

Don Chancey
 Photos by Jim Haught

Proudly displaying model he flew at the World Championships is author Don Chancey. Much time and effort goes into development of a ship like this—for example, Chancey re-built the wings five times to obtain a stiff, but light panel to stand zoom launch without flutter.

Designed—by a member of the U.S. 1975 Nordic team—for circle tow and zoom launch this glider incorporates the latest practice.

Hyperion mk. V

THE HYPERION MK. V was developed for the 1975 World Championships in Plovdiv, Bulgaria. The model shown didn't just happen; it's the present state of a model that is constantly changing. This is due mostly because every time I come across a new, but definitely better way of doing something I try to incorporate it into the ship. Sometimes this requires building a new ship. In the case of Mark V, the wings were re-built a total of five times before they ended up as pictured. The biggest problem in the wing structure is building a panel stiff enough, but still light enough to zoom launch without fluttering. I fly a pretty tight hook setting (the hook starts moving at 4.8 lbs. and unlatches at almost 7 lbs. tension). The model really has to build up speed to unlatch 7 lbs.

Another problem is tail booms. Fiber booms flex a little too much for the super hard launches. The built up boom helps quite a lot, besides being lighter. The structure of the tail boom is taken from Ekhten-hov's 1973 winner. It's really stiff and quite light if built properly.

The front end is much deeper, which adds considerably more side area. It's purpose is to help the model stay straighter at higher speeds. It acts like a forward fin. Three degrees seems to be about the optimum angle of attack for the wing. Models

with less don't seem to go as high and have poor recovery. Ships with more angle do have good recoveries, but seem to be too loopy and don't get as high either. There are exceptions of course.

The construction details that follow are the way I build my ships. Many people have special building techniques. It really doesn't matter what technique is used to build a model (or models). The important thing is that they turn out correctly. If your personal techniques work better for you, use them!

Construction

Before beginning the actual construction of the wing, there are two items that I consider an absolute must for a good ship. The first is an airfoil sanding block. Cut a block of wood slightly wider than the wing chord. Cut the top of the block to match the bottom camber of the airfoil and the bottom of the block to match the top camber of the airfoil. Then glue 320 A sandpaper to the block. Using this method, a wing with a very consistent airfoil may be produced. It has always been my opinion that a constant airfoil from tip to tip is much more important than trying to get an exact G-F6, or B6356B, etc. But, naturally, get as close as possible.

The second item of preparation is a jig. The construction of modern high-performance under-cambered wings can be considerably simplified and speeded up by using a curved form wing jig. In the initial stages of construction there is no need to pack up the leading and trailing edges in the traditional way and much time can thus be saved. Later, because the entire under-surface of the wing panel is supported, much more "holding pressure" can be applied without the ribs collapsing or splitting and the shaping of the leading and trailing edges or the insertion of top spars becomes much easier. In fact, the whole process of building a wing panel appears to be so much easier because of the undercamber support that the not-so-skillful, or less experienced modeler, can attempt a construction that formerly he or she would consider too difficult. Generally, wing warps may be built into wing panels to a limited degree without resorting to packing which, after all, would defeat one of the main advantages of the wing jig. Wing jigs are also very useful when repairs or rebuilds of damaged flying surfaces are necessary and, because they are not as big or heavy as the standard building board, they could be taken to the flying field for on-the-spot repairs which are sometimes necessary during a contest. In recent years with the

advent of quick-drying epoxies more complicated field repairs are possible and the jig will certainly prove more beneficial than the model box lid.

