R/C Soaring Digest

October, 1996

Vol. 13, No. 10

U.S.A. $3.50

A Publication for the R/C Sailplane Enthusiast!

R/C SOARING DIGEST

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INVERTED HAND LAUNCH

Coming in inverted, Fred Mallett is practicing his hand launch techniques in style! Photograph by Renee Mallett, Corpus Christi, Texas.

ZIKA

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National Print Source, Inc.
(972) 570-0052

R/C Soaring Digest
is printed on recycled paper.

The Soaring Site

Area Code Change

Many area codes in the Dallas area have recently changed from 214 to 972. Such is the case for us, Barry and Karen Kennedy at Kennedy Composites, Dale and Marge King, and a whole bunch of sailplane folks too numerous to mention. We do suggest that you write the code change in pencil, because it sure looks like they'll be changing our area code again, and possibly soon.

A Note of Thanks

As you have probably noted, Bob Sowder has been on vacation from writing; rumor has it that the MSSC team, of which Bob is a member, is still recuperating from all the coordination work involved with hosting the Mid-South Soaring Championships this year. Thanks, Bob, for all your help getting *RCSD* out the door this past year and a half; we hope to see you back in these pages, again!

Computer Manipulated Images

Several folks have voiced their objection to the use of computer manipulated photographs on the cover of *RCSD*. Being a philosophical and editorial issue, the subject was turned over to a select group of sailplane enthusiasts to discuss. This forum quickly concluded that digital photography has its place, but not on the cover of *RCSD*. Thanks go to those folks for their input and advice. It is most appreciated!

To summarize those findings, as Gordy Stahl of Kentucky, recently said, "I think the cover should be earned, on the site, in the air. If someone wants a nice picture of a model, they can look in a catalog. You've done a great job on the mag.; just don't bother with those computer generated, cover shots." Thanks, Gordy, and we won't.

And, that's it for this month!

Happy Flying!
Judy & Jerry Slates

Jer's Workbench

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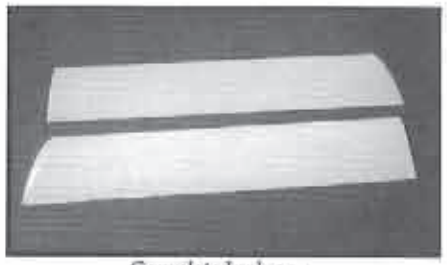
Molded Hollow Core Wings Part II

Well, as promised last month, this month's topic continues with the construction of hollow core wings. The photographs show what has been accomplished, so far.

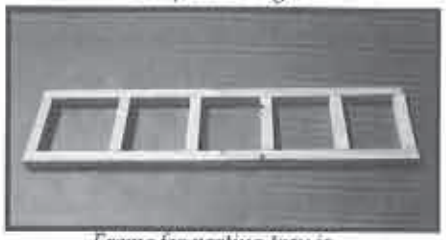
A great deal of sanding has been done since last month, another coat of primer has been applied, and then more sanding was done; the wings were then ready to paint, and I applied two coats of white epoxy. The paint was allowed to dry for three days. At which time, the wings were again wet sanded using 600 wet/dry sandpaper. A finish rub was accomplished using a white finish, rubbing compound. Be careful not to rub through the paint, as it is quite easy to do! Once completed, the wings were set aside in an area out of the way of traffic and such.

The parting tray was constructed next. The frame was built with 2 x 2's, and was covered with a 3/4", pre-painted, particle board, 12" wide and 48" long. Before the top was nailed to the frame, I cut a section out of the top, so that the wing would fit into the parting tray.

Figure A depicts how the wing will fit into the tray. Note the stand-offs that were used, which allow the wing to be adjusted, so that the parting line or seam is centered on the leading and trailing edges. The stand-offs were adjusted very, very carefully; the wing must fit flat into the parting tray. I do not recommend forcing the wing to fit, as a twist could result in the wing; this could result in a twisted mold after all the work is done.

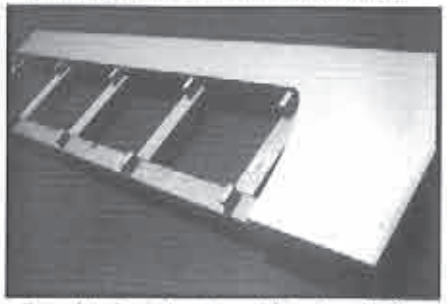


Completed wings.



Frame for parting tray is constructed from 2 x 2's.

Top of parting tray, constructed from pre-painted particle board, has been added.

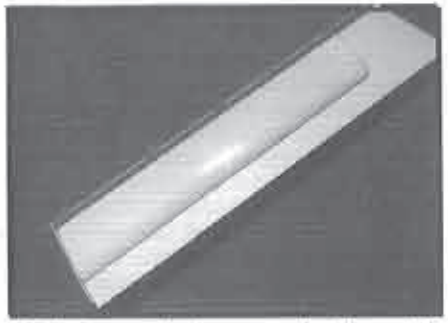


Completed parting tray. Note stand-offs.

FIGURE A
Note: Stand-offs hold wing core in center. Dam at trailing edge was added after core was positioned in parting tray.

Wing is installed in parting tray. Note trailing dam is held in place with clamps.

The wing was fitted into the parting tray, and 2 dams were added. (All the wood used was obtained from a local Home Depot.) The dams were 1/2 x 2" molding; the first dam was glued to the wing root. The second dam was clamped at the trailing edge using simple, home made clamps and screws.



Parting tray and wing are ready to be caulked.

The last step in this process required that the gap, between the parting tray and the wing, be caulked. I used Red Devil, one time spackling.

By next month, the second parting tray should be completed and caulked, and we can get into the actual lay-up of the mold.

See You Then! ■

Plaster Molds

...by David Peale
Chatham, New Jersey

Reading Jer's workbench a few weeks ago, I was interested to see the brief discussion about using plaster for making female molds. Since I was right at the stage of making the female mold from a plug I have been working on for a while, I thought I'd give it a try with plaster before going the whole nine yards with glass epoxy. The advantage I figured was i) that I could do the mold in one step instead of several batches of epoxy and various weight cloths, and ii) that I would have to stiffen the epoxy/glass mold with epoxy/sand or plaster anyway to ensure complete rigidity.

Jer had mentioned that he got a less than ideal surface finish with conventional plaster of paris than he did with something called art plaster. I checked my local craft shop and found that i) they didn't have art plaster, and ii) that the plaster of paris they were selling was very expensive (about 8$/pound). A few short yards away, my local hardware store was selling 8 pound buckets of plaster of paris (a.k.a. wall plaster) for $4.69. This had to be worth a try.

My plugs were made from blue foam sandwiched onto two 1/16" sheets of balsa, which had been cut and shaped to the desired profile of the 38" fuselage I was building. The blue foam was wonderfully easy to work down to the desired shape, with minimal effort and time. The final sanding steps were done with 220/330 grit paper, and left a reasonably smooth surface finish. This surface was then painted with several layers of water-soluble polyurethane to fill the porosity. These layers were finished each time with 330 wet paper. Once the desired surface quality had been reached, I waxed the whole plug with a few layers of parting wax, and then split the halves of the plug between the two balsa center layers. The plugs were spot-glued to my casting board (a piece of flat plywood finished with epoxy and waxed as well. N.B. a sheet of plate glass would have done as well with much less effort!), and a fence of blue foam strips was taped in place around the plugs to contain the plaster to be poured. (One strip of tape full length on the insides of each barrier wall.)

I discovered that plaster has as many personalities, as it has ways of being mixed. I would recommend allocating a pound or two of plaster to a few experimental mixings to get a feel for how it mixes and how long it stays workable at different wetness of mix.

I found that the quality of the surface

finish depended strongly on the wetness of the plaster mix. The thicker the mix, the more glassy the final surface finish, but also the shorter its working time! I mixed the plaster for my final mold to a thickness resembling mashed potatoes. Mix the plaster into the (cold) water! (Sounds obvious, but that's not how I started...) Mix more than enough to fill your entire mold. (Remember, this stuff is cheap compared to glass and epoxy.) How much is enough? I used 12 pounds of dry plaster to just barely cover my two 38" plugs - about 300 cubic inches (a.k.a. about 5 quarts). Next time, I would opt for 8 pounds (dry), and mold each half of the casting in separate pieces. You might want to have someone help you in the pouring process. It's tough to wield a 30 pound bucket of wet plaster with one arm and slop/shovel it out with the other hand at the same time. The trick to successful pouring for me was to always add plaster just behind the advancing front of plaster covering the plugs, and spread that mound of plaster forward over the uncovered section plug. This ensured that there were no air pockets trapped at the junction of the last slop of plaster and the next. Work quickly! Once you stop stirring plaster of this consistency, it gels to the point that you won't be able to spread or smooth it, in about 2 minutes. (Another good reason to have someone help you! One person holds and stirs the bucket while the other scoops, shoves, and spreads.) Don't worry about smoothing out the top surface, just get the plugs covered without air pockets. If you want, you can add a runnier mixture later to smooth out the top of the bulk. Also, the fully dried plaster works very nicely with files and scrapers, so it's easy to smooth down high spots and round exterior corners, etc....

