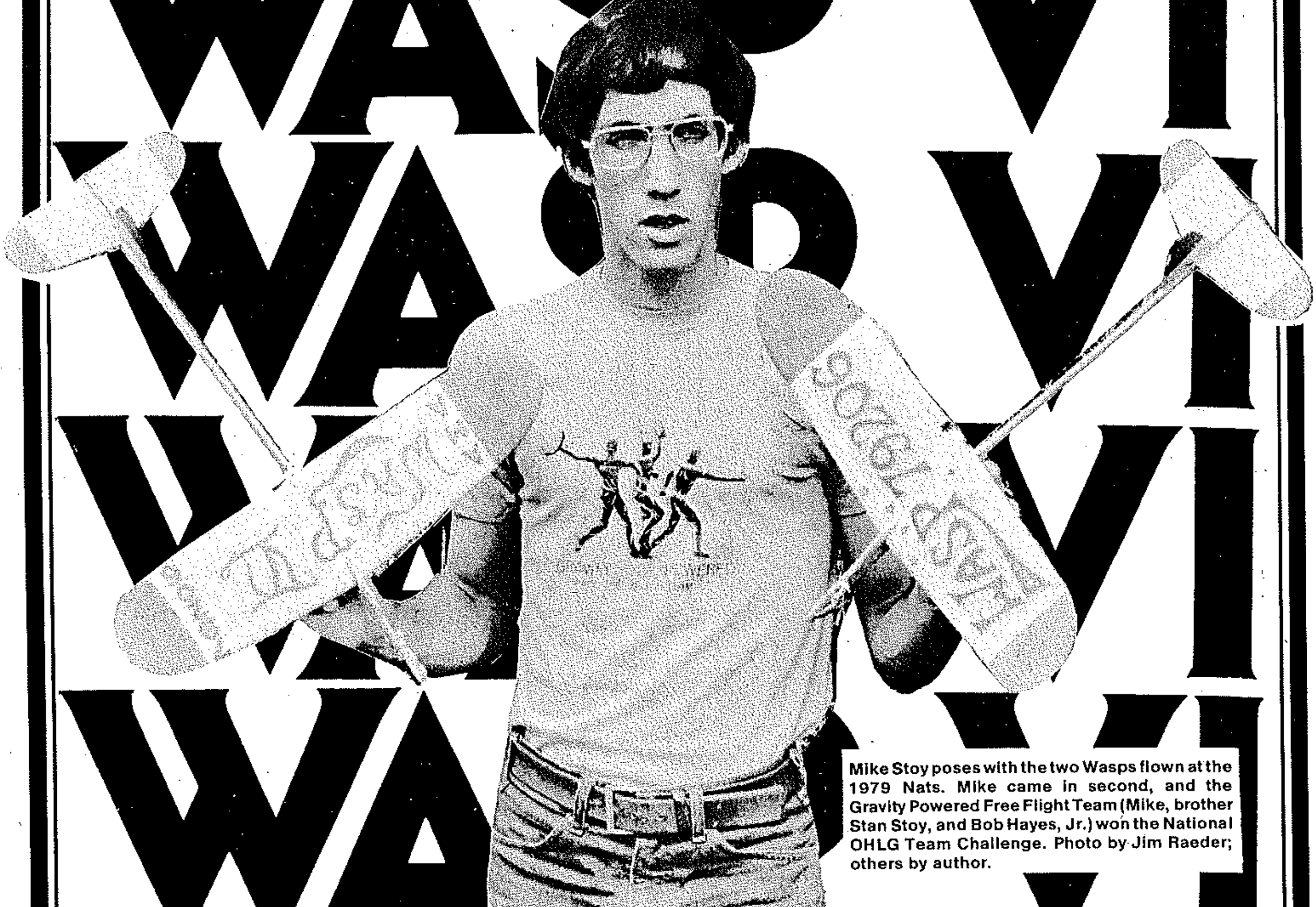
WASP VI



Mike Stoy poses with the two Wasps flown at the 1979 Nats. Mike came in second, and the Gravity Powered Free Flight Team (Mike, brother Stan Stoy, and Bob Hayes, Jr.) won the National OHLG Team Challenge. Photo by Jim Raeder; others by author.