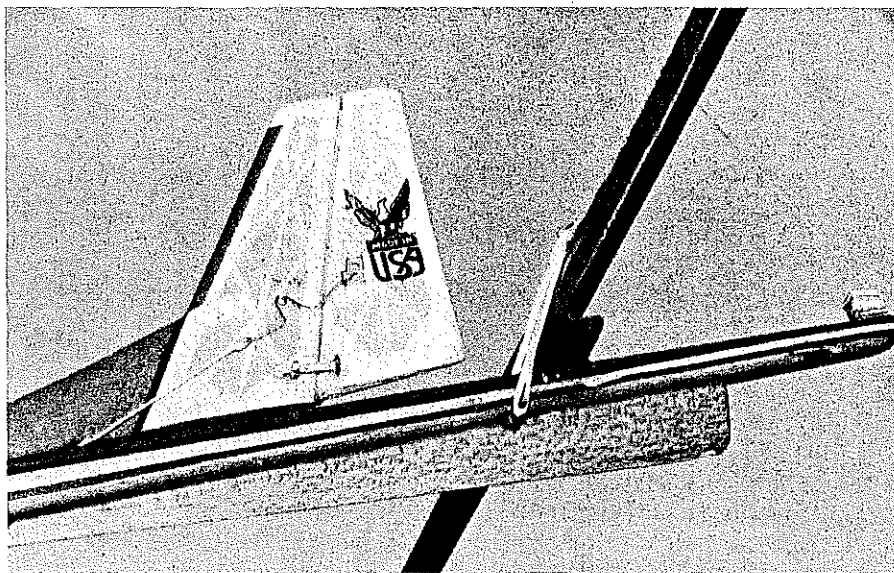
Construction of Wing Jig (Aero Modeller)

Draw the airfoil full size as accurately as possible. Using the undercamber portion only, carefully draw tangents at the leading and trailing edges so that a smooth continuous line is produced, and extend them $\frac{1}{2}$ " at the front and rear of the airfoil so that the width of the baseboard is determined. The length of the baseboard is such to accommodate the longest length of wing panel likely to be assembled over the jig. Something around 30" is normal. Having determined the dimensions of the baseboard, it must now be cut to size from $\frac{3}{4}$ " block board, clipboard or similar, but make sure that whatever material is used it is perfectly flat.

Using a set square, mark off the locations of the ribs allowing a uniform spacing of about 2" or $2\frac{1}{2}$ " between ribs and then mark the locations of any webbing. Carefully make a plywood rib template and make sufficient ribs with it from $\frac{1}{8}$ " medium balsa sheet. When they are all cut out, pin them together and sand them to ensure they all have an identical profile. Epoxy the ribs to the baseboard in the marked off locations. The next stage is to epoxy into place all the webs. These are made from $\frac{1}{4}$ " medium balsa sheet and are located at the leading and trailing edges and intermediates along the chord to give about 2 to $2\frac{1}{2}$ " gaps. Make the webs slightly oversize in the vertical direction, and when the epoxy is set plane or sand them to the correct camber flush with the ribs.

Next cut a piece of $1/16$ " thick plywood slightly oversize to fit over the top of the assembled structure. Cover the structure with contact cement and attach the plywood top using rubber strips or weights to hold it down until the epoxy sets. When all is dry remove the rubber strip or weights and trim the plywood to size. Finally give the jig four or five coats of dope, rubbing down between each coat with 600 grade wet and dry paper, and complete with two or three coats of car or floor wax polish.

Wing: Make the plywood center ribs first, making sure they are all exactly the same and that the holes line up. Spar notches are cut before assembly in the plywood ribs only. Next, cut the main ribs for the center panels from 8-10 lb. C-grain $1/16$ " sheet. Cut the main ribs for the tips from slightly lighter material. Select a good *hard* piece for the balsa portion of the trailing edge, and epoxy to it the spruce portion (the spruce cap on the rear of the T.E. is an absolute necessity with the thin airfoils of today). Do most of the shaping and notch the T.E. before assembly. Pin the L.E., and T.E., and bottom sheeting in place on the jig. Position the plywood root ribs and tack in place with epoxy. (Note: best results



The rear end showing the built-up fin and rudder, and the stabilizer in popped-up position. Nordic A-2 models are hard to get out of strong lift hence the severe pop-up angles.