Once the plaster is poured, you should be prepared with a hefty fan to cool the casting. Plaster gives off a good bit of heat as it hardens. With this large a casting, if you don't cool it as it dries, you risk watching it crack before your eyes. After about 30 minutes you can carefully remove the foam retaining barriers to expose the sides of the casting for more surface area to aid cooling and speed drying. I lifted my casting off the board and pulled the master plugs out of the hardened plaster about 4 hours after pouring. (Pulling the plugs out relatively early also aids more uniform drying.

After the casting has fully dried out (about a week), if there are any small imperfections in the mold or flange area, they can be touched up easily by adding more plaster and scraping carefully (though a mold well poured with nice thick plaster will probably not need any touching up). To add plaster, mix some plaster to the consistency of thick whole milk (like instant breakfast drinks) and drop it into the imperfection. The water from this thin mixture seeps into the porosity of the existing plaster and carries fine particles of new plaster in with it, making for a good bonding between the old and new plasters. A couple of seconds after spreading the plaster in, you can rub excess, drier plaster away with a wet finger and smooth the touch-up down to a nearly finished smoothness. When the plaster is fully dry, the touch-up can be scraped easily with anything much harder than a fingernail, and sanded with 400 grit paper.

The final step in preparing the plaster mold is to impregnate the mold with epoxy to seal the porosity and impart strength to the surface and corners. Just apply a liberal layer of some of your favorite low viscosity, long working time epoxy into the surface with a lint free cloth or stiff disposable brush, work it in for a few minutes (pay extra attention to the corners of the mold) and rub the excess off before it begins to get stiff. Surface tension will cause the epoxy to wick into the plaster, but leaves enough right at the surface to impart a nice polished marble appearance to the hardened epoxy-plaster surface. This is perfect since it doesn't cause a buildup of epoxy on the plaster surface which would ruin the fidelity of the plug surface finish.

Once the epoxy has cured, wax up the mold and go as usual from there. Thanks to the rigidity of the mold, my first pieces lifted out very easily with only two layers of parting wax as the release agent. ■

TIP

Marking the Center

...from Wes Deetz, President
Sussex County Thermal Sniffers
Franklin, New Jersey

Did you ever have the problem of coming up with a way to mark the center of the landing strip, and still not jeopardize the landing sailplane? Well, Al Stoel came up with this idea.

Take an empty, 2 liter, plastic soda bottle and cut off the top, just above the label. Remove the label and the black (lower) bottom. Drill a hole in the bottom (clear) that will accept the size of nail you use to anchor the landing strip. Spray the inside of the bottle with a bright color paint. When dry, take a pair of scissors and cut 10 one inch strips down to the bottom.

When installed, it stands about 8" high, and folds over very easily. Thank you, Al Stoel! ■

Spin Launching,

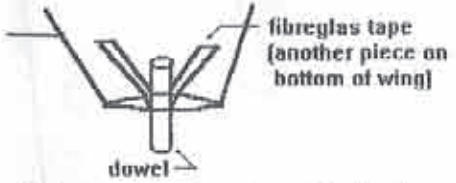
Another Way to Launch a HLG

...by Jim Keller
Belmont, California

Recently, at my flying field, I had the opportunity to watch Al Nies launch, using a sideways, spinning motion. He consistently got about fifty percent more altitude than anyone else.

Al has a handlaunch glider with a straight (no-polyhedral) fiberglass covered wing. A while back he started doing little launches by just flipping the plane from the wingtip like a frisbee. A little development, and he came up with his present method.

He fastened a small piece of wooden dowel to the wing tip with tape, top and bottom. To launch, he just holds onto the dowel and spins around like a discus thrower. It works great! Al says it takes a bit of practice to know when to let go and to avoid scraping the opposite wingtip on the ground.



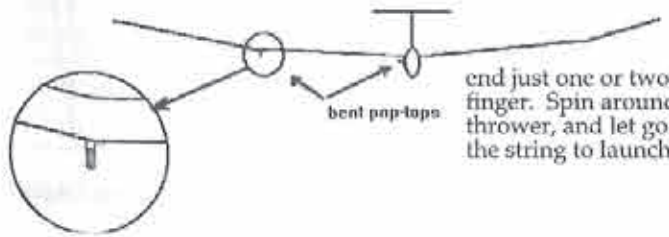
To keep the fuselage from shifting, he has a small block of wood glued to the wing on the side away from the wooden dowel.

He says he can launch all day long and go home with no arm strain. There seems to be no effect on the flying qualities of the plane. It's fun to watch him launch.

But what if your glider has polyhedral wings (upward bends about halfway out to the wingtips)? There is a good chance of breaking the wing if you throw from the wingtip.

I (sort of) solved this problem by taking a bent pop-top from a soda can and fibreglassing it to the fuselage near the CG to pass a string through. Be sure it is anchored well to the fuselage! Another pop-top at the dihedral bend provides a guide hole to keep the wing parallel with your arm. This method does not work as well as Al Nies' method, but it is always fun to experiment. With Al's method the "effective arm length" is the distance from his shoulder to the fuselage (i.e., arm length plus one wing). With the string and pop-top method, the "effective arm length" is only arm length plus the distance between the pop-tops, since you need to hold the string near the wing pop-top.

To launch using this method, take some strong, but thin, string and pass it through the wing pop-top, on through the fuselage pop-top, and back through the wing pop-top. Wrap one end of the string around your hand and the other end just one or two loops around your finger. Spin around like a discus thrower, and let go of the finger end of the string to launch. ■



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CO7 V4 Sections (RS series)

These are the sections used on Hans-Jürgen Unverferth's CO^7 V4. As they are used in a rather unique way on this sailplane, refer to the CO^7 V4 three-view published in the September issue.

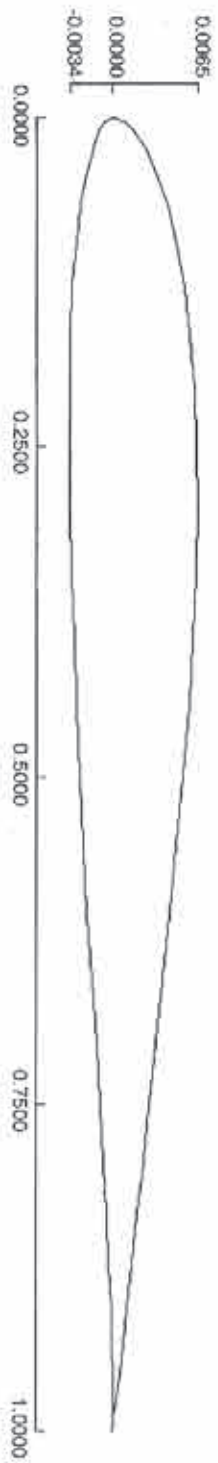
The RS001 is used unchanged from the root to the first taper break at 1290 mm — that's over 78% of the span!

The section designated RS001M05 is used at the second taper break, at 1550 mm. The 260 mm distance between the first and second taper break serves as a transition from the RS001 to the RS001M05 section.

The RS001T10, a symmetrical section used only at the wing tip, terminates a transition from the RS001M05. This transition occurs over the last 100 mm of the wing, from the second taper break.

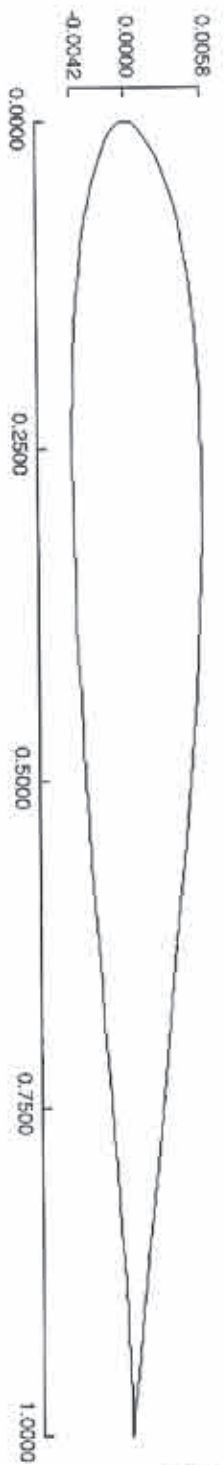
Note both the RS001 and RS001M05 have substantial negative pitching moments. In fact, the only place a zero pitching moment section is used on the CO^7 V4 is at the wing tip. This means the entire wing is composed of sections with negative pitching moments. Hence, the need for several degrees of washout, despite a relatively severe sweep angle of 25 degrees. CO^7 V4 thus stands in direct contrast to Hans-Jürgen's previous designs which have used sections with near zero pitching moments across the entire span

RS001		
n	x	y
0	100.0000	0.0000
1	99.7260	0.0280
2	98.9070	0.1220
3	97.5530	0.2920
4	95.6770	0.5260
5	93.3010	0.8070
6	90.4510	1.1330
7	87.1570	1.5070
8	83.4570	1.9250
9	79.3890	2.3730
10	75.0000	2.8500
11	70.3370	3.3540
12	65.4510	3.8570
13	60.3960	4.3530
14	55.2260	4.8890
15	50.0000	5.4360
16	44.7740	5.8890
17	39.6040	6.2150
18	34.5490	6.4280
19	29.6630	6.5190
20	25.0000	6.4720
21	20.6110	6.2810
22	16.5430	5.9470
23	12.8430	5.4780
24	9.5490	4.8840
25	6.6990	4.1780
26	4.3230	3.3730
27	2.4470	2.4900
28	1.0930	1.5640
29	0.2740	0.6920
30	0.0000	0.0000
31	0.2740	-0.5390
32	1.0930	-1.0430
33	2.4470	-1.5520
34	4.3230	-2.0360
35	6.6990	-2.4800
36	9.5490	-2.8510
37	12.8430	-3.1210
38	16.5430	-3.2880
39	20.6110	-3.3620
40	25.0000	-3.3550
41	29.6630	-3.2800
42	34.5490	-3.1460
43	39.6040	-2.9660
44	44.7740	-2.7510
45	50.0000	-2.5200
46	55.2260	-2.2710
47	60.3960	-1.9670
48	65.4510	-1.6210
49	70.3370	-1.2850
50	75.0000	-0.9740
51	79.3890	-0.6940
52	83.4570	-0.4570
53	87.1570	-0.2640
54	90.4510	-0.1190
55	93.3010	-0.0260
56	95.6770	0.0210
57	97.5530	0.0320
58	98.9070	0.0210
59	99.7260	0.0080
60	100.0000	0.0000



