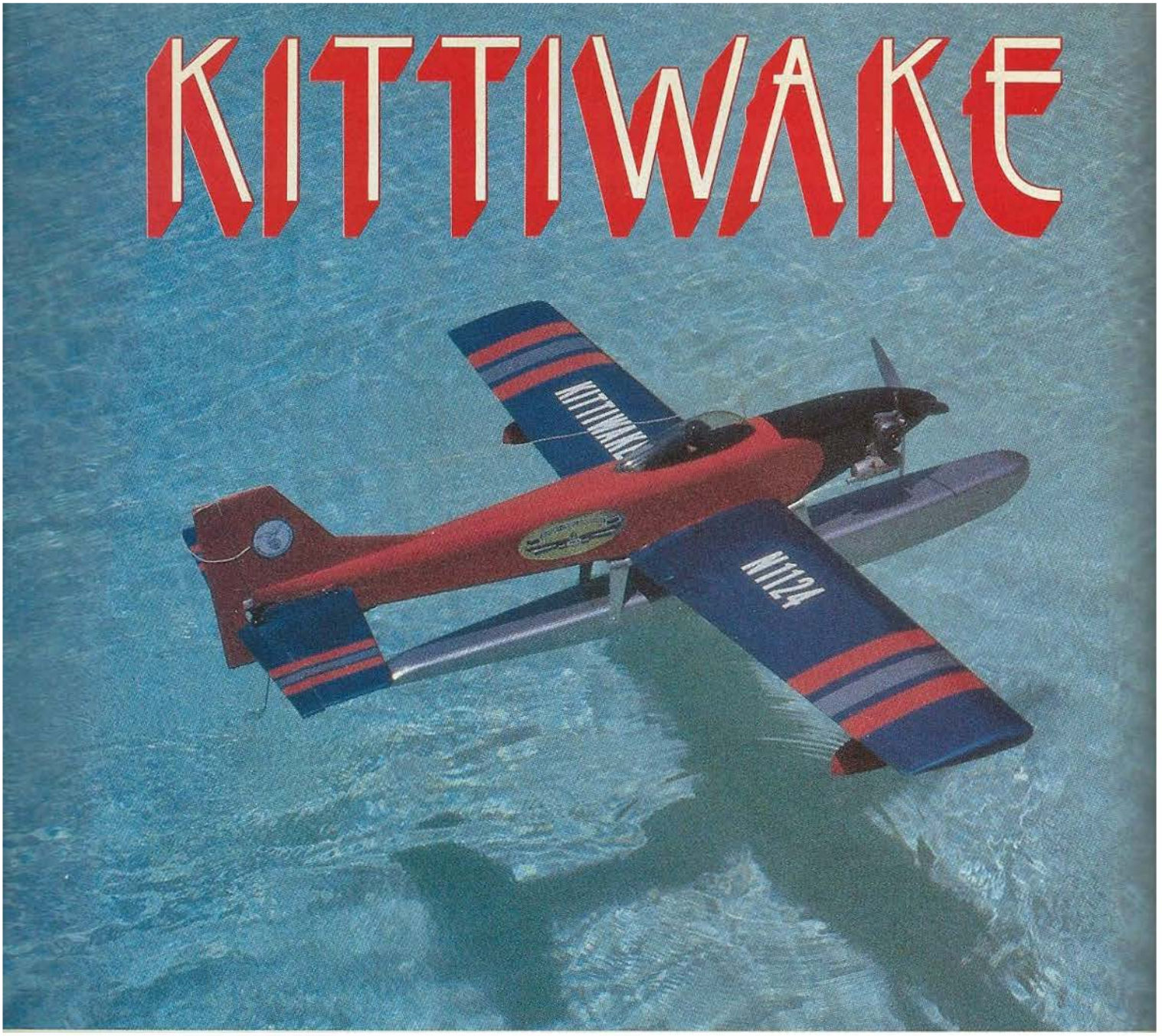
KITTIWAKE



Enlarged from the popular "Islander" (RCM Aug. '70), the Kittiwake is a .20-.25 powered land or float model. It is a sport plane for the relatively proficient sport fliers — definitely not a trainer.

Sixteen years ago, in the August 1970 issue of R/C Modeler Magazine, RCM published a construction article on the "Islander," a single float seaplane which could be converted to a landplane. It was designed for the Max .10 engine, which was, and still is, one of my favorite powerplants. It used three channel radio to control rudder, elevator and engine --- a nice, simple little job for sport flying on land or water. It was a very popular design.

However, as is always the case, some modelers wanted more performance. One of them was a friend of mine named Scott Christensen, who lived nearby and went flying with me whenever we could get together. He built the Islander, but modified it --- reduced the dihedral (very necessary for rudder only type flying), added ailerons, and stepped up the power to a Max .15. He then proceeded to enter it

By Scott Christensen and Ken Willard

in any seaplane contest within driving distance, and just about cleaned out all of the clubs' trophies for seaplanes up and down the West Coast.

Time passed, Scott moved out of the area, worked with several model companies, and finally wound up in Chicago with Top Flite Models, where he is now the Vice President of Operations.