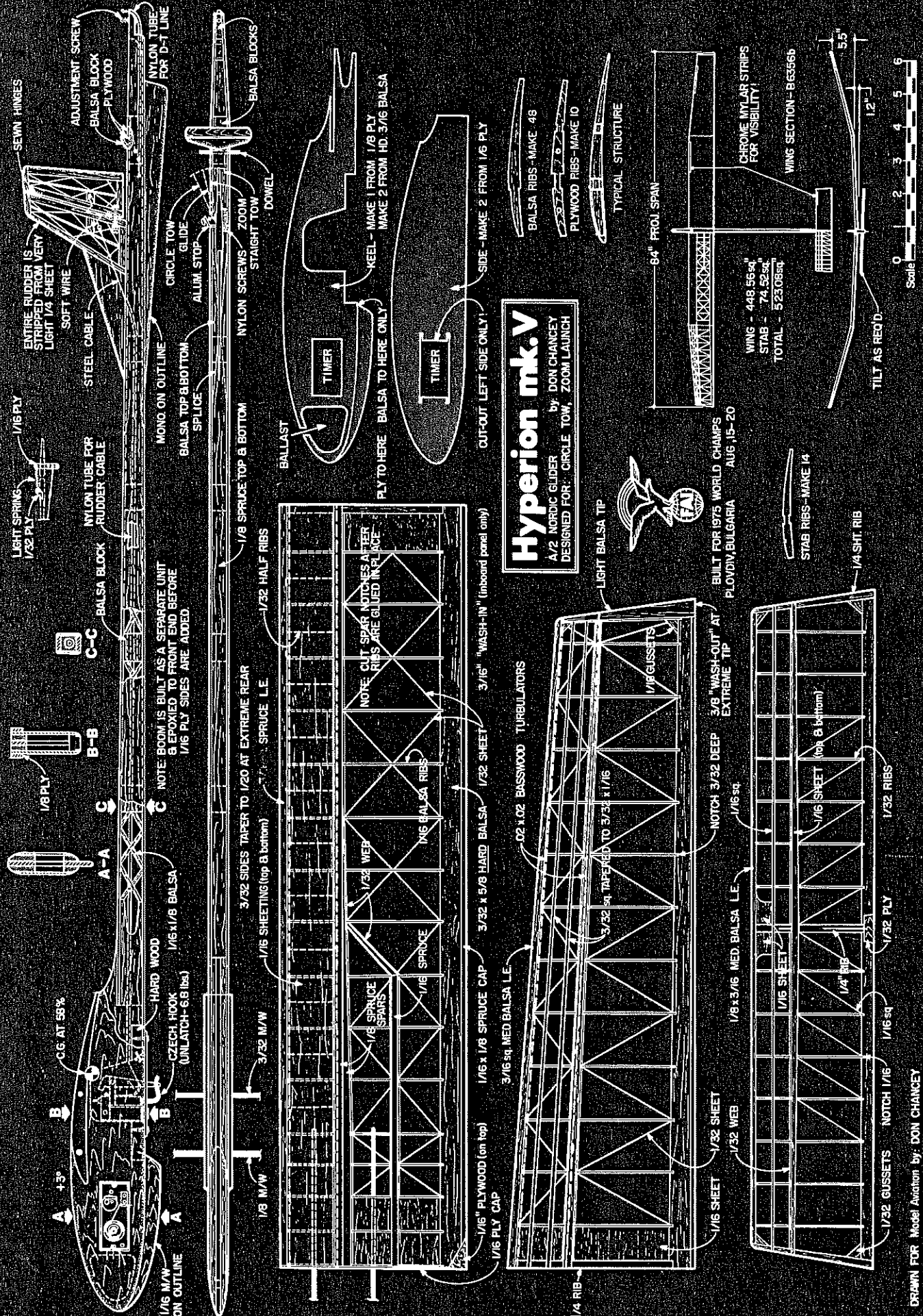
Photo taken during launching. Note how line is attached to the right wrist, and how the monofilament hangs free and lies on the ground. Almost tangle free. Tricks to every trade!

come from building center panels end to end. Tubing is cut in two after complete assembly of wing.)

