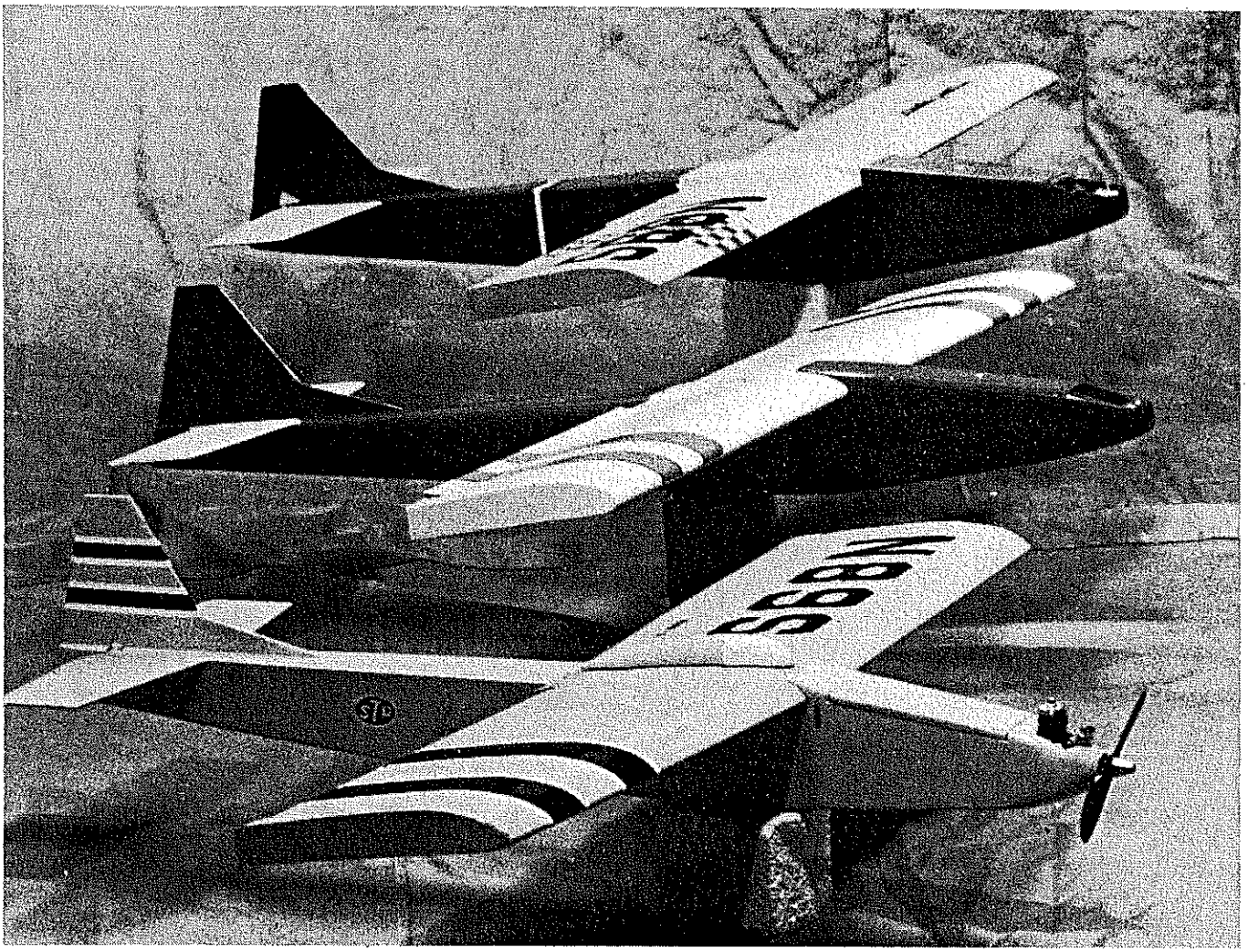
THE HARE



Flown with out-of-the-box engines, this well proven 1/2A pylon racer, is popular with the MARCS club—and in the circuit they fly—both for average members and hot-dog pilots. No one has an overwhelming advantage.