About a year or so ago, Scott and I were talking about old times, and he brought up the Islander.

"I sure liked that design," he said. "I'll bet that if we enlarged it to take a .20 to .25 sized engine, and gave it some modernized touches --- tapered wing, ailerons, and the currently popular straight lines on the tail feathers, the modelers would really go for it."

"Sounds good to me," I replied.

"Why not do it?"

Not long after that, I received a note from Scott, in which he included a drawing and some Polaroid shots of a framed up version of the enlarged and revised version of the Islander. It really turned me on. Then, last April, at the Toledo show, he had the uncovered model with him --- not to be shown, but just to be discussed. We did just that; I was mildly concerned about the vertical fin and rudder area, but with aileron control it probably would be okay. However, we agreed that I would build one and use slightly larger tail feathers so they could be compared.

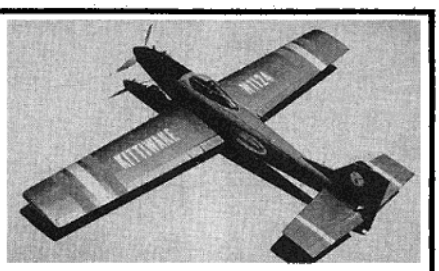
So far, so good. Now, what should we call it? The "Long Islander?" No --- too provincial. Keep thinking.

One night I was watching a nature program, narrated by William Conrad, about wild life in the Aleutians. There were some beautiful birds flying around the cliffs. Conrad referred to them as "Kittiwakes --- strong, powerful, aerobatic birds equally at home on the water, or land, and especially in the air." That did it. I talked with Scott, and he agreed: we'd call it the "Kittiwake."

Yes, there was another model called the Kittiwake. But it was a sailplane --- and not very much at home on the water.

We figured there wouldn't be much confusion; it wasn't the first time the same name had been used for different models at different times --- and in this case, they were quite different from each other. Something like the product "Dash" comes to mind. How many people put Dash dog food in their washing machine? About the same number as feed Dash detergent to their dog. Naturally they stop when the dog starts foaming at the mouth. Oh, well.

Enough history. Let's get on with the building and flying of the Kittiwake convertible seaplane / landplane. You'll find it to have very simple construction features, but let me give you fair warning. It is a sport plane for relatively proficient sport fliers --- definitely not a trainer. By properly setting up the throw of the control surfaces, and adjusting the center of balance for maximum performance, it flies like a pattern plane. That is not to say that it can't be "gentleized." If you can fly a good low wing sport plane like the Skylark, you can easily handle the Kittiwake. Let's build.



KITTIWAKE

Designed By:
Scott Christensen &
Ken Willard

TYPE AIRCRAFT
Sport — Wheels or Float

WINGSPAN
45 Inch

WING CHORD
7 Inches (Avg.)

TOTAL WING AREA
315 Sq. In.

WING LOCATION
Low Wing

AIRFOIL
Semi-Symmetrical

WING PLANFORM
Double Taper

DIHEDRAL EACH TIP
7/8 Inch

O.A. FUSELAGE LENGTH
35¾ Inches

RADIO COMPARTMENT SIZE
(L) 8" x (W) 2¾" x (H) 2½"

STABILIZER SPAN
16¼ Inches

STABILIZER CHORD (incl. elev.)
4½ Inches (Avg.)

STABILIZER AREA
72 Sq. In.

STAB AIRFOIL SECTION
Flat

STABILIZER LOCATION
Mid Fuselage

VERTICAL FIN HEIGHT
4½ Inches

VERTICAL FIN WIDTH (incl. rud.)
4½ Inches (Avg.)

REC. ENGINE SIZE
.20-.25

FUEL TANK SIZE
4-6 Oz.

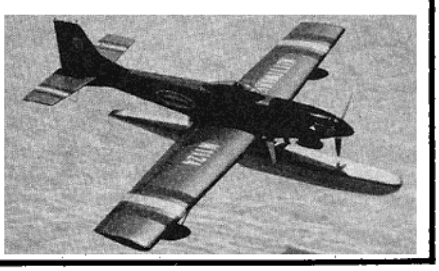
LANDING GEAR
Conventional
Wheels or Single Float

REC. NO. OF CHANNELS
4

CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Ply
Wing	Balsa, Ply
Empennage	Balsa
Wt. Ready To Fly	**Land: 3 Lbs. (48 Oz.)**
	Water: 3½ Lb. (56 Oz.)
Wing Loading	**Land: 22 Oz./Sq. Ft.**
	Water: 25.6 Oz./Sq. Ft.



CONSTRUCTION

Main Float:

You can't make a simpler balsa "box" float; four flat surfaces, one of them with a break in it to create a step. Since this model is not for beginners, I won't bore you with "glue part A to part B" instructions. The plans show the shape and sizes, so just follow the plans. Do note the centerline stringer on the top of the float; it will help you to keep the curvature of the sides equal. The mounting blocks for the struts can be made of hardwood or plywood. Put them on the sides before you join the sides to the formers, otherwise you'll have a devil of a time drilling the holes and installing the blind nuts. I know, because I did it out of sequence myself. Dum-dum.