High-time winner in Outdoor HL Glider at last year's National Contest, this is a design that can be built without specialized materials. Author includes a bushel of good advice about planning for, training for, and winning contests. He should know . . . he's won plenty.●Mike Stoy

IN OUTDOOR Hand-Launched Glider competition, consistency is the name of the game. The Wasp VI, due to its large size and a careful selection of moments, offers superb consistency and a thermaling ability that is nearly impossible to beat. The plane's contest performance is impressive in all kinds of weather—from light lift and calm winds to high winds and super booming thermals.

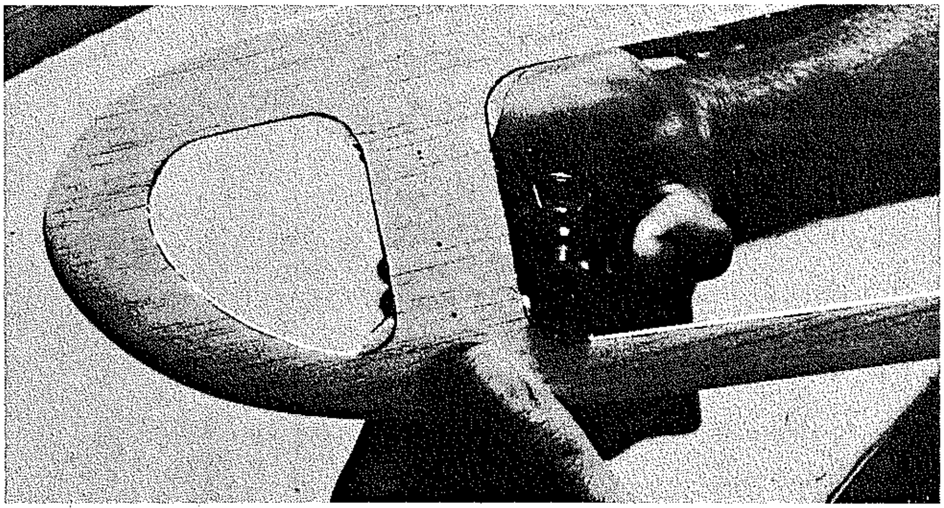
To many people the idea of a built-up Hand Launched Glider may seem like too much unnecessary complication. For a sport model this is probably true, but for a competition design the concept offers several advantages. The major difference is the wing loading that can be achieved with a built-up structure. The real importance of this is not that it produces a super-light airplane, since too light a plane is impossible to throw, but that you can build light planes from less-than-light wood. Getting a piece of good C-grain wood in the 8- to 10-lb. range is a lot easier than finding the same type of wood in the 4- to 6-lb. range. The heavier wood is also less likely to contain wind checks (which will weaken it) than the light stuff. By using the right weight of wood and a built-up structure, you can produce a plane which is lighter than the same plane built from a super-light piece of wood with a solid wing, and with no sacrifice in strength.

This design is not a beginner's model. Its complexity makes it a bad choice for anything other than contest performance, and its large size requires a fairly good throwing arm to achieve a reasonable altitude. But, if it is a top-notch contest design you are looking for, this plane will fill the bill.

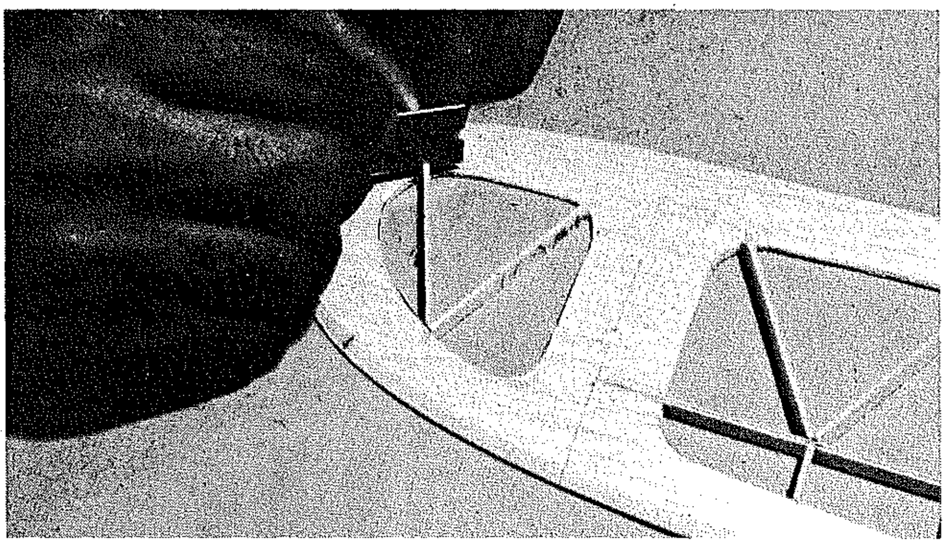
Construction. Wood selection for the Wasp VI is not as critical as it is on many competition designs. The wing wood should be C-grain, with 8 to 10 lb. per cubic foot density preferable (lighter for strictly dead-air planes). Both the stabilizer and rudder should be 6- to 8-lb. B- or C-grain wood, and the fuselage should be springy, straight-grain spruce.