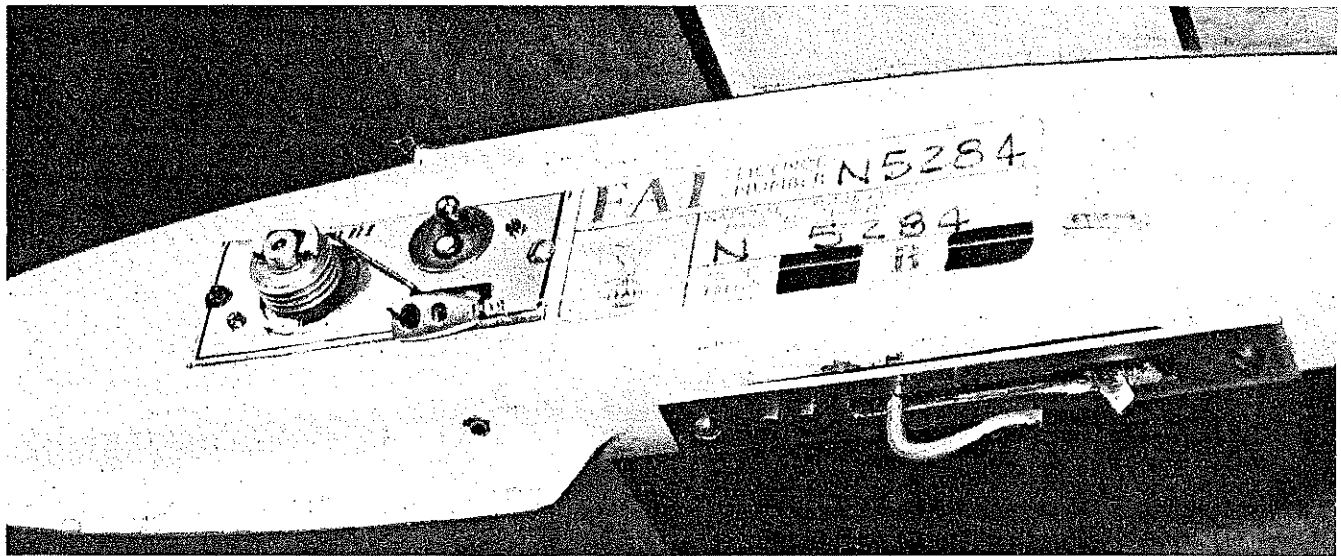
Now glue in all main ribs and allow to dry. Using a straight edge, mark and cut notches for all top spars. Install top spars, sheeting, etc. Allow to dry while still on jig. After this is thoroughly dry, remove the wing from the jig and do the same for the bottom. Next, add the webbing to the spars, the remainder of the sheeting and the cross ribs. The cross ribs are cut slightly oversize and sanded to shape after assembly with the airfoil block. The tips can now be assembled on the jig with the leading edges straight. Due to the taper and the airfoiled jig, this will automatically "build in" the required amount of wash out.

Dihedral angles may be sanded into the $\frac{1}{4}$ " "top of ribs" by propping the wing up to the desired angle and sanding with a flat sanding block "hand launch glider style." Finish sanding the entire wing with 400A sandpaper. At this point I apply a total of five coats of 60-40 dope to the entire structure. This serves a dual purpose. First it insures that the tissue will stick to every part of the structure it touches, and secondly it is especially helpful in weather-proofing the wood. Models done this way will last for several years of flying. Allow the structure to dry thoroughly and cover with Japanese tissue.

Monokote does not give the proper rigidity required for zoom launching, plus the fact that it is just too slick. The slick surface definitely hurts the glide. (Bob White is using a flatter in *his* dope to roughen up the flying surfaces—an obviously successful attempt to make the air stick to the airfoils better.) The bottom of the center panels should be double-covered to help cut down on punctures. (Note: I don't remember seeing one single airplane at the World Champs that was Monokoted; that's in all 3 events.) Apply several coats of dope and allow to dry thoroughly. Add



DRAWN FOR Model Aviation by DON CHANCEY



Front end of the Hyperion showing the neat installation of the Czech tow hook and the Sellig timer. Hardware by Jim Crockett. The columns by Bob Meuser include many such sources.

