AHOY THERE, SKIPPER!

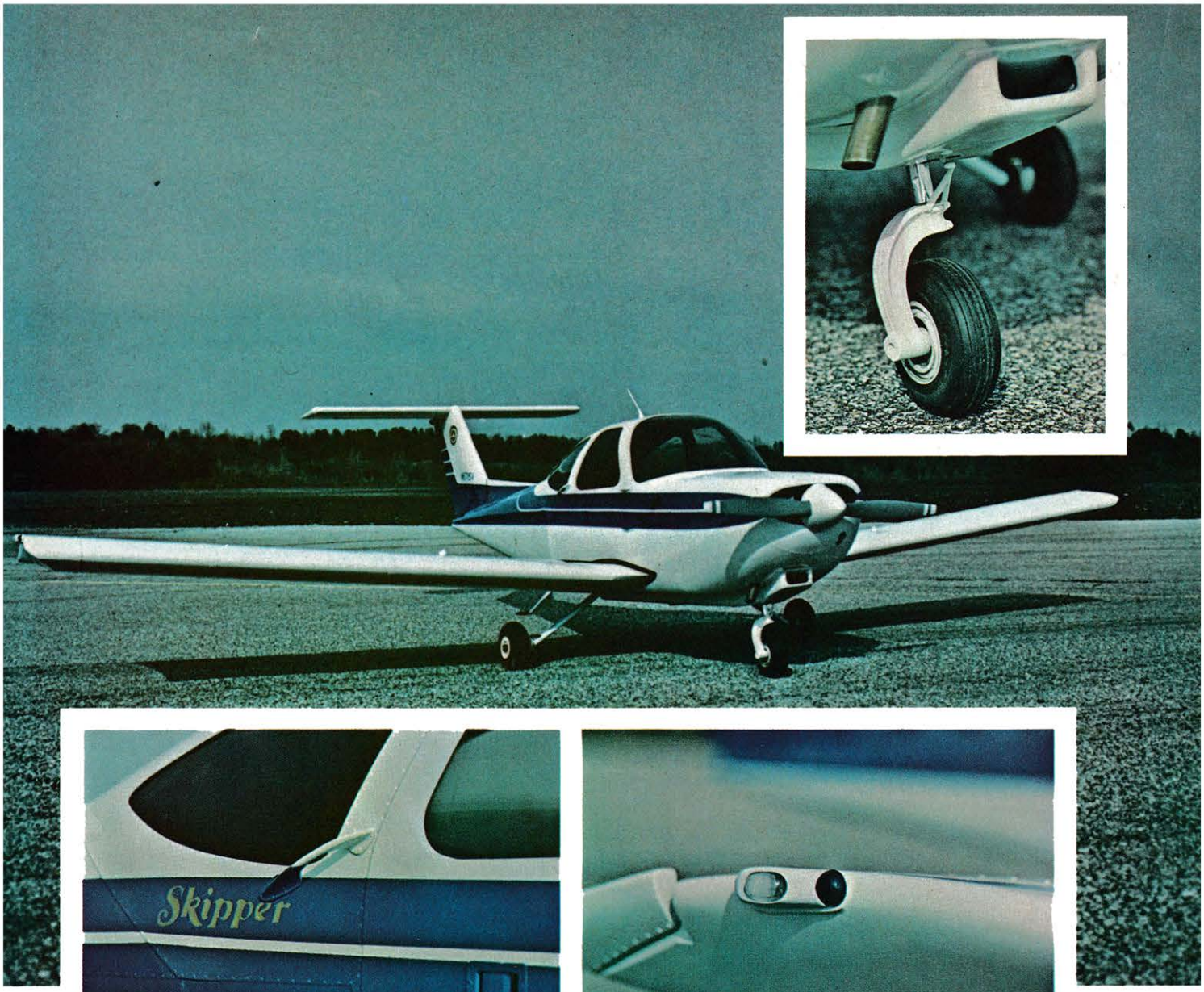
What does the captain of a boat and this airplane have in common? They are both Skippers.