If you can't obtain a wide enough piece of wood for the wing, you can splice it from two narrower pieces. True up the edges to be joined with a straightedge and a razor blade. Hold the edges firmly together on the work board and tape them with a few strips of masking tape perpendicular to the joint, followed by one long strip of 1-in. masking tape running the length of the joint—on the same side as the earlier strips. Now flip the wood over and fold it open along the joint. Run some white glue the length of the joint and lay the wood flat on the work board, masking tape side down. Weight the wood with some dope bottles (or other weights), and wipe off any glue which squeezes out. Let the glue dry, then remove the tape, and you will have a piece of wide wood.

Begin by cutting out the wing. Splice the spruce leading edge on the wing after soaking it in hot water for a few minutes. Use masking tape or pins to hold it in place. The spruce will bend easier without breaking if you pull firmly on it to



After cutting the rectangular wing holes, the corners are rounded. A power tool makes this easy.

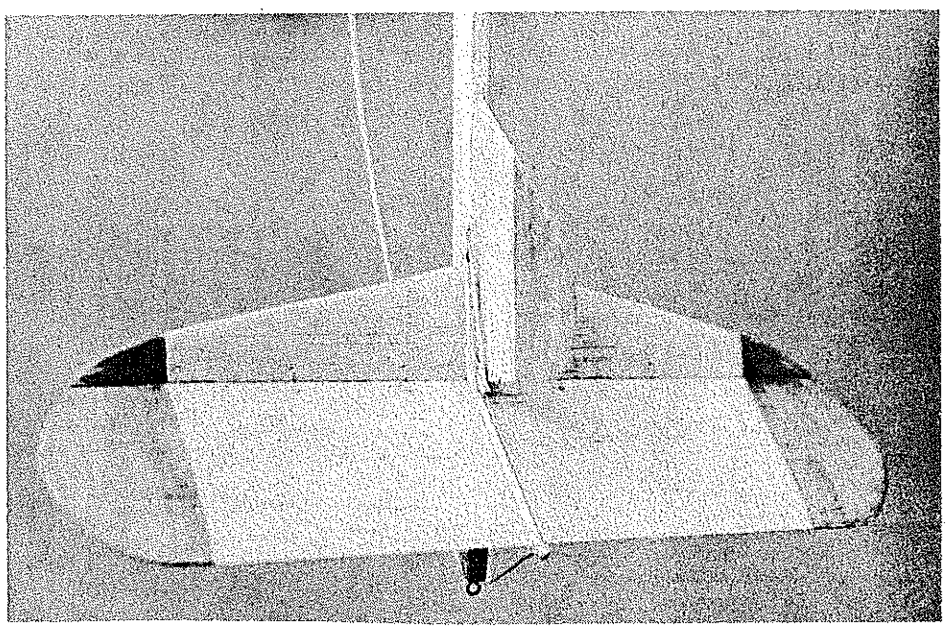


Wing ribs are trimmed, then glued in place. Sand the airfoil into the ribs when the glue dries.

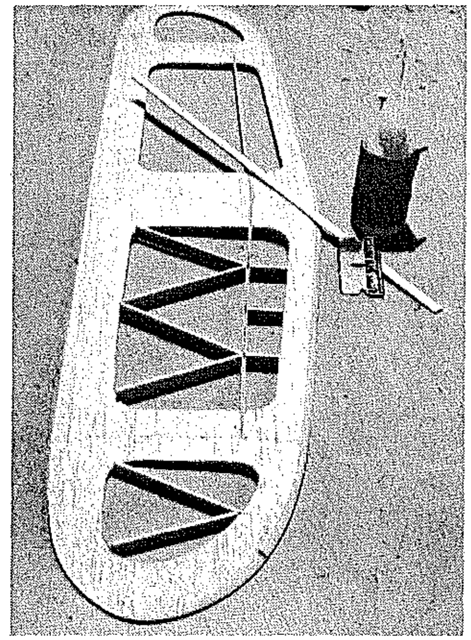
keep it in tension while you bend it around the tip.