RS001M05		
n	x	y
0	100.0000	0.0000
1	99.9013	0.0068
2	99.6057	0.0288
3	99.1144	0.0688
4	98.4292	0.1298
5	97.5528	0.2120
6	96.4888	0.3138
7	95.2414	0.4326
8	93.8153	0.5668
9	92.2164	0.7172
10	90.4508	0.8846
11	88.5257	1.0700
12	86.4484	1.2730
13	84.2274	1.4916
14	81.8712	1.7231
15	79.3893	1.9657
16	76.7913	2.2202
17	74.0877	2.4867
18	71.2890	2.7625
19	68.4062	3.0418
20	65.4508	3.3202
21	62.4345	3.5962
22	59.3691	3.8770
23	56.2667	4.1660
24	53.1395	4.4581
25	50.0000	4.7394
26	46.8605	4.9904
27	43.7333	5.2071
28	40.6309	5.3871
29	37.5655	5.5336
30	34.5492	5.6472
31	31.5938	5.7209
32	28.7110	5.7550
33	25.9123	5.7452
34	23.2087	5.6999
35	20.6107	5.5904
36	18.1288	5.4420
37	15.7726	5.2498
38	13.5516	5.0119
39	11.4743	4.7294
40	9.5492	4.4072
41	7.7838	4.0417
42	6.1847	3.6421
43	4.7586	3.2096
44	3.5112	2.7499
45	2.4472	2.2720
46	1.5708	1.7729
47	0.8956	1.2782
48	0.3943	0.8042
49	0.0987	0.3697
50	0.0000	0.0000

RS001M05		
n	x	y
51	0.0987	-0.3409
52	0.3943	-0.6971
53	0.8856	-1.0592
54	1.5708	-1.4298
55	2.4472	-1.8030
56	3.5112	-2.1698
57	4.7586	-2.5039
58	6.1847	-2.8281
59	7.7836	-3.1250
60	9.5492	-3.3907
61	11.4743	-3.6152
62	13.5516	-3.8022
63	15.7726	-3.9492
64	18.1288	-4.0578
65	20.6107	-4.1310
66	23.2087	-4.1672
67	25.9123	-4.1710
68	28.7110	-4.1448
69	31.5938	-4.0882
70	34.5492	-4.0056
71	37.5655	-3.8982
72	40.6309	-3.7704
73	43.7333	-3.6233
74	46.8605	-3.4593
75	50.0000	-3.2814
76	53.1395	-3.0896
77	56.2667	-2.8841
78	59.3691	-2.6647
79	62.4345	-2.4352
80	65.4508	-2.2023
81	68.4062	-1.9718
82	71.2890	-1.7468
83	74.0877	-1.5291
84	76.7913	-1.3214
85	79.3893	-1.1262
86	81.8712	-0.9460
87	84.2274	-0.7800
88	86.4484	-0.6288
89	88.5257	-0.4944
90	90.4508	-0.3776
91	92.2164	-0.2801
92	93.8153	-0.2000
93	95.2414	-0.1359
94	96.4888	-0.0885
95	97.5528	-0.0500
96	98.4292	-0.0259
97	99.1144	-0.0113
98	99.6057	-0.0040
99	99.9013	-0.0008
100	100.0000	0.0000



and incorporated only a degree or so of wing twist.

For those contemplating construction of CO^7, be advised Hans-Jürgen states there are no performance improvements to be made by changing the wing tip section.

The successor to the JOINED 1, described in the April issue, will be the focus of our next column. ■

RSOO1T1O		
n	x	y
0	100.0000	0.0000
1	99.7260	0.0112
2	99.9070	0.0513
3	97.5530	0.1321
4	95.6770	0.2566
5	93.3010	0.4233
6	90.4510	0.6362
7	87.1570	0.8999
8	83.4570	1.2104
9	79.3090	1.5584
10	75.0000	1.9431
11	70.3370	2.3572
12	65.4510	2.7835
13	60.3960	3.2114
14	55.2260	3.6382
15	50.0000	4.0427
16	44.7740	4.3902
17	39.6040	4.6651
18	34.5490	4.8653
19	29.6630	4.9792
20	25.0000	4.9934
21	20.6110	4.8999
22	16.5430	4.6926
23	12.8430	4.3694
24	9.5490	3.9304
25	6.6990	3.3831
26	4.3230	2.7485
27	2.4470	2.0539
28	1.0830	1.3247
29	0.2740	0.6255
30	0.0000	0.0000
31	0.2740	-0.6255
32	1.0830	-1.3247
33	2.4470	-2.0539
34	4.3230	-2.7485
35	6.6990	-3.3831
36	9.5490	-3.9304
37	12.8430	-4.3694
38	16.5430	-4.6926
39	20.6110	-4.8999
40	25.0000	-4.9934
41	29.6630	-4.9792
42	34.5490	-4.8653
43	39.6040	-4.6651
44	44.7740	-4.3902
45	50.0000	-4.0427
46	55.2260	-3.6382
47	60.3960	-3.2114
48	65.4510	-2.7835
49	70.3370	-2.3572
50	75.0000	-1.9431
51	79.3090	-1.5584
52	83.4570	-1.2104
53	87.1570	-0.8999
54	90.4510	-0.6362
55	93.3010	-0.4233
56	95.6770	-0.2566
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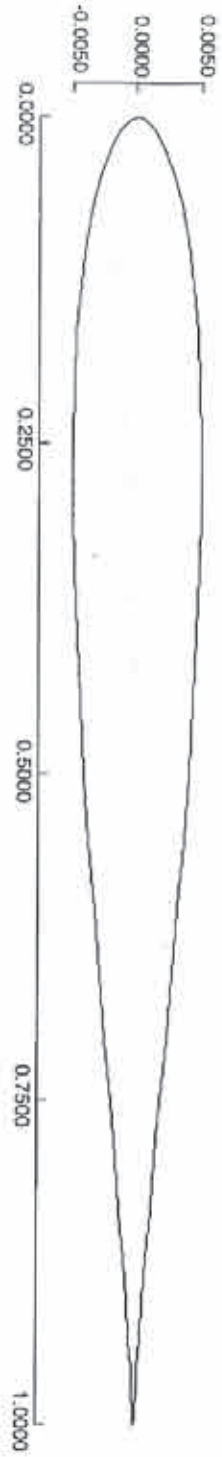

Ways To Get "Her" to Fly RC Gliders .....She says.....

...by Sandie Pugh
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I am often asked, "How can I get my wife to fly gliders like you do? How did you get started flying RC gliders?" I will try to give anyone interested some hints, from my point of view, on how to get "Her" to fly RC gliders. I should start this off by stating that it seems to help, if the person you want to share glider flying with, likes to go to the field, be in the outdoors, and likes to share things together; likes airplanes; likes electronic toys and gadgets; has the time to spend on this hobby, and is a bit of a "Tom-Boy". She may also display other skills which are helpful, such as enjoying and being good at crafts and hand projects; or, she can sew and follow the directions on a pattern; she knows the names of, and can use, some of the tools in your workshop; or maybe, she is a certified meteorologist (Tongue in cheek, here.). This is really an aptitude review; and, these sorts of skills can make it easier for "her" to become a competent pilot and builder (eventually).

I have been actively building and flying RC gliders for over 10 years. At first, everything was not only a struggle, but also each step forward was its own reward. When I got to the point that repairs could be done at the field and the glider went home in one piece, fully flyable, to me, this was a great big deal! RC glider flying is not a "natural" for me, as it seems to be for some of the pilots. I have been a slow learner. But I have persisted, and now I truly enjoy the competitive arena and the camaraderie that is associated with it. This is a hobby that my husband and I can participate in together. We can compete with each other, and still share the joy of the other person winning. My husband has been my coach, and biggest supporter throughout the entire process. We travel to contests throughout the Northwest and spend many wonderful weekends throughout the summer in this manner. We have also enjoyed being very actively involved with the Northwest Soaring Society (NWSS) for the past twelve years. I won't begin to cover all of the many ways to encourage "Her", but if you want to get "her" into this sport, here are some of the things that we did to get me going.

Build her a Standard Class (98-100") glider, such as an Oly II. I tried power flying first, and went through several iterations of 2 meter gliders before graduating to a standard class glider. For me, it was with this standard class glider that I suddenly felt that I had control of my own destiny and could actually relax and fly this airplane. The 2 meter gliders are faster, more responsive, and less forgiving than the standard class polyhedral airplanes. Consequently, it is my opinion that "she" will feel more comfortable with this class glider.