In our club, the Madison Area Radio Control Society (MARCS) one contest event has captured the interest of a large number of members: 1/2A pylon racing. It is an event where the beginning racer and the pro can both have a great time. For the neophyte, just trying to stay with the pack is fun. Yet, in the same race, the experienced racers are shaving the pylons and using their pet strategies. The popularity is due to a number of factors: equipment requirements and hence investment is minimal, rules preclude winning the event in a machine shop, design parameters lead to a variety of aircraft all with comparable performance, and, finally, little or no practice is necessary.

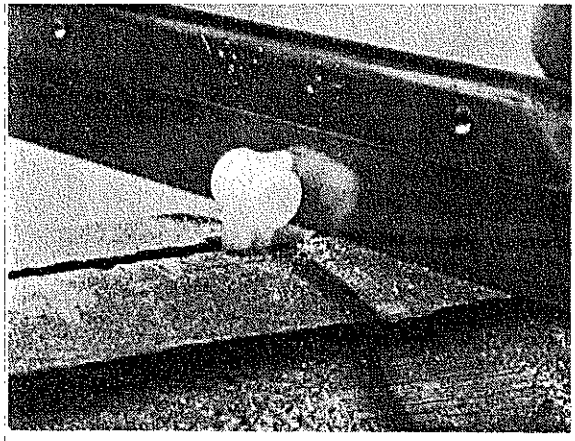
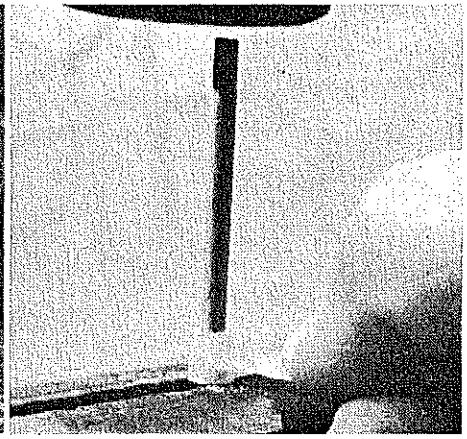
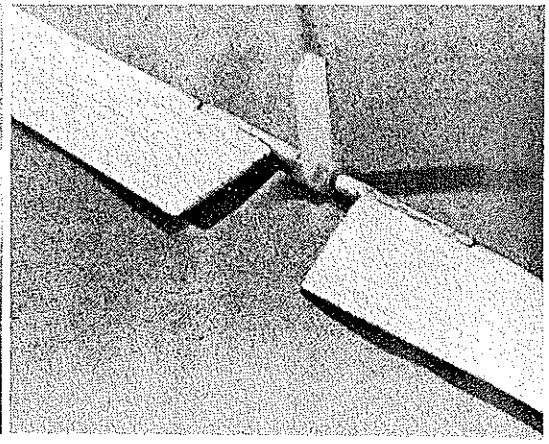
Evolution of a racer. Top aircraft is Hare I. MARCS rules preclude winning the event in the machine shop. Design parameters lead to variety of aircraft having comparable performance; in our unfable Hare beats a tortoise.

Most of these points are not well understood by the competition-oriented flier. For example, nothing turns off the average member quicker than an event, such as a pattern, that requires hours and hours of practice before each contest. Some of our most successful pilots fly their 1/2A pylon racers only when there is a contest. Although the "old hands" often win, the average club member leaves the contest knowing every point was closely fought.

Around 1968, Frank Garcher commissioned MARCS member Owen Kampen to design two 1/2A pylon racers with rudder and elevator control—power by Cox Golden Bees. Bonzo and Hoosier Hotshot, were published in *RCM* and kitted by Midwest Products. Typical of 1/2A planes based upon the chosen engine and the Testor's foam wing, they were slow and difficult to keep in the groove with rudder/elevator. After Owen designed the Pacer, the speed potential of a clean airplane utilizing the ACE foam wing was recognized.

In 1976, the author designed the Hare using a 200 sq. in. ACE straight foam wing and a fuselage meeting the 2X4 rules then in effect.

