is worth the extra effort to have complete piece of mind while performing snap maneuvers.

The biggest problem I faced with the wing construction was the cut-outs for the retract system. The plans give you a gear strut location but don't really tell you the distance between the bottom surface of the wing skin and the center of the wheel axle (the distance in my case turned out to be 3/8 inches). Without this dimension I was forced to mount the main landing gear assemblies first and worry about the wheel well cut-outs later on.

Hobby Barn also provided the material and details for the inclusion of two small drag flaps (located just outboard of the fuselage at the wing trailing edge). Again, in talking with Dave Brown (who, as you may have

noticed, gave me no small amount of advice for this project), I learned that he was going to eliminate these naps on his next model. He really didn't feel he used them that much. More important, the flaps and the extra servo required to operate them, caused a 7 ounce weight penalty. With that in mind I decided not to install the flaps. But, as you can see in the photo, this caused a little discontinuity in the fairing of the fuselage wing fillet as it meets the wing trailing edge.

That just about covers the Curare kit highlights. I will comment later on the weight and balance aspects of my model as well as the flying qualities. Probably the most difficult aspect of assembling this model was the actual installation of the retractable landing gear system since it must be fully integrated between the wing mounted mains and the fuselage mounted nose gear. This all takes a lot of time and extra patience.

## World Engines OS Max .61 FSR

For the size and weight of the modern day pattern competition model you need a motor with plenty of power. The new OS Max .61 FSR from World Engines, 8960 Rossash Rd., Cincinnati, OH 45236, was recommended to me by several local flyers who specialize only in pattern competition. List price for this engine is \$159.95 (including a muffler). Weight of the engine is 17 1/2 ounces. The OS muffler weighs an additional 4 1/2 ounces. As far as I can tell the two major differences with this new engine is the all metal precision carburetor and the 5/16-inch diameter prop shaft. I won't give any tach readings here because I'm going to leave the detailed engine performance evaluation to our new resident engine expert, Mr. Mike BiUnion of Great Britain. I hope Mike has this engine scheduled for an upcoming review. My comments presented here will be more of a personal testimonial.

After all the effort of building the Curare (admittedly with techniques new to me) and installing the retracts (also new to me) the one item I paid least attention to was the engine. On the day of the first flight I did something I never did before. I brought out my new plane, got all the camera equipment set up to record the first flight and I had



Here are the contents of the Hobby Barn Deluxe Curare kit which lists for \$96.99. All the necessary balsa sheeting and hardware is supplied.

The foam wing and stab cores have already been skinned and are displayed in the background. The remaining balsa, hardwood and parts in front.

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never run the engine before. The OS instructions say you only need to run a single tank of fuel through this engine before flying. That's what I did-at the field. The OS Max .61 FSR started on the second flip of the prop, right out of the box. I set the engine at full throttle and opened up the needle valve for a very rich four cycle run. Every couple of minutes I leaned it out for a few seconds and then returned it to a rich four cycle. I continued to do this until the 16 ounce tank was drained. After a quick fill-up I made the first flight. The engine held its needle valve setting for over a 10 minute flight and the idle was about as low as you could go without stopping. I might add that it idled that way with the factory carburetor setting. I have not had to make any idle adjustments at all. For my initial flying I used a Zinger 11-7 wide blade prop. A consensus of opinion (from the experts) seems to indicate that an 11-7h prop would be the better choice. I have yet to find this out. I do take the trouble to balance all of my props. Sometimes I still end up with vibration problems despite all my good intentions. In this case the engine/aircraft combination did not produce any noticeable vibration at any speed level. Even though the OS Max .61 is physically a large engine, I had no problems mounting it to the Kraft radial mount. A long DuBro allen wrench does the job easily. As you will find out in the next section, I did use a tuned pipe. For my first flights I thought I would try the regular OS supplied muffler to simplify things. Unfortunately this muffler does not lend itself to easy mounting with the cylinder head on its side. It would have required cutting a lot of the nose section away to clear the muffler. Had I planned ahead and mounted the engine cylinder at a slight upward angle, I could have mounted both the muffler and the pipe header easily later on. So keep this point in mind when you mount the engine in the Curare.