Plane the wing to a rough airfoil shape with a sharp razor plane. Follow this with sandpaper, working from 80 grit down to 400 grit. Form an airfoil in the wing just as if you were building a solid wing. When you have finished sanding the wing, cut out the holes in the panels. For this operation, cutting a square hole with a razor blade is the easiest method. Cut the dihedral breaks, and bevel the dihedral angles. Cut the spar slot in the main panels (note that this actually involves removing 1/16 in. of wood from the main panels; otherwise, they will not match the tips). You should pay particular attention to getting this slot vertical.

Cut out the plywood spars, and check the fit before gluing them in place. Glue in the spars first, then glue the ribs. The easiest way to make the ribs is to cut out rectangles of 1/16 balsa rather than cutting out airfoil shapes, then glue



The Wasp uses a pop-up dethermalizer. See the text for details of how to make the thread hinges.



The wing ribs are cut from 1/16 x ¼ strip stock and glued in place with cyanoacrylate.

them in. Sand the airfoil into the ribs after they are in place and the glue has dried. Glue the dihedral joints, and check the lateral balance of the wing; sand the heavy tip until the wing is balanced.

Dope and sand the wing before covering it with tissue. Using a bright colored tissue on the wings will make the plane easier to spot when it lands. Give the wings several coats of dope. The tissue is necessary to maintain the strength of the wing. Not using enough dope can let the tissue sag, reducing the wing's strength. A well-doped wing will also reduce the chance of the wing warping which will change the trim.

Cut the fuselage and wing hold-down piece from spruce. Don't omit the wing hold-down. It adds considerably to the strength of the fuselage-to-wing joint. This is a major trouble spot for some modelers.

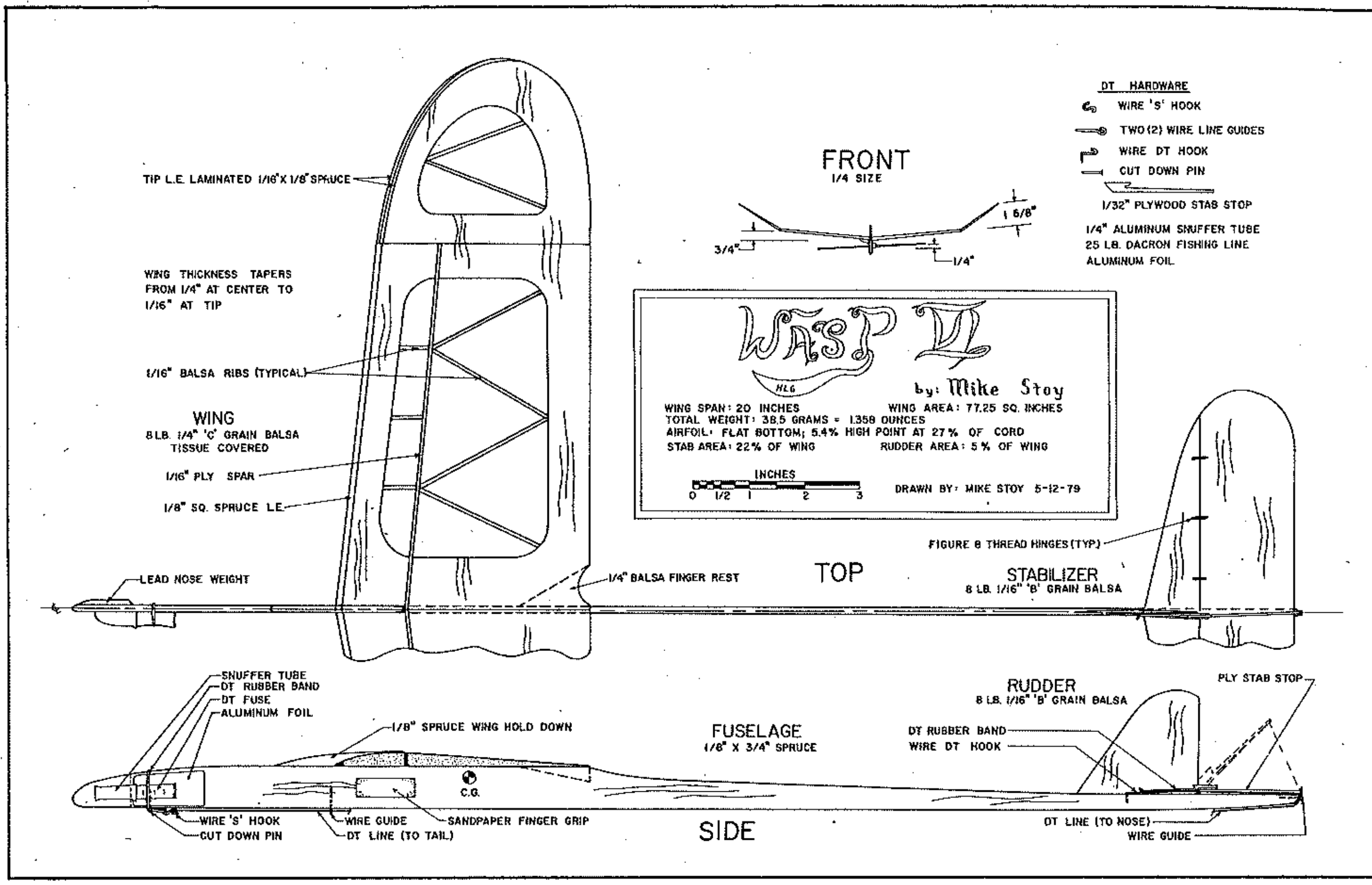
Cut out and sand the stabilizer and rudder. Cut the dethermalizer (DT) break line in the stabilizer, and round the edges of the joint. Tape the stab back together, and drill the holes for the thread hinges. Sew the hinges in a figure-eight pattern, giving about three passes to each hinge. Use ordinary sewing thread for the hinges. Don't forget to take the tape off the stab and glue the ends of the thread when you finish.