Note the top of the float is rounded, but the bottom edges are sharp to give a good planing surface.

One more thing. Before you close the float up with the top surface, dope the inside of the bottom and sides to make them water resistant on the inside, and do the same to the top surface inside face. Then, if a water leak should occur, the wood won't become water soaked. Desirable --- but not mandatory.

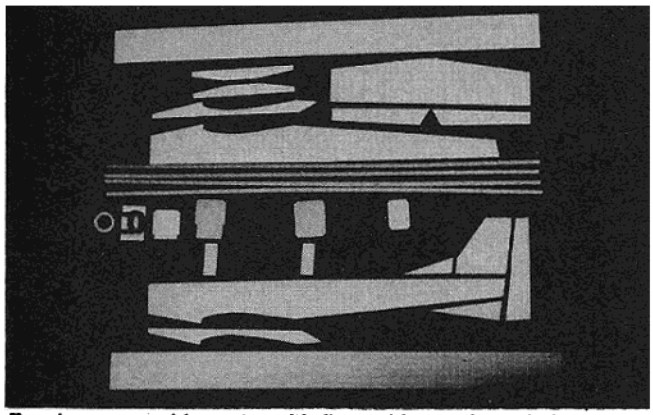
Tip Floats:

Cut out a center crutch as shown on the plans from 1/16" plywood. Note cut-outs to accommodate short lengths of brass tubing with 1/16" inside diameter into which the wire struts fit. Cut out two balsa blocks to the same shape, 1" wide, for each float, Hot Stuff them to the crutch, and then carve to the somewhat streamline shape which is best shown in the photographs. Insert the brass tubing. Waterproof the floats using several coats of dope colored as you prefer. Set aside for mounting later on.

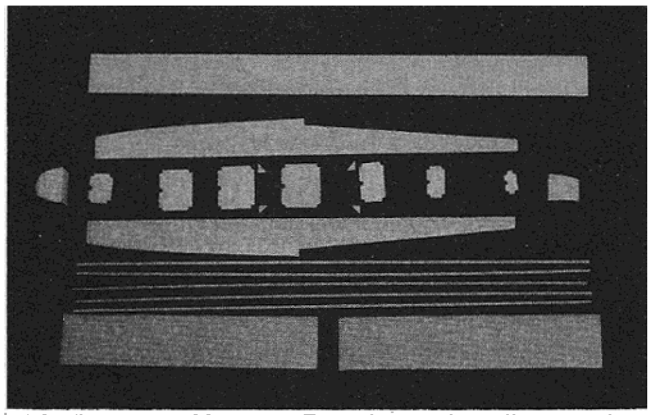
During the test flights of the Kittiwake, some rough landings were had. They knocked off the tip float struts, and required some repair work. As a result, a different type of tip float, similar to those on the Seamaster design, was installed. This is a simple shaped balsa block type, patterned after the full scale Osprey amphibian floats. It is attached to the wing with double stick tape (servo mounting tape) or Velcro strips. On rough landings, it is knocked off, but easily remounted. True, it is not the "classic" strut mounted tip float, but it serves its purpose very well, and keeps damage from rough landings to a minimum. It also has the advantage of easy installation. The plans show the profile and top view of the "Osprey" type float for those of you who prefer to go to that type of installation. Again, it's "builder's choice."

Wing:

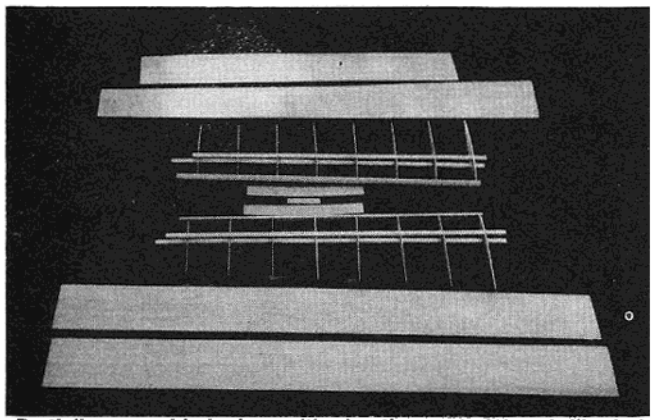
The wing is standard, rib and spar, with leading edge of uniform size from root to tip even though the wing is tapered. Easy to assemble, and the thicker radius at the tip (relative to the tip airfoil) gives good flight characteristics. Sheeting areas are



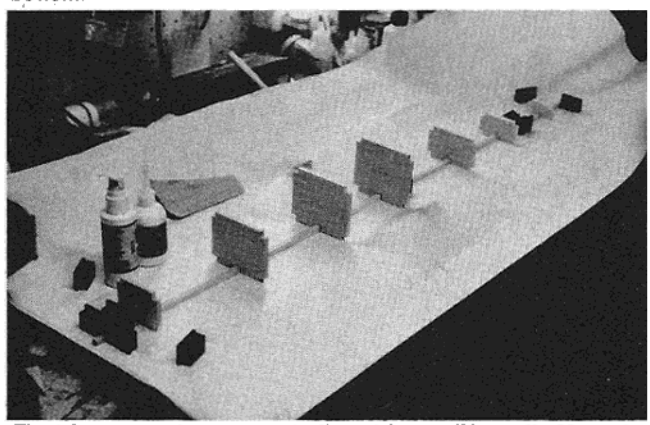
Fuselage assembly parts, with fin, rudder, stab, and elevator.



