

Windsong

By OWEN KAMPEN

A cool summer evening. The winds of the day are now a soft breeze and low on the horizon the sun seems to rest. The others have departed and, suddenly, the field is strangely silent. Alone — watching the cluster of rose-grey clouds gathering around the sinking red globe, I am reluctant to leave for this is the moment for one final joining of pilot, plane, and sky. This is NOT the time for the roar of a hot .60 shattering the silence, or 70 mile an hour missiles splitting the air. It seems wrong to disturb the serenity of the evening.

The Windsong rests on the grass, clean red and white against the close cropped green, waiting. In a moment the tiny .049 comes to life, systems are checked and the slim bird is lightly launched. Climbing out a little faster than might be expected we smoothly circle upward toward the sunset till only a moving dark dot is visible against the colored light of the sky. At several hundred feet the engine quits, the transition almost imperceptible except for a slight slowing down and a leveling of the flight attitude. Quietly flying elongated figure eights across the wind line above a nearby hill, I find there is little lift but here and there are the areas of zero sink. We hold our own for some minutes until the gathering darkness quiets the breeze and the slow descending circles terminate in a soft-slide across the grass, Windsong coming to rest a few feet from where I stand. The switch is turned off, plane wiped clean, gear loaded and it's time to leave. . . to return to reality.

How does one explain the mood, the time, the place, the peace? To me, this is what it's all about, but only another sailplane addict can ever understand or even believe in its importance. The Windsong does not stunt, roll, do vertical eights or hot touch and goes. It is not at home in a powered pylon race, it just flies. It flies up rather quickly and comes down quite slowly and it does this with great grace. That's all. It is beautiful to the eye, in the air or on the ground.

It has a detachable motor pod so that it can be soared in thermals or along slopes but in these flat lands I fly the "impure" powered version. The Windsong is the end result of several years of design experiments with a wide variety of sizes and shapes and constructions of powered gliders. It's quite traditional in many respects but unique in a construc-

tion technique which contributes to the simple clean lines of the fuselage form. It came about by accident.

I have long envied the clean and smooth oval cross-sections possible with fiberglass fuselages, but considerations of time combined with an inherent laziness has prevented me from going that aromatic route. Lots of formers and gangs of little stringers belong to my lost youth and so for years modified rectangles have become the rationalized expedient.

It was while working on the original SKAMPY that thoughts of the strength of curved bent forms occurred which resolved themselves one quiet evening when, with nothing better to do, I began to bend balsa. Two disadvantages soon became clear — the tendency to split along the grain plus the necessity of gluing up wide sheets. Looking around for something else to bend I found a rather large sheet of Midwest's 1/32" birch plywood left over from an abandoned project and an idea was born. Not very clear but a glimmer. A one piece formed fuselage! Abandoning the traditional engineering approach of "draw it up and build it," I reverted to my artist's instinct to let the material lead the way. I became a follower. Rough cutting and wet bending resulted in an inverted teardrop section and formers were then cut to fit existing openings. The whole procedure was backwards but it worked. Within a few days the process was refined and a larger version soon became the beginnings of Windsong.

Since then, several more fuselages have been built with minor modifications which have been included in the plans. While an extra pair of hands are helpful, construction can be handled alone with the one-piece shell-forming and gluing being accomplished in as little as 1½ hours. The end result is smooth and round, exceptionally strong and almost as light as sheeted balsa. The birch plywood does NOT require additional covering and takes half the usual amount of dope to achieve a fine finish. Reasons enough to give it a try.

The resulting reduction in drag coupled with a rather thin airfoil section creates a sailplane with excellent penetration capabilities plus a wide range of slow to fast flying speeds. All original flight testing was done with pulsed rudder using an Adams dual actuator which is a most reliable and economical

performer. Other R/C packages are being worked on at the time of writing including a hi-rate pulsed Bellamatic servo, and the use of the Hallco "103" on rudder with the motor control arm linked up for positionable elevator trim.

With the large number of reed sets now gathering dust and often available at a fraction of their original cost, consideration should definitely be given to a Reed-Rudder or Rudder-Elevator combo. Controlaire's single channel Analog system provides an almost dither-free, low drain arrangement, reported to be excellent for large gliders. Two flapping surfaces create considerable drag which would tend to discourage the use of the Galloping Ghost combinations, but the Rand LR-1 or Dual Pack are proven performers which overcome this objection.

The ultimate, of course, would be any of the new miniature proportional systems, such as Orbit's 8 oz. system, Kraft's 11 oz. rig, etc. The choices are many and dictated only by your pocket-book and personal taste. Let's get on with the construction notes which are the result of a lot of trials and errors. Give them a careful reading.