Attach the stabilizer and the rudder to the fuselage, being careful to get the alignment correct. Again watching the alignment, glue on the wing, wing hold-down, and finger grip.

Prepare the hardware for the DT system, and install it as shown on the plans and in the photos. There are a couple of things to watch when installing the DT system. Don't use a cyanoacrylate glue to hold the DT line to the rear of the stab, as the cyanoacrylate soaks into the thread and stiffens it for a short distance from the knot. This stiffened thread can hang up on the rear DT guide loop and stop the tail from popping up. Second, when gluing the plywood stop on top of the stab, make sure there is room for the DT rubberband to clear the rudder when the stab pops up. This can also cause the system to fail, or crack the rear of the rudder.

Trimming and flying. Bring the glider into balance at the CG by epoxying a piece of lead to the nose and filing away the lead until the glider balances at the fore-aft point shown on the plans. Check the plane over thoroughly for warps, then head out to the flying field for trimming.

The procedure is as follows: test glide the plane until a smooth glide is obtained, with a left-hand



circle of about 50 or 60 feet in diameter. Adjust the plane for a smooth launch and transition by warping the aerodynamic surfaces as required. When smooth launch and transition are achieved, fine-trim the glide by moving the CG position.

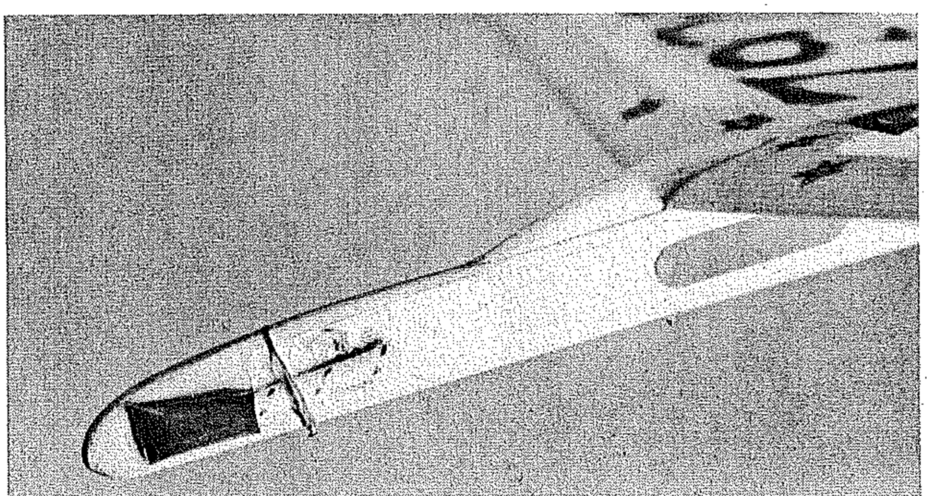
When making the initial flights, throw at about 60% power at a 45° angle with a slight right bank. Once the plane is flying to your satisfaction, work up to about 90% power, and bring the launch angle down to 10°-20°. Throwing with full power, or very close to it, is a little risky. Your accuracy decreases as you near full power, and this results in more badly blown launches, something you can't afford at a contest.