Carefully pick "practice days". For example, calm, minimum wind conditions, and few flyers at the field. At first, I was very reluctant to fly with other people around, and felt that making mistakes would make me look foolish. I also was concerned for the safety of other people at the field. It helps you to be aware of this and to also let her know that we all have to go through the learning curve to fly RC gliders.

Build up her confidence. If she crashes, rebuild her airplane and tell her how proud you were of the way she handled things. Ignore the fact that there was only one tall tree close to the field, and she hit it. I probably hit most of the objects on the field when I started, and so did many of the other novice pilots.

Set up a training program. My coach (husband, best friend, flying buddy) established days that we routinely went out to practice; this became a routine. My husband taught me things such as: controlling right and left and up and down, and how to control the glider when it is flying directly at you. It helped for me to stand in the same direction as the glider was flying, until I got the hang of changing controls when the glider was flying directly at me. Another tricky operation is learning depth perception. I had no idea at first if the glider was 50 feet off the ground or 100 feet. We used a bike flag attached to the end of a tall stick. This was my visual guide for my landing approach, and knowing it was low enough to land. Think about unique ways of teaching "her" these basics.

Practice the 3 P's. Practice, Practice, Practice. She can't learn to fly unless you are flying regularly with her.

Join League of Silent Flight (LSF). This is probably the very best way to put her through the discipline required to learn the basics. It is also self-rewarding to be able to track your progress and accomplishments. My husband and I went through these tasks together. Level I and II are particularly geared to the beginner. Level III, IV & V can be quite challenging. We actually made a game of it and, when we accomplished a certain level or especially difficult task, we rewarded ourselves with dinner out.

Attend local club meetings together. As a method of encouraging her to attend club meetings, take her out for dinner before you go to the club meeting. This is a wonderful way to get building, flying, etc., information from other pilots. It also is a great bunch of people. Here, you can learn the latest building techniques to recommendations for the next glider you want to build, or discuss the next transmitter to buy or not to buy.

Launch her airplane. I found it less stressful/intimidating to have someone launch my glider and fly it up for me, handing me the controls after it was safely launched. After I was comfortable with that procedure and could safely manage control of the glider, it was time for me to fly it up while someone else launched. I still

have someone launch the glider for me. I have difficulty controlling the glider and launching it with sufficient power behind the toss. *(Maybe I should take up weight lifting.)*

Be encouraging, not critical. This is probably the most important hint I can give you. It takes a great amount of patience and consideration to teach "her" to fly. Never, never, never, discourage her with verbal put downs whether it pertains to flying, crashing, or building skills.... You could very quickly lose your flying buddy.

Don't intimidate her with the aspects of building. At first, just let her get the feel of flying. As she starts to improve her skills and is enjoying flying, let her help you with the repairs. At first, just being together and watching while you repair the glider is enough. This will help her understand how much time is involved with repairs, and that one must be as careful as possible when flying. It will also teach her the language of gliders (i.e., fuselage, rudder, horizontal stab, control surfaces, servos, etc.). As her understanding increases, let her do the repairs (with your encouragement and assistance, of course). However, building/repairing is not necessarily a requirement. If you don't mind doing this for her and she prefers, trade tasks. For example, you fix her glider while she prepares dinner for you.

Participate in Novice Events together. Encourage her to participate in the local club contests. Participating as a novice is fun, plus you will see others flying and gain from their advice and help. She may pick up hints, such as how to work low thermals, where the thermals seem to be on the field that day, etc., from watching the more experienced flyers. Don't forget that camaraderie (from the RC pilot community) is a side benefit of this hobby.

Help her read and understand the building plans/instructions. This assumes, of course, that she is to the stage where she is interested in building a glider. When I was beginning, most manufacturer's instructions said, "Be sure to read all of the instructions before starting." Yeah, right! When I started, I couldn't get through the first paragraph and understand it, let alone read through all of the instructions. It takes time and experience to get to a level where you can read through the plans and remember the pertinent information prior to beginning to build. We have handled this difficulty in several ways. Sometimes, my husband and I would build two models simultaneously. He would complete one step, show me and I would copy this step. Now, I use him as a consultant. (The fees are pretty high.) He tirelessly seems to answer my many questions, and give me help each time I ask. This keeps the frustration to a minimum for me. It also frees up his time to build his own gliders instead of having to build for both of us. It's a win-win situation.

Join AMA (Academy of Model Aeronautics). She can get a slightly reduced family membership rate. The magazine, *Model Aviation*, which is included with membership, is interesting to read and has lots of manufacturer's advertising of new products, etc., which is helpful. Most important, however, is the $2,500,000 insurance coverage that is provided by AMA. AMA membership is also required for local club participation in contest events.

Remember, when all else fails, rewards do work. Tell her you will buy her a new dress, diamond bracelet, etc. if she passes LSF Level II. (Tongue in cheek, of course.)

Well, whatever it takes, this is a hobby that a family can do together. Good Luck and High and Long Thermals! ■

Jim Pugh dropped us a note to let us know that, "At the conclusion of the '96 Northwest Soaring Society (NWSS) contest season, just ending on September 15th, Sandie has been elevated from Competitor Class to the Expert Class after her great flying the past season. She is the first Woman in the history of the NWSS to achieve this honor. Also, Sandie will be doing the honors as the new NWSS Newsletter Editor, replacing Roger Breedlove, who has been doing the newsletter for several years." (Congratulations, Sandie!! Ed.) ■

Don with his Calculus and Barry with his Contestant after both completed 8 hour flights.

Right - Don, Barry, Glen, and Wayne. Note ribbon on Barry's antenna. The wind was brisk for the first 6 hours.

LSF Trials

Tri-Cities, Washington
...by Harley Michaelis, LSF 023
Walla Walla, Washington

Saturday and Sunday, June 1st & 2nd, a group of aspirants gathered north of Pasco, Washington on Sagemoor Road, which extends westerly from its intersection with Highway 395 going north out of Pasco.

Among those present were this writer and Harold Ochs of Walla Walla, Washington, Kirby Parker, Wil Byers and Wayne Yamamoto of the Tri-Cites, Don Pesznecker, Barry Kurath, Dave Johnson, Prashant Manikal, Mike Bamberg, Dale Bamberg, Greg Springate, and Glen Pyle of the Portland area, Jay Decker of Albany and Greg Norsworthy, a recent arrival to the West Coast.

Sagemoor is a mostly flat, black-topped country road that provides an ample straight stretch for Goal and Return. It is relatively lightly traveled and passes through open, diversified farming land, conducive to good thermal generation. Eagle Butte, facing west, and Kiona Ridge, facing north over Benton City are located some miles further west in the event that conditions for slope flight seem promising.

A winch was set up adjacent to the road in a recently harvested alfalfa field. From this point west, Level 5 aspirants could go for a 2-hour Thermal, or a Goal and Return.

Saturday

It was a clear day of 75-80 degrees, with a few, wispy cirrus, and the only "wind" the result of sucking thermals. From initial launches, strong lift seemed everywhere. Those flying dedicated XC ships were soon dotting out, going for 2 hours or the 10K Goal and Return.

The merit of larger ships for such tasks was particularly apparent. The typical thermal contest ships on hand simply can't be seen well enough at the extreme altitudes where the bulkier, larger profile, dedicated ships can fearlessly be allowed to go. Time and time again, going for 2 hours with my Genie, the only thing visible seemed to be the "floaters" in my 75 year old eyeballs. I came down too far the last descent, wanting to relieve the neck, could not find new lift and landed at 88:04. Still, it was the longest thermal flight I had ever had. Two hours would seem feasible with a bigger ship that would remain visible further out and higher up.

Dale Bamberg launches Don's Calculus to start 8 hour flight.

Dave Johnson kneels reverently at the feet of Don and Barry.

Don, Dale, and Barry, shortly after start of 8 hour flight.

Saturday Results

Harold Ochs does his Level 3, 1K Goal and Return. Prashant Manikal does 2K for Level 4. Dave Johnson does a 2 hour thermal flight from a lawn chair, making it look easy.

Barry Kurath does a combined 2 Hour Thermal, plus 10K Goal and Return. He gets back still needing 8 minutes of air time, puts that in over the launch point, then lands. A respectful round of applause was given from all the guys on hand. It could not have happened to a nicer fellow.

Sunday

There was a steady wind from the north, hampering both XC and thermal work. After several unsuccessful attempts at thermalling, some of the fellows took off for Benton City. Those of us who stayed at Sagemoor, thinking 2 Hour Thermal, never caught much of anything. It was just not a thermalling day. Further, the day was marred by calamity.

Kirby Parker, using an RnR SB-XC borrowed from Mike Bamberg, was coming in to land, thinking he was this side of some high-tension power lines. He wasn't. Yep, the CF in those wings will definitely carry a current. The lines shorted out in a big blue arc and one severed line fell to the ground along with the charred XB-XC. We were told electricity to 400 homes was interrupted and major overhead irrigation operations in the area halted. Time will tell what the outcome of all this will be, but we are reminded that our depth perception can deceive us. We are often further out than we think, and find that tree or pole or windmill, in the line of sight, is actually on this side of our ship... Curses!