The bottom line on this engine is that it performed great! It has plenty of power and best of all it is extremely reliable. Considering the final weight of my Curare I wouldn't like to think about a dead stick landing, especially with the small size of my local flying field. How much did my Curare weigh? You have to keep reading, I won't own up to it until later.

## MAC's Tuned Pipe

To get the very best performance out of your pattern competition model the experts say you need a tuned pipe exhaust system on your engine. There are many types of pipes manufactured for use with model engines. I chose Mac's Products for this application because I use their mufflers and tunable exhaust extractors on most of my other engines. Wally McAllister of Mac's Products, 8020 18th Ave., Sacramento, CA 95826, supplied me with one of their muffled tuned pipes (Model 10MP, which lists for \$25.95). The keyword is "muffled". Also available is a pure or straight pipe (no internal baffles) designated as their Model 10TP (list price of \$19.95). I suspect the 10TP pipe might give higher r.p.m.'s, but would cause a much higher noise level. The 10MP pipe is 19 inch-



Bob is shown here using a Custom Crafts Mitre Sander to obtain the correct dihedral angle at the wing root. A photographic print roller was used to insure complete contact of the sheeting to the cores (top). Note the use of weights to hold down the stack of balsa and foam while the cement dries firm. Be sure the wings are weighted down against a perfectly flat surface. A bottom view of the joined wing panels (below). Note the two full depth 1/6" plywood spars. Landing gear mounts connect to the spars.



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es long and weighs 6 ounces. You must also purchase a header pipe to be able to attach the muffled pipe to your engine. For my application Wally provided me with one of his Model 1621 HP header pipes in the extra long configuration (Gist price \$16.95). The extra long model is intended for side mounted engines where the pipe is run under the wing. Included with the header is a short length of silicone tubing which provides a flexible connection between the header and the pipe. Also provided are two nylon cinch straps which help hold the silicone tubing in place. Unfortunately no provision is made for attaching the pipe on the other end. Most of the articles on tuned pipes that I have read fell flat on their face when they got to the part concerning pipe attachment to the model. The method I used is a slight variation of the scheme used by Dave Brown. Dave described this to me in a phone conversation. I hope I understood him correctly. I replaced one of the two nylon rear wing hold down bolts with a 3-inch long 10-32 steel bolt. Since the steel bolt would easily pull out of the hardwood hold down block I added a 10-32 "T" nut (inside the fuselage). The idea here is to use two nuts and two large "fender" washers. The bolt first is threaded into the "T" nut. One nut is tightened down against the wing, holding it in position. About 2 inches of the bolt projects beyond the bottom of the wing surface. At the end of the bolt a second nut is tightened up against a "Mil type" (rubber covered) large cable clamp. Tightening this nut against the head of the bolt will exert enough pressure to hold the rear end of the tuned pipe firmly in place. Admittedly the back end of the pipe has to be disconnected every time you remove the wing, which is somewhat of a nuisance. The alternative is to mount the engine upright, which allows you to permanently attach the pipe to the side of the fuselage. Experts tell me that these pattern models fly better with the pipe mounted under the wing. One benefit of the under wing pipe mounting is that the model is a little better protected should a "wheels up" landing become necessary. Total weight of the pipe and header is close to 8 ounces (6 ounces for the pipe and 2 ounces for the header). This weight is about evenly distributed fore and aft of the C.G. I tried the pipe at full length for my first flights since it is always better to have the pipe too long than too short. To tune the pipe you must cut off the header pipe  $\frac{1}{8}$  inch at a time until an increase in r.p.m. is noted on a tachometer. After that take off  $\frac{1}{16}$  inch at a time until no further increase in r.p.m. is noted. Under no circumstances should you attempt to cut off any portion of the pipe itself. No mention is made of a pressure tap. I decided to make my tap at the header, not the pipe. I installed a Fox 6-32 pressure tap on the header, immediately after the exhaust port (pointing to the glow plug). Use a good silicone fuel tubing so it won't melt on you. From both a quality and cost standpoint the MAC's Products pipe and header looks like the right way to go.