Work outs, practicing, and competing. Hand-launched Glider flying is largely an athletic event. Although you can overcome some deficiencies in your throwing arm, no one will argue with the fact that having a good arm improves your chances of winning. One of the best exercises for HLG is throwing a softball or tennis ball. If you can't find someone else to throw with, find a brick wall and throw against that. For a few weeks before the contest, work on doing a large number of repetitions at about ¾ power. Four or five days before the contest, begin decreasing the number of throws and increasing the power until you reach full power two days before. The day before the contest, do only a few light throws to loosen up; don't do a heavy workout. On the day of the contest don't throw your gliders until after you have loosened up.

Unquestionably the best single way to get in shape for a contest is to *practice!* This not only improves the shape of your arm, but more importantly it will make you familar with your planes. *Consistency* is the key. Your must know exactly how each plane performs *in all conditions.* This means practicing on windy days as well as in the dead air of evening.

You can't expect to win many outdoor contests without getting into thermals, yet I am continually amazed at the number of people who have never practiced picking air. The contest is no place to find out your plane won't hold lift. So, practice picking

Continued on page 127



The business end of the dethermalizer. The rubberband is cut from a balloon—more consistent.

Stan Stoy launches at the practice field. OHLG is an athletic event, and the author describes his successful training regimen in the article.

his Guardian for fuel tank access. Marc Warwashana's Loire-Nieuport 42 uses a single long hatch for access to throttle, tank and bellcrank. This arrangement is possible because of the aft location of the bellcrank on this particular model. The Blackburn Firecrest built by Leon Ryktarsyk uses separate hatches for engine and tank access. The control system is installed in the wing and limited access is possible after tank removal.

The end result in each case is a model which can accept changes or repairs to fuel system, throttle, and even control system without damaging the model. An added benefit is the ability to inspect each of these components and correct problems at an early stage before they cause the loss of a score or the loss of an airplane.

The art of landing. With only two official flights, and the landing score amounting to about 40% of the flight score, every landing is an important one. The two factors most important to a successful landing are: first, getting the airplane on the deck within the arresting area; and second, getting the hook to engage an arresting line to stop the airplane. Assuming the hook is properly constructed and adjusted (see the June column), the type of approach holds the secret of success.

Getting the plane on the deck, in the arresting area, takes a bit of practice since it is a different type of landing than the normal type that most CL modelers are used to. Soft, gentle landings must take second place to *precision* landings, even if the latter are a little harder. The landing area is only 20 ft. long, and the model needs only half to three-quarters of a second to pass completely over it.

There are two ways to land a Carrier model, as illustrated by the photos accompanying this article. The best way, by far, to achieve the desired result is to approach the deck in level flight at about a 5-ft. altitude. At a point about 20 ft. from the stern of the deck, as the deck comes clearly into view, begin a smooth descent that will cause the model to hit the deck about 8 to 10 ft. past the stern (at the fourth or fifth arresting line). At this rate of descent, the landing loads are equivalent to dropping the model onto its gear from a height of about 12 in. The model will land in a near-level attitude, and a normal arrested landing is almost a certainty.

The alternative landing (?) technique is to fly over the deck and apply down elevator to dive at the landing area—reminiscent of a Kamikaze attack. Such approaches are familiar to all of us. I doubt that there is a Carrier flier anywhere who hasn't attempted one. It is the natural reaction to an approach that is made too high. The fear of losing five points for a missed landing approach overrides all reason, and the thought of going around for another approach disappears entirely. The usual result is a loss of 50 to 100 points rather than the five that would have resulted from going around.

The problem with the Kamikaze method is that the tail is the last thing to hit the deck, and the hook often doesn't get a chance to do its job. The usual result is that the prop shaft (and what is left of the broken propeller) or the badly deflected landing gear is forced under an arresting line, and the model either stops on its nose (50 points) or, more likely, is flipped on its back (25 points). If the model should end up on its gear, the chance of the hook catching a line is reduced because of the severe bouncing that results. The engine will have stopped, and a go around is impossible (0 points).

Patience is the key. Success, and trophies, usually go to the flier who abandons a bad approach if necessary and takes a much more certain 95-point landing on the next lap.