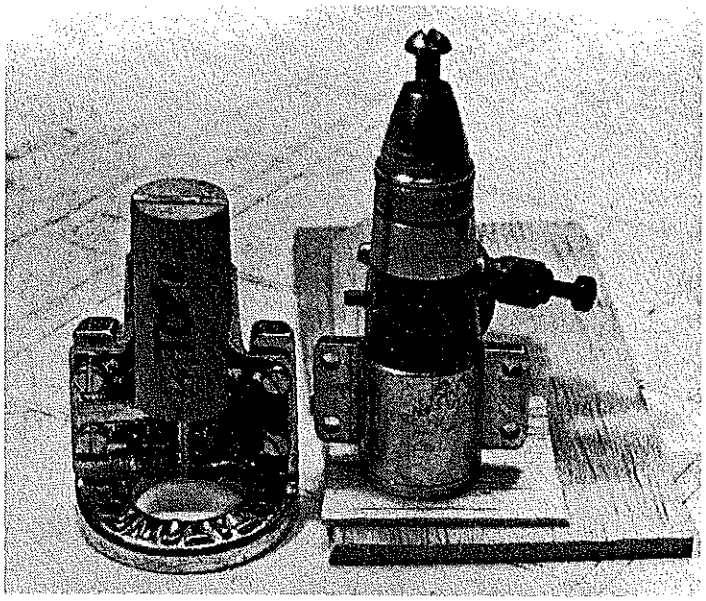
Al Scidmore and Frank Baker

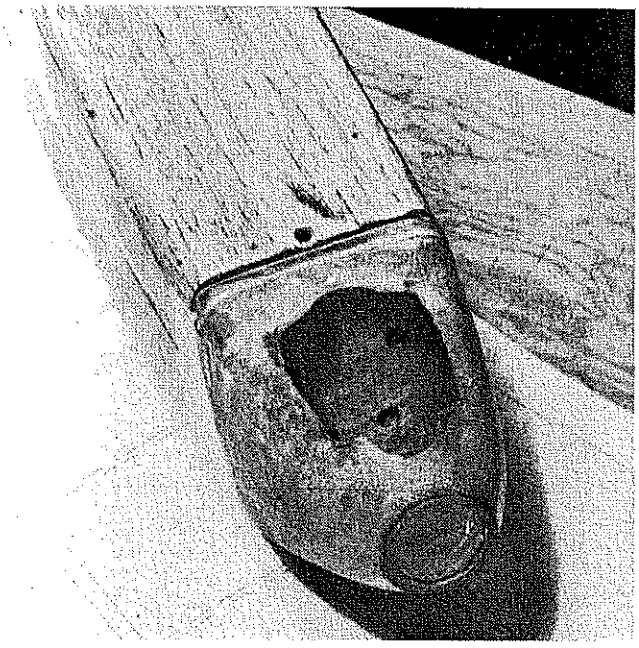
Left: With handy vise and razor saw nylon bellcrank is quickly converted into elevator horn. Center: Elevator dowel is close fit into the horn; ⅛" brass tubing is best but if dowel is used it should be epoxied. Right: Presto, elevator horn assembly—take care with alignment.

Frank Baker then built one from my plans. However, being an inveterate scratch builder, he cleaned up the wing-fuselage junction, lightened and simplified construction. When the ACE GLH appeared in 1977, it was clear that a new level of performance had been established. Both Frank and I created own versions of a swept wing Hare with built-up wings. Both were competitive with the GLH and possessed better aerodynamic properties.

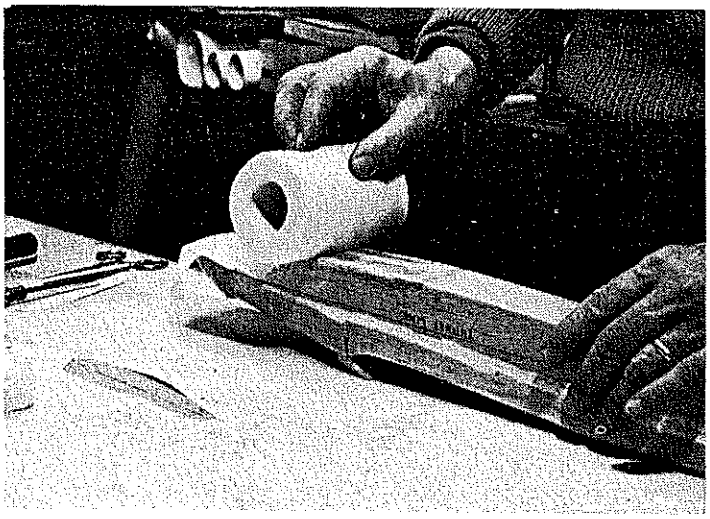
At the end of the 1978 season a number of the local modelers indicated an interest in building a Hare for the 1979 season. Consequently, Frank, who never built two airplanes exactly alike—even from the same plans—and I agreed to pool our variations to provide plans for Hare-V, the version shown on the plans. This version has all the desirable properties of a 1/2A pylon racer: stability, especially at launch; cornering ability—tightly without loss of speed or altitude; very fast on the straight-away with a superior grooving capability; unusually good wind penetration and ability to plow through turbulence; and finally a very smooth, controllable glide.