## Sonic Systems Turfmaster Retracts

There is still a big debate with pattern flyers as to which retract concept is the best.



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You have a choice between a full air system, a full electric system or a pure mechanical device operated directly by a servo. Each has its advantages and disadvantages. Sonic Systems, P.O. Box 192, Whippany, NJ 07981, had just introduced their new "Turfrmaster" retract system last fall when I started acquiring the material for this article. The unique feature of this new system was the inclusion of a second cylinder (on each gear unit) expressly for locking purposes. This means that all three gears are positively locked in either the extended or retracted positions. I decided to try their trike gear set which is designed as Model 800 and lists for \$119.95. Before getting into the details of this system I must honestly say that this is not for the beginners. This system is basically simple and straightforward in theory, but it does take a great deal of planning and time to get it all packaged into your model. The instruction booklet provided is very detailed in every respect. However, it still took me many readings to fully understand the installation and operational aspects of this system. The very best piece of advice that I received came from modeling friend, Joe Redan, was to first set up the entire retract system on a bench in a mock-up type set up. Install all the tubing and get everything to operate properly *before* attempting installation in the model. Once working on the bench all the plumbing can be identified with tape or cable markers, which will permit easy re-assembly in the model later on.

Each of the three gear units (two mains and the nose gear) has two pneumatically operated cylinders. One cylinder extends or retracts the landing gear strut. The other locks the strut at either of the two extreme positions (wheels up or wheels down). The heart of the system is a master control valve. This valve simultaneously controls the air going to the retract and locking cylinders. You must precisely connect up a servo to operate this valve. Linkage connections, to the valve, are extremely critical requiring a great deal of care during installation. In normal operation as you hit the retract switch on your transmitter the servo will begin to rotate. First in the sequencing the lock mechanism is withdrawn, permitting free movement of the landing gear strut.

Next the strut itself is raised or lowered. And finally the lock is reset. To help in the timing of this sequence it is recommended that you use a 180 degree retract servo. These servos generally take about 3 seconds for full rotation. You could use a 90 degree (standard) servo, but the linkage adjustment to the control valve would be very critical and therefore Sonic Systems does not recommend it. On my Kraft Signature transmitter I can set a regular 90 degree servo to operate up to about 160 degrees rotation. But the problem I found was that the rotation speed of the standard servo was a little too fast. A slow 180 degree rotation servo is definitely the best choice.

Sonic Systems also supplies a pressure regulator which can be adjusted to prevent the gears from retracting too fast and literally slamming into position. This works fine but there is a limit as to how slow you set the retract speed. If too slow the system might attempt to re-lock before the gear finished cycling. So don't look for a real scale retract operation as is obtained on the electric systems.

I might add that you should definitely use air (from a pump) to operate this system. *Do not attempt to use Freon at all.* Sonic Systems sells a pump specifically designed for this purpose which will easily fit in your model field kit. It is called the Sonic Super Charger II and lists for \$12.95. About 25 pumps is necessary to achieve 100 p.s.i. of pressure in the airborne storage tank. That should be enough pressure to cycle the gears several times before re-charge is necessary. Total airborne weight of the trike gear system is 13.5 ounces (less the wheels, of course). Sonic Systems supplies the struts ( $5/32$  inch diameter) without the axle bends. You can either bend the strut yourself or (as suggested) use the Carl Goldberg axles which are very easy to install and adjust. I decided on the latter and it worked fine. Both the main gear units and the nose gear mechanism have the same mounting hole dimensions as the Rhom-air systems. Mounting wise they are completely interchangeable. The nose gear unit is mounted in a vertical position on the lower rear portion of the firewall. Connection to the sliding nylon nose gear steering arm proved a lot simpler than it initially looked in the instructions.

This hook up permits the nose gear to be steered off the rudder servo only when the gear is extended.