The landing photos are of Bill Rutledge's STOL Bearcat at the 1978 Nats. With the good landing, he placed first in Junior Profile.

Richard L. Perry, 416 Woodhill Drive, Goldsboro, NC 27530.

Wasp VI/Stoy

Continued from page 59

air, and get your planes trimmed for riding thermals.

There are many different ways of picking air at a contest. Some of the most common ones: piggybacking, thermal poles with streamers, and bubbles or cattails. Each of these three systems has advantages and disadvantages.

Piggybacking tells you exactly where the thermal is and how strong it is. However, it requires that you run under the plane you are going to piggyback. This can be quite a feat on a windy day, and it means you frequently launch downwind, so the plane goes out of the timer's sight sooner. Piggybacking also results in quite a few badly blown launches when the flier is off balance, in a hurry, and hasn't set himself properly to launch—as demonstrated at the 1978 Nats when Bob Boyer (who won the event) missed his sixth max and a national record after running under another thermaling glider only to have a bad launch. Another problem with piggybacking is that there isn't always someone else in the air when you are ready to fly.

Thermal poles with streamers allow you to stand in one place and set up to launch. This lessens the problem of bad launches. Poles also eliminate the need for someone else to be in the air when you fly. The big disadvantage to streamers is they do not tell you exactly where the thermal is centered, and they are less of an indication of how strong it is (using two poles can lessen this problem somewhat). The big advantage to poles over bubbles is that poles work well on windy days, and they don't indicate the very light lift.

Bubbles or cattails show where the thermal is and how fast it is going up. They also allow you to set up in one place prior to launching, and they don't require that other planes be in the air. Their biggest disadvantage is on windy days, when the bubbles break up and are blown into the ground.

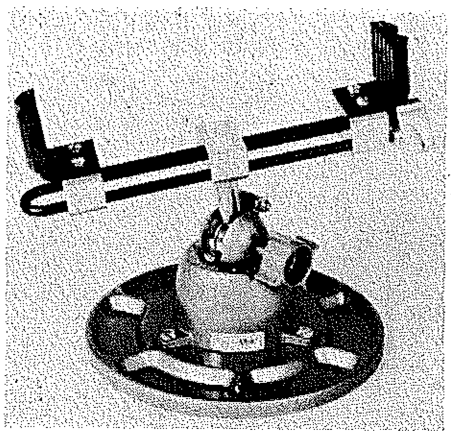
The system you use isn't as important as knowing how to use it well when you get to the contest. This again means going out and setting up your equipment, or getting someone else to fly 'goat' flights for you while you practice.

When trimming your plane for a contest, you should (as mentioned earlier) check the pattern in different weather conditions, particularly in thermals. The big problem in trimming for large thermals is that some planes will spin out of them. The single best remedy for this is to washin the inboard tip by twisting the leading edge upward with respect to the trailing edge. When you are trimming the plane, try to get the transition to come out directly over your head, with the plane pointed into the wind or flying crosswind. A downwind transition will put the plane out of the timer's sight sooner—as well as causing the glider to come out downwind of the thermal. Knowing exactly where your plane transitions is even more important if you plan to piggyback or throw at rising bubbles.

Another thing to check is the trim of the plane in the DT mode. The purpose of a dethermalizer is to bring the airplane down as fast as possible without damage. This is best accomplished when the plane is outside the thermal. A big problem with swinging weight DTs is that they allow the plane to continue circling after the DT has activated. I have lost several planes where the DT went off, but even with the swinging weight the plane stayed in the thermal and flew out of sight, stalling all the way. The big advantage of a pop-up stab is that, when trimmed properly, it will cause the plane to fly straight and, thereby, leave the thermal, as well as to kill the glide.

A dramatic demonstration of this occurred as last year's Three Rivers, MI contest. Stan Stoy and Paul Shailor both hooked the same thermal for a max late in the day. Both planes DTed within a couple of seconds of each other. Stan's, with a pop-up stab, came down on the field, and Paul's, with a swinging weight, flew OOS and

product review product review product review



Multi-Purpose Work Center, Panavise Products, 2850 E. 29th St., Long Beach, CA 90806.

Unless you have three hands, Panavise's Model 350 multi-purpose work center is a most alluring product. It gives you a Standard Base (Model 300) that tilts, turns and rotates to any desired work position, and a Tray Base Mount (Model 312) with six individual trays to hold small parts and tools right where you want them. The Self-Centering Extra Wide Opening Head (Model 376) allows you to work on objects up to 9 in. in size, as well as tiny hard-to-hold things. Panavise says Model 350 will find a million and one uses on your workbench. At least. It's ingenious.

product review product review product review

came down in a lake.