The Tatone engine mount with a dummy TD engine in place to guide the cowl shaping. The fiberglass cowl is made by the balloon method—gives superior, smooth finish. Pettit Paint has "Easy Does It" brochure which describes technique with pictures. Something you should know anyway.

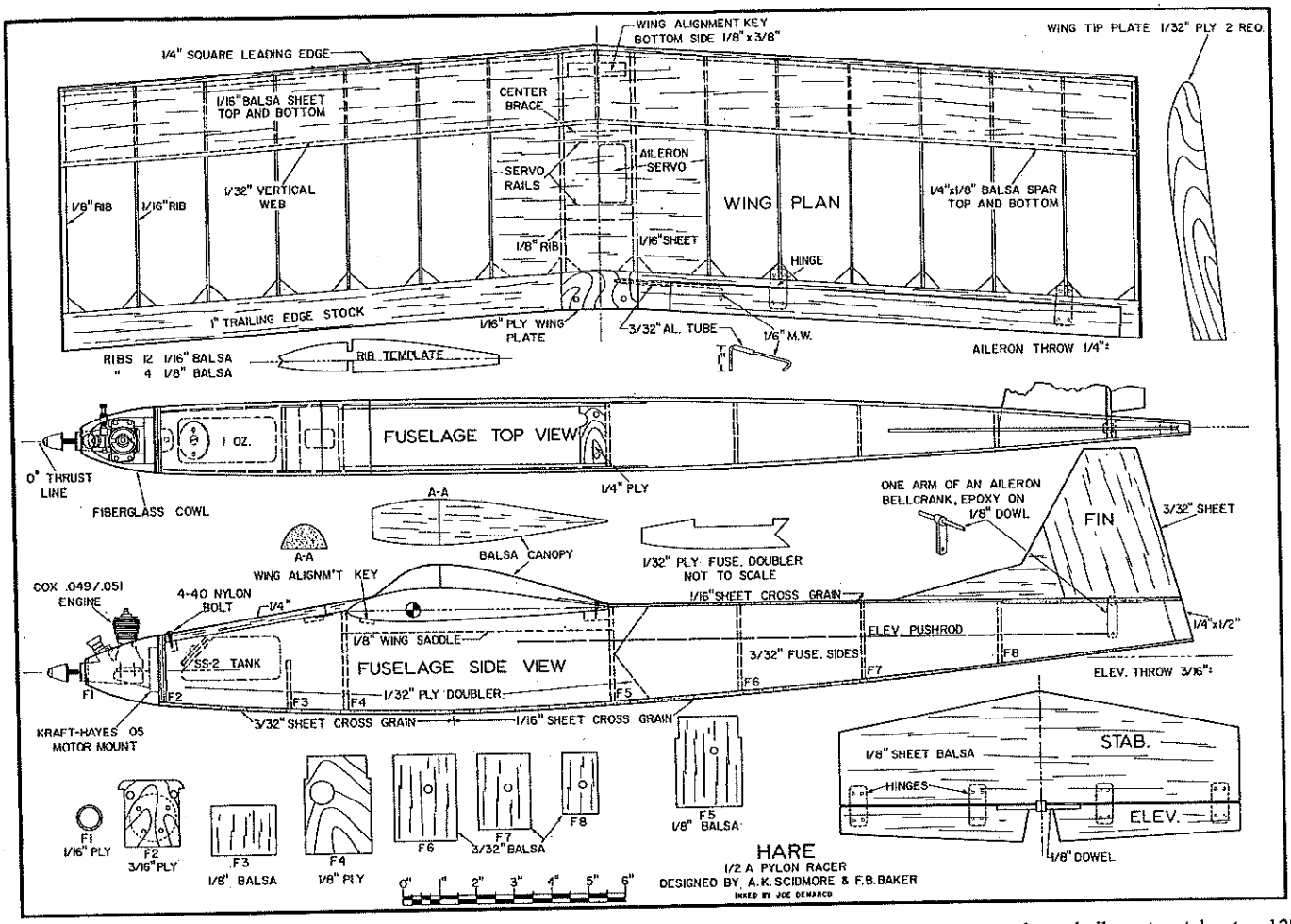


Front end with fiberglass cowl in place. Filler is added and sanded to smooth the transition from the glass cowl to the balsa fuselage.