Hyperion Mk. V

the turbulators and set up to cure while you finish the rest of the model.

Stab and Rudder: Carefully select the wood for the rudder/fin and stabilizer. Lightness is a virtue, but don't build too flimsy. I hear talk of 7- to 10-gram stabs and people just turn green with envy. A stab that light is just not necessary (the 1975 World Champion's stab weighs almost 12 grams). I recommend building a *substantial* stab of 10 to 12 grams. You can make up for the extra weight elsewhere on the tail end. The built-up rudder can save 1 to 2 grams if built properly. The wood for my rudders is all stripped from 1/4" sheet. Use 4-lb. stock when possible. After construction, coat the entire rudder with "Hot-Stuff." This will yield a rudder that is extremely light yet very tough. Coat the framework of the rudder and stab with three thin coats of clear dope and cover with Japanese tissue. About three coats of dope over the tissue is fine. Set this aside and allow to cure.

Fuselage: If you want to build an all-out serious model and do not have access to materials for making large diameter fiberglass tube, the built-up balsa and spruce tail boom is the best way to go. It can be built much easier than a rolled balsa tube. The ones that I built turned out extremely stiff (much more so than a fiber boom). My built-up booms are not only stiffer, but also 4 to 6 grams lighter than a comparable length fiber tube.

Cut the sides for the tail boom from stiff but light 3/32" sheet. I use "C" grain, because that's what I use almost everywhere. Make sure both sides match exactly. Sand the sides so that they taper from 3/32" thick at the front to 1/32" at the extreme rear. Pin the two sides to a *flat* board and add the square blocks and geodetic bracing. To avoid excess pulling, and especially excess weight from glue build-up, the entire aft end of my ships (from rear of wing back) is built with "Hot-Stuff."

Build-up the tail boom as a separate unit. After the front end is constructed to a certain stage the boom is just plugged in place and epoxied there. Be sure to make provisions for the braided steel auto-rudder cable!

The front end of the fuselage is relatively simple. Using the template shown, cut out the main keel from 1/8" plywood. The sides are 1/16" plywood. Two 1/8" ribs are epoxied on to add support for the wing wires. I use K&B microballoons and 5-minute epoxy to fill around the two 1/8" ribs and to make all other fillets. I use Cerrabend for ballast because it weighs almost twice as much as lead and has a much lower melting point. It can be obtained from the larger model train shops. They use it for ballast in model trains where they need a lot of weight in a small area.

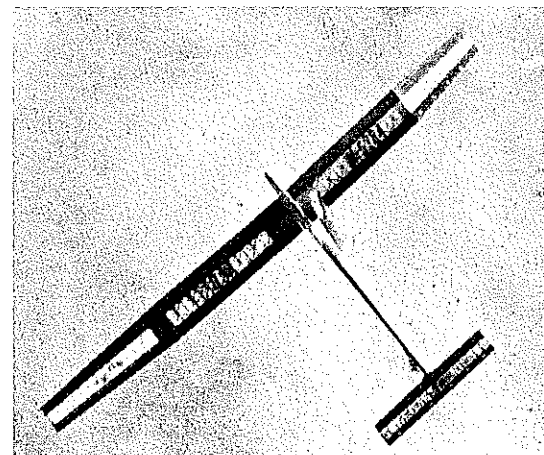
I finish my fuselages as follows: Apply two to three coats of clear dope to the boom, then cover with Japanese tissue. The tissue then gets three coats of clear dope. The front end gets three coats of lacquer sanding sealer from the tail boom forward. Allow to dry thoroughly and sand flat with 320 then 400 sandpaper. The lacquer sealer is very easy to work and yields an extremely smooth surface to paint over. I use white spray lacquer for color. It dries quickly and is especially easy to work with. (Much more so than the white epoxy I had used in the past.) Allow the lacquer to dry thoroughly. Hook up the auto-rudder, and "D.T." lines, install the timer and tow hook, etc.