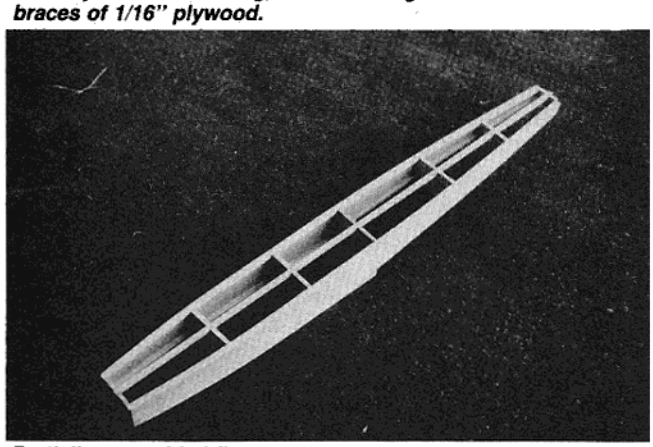
Main float assembly parts. Two pieces of 1/16" plywood at bottom.



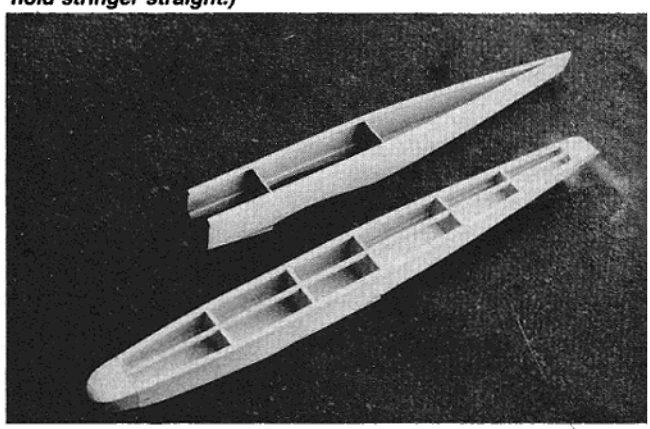
Partially assembled wing, with sheeting material and dihedral braces of 1/16" plywood.



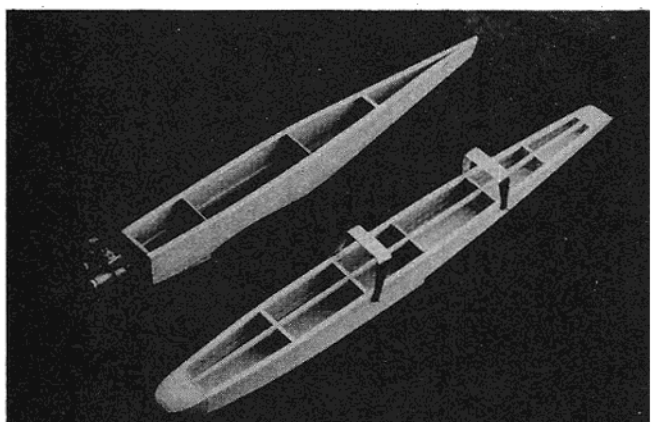
Float formers set up on centerline stringer. (Magnajig Magnets hold stringer straight.)



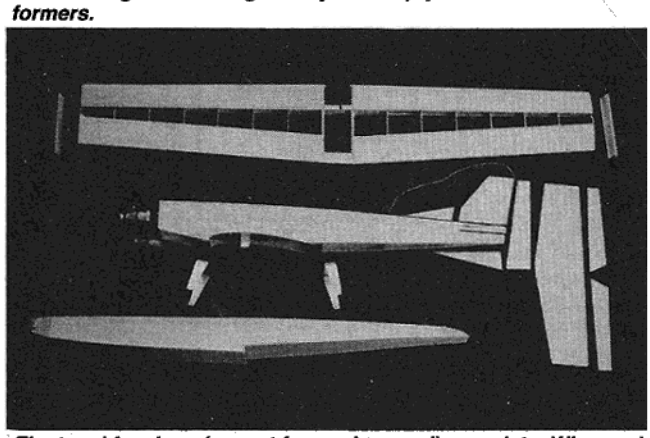
Partially assembled float.