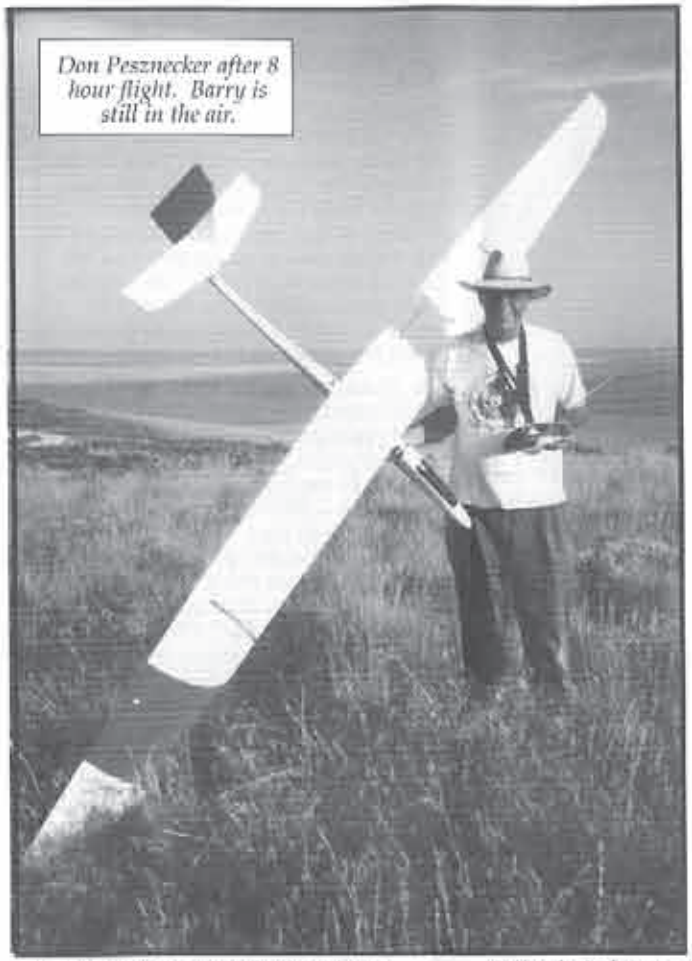
Sunday Results

At the slope, with several of the fellows volunteering all day as a dedicated slope support group, Glen Pyle completed a Level 2, 1 Hour flight. Barry Kurath and Don Pesznecker did their Level 5, 8 hour flights, finishing up around 7:30 P.M., claiming it was easy.

As usual, spirited camaraderie highlighted the occasion and we were happy for those who accomplished their objectives. As to the rest of us... Well, with the help of our friends, we will try again another time.

An additional note from Don Pesznecker

Barry and I had planned this event for Level 5, only. As it turned out, there were flyers working on other levels who did not only Cross Country, but Thermal and Slope flights as well. This worked out rather well for everyone. On Saturday, after Barry left in the convertible for his Cross Country flight, Dave Johnson and I launched within minutes of each other and were specked out in no time. Dave was flying a multi-meter XC airplane at



Don Pesznecker after 8 hour flight. Barry is still in the air.

about a gazillion feet (higher than I wanted to fly), and only needed help finding his plane about 5 times during the flight. About 1 hour into the flight, Barry returned, and I elected to continue my thermal flight rather than going out on the road. As it turned out, I only flew for 1 hour and 40 minutes. Later I tried the XC, but only went 3 miles. I was a little disappointed, but very happy for Barry. What can I say about the slope flight? It was a long day, we had a great time; flying with another airplane doing the same thing is a huge benefit. I am not sure I have really landed yet. Barry?

A note from Barry

It always amazes me how much support I get from my fellow soaring pilots. These guys drove a long way to spend the weekend helping us achieve our LSF tasks. Harley didn't mention a couple of the flyers who showed up on the slope, and added a bit of fun and excitement to a long, boring flight. Russell and Chris flew over from Seattle, just to do a little slope flying on the world famous, Tri-Cities slopes, and they ran into us. I think they thought us a bit peculiar to want to fly 8 hours, and they are quite right. Crazy might be more accurate. They didn't realize how BIG our planes were until I started chasing Russell's plane with my Viking Models Contestant. It has 12 foot span glass polydihedral wings, and is pretty fast. Don's British Calculus is even bigger, at about 14 feet! Without the other planes in the air, the 8 hours would have been much more difficult. I also want to mention the land owners who allowed us the use of their field and slope sites. Without the use of those sites, this whole event would have been impossible. Many local pilots have done a lot of PR work to make sure that these slopes remain open to us all, and I certainly appreciate their efforts!

The LSF Accomplishment Weekend was a far greater success than we could ever have hoped for, and we would like to do something similar in June of 1997 if there is any interest. Please call us if you would like to participate, or be part of the support crew for the next batch of pilots.

Don Pesznecker, (503) 659-9624, e-mail: Pesznecker@aol.com

Barry Kurath, (503) 236-4067, fax: (503) 236-1503 ■

"SHORT CUTS"

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(207) 929-6639

Infinity 600 Modification

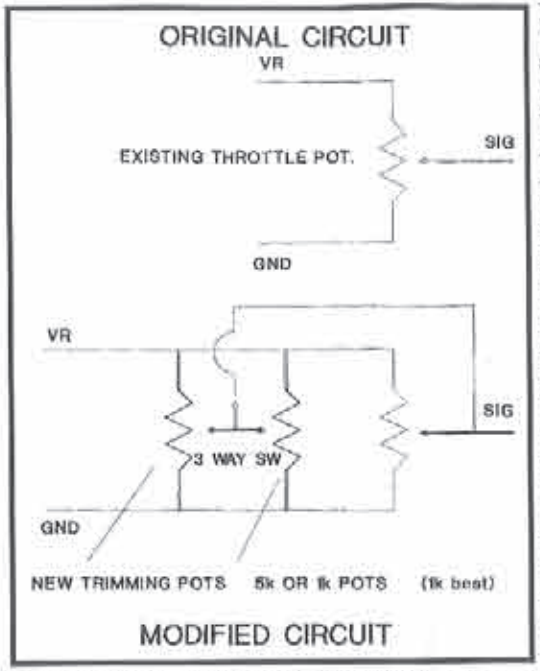
In December of 1991, I received my Airtronics Infinity 600, and have been quite pleased with the performance of both the hardware and the software. The radio has been left unattended in the hot 90 degree sun for hours, used in 10 to 20 degree winter weather during slope soaring, and has suffered through the sandy grit of Cape Cod, without much more than the need for a good cleaning. The software has been everything I expected, and then some. But now, after 5 years, I find myself wanting a bit more out of my radio, but not enough to justify purchasing a new Stylus; well, not yet, at least. Having 11 planes, I find the 50 plane, memory card of the Stylus tempting; but, I just bought another Infinity 600, instead. This means, that at any one time, I have 3 planes which are not in memory.

What am I getting to? Well, I sometimes program the flaps to either drop or reflex by using the gear as the master on the compensating mixer and the flap as the slave. The problem is that you can have only one secondary preset position for the flaps by this method. The solution to this was to install a seventh switch along with two adjustable potentiometers on the radio case. The new switch has three positions, and is wired into the circuit controlled by the throttle stick. With the stick in the forward position, and the three position switch in the center position, the flaps behave as normal. Flip the switch up, and the preset position of the flaps can be adjusted by the appropriate potentiometer to the desired amount of reflex. Or, flip the three position switch to the down position, and the flaps can be preset down for additional camber.

The circuit works the same as if the throttle stick has a preset, pre-designated position (detent), or similar to an elevator preset. Only the at rest position of the flaps is changed; the throttle stick will still control the flaps through their entire range of motion, regardless of which position the switch is in. What about the rest of the trailing edge, you may ask? No problem; just use the F/E-LAIL and F/ERAIL mixers to adjust the amount of travel needed in order to get the ailerons to follow the movement of the flaps. This works great in the air during launch, thermal, and reflex conditions, but what about landing?

Well, when you pull the flaps via the throttle stick, the entire trailing edge will drop; adverse yaw will be a nightmare. Here's the solution; set up one of the switches to control the compensating mixer, either on or off. Select the throttle as master and the aux channel as the slave. Here's the trick; mix the aux channel to tip the ailerons up, or use just enough mix percentage to counter the pre-existing F/ELAIL and F/ERAIL to keep them neutral, if desired. Just remember to snap the switch on approach. You got all of that? Don't bother looking in the manual, because it's just not there.

The circuit I used is enclosed with this article, and is very simple for those electronic wizards out there. (If you are not an electronic wizard, are concerned about voiding the warranty, or simply don't have the time, have the modifications done by someone who can.) Pat Flynn of Cross Country fame had his Infinity 600 modified by Craft Midwest for a very reasonable fee. When I did mine, I used 20k pots, which were a bit coarse, so I would



have to recommend using either 10k or 5k pots. There is ample room to install the two pots and the three way switch on the upper face of the transmitter.

Ever seen an Infinity 660 or 1000? They have pots and switches already installed in this area of our radios and, since the 600 case is the same, Airtronics put neat little cap plugs in these areas.

To remove the cap plugs, just open the case and use a pair of needle-nose pliers to squeeze and push the plugs out from the back. Oh, in regards to opening the case, first, remove the module and then the battery. You'll find two screws under the battery and four in the back or the case. Early 600's like mine have only two screws on the backside of the case. After that just connect the leads as shown, or better yet, let an electronic tech who's familiar with R/C gear do it. It's as simple as that. The camber changing done through this modification and mixing is not as accurate and user friendly as that of the Vision or Stylus but it's fine for my stock of planes and for my flying skills. Have fun and don't let your solder run.