Left: Applying fiberglass to fuselage bottom. Excess epoxy resin is removed with toilet paper, as shown here, using the entire roll. Right: Laying on the medium light glass cloth back to midpoint of wing. When using shaped foam for cowl form, do not mix epoxy with thinner. Use epoxy resin—such as Hobbypoxy II which does not attack foam. Polyester resin dissolves foam. If in doubt, try small amount of resin on a test sample first.

FULL SIZE PLANS AVAILABLE . SEE PAGE 128



There are two predominant philosophies for building pylon racers: light and expendable, or stout and durable. The 20-oz. minimum weight rule allows a reasonable compromise. Hare construction is sturdy yet designed to come in at 20 ounces. Because of their small size and high flight speeds (around 70 mph), all 1/2A pylon racers must be built absolutely true, and the Hare is no exception.

Fuselage: Cut sides out of medium-hard straight-grain 3/32 sheet and check two sides for equal flex. Draw thrust line on side as an aid in aligning parts. Use contact cement to glue in 1/32 ply doublers. Glue in ⅛ wing saddle. Cut out fuselage formers and draw horizontal thrust line and vertical center line on each former. Draw straight line on work surface and pin tops of formers F4-5 to board while aligning center lines. Use 5-minute epoxy to glue body sides to formers. Before glue sets, use square to check that front of fuselage sides are even and that body sides are even and that thrust lines match. Pin formers F6-8 to board, glue to sides and install ¼ × ½ tapered tail post. Install F2 and F3 last; use triangle and square to insure that firewall is at zero degrees. Use lines on the formers and body sides to insure proper alignment.

Once basic box is established, install elevator pushrod tube before sheeting top and bottom of fuselage. Except where noted, we use PICA Gluit; it dries quickly and is strong. The fiberglass cowl is built using "balloon" method. Pettit Paint Co., has an "Easy Does It" brochure which describes the technique with pictures. Install engine mount and crankcase of Cox TD or Medallion to guide shaping of foam nose form. Cut foam block to fit (closely as possible) crankcase and mount, and completely enclose them. Cut foam to leave about ¼" behind front of prop driver, and glue F-1 to foam. Use razor blade to carve foam to rough shape, and finish-sand with 120 paper. Practice sanding piece of scrap foam before working on nose foam. Place masking tape on fuselage about ½" behind firewall in fuselage areas close to nose that will not be fiberglassed. Cut two layers of fairly heavy glass cloth to fit.

Use epoxy resin, such as Hobbypoxy 2, and foam will not be attacked. Do not mix resin with thinner. If you use polyester resin, foam will dissolve and when you cover it with tightly-fitting rubber balloon, you will create real mess on front of your plane. If in doubt, test epoxy you intend to use on foam scrap.

Put small amount of epoxy on foam nose form and all areas to be covered, then lay on first layer of fiberglass cloth. Do not use small loose pieces of cloth unless they pass over nose of form, or they will be forced out of position by balloon. Smear on resin, add second cloth layer. Be sure that both layers are well coated with resin. Support fuselage so both hands will be available. Blow up very large balloon to at least a 12" diameter. Place center of balloon over end of nose and push down firmly. Once balloon covers all glassed areas, use one hand to keep balloon from sliding back up fuselage, while slowly releasing air from balloon. Use masking tape to secure bottom edge of balloon (opposite from nozzle) to fuselage. When epoxy is hard, remove balloon. Cut hole large enough to retrieve crankcase and pick out foam. Cowl will be very smooth and quite strong. Any weak areas can be found and additional cloth and epoxy added to inside of cowl. Shape engine access area to requirements.