By Bud Caddell **Photos by the author**

It looks like a Piper Tomahawk, doesn't it? Or, is it that the Tomahawk looks like a Skipper, I've heard they were designed by the same man. I've also heard that they're entirely different! The actual fact is that they are designed to train embryo pilots to fly, and they both do a superb job . . . a far cry from the J-3 in which I first soloed in. The Skipper is considered the bottom of the Beech line—in price only, though. With normal optional equipment, you'll spend about $32,000 for a factory fresh model.

My interest in the Skipper started with the demise of a Nosen Citabria, which met its death from a too rich diet of G-forces created by a newly installed Webra .91. The Citabria was my camera plane—a cheap 8mm movie camera was installed and I got many exciting rolls of film from the air. However, the Citabria was not the best camera mount—it was just too stable—and turns could only be done with coordinated rudder and aileron. Quite often the pictures showed only blue sky from poor control coordination.

I came across a picture of a cute little Beech Trainer—I knew from past experience the fine folks at Wichita have 1/20th scale drawings available for a nominal price. I wrote, got a copy and went to work. I guess you can call this go project "apartment-size-¼-scale." The Skipper employs the GAW-1 wing section, and it sure is strange looking—sort of like an airfoil section drawn up by a committee. I was hesitant to use it. The theory behind the section is way over my head in technical jargon but, boiled down, it means



Skipper


N6715V
Skipper

If there's one thing that the Skipper does well, it's fly.

getting the same amount of lift from a wing that's 25 percent smaller. But, hey! That's on the full-size airframe . . . we use different Reynolds numbers on our models. Finally, I said what the heck, nothing ventured nothing gained. If it doesn't fly, I'll give it to my ole buddy Doss Steed —he can make anything fly.

But fly it did! Right off the board, I was almost a spectator through the whole flight. My official photographer and good friend Gary Tatasciore was ordering me around on the first flight like a director. Usually, I'm nervous Nellie on the first flight of a new scale bird—but not this one—it was like I had flown it 200 times before. It flies just great and with this airfoil section, and you can practically park it in the air.

The prototype was built almost entirely of Sig contest balsa—this resulted in a flying weight of a tad over 16 pounds. I kept it light because of the unknown value of the GAW-1. I now feel that a couple of pounds of ballast will make a great plane even better. But please, only light balsa in the tail section. This bird has a long tail moment, and you just might end up with an overweight bird that's tail heavy . . . perish the thought!

Usually, at this point, I'd go right into construction procedures. But first let me tell you a few things that a designer goes through before he can get to the point of gluing Part A to Part B.

There are at least 250 more airplanes I want to build than I have time left. So believe me, in my middle fifties, I give a lot of thought to a project before I decide. I've been building models for at least 50 of my 55 years (16 years in R/C, and 13 years in Scale), and in that time I've made about every mistake possible, and have seen a lot made by a host of others. I hope I have profited by this in the three important phases of the scratchbuilder — Designing, Building, and Flying.

The research that goes into such a project is probably at least equal to the building time. I like Beechcraft airplanes, and this is my third. Why? It's simple, Beech makes some 20 different airframes, and I could stay happy if I never looked beyond their brochure for a model to build. But, more importantly is that from where I write, it's a 15-minute drive to the local airport. I can photograph to my heart's content. They know me out there and allow me to crawl over the airplanes with a tape measure. But why a tape measure, when I said Beech has 1/20th scale drawings. Well folks, at the risk of slightly offending some good friends in Wichita, I have to say that even the manufacturer makes mistakes on drawings. Quite often, the task is assigned to a draftsman whose job it is to turn out a 4-view drawing of a general nature. This is fine in most cases, but not for nuts like me.

The question most asked me is "how scale is it?" My answer is: "as scale as I can make it." I've found that my designs fly just fine when I don't monkey around with some things I don't know nearly enough about! The wing area is left as is, as are the fuselage width, the moments, and the tail area. I just don't take any poetic license at all in these areas. The first thing that usually gets changed by a designer is the fuselage width. They narrow it! Why, I don't know, but their sins

The shape of things to come . . . two major airframe manufacturers have opted for the T-tail configuration.

are coming home to roost! When they have to put a pilot in the cockpit, it's got to be about half the correct size to fit—you don't see too many pilots too big for the airplane, do you?