You will end up with a lot of "plumbing" (plastic tubing) being routed all around your model. Sonic Systems supplies red tubing for the retract function and black tubing for the locking cylinder function. Four lines must go to each gear unit. Then additional lines must go from the storage tank to the regulator and then on to the control valve. The storage tank was cemented into the top of the fuselage (in the area of the wing trailing edge) using silicone rubber bathtub caulk. A disconnect point is required between the wing and the fuselage. To make this chore easier, Bell Wardlow of Sonic Systems, supplied me with two sets of his "Quick Disconnects" (catalog No. 309). Each set consists of two mating pairs and lists for \$3.95. Two complete sets are required for the Turfrmaster system. You must also identify these interconnecting lines otherwise it is possible to have the gears work out of the proper sequence.

Another interesting point! This system is not fail safe. If you should lose air (because of a leak) or run out of air (carelessness) you won't be able to unlock the gear struts. In other words you would not be able to release the gears and let them drop into place.

Although possibly a little more complicated than other retract systems, the Turfrmaster system does work reliably. However, there still is an inherent problem with all the retract systems now on the market. Even with the most reliable mechanism your wheels can still get stuck up in the wells due to the wire bending rearward in rough grass takeoffs rendering the system useless. This is because the wheels then snap into the wells but will not come back down. To correct this problem many modelers have resorted to extremely small wheels in combination with very generous size wheel wells. My particular flying field would certainly not tolerate wheels much smaller than 2Y4-inch diameter mains and 2 inch diameter nose, as I used on my Curare. An alternative would be to slope the sides of the wheel well, thereby eliminating the chance of the wheels binding. This would, however, make for more drag since the well openings would be considerably larger than we are presently using. The ultimate solution is going to be articulated



This is one of the main retract units. Bob chose the Sonic Systems set. The gear is shown in the extended position. Note how the four air lines have to pass beneath the wheel well opening. Bob fuel-proofed the wells.

A close-up of the nose wheel well shows the connection to the steering arm. The support for the steering cable must be accurately located so that it doesn't interfere during the retraction sequence. A tight fit.

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landing gear doors or covers as employed on full size aircraft. It may sound complicated but it might be worth it if you didn't always have to worry about wheels up landings.

## Finishing

Again just the highlights. I applied 1/2 ounce fiberglass cloth to the wing using a thinned mixture of white glue. This technique has been used on Long Island with certain success. It does a job, not as good as polyester resin, but at least it doesn't smell up the entire house. I applied two brushed coats of Hobby epoxy grey primer undercoater, wet sanding between coats. This was followed by a *brushed* coat of Hobby epoxy yellow and then two sprayed coats of yellow (thinned considerably). Again I wet sanded between each of the coats. The black trim paint was added next. I used 3M brand 1/8-inch thick automotive trim tape (silver) to separate the paint colors (black from yellow). This tape is a lot cheaper than the variety offered for the hobby market. After applying all the decals I gave the entire model a light spray coat of Hobby epoxy clear. This all results in a good durable finish. But remember my caution at the beginning of this article - clean the raw fiberglass fuselage with *Hobby epoxy thinner*, not acetone as stated in the instructions. Failure to do this will cause problems with epoxy cement adhesion and will also cause a paint problem which the experts call "fish eyeing".

## Radio system and installation

The radio installation included a Kraft KPR-7F receiver (operating on six meter FM). Because of the large fuel tank, the receiver and a Kraft KB-4E 550 MAH battery pack were installed in the RIC compartment just behind the wing leading edge. The remainder of the RIC compartment was taken up by four Kraft KPS-15 servos. The two forward servos handled the rudder and throttle functions, while the two aft servos operate the elevator and retract system air valve. A single new Kraft KPS-20H servo was mounted in the wing for the aileron function. Hardwood servo bearers were used throughout. No servo trays were employed.

For a model of this size and weight you must be very careful with your control surface installation. I used five DuBro hinges on each aileron, three on each elevator and four on the rudder. Elevator and rudder surfaces were activated via Sullivan fiberglass rods (stock No. 509). Because of the anhedral in the stabilizer you will have to provide a split or "Y" yoke connection at the rear of the fuselage (each elevator half is essentially separate). DuBro ball and socket sets work well in this application.

I did run my radio antenna on the outside of the fuselage up to the vertical fin. In retrospect I'm sorry I didn't take the time to run an outer Gold N' Rod up the inside of the fuselage towards the tail and then insert the antenna inside this tube. For a model as clean as this an internal antenna is the right way to go.