Fuselage

Construction is NOT straightforward until after you've built one. Since few of you have large sheets of 1/32" plywood lying around, start by ordering a 12" x 48" sheet from Midwest Products or Sig. The cost is approximately \$2.40 and you'll have some left over for all kinds of doublers and other uses. With balsa prices what they are — it's a good deal! While you're waiting for the ply to arrive, start on the wing and stab. They are "straightforward" (whatever that means). Or — if you lucked out and your corner Hobbie Shoppe had some stacked in the corner, let's start right now!

1. Use a ballpoint pen, layout and locate the fuse center line on the ply sheet. Transfer all measurements from the pattern with care and use lines to locate all former positions. Cut out the fuse blank.
2. Draw a VERTICAL center line on ALL formers and carefully cut to shape.
3. TEST the accuracy of fit by placing the former center lines on the fuse center line and rotating out to each edge. There should be about 1/16" margin on each side of the fuse blank to provide adequate gluing



surface.

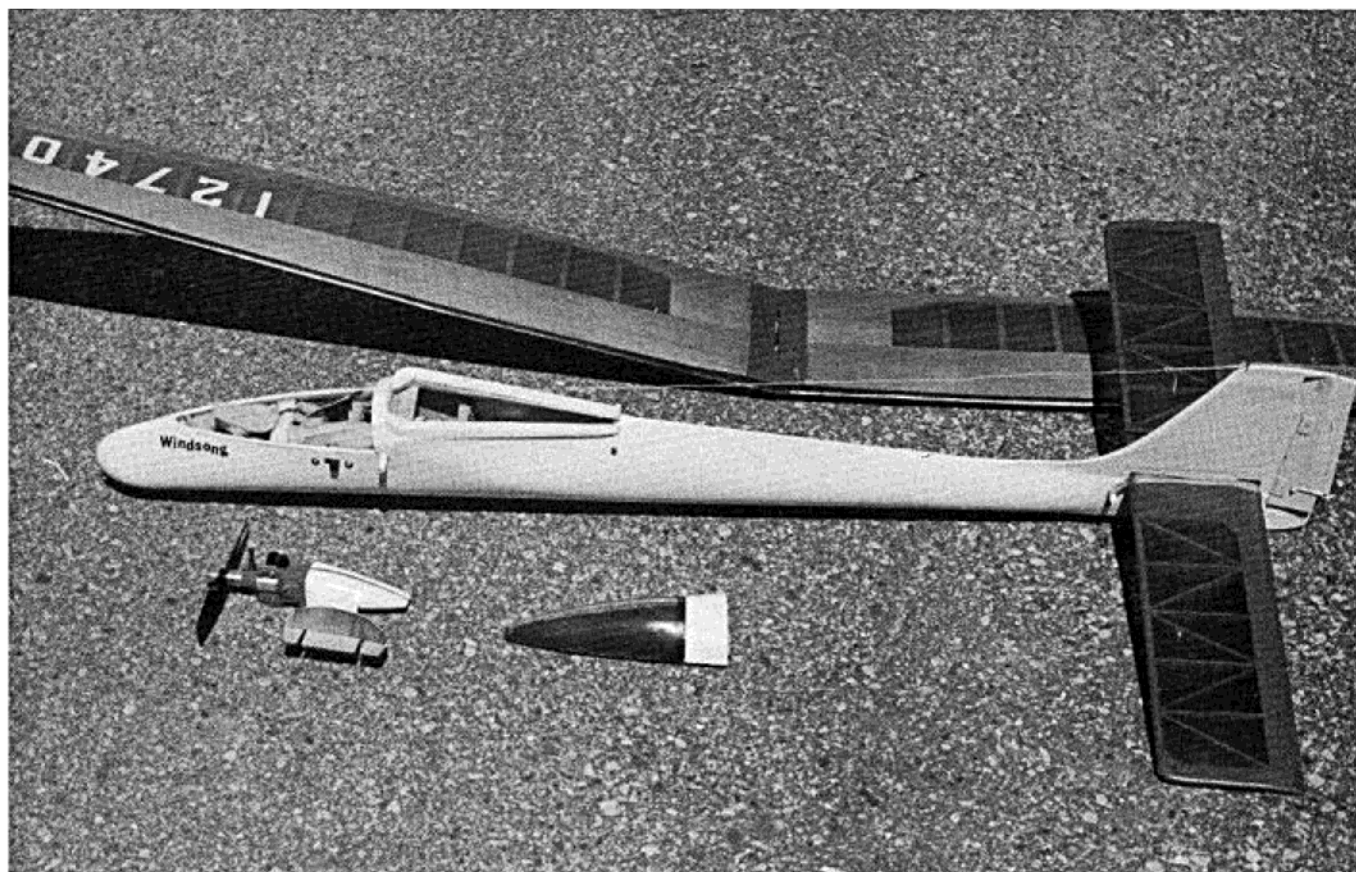
4. You'll now need a sponge, a roll of masking tape, a bunch of No. 62 or No. 64 rubber bands, TITEBOND GLUE and a small pot or pan of water. (Note: ammonia hastens the bending process but the aroma is too much for me.)
5. Let's go. With the sponge - wet along the center 1/3 of the blank LENGTHWISE on the outside (side

opposite the center lines). Several light wettings are better than one big one. Do not get water on the outer edges of the blank or the masking tape will not hold.