Fortunately I like all different kinds of airplanes. I used to be a WWII fanatic. I once built a T-28 that I was sort of proud of—I used what I thought was a good plastic kit for panel lines and rivets reference. Yes sir, she was a thing of beauty but, only until a full-size T-28 came into the airport—mine had about half the rivets its big brother had. The panel lines were all wrong and, worst of all, mine looked just like a model airplane when photographed. You just can't beat having access to the full-size aircraft for copying purposes.

Speaking of photographs, that was the starting point. The first job was to photograph the two local Skippers in color. One was a blue and off-white, the other an orange and white. I then asked a lot of modeling friends which they preferred. By a three-to-one majority, it came out in favor of the blue bird. I value my friends' opinions, but I also was interested in colors which might most appeal to scale judges.

Bud Caddell, himself, with his Skipper. The aircraft is larger than the typical .60-size scale project.

I've been fairly successful in contests, primarily because I try to pay attention to small details. I've observed that when I win or when I lose, quite often it's by only a point or so. I now lean toward civilian airplanes with tricycle gear. I believe—and it's only my opinion—that, considering the age of most judges, they identify with factory fresh, sparkling civilian birds better than airplanes whose prime was years before they were born. Back to the tricycle gear. It's so obvious, I shouldn't even bring it up, but tail-draggers just don't handle on take-offs and landings as well as three-legged airplanes. If you fly in contests, that could be the margin of success.

Unfortunately, it's not practical to build the model out of metal, is it? The next step toward getting our bird in the air is the engineering. First you have to know what engine will be in the nose. I've never designed a model before making the engine selection. I built a Bonanza a couple of years agot at 2-5/8″-to-the-foot. That size was determined by one thing, and that was how wide the cowling had to be to get the engine inside. I was shocked to discover that the airplane was a 1,300 sq. inch monster. Through the whole building stage I felt it was too big

for a .90. Good came out of this, for it forced me to be very frugal with weight.

I came into R/C from competitive Free Flight. I used light balsa then, and I use it now. My old Bonanza came in under 17 pounds, and I actually had to throttle back for realistic flight. Don't delude yourself that a model built with heavy balsa will survive a crash better—it won't! You'll just have less of a job picking up pieces . . . build it to fly, not to crash.

As you see from the plans, I don't like a bunch of little pieces to put together. I like this size bird because all the parts are man-sized and not too many, at that.

The best place to start is with the fuselage crutch. Lay it up and pin it accurately and there's no way you can end up with a crooked fuselage. Leave it pinned to the board, install the lower formers, then make a mark half way up the crutch sides. Plank as much as you can while the crutch is pinned. The sheeting should be half way up the crutch so you'll have something to which to glue the top sheeting. Unpin it, and the first thing you'll notice is that it's torsionally strong and very light. Glue the top formers in, plank it. I sure hope you remembered to use

The cowl can be either carved out of balsa, or formed with the foam/wax lay-up technique. The lines are very basic, and easy to duplicate.

The theory is that T-tails are more efficient because they are not affected by the turbulent airflow around the fuse. This picture says it all.

only half the crutch side—if you didn't, you haven't got anything to glue to, have you?