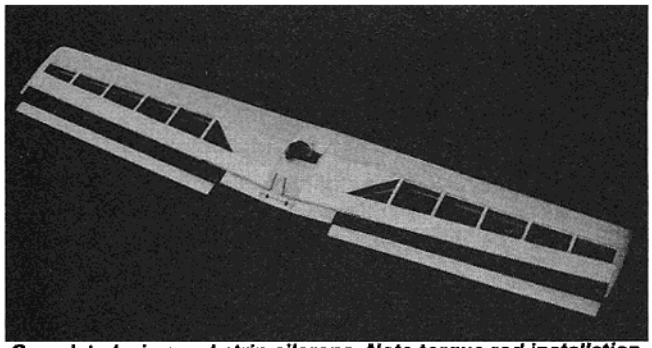
Nose and tail plugs, and bottom 1/16" plywood added to float, and fuselage sides aligned by 1/16" plywood L.E. and T.E. formers.



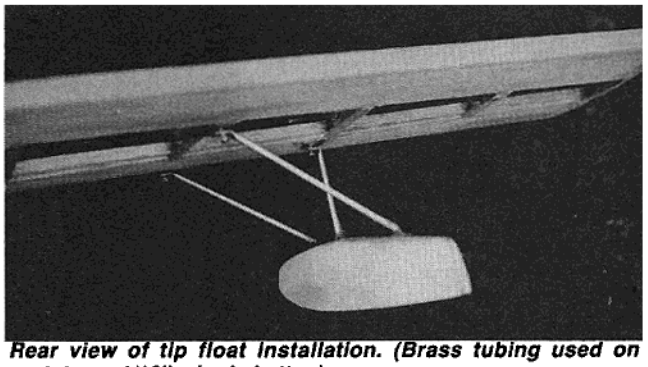
Fuselage firewall and rear end closed. Aluminum struts on float.



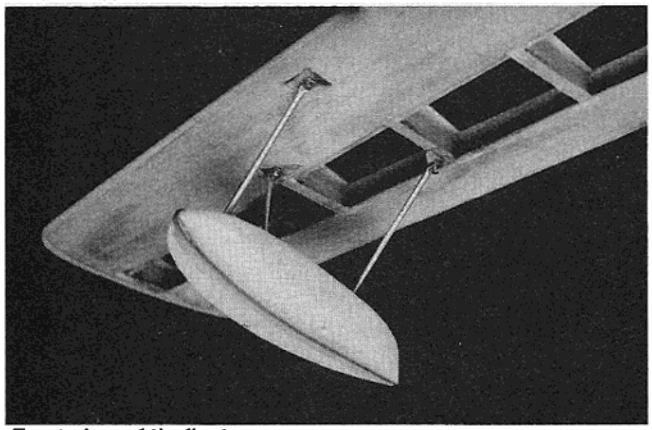
Float and fuselage (except for engine cowl) complete. Wing and tail feathers ready for assembly, except for center sheeting and cap strips on wing.



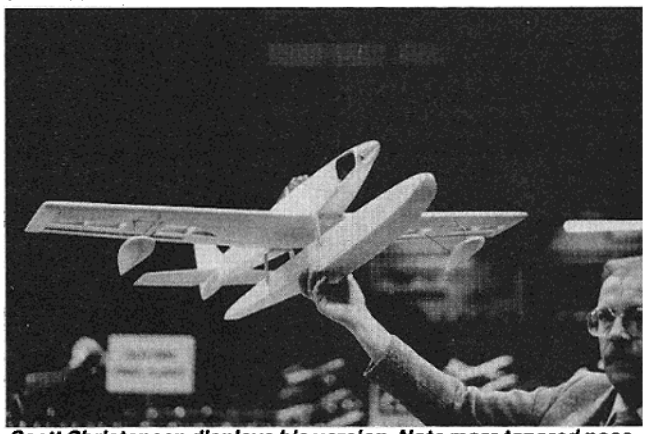
Completed wing and strip ailerons. Note torque rod installation on prototype (not recommended — use flexcable).



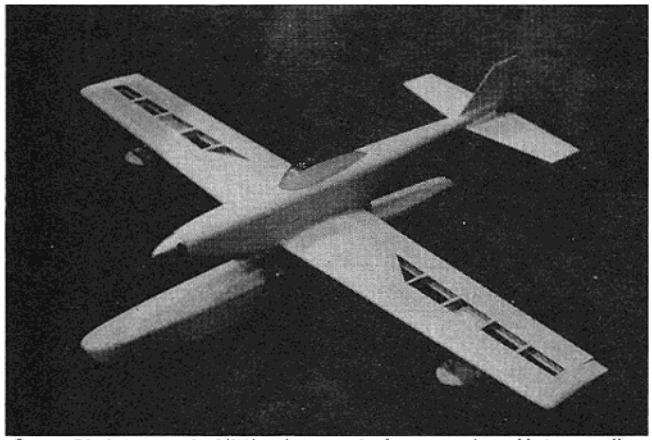
Rear view of tip float installation. (Brass tubing used on prototype: 1/16" wire is better.)