6. Slip a few No. 62 or No. 64 rubber bands over the blank and it will start to form a tube. Keep wetting but TAKE YOUR TIME. DO NOT FORCE!! In a short while (5-10 min.) the edges will meet making a

natural tear-drop shape.

7. Several approaches have been tried but I prefer to work from the tail forward. Insert the rudder post and clamp tight. Some splitting will occur at the bottom but don't panic as this will later be cut open to accept the tailskid.
8. Run glue along the edges of the fuse top spine and around F4.
9. Carefully checking the alignment of



center lines, insert former F4 (tweezers make it easier), and close tight with masking tape and more rubber bands.

10. F3 and F2 follow. These are easy as there is more hand room. Just make sure the center line of each former is EXACTLY on the fuse center line. At this point, check to make sure no twists have developed. You might have to remove and straighten the tail post.
11. Now turn the fuse shell upside down so that the glue will settle along the inside of the spine. Check again for twisting then LET DRY.
12. Add F1 and clamp balsa stiffeners along the hatch and wing openings.
13. From here on it's like any other fuse construction. Rough carve the nose block and glue in place and install the wing saddles as per drawings.
14. The rudder is added and faired in with balsa putty. The tail skid of hard balsa inserts about 1/4" into the fuse bottom. Epoxy the nose skid in place.
15. Light weight fiber glass cloth can be used to reinforce the nose and tail skid areas.
16. Check the angles of incidence of both wing and stab. Trim the fuse sides if necessary until alignment is correct.
17. Complete the hatch as per drawings.

The Hotshot canopy is available from Midwest Products, Hobart, Indiana.

18. A smooth glassy finish on the ply can be achieved quickly with four coats of clear dope – sanded between coats. Two color and one clear finish. Wet paper sanding and waxing complete the job.

R/C Installation

No details are presented here because of the wide variety of equipment combinations. But whatever is installed – KEEP IT FORWARD! Otherwise you'll wind up adding lead for balance! The all up weight with .049 motor, Adams actuator and 4-600 mah. nickel cadmium battery packs was 34 oz. About optimum for average flying.

Wing and Stab

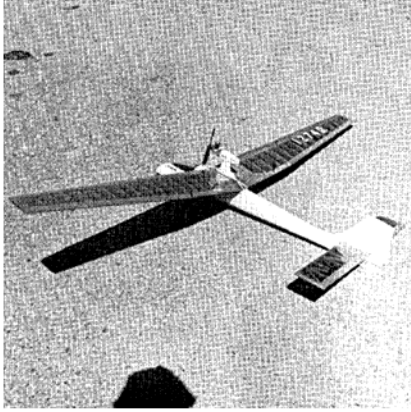
About the only comment here is to build it on a flat board. NO WARPS PERMITTED. If you have never tried a built up wing before – don't start now! It's not difficult but accuracy is vital. If you want the option of the engine, be sure and add the 1/8" ply spacers in the center section to take the pylon mount. The original was built with Midwest Micro cut balsa and covered with red silk and clear doped. With so many covering materials now available, the choice can become a bit confusing so stick with something you are familiar with.

NOTE: Spruce wing spars are recommended as loads on a thin, high aspect ratio wing such as this, can build up rather quickly. Be sure the wing balances. With the long moments involved here, unequal balance will result in a built in turn.

Flying Notes

As previously mentioned, several hours of flight time have been logged using pulse rudder-only. The response is very positive when using full off or on signals while on the stick it is best to LEAD the plane – both INTO and OUT of turns. Response is very smooth but slow and so it is necessary to anticipate all turns and let it come around. The rudder area shown is OK for powered flight and thermal soaring.

Slope soaring is another matter and I am told by experts that at least 50% more rudder and elevator area would be desirable. I can only suggest that any modification be determined by the type of flying you intend to do and the equipment you will use. The Windsong responds readily to elevator trim and can be flown quite fast for wind penetration or trimmed out close to a stall for thermal sniffing – not unlike a free flight or tow-line glider. On an engine run of 3-4 minutes, an estimated altitude of 3-400 feet can be reached giving an average gliding flight of 6 minutes in



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absolutely still air. Under lift conditions anything is possible so be sure your batteries are always charged up fresh.

It has been a real joy to make, what I hope is, a small contribution to the "state of the art." Here then is another approach in construction which will lend itself to a variety of applications limited only by one's imagination.

Imagine away!