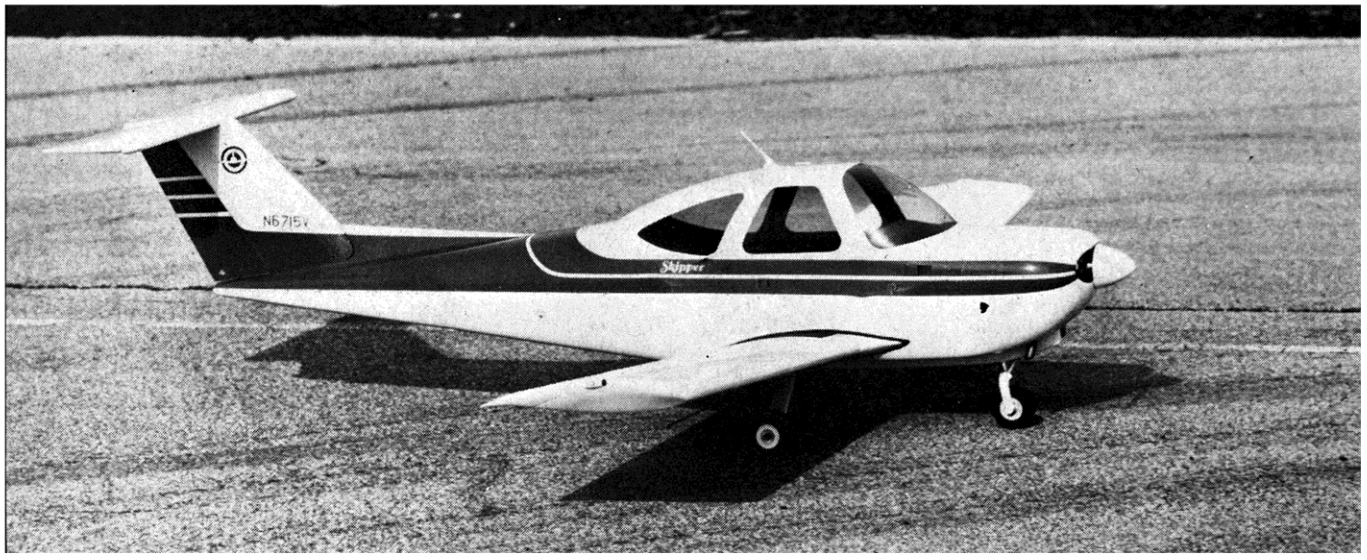
The Skipper has lots of compound curves in the cabin area. I've found the best way to take care of this problem is urethane foam. Most solvents don't attack it and it sands beautifully. It's available at insulation dealers. To form the cabin, cut foam to the shape of the outline, and spot glue in place. Roughly carve it to shape and finish with 80 grit sandpaper. Be sure to check the contours with the template outlines provided.

When you're satisfied that the shape is okay, put about three heavy coats of paste wax on the foam. Take care that none gets on the balsa. Apply two layers of 8-oz. fiberglass cloth so that it overlaps about an inch onto the balsa. Let it cure and make up a runny mixture of micro balloons and resin, then paint it on the surface. Let it cure about 30 minutes, or until it has a "cheesy" feel. Sand with 80-grit paper, down to the cloth weave. Wet sand it with 220, finished off with 320 paper. The rest of the fuselage is covered with 2-oz. cloth. Remove the foam and cut out the windshield and side windows.

The wing is straightforward—if you have a jig saw, you can stack the ribs and cut most of them out at one time. Construction starts with pinning the lower spar to the building board. The ribs are glued, followed by the leading and trailing edge. The wing was made in three pieces—a center section and two outer panels, joined with a 1/16″ plywood joiner on each side of the main spar. The next step is to cut the landing gear mounting block from hardwood. I like bass, because it has a fine grain and is reasonably light.

After fitting the 1/16″ ply doublers, you're ready to sheet the wing. I use Contest Grade A-grain balsa. At the risk of getting too basic, let me tell you a little about the three types of balsa: "A" grain is straight grain and very flexible, good for sheeting. "B" grain is part straight grain and part "C". "C" grain has a mottled look and very brittle—it will hardly flex, and it's best for formers and ribs. Balsa has a density range of about 3.5 pounds per cubic

(Continued on page 70)



Ready to taxi out on another flight, the Skipper has proven itself to be very contest worthy, and has won almost every meet entered.

AHOY THERE, SKIPPER!

(Continued from page 48)

foot, up to 15 pounds per cubic foot. Unless you buy graded balsa, you might end up with wood weighing about the same as white pine. I butt glue the planking with cyanoacralate cement, sand it smooth, apply the sheeting, and then cover the sheeting with 2-oz. cloth and resin. Mix about two ounces of resin, lay the cloth over the sheeting, slowly pour a bead of resin across one panel, squeegee it forward and aft (I use old plastic playing cars). The trick is to remove the resin from the surface and let it soak into the wood —don't leave any runs and you'll have only a little sanding to do.