Flying: Make a few test glides to insure that the C.G. and incidence are close. Remember, you will need approximately 3/32" more up in the tail due to the turbulator strips on the wing. If you are new at circle towing, a good way to start off is to make the first few flights with the tow hook unlatched. Simply tow the model to the top and notice what rudder adjustments should be made to produce a straight tow. After the model is towing straight, (due to the

wash-in in the right wing, a certain amount of left rudder *may* be required to produce a straight tow; if so, don't worry, this is normal). Set the latch and attempt to circle the model. Due to the excess drag of the tow line, a rudder setting of approximately 25° is required to turn the model.

I presently am using the Russian towing method, i.e. 50-lb. test monofilament and no tow reel. Slack in the line is taken up by reeling in the line hand-over-hand. By using the hand-over-hand method, the model can also be pulled quickly to the top to set up for the circle. When setting up to circle, pull the model over head and slightly over in front of you. Pull the nose down and let go. The model will "stall" and quickly turn about. The turn should be as tight as possible without spinning (or spiralling) down when lift is encountered. Always be sure to have enough slack in the line, so that a turn can be made without any tension on the line. You will need to

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The grace of soaring birds is found in a Nordic in flight. Don's hook starts moving at 4.8 lbs. pressure and releases at 7 lbs. tension.

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THANKS TO TREMENDOUS
WORLDWIDE MODELER
ACCEPTANCE

Rain Show/Samuelson

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under the head of Bob Uguccioni, mailed news releases to all of the area newspapers, as well as publishing the event in the weekly booklet that is distributed throughout the entire resort area. RCers from the Aeroguidance Society of Endicott, New York, and the pylon racing group from Harrisburg agreed to help us with the show.

Everything was geared for October 18, 1975, at 1:00 p.m. As luck would have it at this time of the year, we had rain. Frantic calls to the regional flight service at Wilkes-Barre at 7:00 in the morning were not reassuring—rain the entire day. All preparations had to be cancelled, our flying guests from out of town had to be called, the food had to be refrigerated or frozen, and a new advertising campaign had to be started to regear for the rain date of October 25, 1975. Advertisements ran in the local paper during the rain-date week, stating that the Red Baron had caught a cold preparing for his fight with Snoopy and that he had recovered to do battle. By Thursday of the rain-date week (rain date being October 25, 1975), everything was set, even the weather forecast was good for the weekend. But as luck would have it, the forecast changed Friday evening and we were plagued with a fine mist during the early Saturday morning hours. Again, we called the flight service station at Wilkes-Barre and the report called for a rising ceiling with no rain cells in the area. Winds were light and variable and the early morning fog and drizzle should be cleared by noon.

We plowed ahead and prepared for the show. The eating area was moved inside, while rain-soaked cooks prepared the hot-dogs and hamburgers on charcoal hearths. The PA system had to be set up in the hangar away from the flying area and our announcer, Duane Walck, could not see and comment on all of the aerial maneuvers. The rock group, Reign, also had to set up inside the hangar to protect their electronic gear. As 1:00 p.m. neared, only the people helping in the preparation and performance of the show were present. Joel Samuelson, the president of the Pocono Modelers and Chairman of the Air

Show, paced back and forth hoping for a break in the weather. Surprisingly, people started to trickle in, even in the light rain, and by 1:30 we started the show with approximately 150 to 200 spectators. The rain didn't clear until 3:00 that afternoon.