■

IHLGF

Photograph taken at the June, International Hand Launch Glider Festival in Poway, California was sent in by Dennis Short of Big Water, Utah. Dennis says, "Joe Wurts is showing his inimitable style at the IHLG Festival. Of interest, is Daryl Perkins waiting to launch, seeing if Joe catches 'air'."

The Electric Connection

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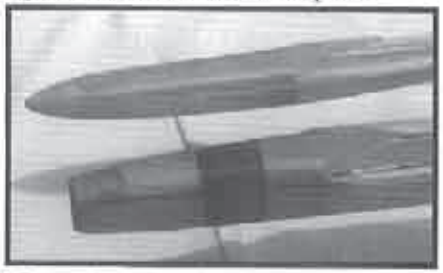
First Look at the DJ Aerotech Monarch EX

I was excited to receive in the mail a DJ Aerotech Monarch EX kit and quickly popped the box open to look over the contents of the kit. As many of you out there flying R/C HLG know, the Monarch series of R/C HLG models are some of the most competitive models on the market today, and the sheer numbers of them at contests, both large and small, attest to the Monarch's capabilities. Joe Hahn and Don Stackhouse have been constantly tweaking and improving the breed and have yet to hit a plateau when it comes to improvements. They have now turned part of their attention to the Speed 400 size electrics with a model that mates the wing and tail feathers of the Monarch HLG to a new fuselage that has the room to take a motor, speed controller, and motor pack.



Comparison shot of a Monarch '93 fuselage and that of the Monarch E. The black band is a piece of heat shrink tubing that you carefully shrink to fit so as to hold the canopy in place. A great idea, and it saves peeling off tape between flights! The E fuselage has the nose and LE bulkheads already epoxied in place and weighs a scant 1.8 ounces.

The electric version of the Monarch comes in either E or EX versions with the E being the polyhedral version while the EX comes equipped for flapperons. The kit comes with pre-sheeted wing panels and V-tail stabs, a fiberglass fuselage with the bulkheads already epoxied into place, fiberglass wingtips, strip balsa for the wing and stab leading edges, as well as flapperon and ruddervator facing material, and a bag of accessories such as wing mounting plate & bolt, wire pushrods, fiberglass tape, flapperon hinging material, etc. When I first pulled the wing panels out of the foam core beds, I was struck by the exceedingly thin, almost free flight shape of the airfoils used. If I didn't know better, I would have thought that the wing panels were bagged with too much pressure! Having looked at Joe's Monarch C at the LSF/AMA Soaring NATS, I was prepared for it and I look forward to seeing how they work out in practice.

The airfoils used on the Monarch E wing are definitely thin! Chords for the wing are 7.5" at the root, 6.375" at the panel break, and 5" at the tip with a total wing area of 387.5 sq. in.

After looking over the drawing and instructions care-fully and visualizing what would need to be done, I started by putting the leading edges on the wing panels and stabs and the tip blocks for the stabs. After the glue had dried, it was time to razor plane and sand them to shape, checking the shape with the LE templates found on the drawing. I would suggest care and caution with this step, as the balsa used for the leading edge stock is quite soft. Slow yourself down and use 400 Grit sandpaper and a light touch, checking often. The wing panels already have the dihedral sanded into the ends, so joining them is fairly straightforward. The V-tail stab halves also are pre-sanded for joining. I cut away the ruddervator surfaces from the fixed surfaces and joined the fixed surfaces together. I then proceeded to attach these to the fuselage, checking and double checking the alignment. I then started to carefully cut away the flapperon surfaces from the wing panels by using a very sharp razor. You will actually cut through the balsa skins and some fiberglass reinforcement under the skins. Go slow so as to not distort the wing panels or flapperons. The hinge line for the flapperons is actually a 1/8" inch wide gap; and this gap is spanned by the hinging material. When the flapperons are cut free, clean up the edges with a sanding block, and then glue the facing material to the exposed edges.

We'll finish up construction and hopefully have some flights under the belt for the next column.

Most of you know about the *League of Silent Flight* (L.S.F.) and the great flight achievement program that is promoted. Well, there is an electric flight equivalent to that program and it's handled by the *League for Electric Soaring* (L.E.S.). L.E.S. is a no dues organization that has no direct affiliation to the L.S.F. but is meant to parallel the goals of that organization.

The Flight Achievement Program consists of 6 levels with goals based on thermal duration times, landings, goal and return flights, and competition participation, again similar to the L.S.F. program. These Flight Achievement Level Requirements are:

I - • Two - 10 minute thermal flights
• Ten spot landings within 10 feet of a mark

II - • Two - 15 minute thermal flights
• Ten spot landings within 5 feet of a mark
• Competition performance - at least 5 entrants resulting in 1 place or 2,000 points

III - • Two - 30 minute thermal flights
• 1/2 mile unpowered goal and return flight or
• 3/4 powered goal and return flight
• Competition performance - at least 5 entrants resulting in 2 places or 3,500 points

IV - • Two - 45 minute thermal flights
• 3/4 mile unpowered goal and return flight or
• 1 1/2 powered goal and return flight
• Competition performance - at least 7 entrants resulting in 1 win and 2 places or 5,000 points

V - • One - 1 hour thermal flight
• 1.0 mile unpowered goal and return flight or
• 2.0 mile powered goal and return flight
• Competition performance - at least 10 entrants resulting in 3 wins or 8,000 points

VI - • Two - 1 hour thermal flight
• 2.0 mile unpowered goal and return flight or
• 4.0 mile powered goal and return flight
• Competition performance - at least 10 entrants resulting in 3 wins or 8,000 points

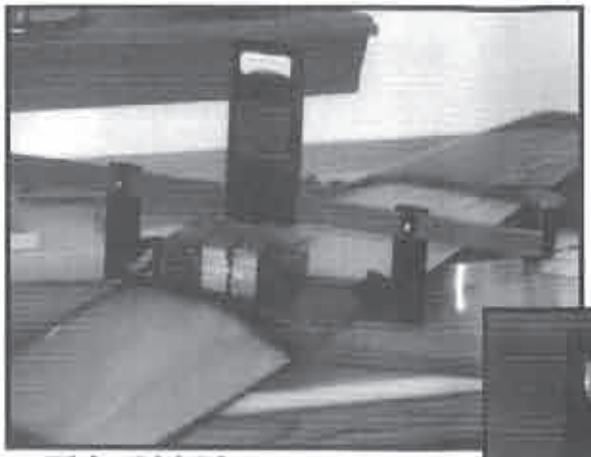
To receive a copy of the complete Flight Achievement Program and voucher, contact: League for Electric Soaring, Ken Cashion, Recorder, 157 Tennyson Cove, Picuyane, MS 39466; 601/798-5807.

It looks to be a worthy program and I plan on participating in it myself.

I need to set the record straight on a couple of models mentioned in the July '96 issue. I referred to the Klingberg Thermal Thing and Thermal Fling when listing other Speed 400 size models that are available. These models are actually the Future Flight Thermal Thing and Future Flight Fling Thing and they are available from: Future Flight, 1256 Prescott Ave., Sunnyvale, CA 94089; 408/735-8260.

I previously framed up a Thermal Thing for a friend, easily modifying the nose to accept a Robbe Speed 400 motor with Planeta gearbox. The model went together very easily and the finished airframe is very light. With a wingspan of 71", it's a little too big for ElectroSlot 400 rules but that's easy to modify or you can leave it as is for a fine sport thermal model.

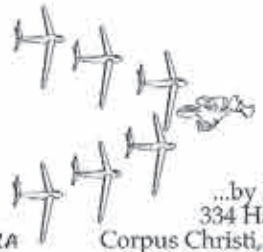
That's it for this month! Get'em built and keep'em flying!! ■



Picture 1 - Mount the fuselage solidly, and measure wing angle. In this case, +3.5 degrees.

Picture 2 - The desired +2 degrees on the meter, yields a -1.5 degree incidence. Note the line drawn on the fuselage, parallel to the bar. This is the mounting reference mark.

This Old Plane



...by Fred Mallett
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ZIKA

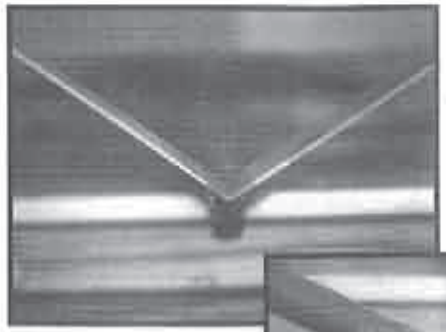
Mounting a V-Tail

I like V-tails. Mostly due to the fact that with 20 some odd planes in the shop, I could not even walk around if they were conventional, or T-tails. With V-tails, I can hang 4 or 5 on each set of pegs. They stack up so nicely, and there is little better than a stack of planes waiting to fly.

I have heard the question regarding how to get V-tails attached at the correct angle, so many times, that I wonder if the question is really about what decalage one should be using. In other words, if it was a conventional tail, would these same people get it right? Let's assume that is true, and that you know exactly what decalage you want. In that case, there is really no difference between mounting V-tails, or cruciform (conventional) stabilizers.