Just a few more comments on contests and flying in general. When you go to a contest, take three well-trimmed planes if you possibly can. I can tell you from personal experience that there is nothing more frustrating then losing your only trimmed plane and having no back-up ship. Secondly, since you have a DT on your plane, *use it!* Again from personal experience, not lighting the DT is a surefire way to hook a thermal and lose your plane.

Let me relate an experience that demonstrates the results of not following these suggestions. At the 1975 Nats I came within 24 seconds of becoming the first person to win the 25-year-old Tulsa Glue Dobbers Trophy twice. I had only one trimmed glider, and I didn't light the DT, only to watch the plane disappear over Lake Charles. Then I blew the launch on my trimmed back-up ship and finished second to Joe Mekina.

Finally, remember Murphy's Law: anything that can go wrong will. The secret is to have it go wrong in practice, when no one is watching, so things won't go wrong at the contest.

FF Duration/Meuser

Continued from page 61

The basic idea is that the fuse burns through the wing hold-down rubberbands, and the wing pops off the model. But, inasmuch as a string has been provided to keep body and soul together (being attached to the aft end of the fuselage and some point near the tip of the wing), the thing comes down in rather well-behaved fashion. The fuselage assembly hangs nose down, suspended by the rapidly rotating wing.

For a P-30, the rate of descent is just about right: fast enough to ensure its falling out of boomers, slow enough to ensure its survival.

It isn't quite as simple as it seems; a few details require attention. Swivels must be provided to accommodate the rotation of the wing, or you might have to cope with either a horribly snarled line or a line actually being twisted in two. The wing rubberbands must touch the fuse, but not squeeze it so tightly as to snuff it out before it does its duty. When the wing pops off, it must do so in such a way that the string doesn't wrap around the stab. That means the DT line must pass over the top of the stab, and it must be short enough so it can't slip under the stab. Light monofilament fishing line or leader stock makes a good line. There must be a swivel at either end (or preferably both ends) of the line, and there should be a snap catch at one end for convenience. I made the swivel from pins, copying George Xenakis' arrangement, but you can buy neat little swivels, with or without snap catches, at stores selling fishing tackle.

NFFS news items. NFFS *Digest* has new editor: If you are a member of the National Free Flight Society, you already know about this (or maybe you didn't notice?). Anyhow, I thought I'd let a couple of issues slip by before saying much about it, just to be sure it was really going to happen. Due to circumstances entirely within my control, but which got bungled somehow, I once again find myself in the role of editor of the Western Hemishpere's most prestigious all-Free-Flight publication, *Free Flight*, familiarly known simply as *The Digest.*

Over the years, cover dates have slipped substantially behind dates of publication, so it will take some fancy footwork and a bit of lying and cheating to catch up. This will have no effect on the number of pages you get per subscription dollar. The goal, as ever (but different editors have different ways of going about it), is to maximize the amount of material members are likely to find interesting and informative, per square inch. The type will be 17% smaller, for one thing, but still easily readable. Ad prices are being juggled to discourage overly-large ads and to make the ad prices at least cover the cost of publishing them, while at the same time making it no more expensive for the modeler who has only a few items to peddle off.

A lot of good material was inherited from the previous editor, John Oldenkamp, and a lot has been received since then. But we can always use more. As always, we'll need all the help we can get with drafting—nothing fancy, just good, clean pencil work. Photographic and journalistic coverage of major meets—especially the Nats—would help too.

Adult memberships, including subscription, cost $15 for one year, $27 for two; for persons 18 and under it is $7.50 and $13.50. Send your money to Kit Soneson, 8616 Maple Grove Ct., Sacramento, CA 95828.

NFFS Model of the Year and Free Flight Hall of Fame awards for 1981: The National Free Flight Society proudly announces its traditional annual awards for outstanding Free Flight models and modelers. Hall of Fame awards include: **Maxwell Bassett**, who introduced the internal combustion engine to competition Free Flight in 1932; **William L. Effinger**, of Berkeley Models, developer and manufacturer of a large number of award-winning kits; **Duke Fox**, who developed and produced competition engines at a reasonable price and who started the trend toward the "hot" fuels used today; **Joe Lucas** (deceased), expert teacher and writer of model aviation