The tail is built up, sheeted and covered with ¾-oz. cloth and resin, except where the fin is glued to the fuselage. In this area, take a piece of 8-oz. cloth about two inches wide and lay it half on the fin and half on the fuselage. Apply the resin and, while still wet, lay down one inch masking tape to the edge of the cloth and work it smooth with your finger. After the resin cures, you'll be able to lift the masking tape up and find you have nicely feather-edged the cloth over balsa and you want to hide the edge.

Painting: This is generally where a model is born or dies. You have already invested considerable time in framing, covering and fiberglassing, so don't rush the paint job. Before any primer is applied, I go over the entire airframe looking for visible dents. I fill these with a stiff mixture of resin and micro balloons, then it's sanded with 220 dry paper. I then shoot a coat of K&B primer, thinned about 25 percent; when dry, you'll see a lot more dents and holes that need filling. Fill these with micro ballons and resin, let cure, and give the whole bird a good sanding with 220 wet. You should aim toward removing most of the primer with this sanding. Shoot it again, filling what you missed the first two times. Sand with 320 wet, and shoot one more coat.

Take my word for it, there's no real short cut to a good finish. A good finish *has* to be on top of a good surface. It does no good to keep piling up primer, if it's not sanded between coats. If you're wondering where slick paint jobs come from—it's from lots of sandpaper. Try this: Buy an aerosol can of spray paint. Take an old paint can. Remove the label and spray the can—you did a great job didn't you? Look how it shines, no high and low spots, no grain showing, nothing except shine—it's because you sprayed a slick surface, and this is what you want to aim for on your model.

I use acrylic lacquer, known as R-M brand. There are other good ones. R-M is a fine automotive finish that has a brilliant gloss. It has to be plasticized, however. Add about a teaspoon per quart of thinner paint. I thin this particular brand with about two parts thinner one part lacquer. That sounds thin, doesn't it? Spraying paint of a thin consistency allows you to cut the gun's pressure way down. I never spray at more than 18 pounds pressure. My gun is a Speedaire, one quart external mix. It cost about 20 bucks. I've got a couple of guns that cost over $100, but I do the best job with this one.

Most instructions say to work about six to eight inches from the surface. At the lower pressure I'm never more than three to four inches away. Don't try to cover everything in one pass. Put a "tack" coat on first just to cover the surface. Wait about two minutes then put a second coat on. Wait two minutes again, and gradually richen the mixture by moving closer to the surface. After six or seven passes, the gloss starts to appear and everything is covered. Since most Beechcrafts are painted with epoxy type paints that have a plastic look, the best way to achieve this is to sand the final coat with 600 wet. Put pure thinner in the gun with about one to two ounces of retarder per pint. Spray this on carefully, and you'll end up with a gloss that rivals Super Poxy, without all the little flecks.