Shown here is a pictorial example of how I do it, along with some text that explains how I would have done it on different fuselages. The steps are the same as mounting any stabilizer, except that most fuselage manufacturers give you a pre-set flat spot for conventional tails. The issue here is to set the angle between the wing, and the tails. What angle, you ask? That is way beyond the scope of this article. However, I typically guess, based on the airfoil being used, the performance envelope of the plane, and the desired pitch handling. For example, using an RG-14, on a fast slope ship, I always like .5 degrees. On an HLG with high camber, I like about 2 degrees; with lower cambered foils, I start with 1 to 1.5 degrees. Note that if it is a new foil, or planform, I expect to have to do some shimming to get the exact performance I want from the plane. I often build prototypes with a conventional tail to start with, and then it is easier to shim the wing or stab to find the right decalage angles. Once you know the angles needed, a V-tail is easy to mount.

The plane used in the pictures is a combination of the wings and tails from my competition HLG called the "Epsilon", and is being mounted on a Mosquito 96 fuselage from Weston Designs, also known as WACO. With a 4 oz. wing, .6 oz. tails and a 1.1 oz.



Picture 3 - Joined V-tails, tacked with thin CA in the notch. This is the last chance to make changes before permanent mounting.

Picture 4 - Glass reinforcement 3m77'd into place before laminating, in this case, with CA for lightness.

fuselage, it was easy to come in very light. Due to previous testing, I know that this plane flies best for me with 1.5 degree decalage between the wing and stab, as measured with my Robart incidence meter. I point out the meter used, as the cradle that sits against the leading edge of the wing does not exactly center, since this is not a symmetrical airfoil. If I were doing this with rulers, the actual angle in this case would be 1 degree, when measured from exact LE to TE of each surface.

The $35 for the meter was among the best tool money I have ever spent on planes. I recommend it strongly.

The steps:

1) Mount the wing on the fuselage. Until you do this, it is rather difficult to determine the angle the wing will be sitting at exactly. Now, mount the fuselage solidly. Don't worry what angle it is at, so long as it is solid. I also block the wings up level.

2) Measure the angle the wing is sitting at. This is shown in picture #1. I have clamped the meter on the wing, being sure to keep the bar aligned with the fuselage center. If you are not familiar with this meter, it has two swiveling V-notched plastic pieces that center on the LE and TE. This makes the horizontal bar indicate the angle that the wing is at. (I didn't notice, until the pics were developed, that I attached it on the far side of the fuselage; it would have been easier to see if it were on the close side. It is reading +3.5 degrees. This means that I will need the tails to be set to +2 degrees to get the decalage of 1.5 degrees, as desired. This might also be called 1.5 degrees negative incidence on the stabs.

3) Next, I remove the V-notch attachments, and place the bar against the top back of the fuselage, adjusting the angle until it shows the desired decalage. In picture 2, you see it reading the desired angle. Now, very carefully, looking perfectly horizontal, mark a line on the fuselage parallel to the bar. Check it 3 times, then go get a cup of coffee, then come back and check it again. This is the line that the tails will be mounted to, which is the incidence.

4) At this point, it is all over. Just mount the tails with their leading edge and trailing edge on this line, and you have set the decalage.

Other Thoughts

On some planes, you could take the two tails, make a jig for the angle from horizontal, and glue each tail separately to the sides of the fuselage. I find this one difficult to get perfect, as you make 2 lines, and 2 glue joints; this means there is 4 times the margin for error. I find it much easier, and more accurate, to join the two tails at the desired angle for the V, and then mount the whole assembly.

In the example shown, I did make two lines, one on either side of the fuselage; then cut along the lines, and across the top, to get a slot in the top of the fuselage. At this point, you can check to be sure the decalage is correct, measuring against the top of the slot. I

put a block of wood on the slot, pretend it is a stab, and re-measure the decalage. If all is well, proceed; if not, whittle away.

Next, I do the sanding, and join the V-tails with C/A, then two small layers of glass and C/A on the top in the V. One is 1/2" wide; the next is 1". Next follows one 1" layer of glass on the bottom of the joint; then it is ready to mount.

Put the V-tail in the notch, as seen in picture #3. Put a ruler across the tops of the V, then back up until you hit a wall, and eyeball it to see if the ruler is parallel to the wing; if so, glue it in place lightly with thin C/A. I say lightly, because when you remove the ruler, things might change; this is due to the weight of the ruler bending the V-tail if it is an HLG. If they are slope plane tough, it'll be fine. Shake the plane around; then eyeball it again; set the ruler up there again, and be sure you are happy with it. Time to lay a bit more C/A on there to be sure things don't move during glassing. In Picture #4, you see that for HLG's, I use 3m77 sprayed, glass cloth; rub it into place, and then use C/A to laminate it. On larger planes, I use epoxy, and don't need the 3m77 first.

If you don't have the $35 for an incidence meter, you can still do all the steps above. Use masking tape on the sides of the fuse under the wing, measure down the same distance from the wing at the LE and TE, and then use a line drawn through these 2 points as the reference. Extend this line to the tail sides; then use a compass to draw the angle for the tail.

Good luck, and good flying. ■

Robin Lehman holding his RCSD "So you want to learn to fly gliders?" article at the Los Banos Slope Scale Soar-In. Photo by John Dvorak.

Teach Glider Pilots in Gliders! On the Slope!

A rebuttal to power plane instructors.

...by John Dvorak
San Jose, California

Out West, we are blessed with slopes and wind in the right direction, most of the time. This means flying until your batteries give out, or the lift quits, or the wind becomes too intense for a beginner. It means many landing approaches or landings, and many controlled turns.

I can't imagine turning over a future glider pilot and potential club member to a power pilot. Sailplanes are simple: no engine, no throttle, no noise, no fuel, no smell, and no high speed, unless of course, it's electric. Slope gliders are at altitude soon after launch; they can stay at eye level and close-by most of the time.

Teaching a student pilot to fly from a flat field and catch thermals, may be a little more difficult, but launching a Gentle Lady from a hi-start simply slows the instruction due to more launches, unless you luck into a thermal. Even though visibility is reduced at altitude, the student may feel more confident that he won't crunch his sailplane, or the instructor's plane.

Thanks to Robin Lehman and his article on turning over a student glider pilot to a power pilot, I was motivated to write this article, and to take his picture. Robin traveled from New York to the Los Banos Slope Scale Soar-In located in California, just south of San Francisco. He is a very informative and interesting guy to talk with. I hope he returns next year. ■

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Sur Rebuttal, or More thoughts on power...

It's really nice to know that someone out there is reading my articles. Thanks, John!

From John's point-of-view, there are even more problems associated with powered aircraft that he didn't mention: vibration, the danger of getting your fingers cut off by propellers, spilling fuel into the fuselage and ruining the airplane, spilling fuel in your car and having to smell it for weeks afterwards, fire hazard, more expensive aircraft, more complicated aircraft, having to fuel-proof the airplane, and last, but certainly not least, it might take up to twice as long to build a powered aircraft; because of motor installation, wheels, and extra servos, it's undeniably a more complicated building job.

That being said, why would anybody in their right mind ever want to fly a powered aircraft?

One man's opinion

I like powered aircraft because they can take-off and land, are not dependent on wind conditions, and do superb aerobatics; when it comes to teaching (with a trainer cord), you might want to re-read "So you want to learn to fly gliders?". Also, unlike a crowded slope, they are not particularly prone to mid-airs. I plan to teach my kids with a powered trainer.

Interestingly, you will rarely find an experienced, powered pilot who doesn't use both sticks on his transmitter almost all the time. Powered aircraft are flown uncoupled. You will never find an experienced, powered aerobatic pilot who doesn't fly using both left and right hands all of the time.

If you learn to fly a powered aircraft from day one, you will learn to use both your left hand and your right hand most of the time. You will have to taxi your aircraft out onto the field using your rudder in the left hand; obviously, for take-off flying and landing, you use your throttle (also in the left hand) quite a bit.

Now, why would any of this be an advantage to a glider pilot? The answer is that there is no advantage if you're going to fly two meter sailplanes, exclusively. If you want to fly a Gentle Lady, or something similar, for the rest of your life, then there is absolutely no reason to ever get involved with a powered aircraft. If, on the other hand, your aim is to end up flying large sailplanes, and especially large scale sailplanes, then it really is in your best interest to learn to FLY an airplane from day one - meaning uncoupled. You will quickly find that each large sailplane flies somewhat differently and requires different combinations of controls in turns (rudder, aileron, and elevator). If you have learned to fly powered aircraft from day one, it will be natural for you to fly your sailplanes uncoupled and to great advantage.

Lehman

I found my visit to this year's Los Banos Scale Fly-In most interesting in many respects. Not the least of which was the fact that only about one in five or ten sailplanes were able to land on the landing strip. I had the strong impression that very few of these sailplane pilots had ever made a square landing pattern, and so they had great difficulty in placing their sailplane where they wanted it! Sorry guys! That's how I saw it! Interestingly, the one tow pilot who showed up landed his airplane every time, in just about the same place, on the strip. Now why is that?

If you learn to fly power, you will learn to do a square landing pattern (just like the full sized sailplanes). A square landing pattern helps you spot land with ease.

And last, but certainly not least, perhaps the most compelling reason for a glider pilot to learn to fly powered aircraft is to airtow. Wouldn't we have been delighted on two of the three days at Los Banos if there had been experienced tow pilots with good towplanes, ready, willing and able to airtow until the wind came up?

As the relatively new and happy marriage between powered aircraft and sailplanes becomes more and more firmly established here in the USA, more of you pure glider pilots will have first-hand experience with power, and can draw your own conclusions.