All of the radio equipment described here (with the exception of the KPS-20H servo) were previously reviewed in FLYING MODELS.



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You may want to refer to the following issues: Kraft Signature transmitter- April 1978; Kraft FM receiver-FM module and exponential rate control- December 1979 and finally the new KPS-20H servo- July 1980. Back issues of all these FLYING MODELS are available from the Carstens Publication offices in Newton, New Jersey.

The basic radio system described here has been in operation for about 1 1/2 years in several other models. It has performed perfectly except for an intermittent switch harness which I fortunately detected before it caused any problem. I am using exponential rate control on both elevator and aileron (all the time). Quite honestly I would like to have this feature on the rudder function as well since it would really smooth out the take off run and landing rollout. And finally the new heavy duty Kraft KPS-20H servo is every bit as fast and precise as it looked during my bench testing. I will probably now replace the remaining .KPS-15's with the 20H's in the next few months. For information, the airborne weight of my RIC equipment installed in the Curare, is 16 ounces. That includes all five servos and the 550 MAH battery pack.

## Weight, balance and flying

Here it comes my friends! My Curare topped off at 8 1/2 pounds total weight less fuel and it appeared slightly tail heavy. I can just see the experts laughing already. My only defense for this high weight is inexperience with this particular type model. In talking with Dave Brown I learned that his Curare type models are coming out around 8 pounds

even. Dave's wing complete with naps, two servos and the retracts, run 2 pounds 12 ounces. My wing, without flaps, came out to 3 pounds even. What can I attribute this overweight condition to? I believe it was basically the selection of the balsa sheeting that added a part of this. The wood could have been a lighter weight grade. The 7 ounces of Carl Goldberg Blue Goo contact cement used to adhere all the sheeting to the foam seems excessive (or at least now it does!). Probably the slight tail heaviness noted can also be explained by the heavy balsa stabilizer sheeting. I noticed on a similar pattern model the designer called for a built up rudder in the interest of saving weight in the tail. The original Curare design had an indicated C.G. of 31.8 percent of the M.A.C. Hobby Barn Curare plans calls for a little more conservative C.G. location of 27.2 percent of the MAC. Although the main landing gear units were accurately located per the plans, I did find that the Curare would almost rest on the tail skid (without any fuel in the tank). This kind of upset me a little so I chose on the first flight to add 4 ounces of lead up in the nose, which brought the total flying weight to an even 9 pounds (dry).

To my surprise, on the first flight, the Curare took off in less than 100 feet. The climb out was incredibly fast for a 9 pound model. Remember also, I had not even attempted to tune the pipe at that point. On the first flight I tried a few stalls and found them surprisingly gentle with plenty of warning. I made a few very slow speed fly-bys for photography purposes and felt I had perfect control at all times. After that first flight I re-

moved the 4 ounces of lead ballast. I'm now nying at 8 1/2 pounds (the difference between that and 9 pounds is unnoticeable).

## Final comments

By the standards of expert pattern flyers my particular Curare is definitely a bit heavy. However, it still does perform well. I might also add that it is very easy to fly. A reasonably average Sunday sport flyer could easily take on the likes of the Curare. I do expect to fly this particular model in competition during the 1980 season. I definitely learned a lot during the construction of this model. Surprisingly I spent several months constructing this Curare. The next one would probably only take me half that much time. I'm sure I could easily trim a halfpound off the next one which would greatly improve its performance during some of the vertical climbing maneuvers.

The one thing that really surprised me was the lack of real detailed information on pattern models. I did a substantial magazine search before starting this project. This search indicated that a good deal of the detailed information is still left up to trial and error. This all tends to keep pattern flying as somewhat of a "closed fraternity". It shouldn't be that way and, in fact, sport flyers should be encouraged to join the ranks.

Was it all worth it for me to try flying pattern again? Well, quite honestly, you haven't really flown RIC until you have piloted an 8 to 9 pound model, flying at close to 100 m.p.h. If you are presently a good sport flyer, take the next challenge. It's a bit more expensive, but very rewarding!