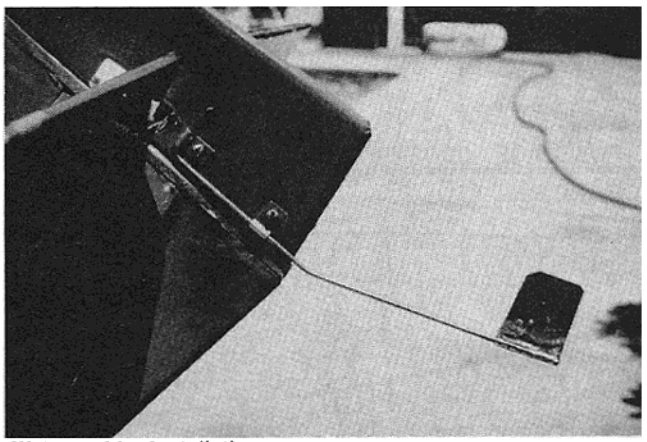
Front view of tip float.



Scott Christensen displays his version. Note more tapered nose.



Scott Christensen's Kittiwake, ready for covering. Note smaller tail surfaces than shown on plans. Test flights will decide final shape.



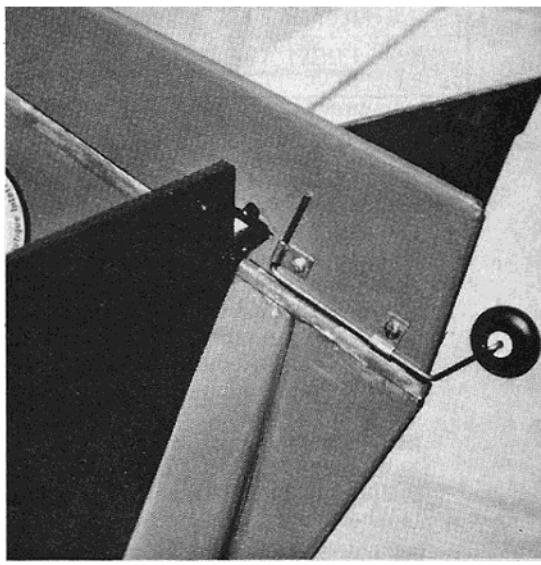
Water rudder installation.

shown on the plans, along with the cap strips on the ribs. However, before sheeting, decide how you want to mount the landing gear and the tip floats. Two methods are shown for each feature.

The landing gear can be either fuselage mounted or wing mounted. In the former case, a Hallco B-105-2 gear is mounted just ahead of the wing on the fuselage, using the same hardwood block that holds the forward float strut. You will note that that is the type of gear I have on my prototype --- simply because it was quick to do, and I had the gear available. Actually, the wing mounted gear, using the trunnion and wire arrangement, allows the gear to be slightly further back, and improves the take-off characteristics, but I found the Hallco gear set-up quite acceptable, since the angle at which the model sits on the ground is quite flat, and reduces any ground looping tendency. Note that the Hallco unit slants backwards.

If, however, you use the trunnion arrangement, then install it before sheeting the wing. The same is true for the tip float mounting. You can use three hardwood blocks as shown in the right wing drawing, or a trunnion with two auxiliary supports shown on the left wing. Builder's choice.

And here's more "builder's choice" items when it comes to ailerons. The plans show a typical wing tip



Tail wheel installation.

"barndoor" aileron set-up, actuated by flexcable tubing from a center located servo. If you prefer strip ailerons, the same set-up modified to terminate at the center of the strip ailerons will work just as well. Finally, you can use aileron torque rods, but they have to be carefully tailored to work without interfering with your rudder and elevator pushrods. I know, because I used them --- and don't really recommend it. Makes the equipment section pretty crowded.

Whether you use strip ailerons (one inch wide) or tip ailerons (as shown on the plans) build the whole wing panels first, then cut out whichever aileron set-up you prefer and make the inserted trailing edge to the wing and leading edge to the aileron from 1/8" balsa, fitted to the depth of the wing at that point. The hinge line is at the top surface, so slant the leading edge of the aileron backwards so that there is enough angular clearance at the bottom to allow for down aileron action.

With the hinge line at the top, and the aileron horn on top, it reduces the amount of water spray which can hit the outlet for the cable.

Yes, there are other ways to do it, and those of you who like to do it "your way" are free to do so. Detail design is largely up to the preference of the modeler.

The method of mounting the wing to the fuselage is the standard leading edge dowel into the bulkhead, with nylon mounting bolts at the trailing edge. And yes, if you want to, you can mount the wing with rubber bands. Many modelers turn up their noses at this type of mounting, but it does make certain that the wing is snugged up tightly to the wing cradle seating tape --- assures tight fit and less possibility of water seepage. Also, in case of a hard dunking, lets the wing shift without breaking away the mounting dowel and bolts. As Scott observed during our discussion, "Watch out for crash landings, or your Kittiwake may become Kittylitter!"

One last word about the wing. Set up the aileron linkage so that you have "differential" throw --- more up than down. There are several ways to achieve this --- separate terminal holes in the servo actuating wheel, offset aileron horns, or, if you have one of the newer "bells and whistles" transmitters, set it up to give differential throw. In any event, you'll get better turns if you use differential throw, with no need to apply coordinated rudder. How much differential? Two to one.