Some fliers treat 1/2A racers as expendable, while others expect one plane to last two seasons. Area from nose to midpoint of wing takes the most beating since this slides on field at each landing. Layer of glass cloth and resin in this area will prolong fuselage life. If medium light cloth is

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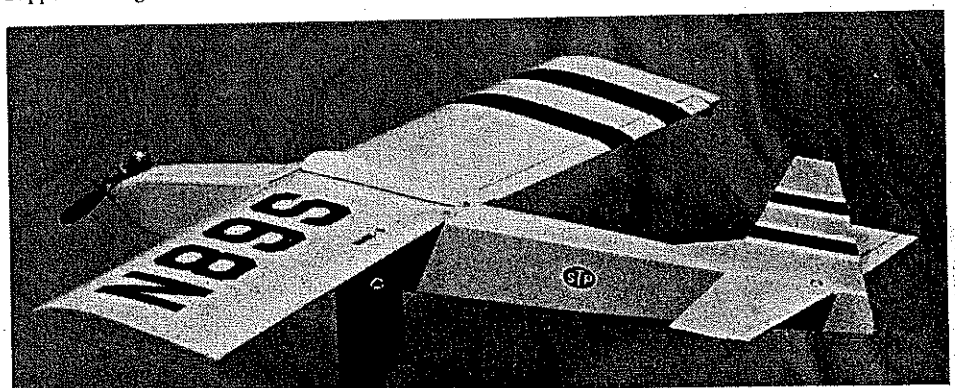

A simple but interesting configuration—swept wings, canopy, black-magic wing tips—set off by your numbers and a few stripes. Aileron on right wing panel only also shows clearly here.

goes out to Nick DeCarlis of Gainesville, FL for his 5-minute OOS flight on his Peanut Cessna Cardinal RG. The plane weighed 8 or 9 grams, used a N.P. 5-1/2" prop (sanded) turned by a 10-14" loop of FAI 1/16" rubber. Congratulations, Nick! Send us the dope on *your* TWA.

If the space devoted to FF scale in the major magazines seems too little for your taste, remember that advertising money talks. Have you considered a FF scale club? Drop me a SASE and I'll see if I can put you in touch with a club, newsletter, or fellow modeler which you might find interesting! Thanks for all the cards, letters, photos, etc.

Bill Warner, 423-C San Vicente Blvd., Santa Monica, CA 90402.

Hare/Scidmore/Baker

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used, and excess resin soaked up with toilet tissue, very light weight job can be done.

Wings are standard. Note plans call for use of 1" trailing edge stock on both panels and ailerons are cut out later. Install aileron servo mounting rails before sheeting center section. Alignment is crucial. Easy way to get true wings is to pin trailing edge to truly flat work surface. Place ⅛ spacer under trailing edge to elevate it, so that spars may be pinned flat to working surface. Glue both top and bottom wing spars in place; while glue is wet, glue ribs to trailing edge. Use ruler to insure that leading edges of all ribs are same height above work surface. Glue in leading edge and hold in place with pins or weights until glue is set. Leave wing on board until shear webs have been glued in place and top sheeting installed. This ensures straight, true wing, a very strong, very rigid, light weight wing. Epoxy gloss center to strengthen wing where it meets fuselage.

Balance wing on center line to check for equal panel weight, adjust by sanding until balanced. Wing alignment key and tip plates are installed after basic wing is covered. Foam wings have been used with only noticeable difference being that they were heavier than built-up.

Once wing is completed, trim fuselage wing saddle until wing fits perfectly horizontal when fuselage sides are vertical. Be sure wing center line is parallel to thrust line—zero degrees incidence. Install ¼ ply wing hold-down block. Before drilling pilot holes for wing hold-down screws, use string to measure that tip of each wing is same distance from fuselage. From hard balsa carve front hold-down block to fit wing, glue in place. Install elevator. Be sure it is horizontal relative to wing. Use triangle to check that fin is vertical. Sight fin from front to be sure it is true and parallel to fuselage center line.

Various covering schemes have been used; heat-shrink covering (Solar Film, EconoKote, etc.) works well. One author uses painted fuselages with film on all other surfaces, the other covers fuselage up to leading edge with film, paints from there forward. It is important to use colors and trim that make plane very visible, distinguishable from other aircraft. Whites, yellows, and orange combinations work well.

Flying: Your Hare should be set up so it grooves, yet turns rapidly. Aileron and elevator throws shown on plans are approximate. Roll rate should be positive without being quick. Too much aileron or elevator throw can make any aircraft difficult to handle. One should initiate a turn with aileron, then use up elevator to tighten up turn. Our preference is to allow nose to drop slightly during turn. Adjust CG until straight-and-level flight can be maintained with no elevator inputs. If you built a true airplane that weighs

between 20 and 21 ounces, all properties mentioned should be achieved. Only other prerequisite is hottest possible out-of-box engine. Any 1/2A pylon racer is no better than its engine and pilot.