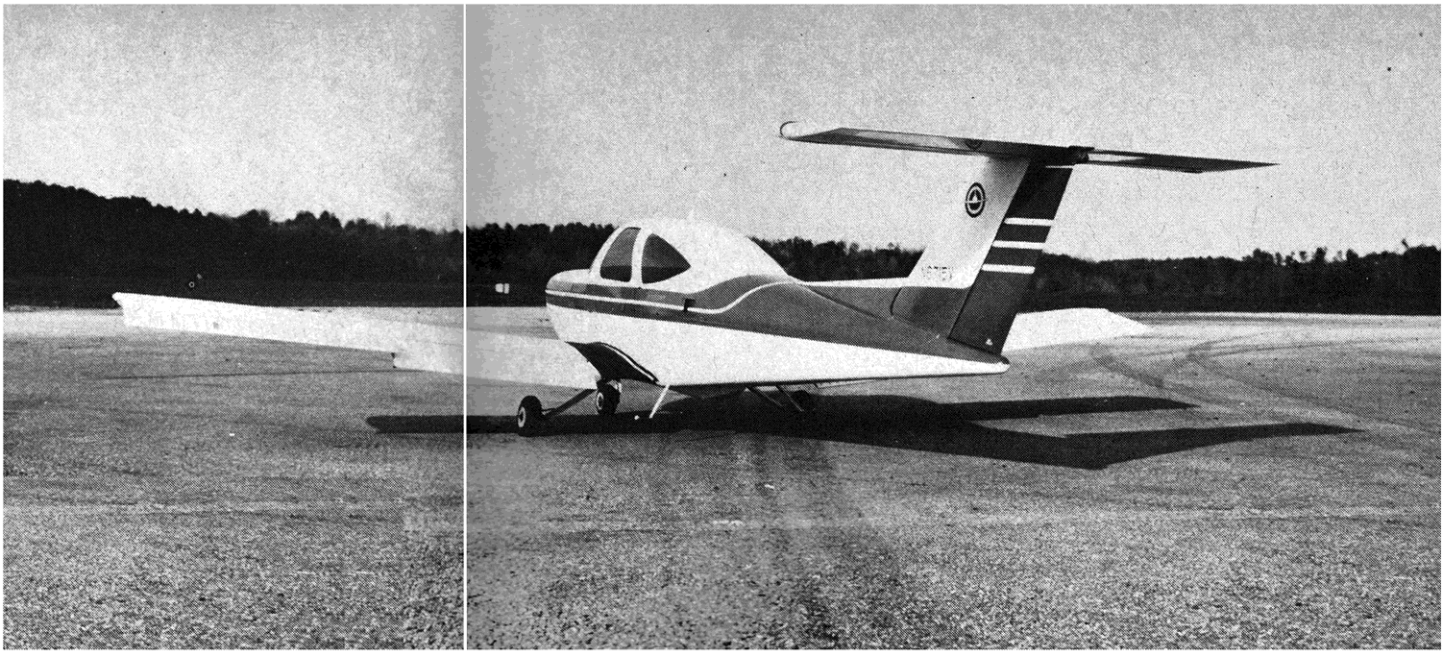
The rivets are applied with a disposable 23-gauge syringe, the point is filed flat, Duro appliance enamel is put in, and pressure is applied to the plunger. The syringe is held like a pencil and the speed of application is about one rivet per second. You might have to stretch a rubberband from the finger grips over the plungerhead in order to increase the pressure. The rivets should be about 1/16 inch in diameter and spaced 1/4 inch apart. Mark off a strip of masking tape in 1/4 inch increments and lay it along the line. One strip will last you for the whole job.

The panel lines are done by placing three thicknesses of masking tape along the line. Using a spatula, "trowel" a mixture of micro balloons and resin about ½ inch wide up to the masking. Let cure to a cheesy state, then sand down to the masking tape. Remove the tape and you'll have a nice sharp overlapped panel line.

The radio installation is straightforward, except for the cable that runs up to the elevator—make certain the conduit is tightly anchored all along the fuselage prior to planking. An alternate method would be a 90 degree bellcrank mounted at the base of the fin, with a 1/16 inch wire pushrod up to the elevator.

Now comes the fun part—flying. I've got to admit that I'm contest-oriented, so some of the points I cover will be nit picking. First off, I hope that during the building process you constantly made sure there were no warps. This job is made very simple with a couple of Robart incidence meters. There should be two degree washout in the wing—that's the only warp there should be. Make certain that the meter shows proper incidence in the wing and stag, and I promise that you won't have much trimming to do.

If you end up tail heavy, it's much better to add lead to the nose. I flew at first with no nose weight, but the Skipper floated a tad on final. I added seven ounces of lead and *that* problem was solved. I spent about an hour adjusting the engine idle. I fooled around until I got a semi-reliable idle of 2,000 rpm, that's the lowest I could get it and still keep it running. Not that I intended to



idle it that slow, but rather in order to make sure I had plenty of safety at normal idle of 2,200-2,500 rpm.

For the first flight, pick a day when the field isn't crowded. You can concentrate better, with fewer distractions. A word of caution—the flaps are very effective, so you had better try them out at a safe height in order to get the feel. If you see you're overshooting, just point the nose down about 15 degrees and you'll kill lots of altitude without gaining speed.

The plans are available from Bud Caddell Plans, Dept. S, 1525 Badham Dr., Birmingham, AL 35216. The plans are on two sheets measuring 6½x3′. They are printed from inked mylar masters, and they are extremely sharp. The price is $18.50 (plus $2.00 postage). I have the "Beechcraft" decals for the fuse available for $2.00.

Just remember that you don't have to own a boat to be a Skipper. □