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and I like to believe are among the best you can use.

After you order your wing and stab components, visit your local hobby shop and pick up the rest of your supplies. Take care in your wood selection, as you want the lightest and straightest there is. We're shooting for an all-up flying weight of around 55 oz., so light building is paramount. Once you have all your supplies, the fun begins. The following construction hints may help in cutting down your building time and effort, which will get you into the air as quickly as possible.

### Fuselage

Since the wing and stab are almost ready to go into the fuse, we'll build it first. Begin by cutting two sides out of 48" sheet, two ply doublers, the two forward bulkheads and your motor mounts. All the woodsizes can be found on the plans. Laminate the ply doublers, using 15 minute epoxy, to the fuse sides being sure to make a left and a right.

Using 5 minute epoxy, glue the motor mounts to each side. When these are set up, carefully align the bulkheads, using a square, and epoxy these between the two fuse sides. Pull the rear of the sides together and epoxy.

Install the engine, bolts and blind nuts, plywood spinner ring and spinner. Check for a degree or two of engine offset to the right side. Tack glue the top block and bottom sheeting in place along with the engine cowl. Now, we have something that looks like a 4-foot 2...4.

Get out the #80 grit sandpaper and your razor plane, and get at it. Once you have the basic shape, graduate to about #320 paper and finish sand.

Cut the rudder and vertical fin to fit to fuse. Now trim the canopy, and fit it to the fuse top block. Do not glue it yet. Remove the canopy, top block, bottom sheeting and cowl. Hollow all these until a 100-watt light bulb is dimly visible when held up to it from the other side. You want a light plane, right? Right!

Make all your cowl openings and hold down attachments. Bend the tail wheel wire and install, using copper wire and plywood.

You now have a fuselage that is basically complete except for the canopy and cockpit detail. Finish sand the vertical stab and rudder and set them aside with the fuse.

### Wing and stab

Since by now you have received the wing and stab and have looked in awe at the



The clean lac trim panels are evident in this photo. Stunters are known for their paint and ink line work. John appears to be happy with his new ship (opposite page top). A front view shows the dramatic anedral stab (opposite page bottom). A plus is the adjustable external control linkage.

quality of these items, this is the time to put them to use.

Make up your control systems using a 3" bellcrank. Epoxy the bellcrank bolt to the left wing panel vertical plywood spar. Cut a notch in the right panel for the flap pushrod, and use 5 minute epoxy to join the wing halves, using the bottom foam cradles to help in alignment. Be neat!

Using scissors, cut a couple of 1% strips of 1/32" ply. Epoxy these over the wing center section front to rear, top and bottom. This provides a stress platform and makes the wing virtually one piece.

Tack-glue the wing tip blocks and carve them to shape. Now remove them hollow out. Install a Control Specialties lead-out guide in the left tip, and a tip weight box in the right tip. Permanently epoxy the wing tips on, and finish sand to shape.

Join the flaps with a 5" horn, check the fit at wing tips, and install the hinges and flaps. Hook up each flap pushrod for maximum throw on the bellcrank and minimum movement on the flaps. Check for neutral setting on the bellcrank and flaps, and freedom of movement.

Install the landing gear blocks, using 5 minute epoxy. For strength, cover the block area 2" outside the gear blocks with lightweight fiberglass cloth and resin. Sand the completed wing and flap with 380 grit, and set aside.

The stabilizer and elevators are built in much the same way, with the exception of the anedral in the stab. Cut and join the stab halves with the anedral as per the plans. Install the balsa wood tips on the stab and elevators, and sand to shape. Look carefully at the pictures and plans to see how the elevator horns are installed. Each elevator has a separate horn, so you will need two horns.

Fit the horns to the elevators so that the vertical part with the holes is clear of each side of the fuselage. Again, refer to the pictures.

Cover each control horn with fiberglass and resin for strength, and hinge the stab to the elevators.

We now have the three basic components needed to finish the model.