CL Scale/Gretz

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cables alone for multi-throttle control. The Piper Twin Commanche he flew at last years Nats had this type of arrangement.

In order to get all of the carburetors opening in the same direction, the engines of the right side of the model need to have their throttle arms reversed to the top of the carb. The two braided cables are wrapped and soldered in the center along with a short drive wire which attaches to the bellcrank. Note that this wire is attached to the *same* bellcrank arm as the throttle leadout—not in the normal place. Du-Bro threaded couplers are soldered to the carburetor end of the cable. The RC link goes on this and gives you the necessary adjustment to get all engines working together.

The most important thing to keep in mind with any of these three control installations is to eliminate all binding and friction wherever possible. The system *must* work perfectly free and smooth throughout its entire range for maximum effectiveness and dependability. During all steps of the assembly, double check to make sure that you are not building in a bind. And if one develops, find it and cure it before proceeding any further. The parts of a control system that have nylon-to-metal bearing surfaces shouldn't need any extra lubrication. However for the metal-to-metal surfaces, such as in the bellcrank, I normally use a little graphite lubricant to help make the system work silky smooth.

Different brands of graphite lubricant are available in both powder and liquid versions at most hardware stores. In addition to the bellcrank, for instance, it's also helpful when using flexible cable pushrods (especially long ones) to work powdered graphite into the outer plastic sheathing. Do this before gluing the pushrod into the model so that it can be held vertically while squirting in the graphite. Better yet, smear the cable itself with the powder before sliding it inside of the sheathing.

Next month, coverage of CL Scale at the '79 Nationals!

Mike Gretz, Box 162, Montezuma, IA 50171.

CL Aerobatics/Paul

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Finish the sanding with 600 wet.

At this point, the plane should be ready for a color coat. If you intend to continue with epoxy paint, then spray on your base coat of color. If you want to use one of the nitrate of butyrate dopes, then you should first apply a coat of Aero Gloss clear over the talcum powder coat. According to Paul, the base coats added about four ounces to a 57-in. span plane with 28 in. stab, and 47 in. fuselage. Figure another four oz. if you use an epoxy-type paint.

The question was recently asked about what to do special when building the M&P Stiletto kit. First, remember that there were two runs of kits. The first had some bad ribs and the instructions were a little vague on the control hookup. The second run had much better ribs. Either way, be certain that your wing ribs are true when you stack them up. Replace any that are off. Also, you may have to cut out larger holes in the inboard ribs for the leadouts.

On several of the Stilettos, Les McDonald used two pushrods from the bellcrank, one going to the flap horn and one to the elevator horn. This gives less flap travel than the standard Nobler hookup, which is actually a 1-to-1 ratio of flap and elevator, which is what 95 percent of the stunt fliers use. To further illustrate this in more simplified terms, to set up a 1-to-1 ratio you connect the pushrod from the bellcrank to the hole in the flap horn, which is ¾ in. from the pivot. Then, the pushrod from the flap horn to the elevator horn is connected to the hole that is ½ in. from the pivot point on the flap horn, and also ½ in. from the pivot point on the elevator horn. Don't forget the brass bushings for long life of the horns. The bellcrank pushrod should connect to the hole in the bellcrank that is approximately ¾ in. from the bellcrank pivot. Actually, on a Top Flite bellcrank the hole is 11/16 in., and on a Sig bellcrank the hole is about ⅝ in. from the pivot point. The writer suggests that the kit builder follow this 1-to-1 setup on his first planes until he can accumulate enough experience to evaluate a possible change to a different ratio.

Most of the Stiletto kits that the writer has seen, have been built using the ST 46 engine. With the wing area in the kit and the weight of 48 to 54 oz. that you can expect, it just makes sense to use the more powerful engine. Be certain that you allow for a tank of 5.25 to 5.50 oz. when constructing the front end of the fuselage. This means that the tank will be from 5.25 to 5.75 in. long.

Probably, the most necessary substitution of wood is the ¼ in. bottom block. Several people have stated that they replaced this bottom block and one or two other pieces in an attempt to cut