Tail Surfaces:

Couldn't be more simple. Cut out from 3/16" balsa sheet, connect the elevators with a 3/16" dowel, install hinges. Hot Stuff the stab into the slot in the fuselage. Mount the fin, dorsal fin and ventral fin to the tail post, then mount the rudder with the hinges, and with the cut-out on the leading edge of the rudder to allow free up and down motion of the elevator.

Fuselage:

The fuselage is a simple box, disguised to look like a rounded structure. If you study the plans briefly, you'll quickly get the idea. Probably the toughest part of the fuselage structure is setting up the forward hatch to allow access to the tank compartment. Look at the photos, and you'll quickly see how this is done. To assure good fit, the hatch is tack glued in place while you do the sanding to shape, then cut free and doped to make it fuelproof. It's held on to the top of the fuselage with one woodscrew going into the top of the firewall.

Some of you may notice that my Kittiwake is not as "needlenosed" as the plans show. You're right. The reason? I had in stock an old 2¼" spinner with cut-outs for a three bladed prop, so I tapered the front end of the fuselage to fit that spinner, and used a Grish three bladed 8 x 6 prop.

Assembly:

Let's start discussion of the assembly with the seaplane version.

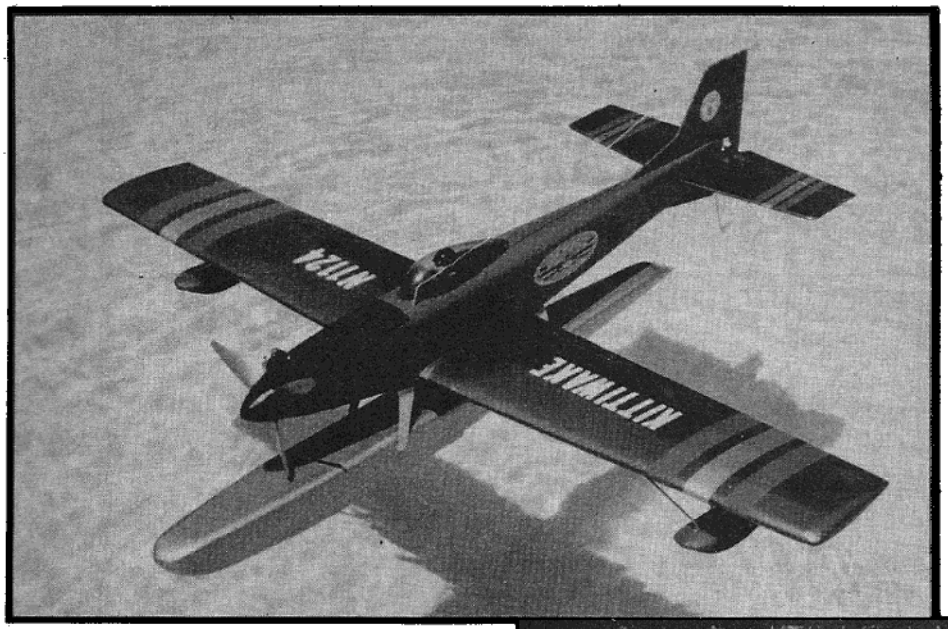
First off, I want to say, very frankly, that there are very few details on the radio and pushrod installations and for a very good reason. With all the variations in equipment that are available, it doesn't make sense to show a detailed installation of any particular one. This model is not for beginners, and the radio installation has to be made to fit the system that you happen to have. Only you know that, so set it up to fit your system.

The drawings show the dimensions of the aluminum struts for mounting the float. The length is set up to accommodate an engine swinging a 9" prop and still giving at least 1/4" clearance from the prop tip to the top of the float.

Perhaps the most critical element in the set-up is the attachment of the tip floats to the wing. Simply put, the tip floats should be installed so that, when the model is at rest in the water, it leans over onto one tip float, and the opposite wing tip float should be approximately 1/2" out of the water. Thus, when the model takes off, and gets up on the step, both tip floats are out of the water and the model is planing on the main float.

Note that the plans show 7/8" dihedral on each wing tip. With that dihedral, the vertical strut from the bottom of the wing to the top of the tip float should measure 1¾". Then the lateral bracing struts should be tailored accordingly. Note that the tip floats have a noticeable upslope from the trailing end to the forward entry. Thus, if a cross wind dips a tip float into the water, it is forced up and out of the water by the slanted bottom.

From RCModeler Nov. 1986



Actually, since the main float has a flat bottom, this doesn't happen too often, but if it should happen, the slant of the tip float bottom helps prevent a "waterloop."

The water rudder installation may seem a bit primitive to some of you purists, but believe me, it works. It is simpler than a flexcable attachment to the rear of the float, and since it is further aft of the center of balance, far more effective. Also, it is easily replaced by a shorter strut for mounting a tail wheel on the landplane version.

As for the landplane version, it's a "taildragger" whether you put the Hallco gear on the fuselage or the trunnion gear in the wing. In either case, the take-off characteristics are good --- although admittedly better with the trunnion mounted wheels. The choice is yours.