### Final assembly

Cut out the wing openings in the fuselage, being careful to keep things accurate. Cut the bottom part of the fuselage under the wing away and test fit the wing to the fuse. When you have gotten it absolutely straight, glue it in permanently with 5 minute epoxy, install the bottom of the fuselage, and let dry.

Install the stab and elevators in the same way, with hinge lines parallel and vertical measurements accurate. Make up the elevator pushrod using 3/32" piano wire, and two 440 heavy duty quik links. Keep the bends in the pushrod at the back as minimum as possible.

Hook up the pushrod to the flaps and elevators and check for smoothness. The flap-to-elevator ratio should be approximately 30° to 45°, or 2 to 3. Install a pushrod guide in the fuse to eliminate pushrod flexing. Using a toothpick, put a drop of STP on all the control joints.

Permanently glue on the bottom sheeting and hollowed out double blocks, using Aero Gloss or Tester's cement. This keeps the seams from showing later on.

Cut and shape flap and elevator fillets out of scrap balsa and install, being careful not to get any glue on the control horns.

Check the airplane over at this stage for accuracy and alignment, and, if satisfied, install cockpit detail, canopy and rudder. You now have the basic airframe of your My Blue completed, ready for fillets.

At this point, install all the hardware, i.e., landing gear, wheels, engine, tank, etc., to check for weight. The model should weigh no more than 45 to 46 oz. at this stage.

### Finish

The original My Blue was finished with nitrate dope, with a coat of clear acrylic. The clear acrylic does not shrink, therefore, if you have smooth fillets to start with, they'll stay that way. This also results in a very glossy finish, with no rubbing involved. The se-



John prefers to use a plastic fuel tank. The vents are of uniflow type. An ST.46 provides the power. Note the neat compact muffler. The adjustments for the elevator linkage and movable rudder can be seen here (below).

The massive nose makes for a solid engine mount. It's a must for a smooth running motor. John gives us a look at the profile (top). A Wing Mfg. Racing Canopy is used to good effect here (below). Details garner points.

quence is as follows:

Install the wing and stab fillets, using Epox-O-Lite and water. Use the water to get the final shape as near as possible as this saves a great deal of sanding. Brush on two coats of nitrate clear, and sand after the second coat.

Using 00 silk span, paper the entire airplane using 500/0 clear and 50% thinner. When dry, brush on another full strength coat of clear, and sand. Check for any rough spots at this time, and fill any dents or dings also.

Mix up some clear and talcum powder and brush on entire model. Sand as much off as possible, being careful not to go through to the paper. Check in the light for smoothness, and brush on more sealer over any rough spots. The model should now have a dull matte finish with no grain visible.

Break out your air compressor and spray the entire model silver. The silver will show any bad spots you may have missed, and now

is the time to fix them. Spray on one more coat of silver, and lightly sand to a dull silver finish.

The model is now ready for the base color coat which, on the original, was a light metallic-blue.

Spray on a light coat of color, just enough to cover. Let dry overnight before masking for trim. The trim on the original was done in white panels with blue lace overlay, and air-brushed border of darker blue.

From here on, let your imagination be your guide. Ink lines and rub-ons add much to the character of a model and, I feel, should be used but not overdone.

Spray the entire model with clear and let dry overnight, being careful not to get any runs.

Flying day is here! Install the motor, tank, wheels, and double-check everything. If possible, run the engine once or twice before flying so that it won't quit just when you need it.

Set the lead-outs as per the plans, and use approximately 1/2% of an ounce of wing tip weight for initial flights. I use 62' lines and a Baron adjustable handle, which seems to be the optimum setup.

Check out engine and controls on the first flight, and make minor adjustments if necessary. Now, go ahead and take her through a pattern.

You'll find that you have a responsive and groovy model that is totally at your command. However, if it doesn't really feel this way, add nose and/or tip weight to suit.

Put in as many practice flights as possible and, with some concentration on your part, there will be no red ribbons for My Blue.

*Editor's note: John Poynter is not only a fine stunt flyer, designer and author, he is also a purveyor of fine foam wings. The toings and stabs for My Blue are available from him at J&K Foam Wings, 10261 Janice Lane, Cypress, CA 90630 or call John at 2131596-9053.*