Don Hewlings opened the show, flying a Bristol Bullet over the strip dropping the official bicentennial flag. This was followed by an RC jamboree. R. C. Noll took off in his biplane pulling a banner saying, "Welcome RC Fans." The show was underway and the weather was showing no signs of clearing. People that would have come with their children stayed home and a lot of honeymooners, I presume, decided to stay indoors due to the inclement weather. R. C. Noll continued the show flying his Jet Star, the deBolt Acrobat, and Eindecker. Ralph Jackson turned in a spectacular scale flight with his YAT-28E. He also flew a pattern with his Tiger Tail. Dick Allen sliced through the mist in his Tiger Tail, Taube and Sopwith Camel Pup, while Hank Farrell did snap rolls in his original biplane, which, by the way, should be published in *Model Aviation* shortly. Gary Booker flew his deHavilland 10-E. During the ribbon cutting part of the show, Don Hewlings had a clevis break in a turn and spiraled in, totalling his plane. Those brave wet kids at the show thought this was the greatest and wanted Don to repeat the performance. The glider portion of the show was performed by Tom Long, flying a Monterey, and Doug Williams flying a Hobie Hawk. Sterling Schoonover flew a pattern with his Phoenix 6 and also test flew an Ugly Stik that was to be part of the aerial dog fight. Because of mechanical problems with the Ugly Stik, he decided not to use this ship for the dog fight. Allen Conklin flew his eight-foot Aeronca and Carl Stengel darted through the sky in his 200 "Quickie" racer. Tom Lilli flew an "original" pattern with the Sweet Stik. Many times, the planes seemed to disappear into the clouds.

Control-line performances were adequately handled by Jim Bush, flying a stunt pattern. Ken Sarer performed brilliantly in a carrier demonstration, and Cliff Hunt flew an original adaptation of his gyrocopter. As you can see, the entire show was

not devoted to World War I planes. However, a respectable number of beautifully designed and detailed scale planes added the extra touch for the World War I theme, besides the aerial dogfight between the Red Baron and Snoopy. The pylon racing teams and the control-line combat teams never did show because of the inclement weather.

During the intermission, live music was provided by Reign, a real hot rock group from the Poconos. Door prizes, donated by various merchants, were given to those lucky people with the correct number. The grand prizes were two vacations for two at Birchwood. These were drawn before the main event.

The main event was announced and the theme song, "Red Baron and Snoopy", piped through the PA system. Snoopy took off and was flying gracefully in the air yelling taunts at the mean Red Baron. The Red Baron never did get into the air until Snoopy was almost out of gas. The Baron had engine trouble. Snoopy won by default.

All in all, it was a tremendous success for our first effort. A large part of the expected crowds never came because of the poor weather. Those, who did come, enjoyed the afternoon. Free Delta Darts and balloons were given to the children and many people walked away with valuable door prizes, as well as a greater appreciation of what airplane modeling is all about. The clubs are looking forward to next year and a bigger and better air show. We plan to hold it earlier in the year because of the weather and, if all goes well, we will be making it a national event with guaranteed prize money. The Poconos are a wonderful place to hold such a large show. The Red Baron of Birchwood is all for it and is looking forward to his revenge flight.

Hyperion/Chancey

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practice so that you will automatically know how much slack line is required to complete a turn. You will need to learn to pull tension at the proper point in the circle to build up speed for the launch, etc.

Because of the stretchiness of the mono-

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Hyperion (continued)

filament the model can be tugged and pulled at without prematurely unlatching the hook. The same hook tension can be flown in *all* conditions. (Starts moving at 4.8 lbs. and unlatches at almost 7 lbs.) The stretchy line makes thermal flying much better. A non-stretch line should be used in calm, no-lift situations. Conditions should be compensated for by changing the tow-line and *not* by re-adjusting the tension of the towhook. The only real reason for accidentally coming unlatched is a lack of practice.

I won't try to explain all the details of circle towing here. Most won't make a lot of sense anyway until you've tried it. If you have any questions feel free to ask. Best of luck with the model and remember, there is absolutely no substitute for practice! Practice until towing is second nature. The only thing you should have to worry about when on the line is finding a thermal.

WANTED: ideas, happenings, hints/kinks, how-to sketches, photos, news, etc. Send to columnist of category concerned—at address shown in column. For each photo or idea printed, Model Aviation will pay \$5 to the contributor.

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