Covering:

Finishing the model is a matter of choice. You can paint the floats and fuselage and tail surfaces with whatever finishing material you like --- epoxy resin or dope, or cover the surfaces with your favorite covering material.

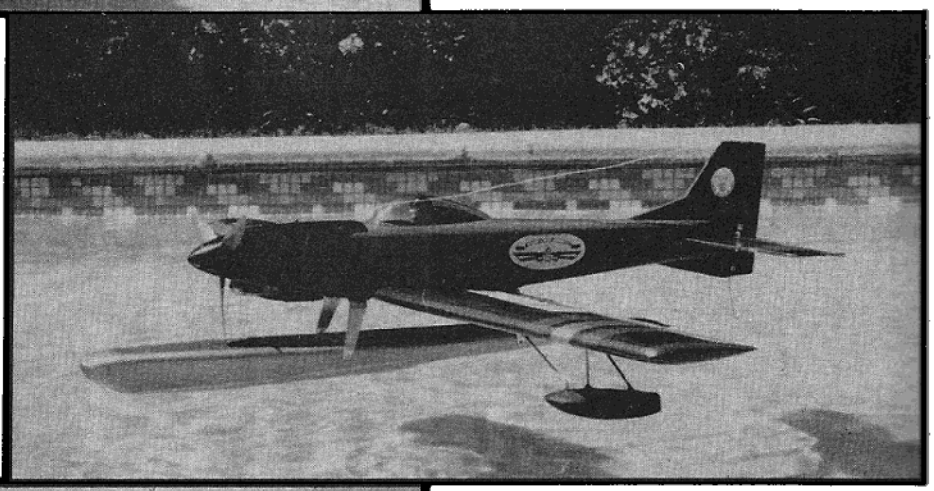
The wing has to be covered, of course. Oh, I suppose if you wanted to, you could sheet the whole surface and then paint it, but it would make the model a bit heavier.

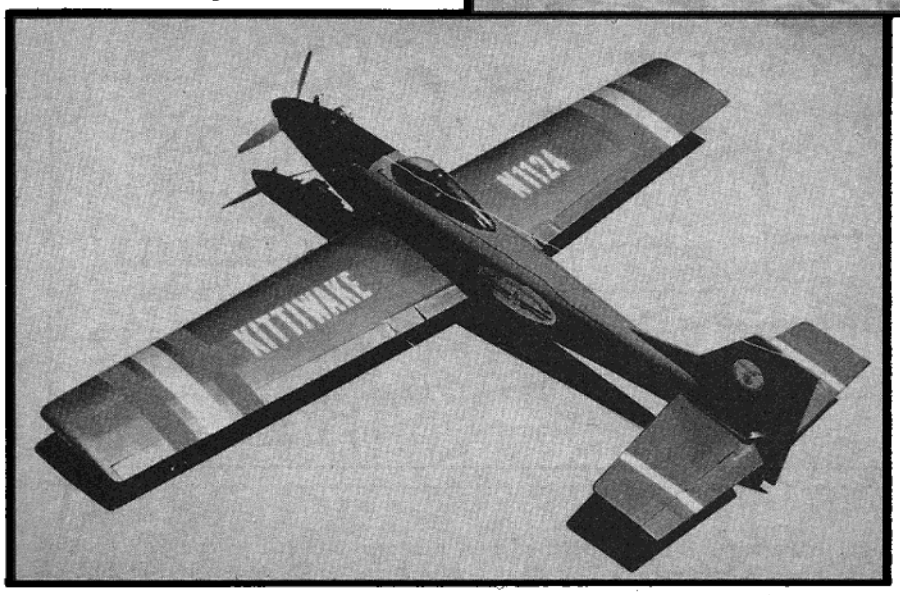
I like Super MonoKote, so I covered the whole model with it, except for the tip floats. In covering the main float, overlap the Super MonoKote seams about 1/4" and seal the overlap carefully. It will be completely waterproof that way.

Flying:

The Kittiwake has no bad characteristics. Fly it in accordance with the accepted principles of seaplane flying or landplane "taildragger" techniques and you're home free.

As a seaplane, you can taxi it around in the water in displacement mode until you are lined up with the wind, then increase power until it comes up on the step, holding a slight amount of up elevator as you do so.





Then, neutralize the elevator, let it gain speed, and then apply a little up elevator and the model is off and flying. Once in the air, fly it just like you would a sport model.

As a landplane, it performs like any other high performance sport plane. What more can I say?

You'll love the Kittiwake. It's great. On the water, on land, and in the air. Just like its namesake.

EPILOGUE

Scott Christensen has informed me that the "production selection committee" at Top Flite has made the decision to produce a kit of the Kittiwake, and they are working on it as you read this article. When will it be available? Depends on several factors, but probably early in 1987, and possibly even sooner. In any event, soon enough for those of you back East to build it during the winter and fly it when the weather gets better. You modelers in California, Florida, and the sunbelt states don't have that problem. Some guys are just lucky that way. I know, because I'm one of 'em.

□