Lehman

Let's just agree that as far as learning goes, for some, the Gentle Lady off a slope or a high-start will be the best route, while for others, the powered trainer will be the most rewarding, fastest and best way to learn.

Above all, have a good time and good flying!

The Fiddler Crab Syndrome

Ever seen a fiddler crab fly? Well I ain't never seen one, neither! But I have seen quite a few guys flying as though they were fiddler crabs! Right-handed fiddler crabs at that! Hey, there are two sticks on the radio - why not use the left hand, as well?

I've seen a lot of guys flying who don't even touch the left hand stick on their radio! They are flying coupled aileron and rudder. And often, a suggestion that uncoupling might be the way to go, is met with everything from disbelief to hostility. Maybe you right-sticked guys interested in scale sailplanes should at least give uncoupling a try. Here's why:

The larger your airplane, the more it begins to resemble its full sized counterpart in flight. In order to make a good turn, you probably need some rudder and aileron (and elevator?) to get you turning, and then you need to do whatever you need to do in order to maintain a nice, gentle, efficient turn.

If you were sitting in a sailplane, you might have taped a small telltail towards the front of your cockpit, and the trick is to keep this telltail pointing right back at you while turning. (Watch your airspeed too, Bub!) When the telltail points directly back at you, this means you're executing a perfect turn - the right combination of yaw and bank, so that you are turning, but not side-slipping (which is a great way to lose height).

Why uncouple ailerons and rudder?

Many scale ships will fly easier and better than the best competition gliders - IF YOU FLY THEM WELL. Flying your particular scale sailplane well, in a turn, may mean starting the turn with ailerons only, then leaving it be; or, use ailerons, rudder and elevator to begin with, and then use a different combination of these to maintain a good turn; or, start the turn with aileron, elevator and rudder, and then use opposite aileron to maintain the rate of bank, etc., etc., etc. In short, each scale sailplane you fly may require DIFFERENT combinations of aileron, elevator and rudder in order to get the best and most efficient turn!

Now while it's true that coupled aileron and rudder sometimes will give you the best turn, this is rarely the case.

What does your particular ship require for the best possible, most efficient turn? I can't tell you. But it <u>does</u> require whatever the proper amount of rudder, aileron and elevator may be, in order to make a perfect turn. That "proper" amount of those three functions is definitely not exactly the same for every sailplane, or for that matter, for every turn. That's why I always fly scale ships uncoupled.

If you are thermalling or flying in marginal slope conditions, getting to know how your bird likes best to turn will serve you well. Uncoupled might be the best way to go! Fly your ship uncoupled and see what it requires.

When you can execute the best possible turns, you will find that you are able to stay up when others (with the same scale sailplane) cannot. The pleasure of an excellent, well done flight is really what it's all about!

Good flying! ■

A Note on Winglets

The following was a response sent to Robin, regarding the winglet article in the September issue. Joe Enhuei of New Jersey said, "Several days ago, early on a foggy morning, as I made a phone call from a phone booth very near to the south end of Newark airport, I observed a Lear Jet landing. It was somewhere around 100 feet overhead as it passed, and a vapor vortex was trailing behind each wingtip. About 5 minutes later, another, similar Lear Jet, with winglets pointing upwards this time, made the same landing approach and landed without any vortex at the wingtips, at all. Just smooth vapor trailing behind the wingtips. Very interesting!" ■

Response to Agnew Soapbox Article

...by Ed Wiley
Lawrence, Kansas

I agree with Brian Agnew. I am a novice glider pilot, and an "intermediate" free flight flyer. In FF, there are plenty (some argue too many) competition classes. Most do not require the equivalent of $1,200 to be competitive. None of these classes are "beginner's" classes. We have learned in FF that there are only beginners and not beginner's classes. But, many classes are within the technical building skills of beginners and novices and, since world-class flyers also fly these classes, the beginner can rely on help and advice from those with more experience. I can step up to the flying line with a $10 HLG or a $30 P-30 knowing that I am on equal footing with the "big guys" in terms of flying equipment, if not in terms of experience. I do not need a $1,500, Russian-made Wakefield (F1B) to compete against members of the US Wakefield team. I can compete against many of them when they fly their P-30s, and I can judge my progress towards FF mastery by watching and talking with them. As I gain experience, master the basics of competition, and perfect my building skills, I know that there are intermediate classes that act as training grounds for the ultimate FAI events. But, if I never get there, I know I can still be competitive in the "lesser" events.

So, what about gliders? I may never move into glider competition. But I would be much more likely to do so if I thought there was a relatively simple class between a Gentle Lady and computer controlled foam and obechi beauty that costs big bucks. Do I expect to see guys like Brian Agnew flying such a class and beating the pants off me? You bet. But I suspect that I would learn a lot, and when it came time to move to that foam and obechi beauty, I would be prepared. As the free flighters say, see you down wind.

■

Greg Finney saying, "See Ya - Goin' Soarin'!" After only 8 minutes of loading up and hooking up, the NuWay Trailer with winch and retriever system is ready to roll.

Close up of the system with the big, Super Crank 1,300 amp marine-commercial heavy duty battery.

Hitch Up & Go.....Soaring!

...by Greg Finney, Secretary
Appalachian Soaring Association
266 Plumb Alley West
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Four years ago, I moved from a large wooden house, that required a lot of maintenance with over two acres of lawn to mow and weed-eat, into a small condominium with no outdoor maintenance. In essence, I sold or gave away everything with a handle on it, and the weekends were all mine!

Having flown power R/C on and off for the last 30 years, sailplanes struck a special interest in me. A close friend gave me an old Airtronics Aquilla, that had been hanging in his garage for 15 years, to try my luck at soaring. After the first flight, I knew I was hooked. I was so hooked that I gave up golf, dropped out of the country club, all but quit fishing, and was flying gliders two to three days a week.

The local power club had an individual that personally owned a winch, but it was only available on the first and third Saturdays of the month. The other days of flying were flown using a high-start. Chasing that line got old real quick, especially in the hot summer afternoons. For a few months, I tried hauling around a borrowed winch with its ever leaking battery. Loading and unloading every time I wanted to fly, not only resulted in a strained back, but several shirts that have a line of little holes in them around the belly area from the battery acid. It was time to purchase my own winch and retriever system!

After attending several local and regional soaring contests, and closely examining and photographing different winch and retriever systems, as well as reading related articles in *RCSD*, I came up with a configuration that works extremely well for my own situation. The criteria for the system I wanted was simplicity, ease of use, quick loading and unloading, and small enough to store in a 10' x 20' garage. The condo association would boot me out if I decided to keep a trailer in my parking space. The second set of criteria was that I did not want to spend a lot of time on building my own home brew system from scratch; besides, I did not own anything with a handle on it to build it! Plus, I was very limited on work shop space.

By this time in my soaring career, I had not paid country club dues for almost a year, so I called up Mr. Cyril Rahm in California and ordered the entire system. A few weeks later, the system arrived by UPS in two boxes that contained plywood crates with the whole system bolted neatly inside. I was very impressed with the care in packaging and, to this date, even more impressed with the quality of workmanship and reliability of his winch and retriever systems. The total cost for the winch and retriever with turn around, line, shipping to VA from CA, etc., was $847.00.

With hinged cover open, the entire system is easily accessible and ready to set up. ASA Members standing (L - R) Jim Yearman, Bernard Leonard, Sr., Bernard Leonard, Jr. Kneeling (L - R) Ron Whaley and Dan Didgeon.

The next project was to find a small utility trailer with a good set of tires and axle assembly to haul the system on the highway with. After looking at several different models, I selected the 40"x48" trailer manufactured by NuWay, which comes in kit form. This kit comes with all the trimmings, lighting package, bearings and even the grease. These trailers are available at most Farm and Tractor outlets. It was hard to believe that an entire trailer could come in a box so small, but after six hours or so, and a good set of socket wrenches (borrowed them from a neighbor), the little trailer was ready to roll. My trailer was purchased from Central Tractor for $199.00. Your sales receipt along with a signature of purchase on the certificate of origin (comes with the kit) will get you the paperwork needed for title and tags at your Division of Motor Vehicles. Fees for title, taxes and tags were $52.00 in Virginia.

The next step was the trailer flooring. At a local lumber yard, I found 3/4" exterior grade, salt treated 4' x 8' plywood, which they agreed to sell me a half sheet for $24.00. They even cut it to size for me, at no extra charge. This was bolted to the trailer frame with carriage bolts, and then painted with four coats of exterior enamel. The underside of the entire trailer was sprayed with an automotive undercoating spray purchased at a local Auto Zone. Cost of the spray was $4.95. Where the edges of the plywood were exposed, I used a marine silicone caulking to prevent any water or moisture from leaking in.

And now came time for the power system. I knew what I wanted: the highest amp batteries I could find at a reasonable price. After some looking, I found the batteries at Sam's Club. For the winch, I purchased a 1300 amp, 12 volt marine-commercial type battery that was designed for starting diesel engines on boats and heavy duty machinery. This battery is over twice the size of a regular car battery and has enough amps to launch 4 or 5 lb. sailplanes over 100 times, without recharging. Cost of this monster was $99.00. The retriever battery was also purchased at Sam's. It is a farm tractor, 6 volt battery, with 875 cranking amps, at a cost of $67.00. I bolted on the winch and retriever to the rear of the trailer with two bolts in each unit. The large battery was mounted behind the winch, with two pieces of 1/4", all thread rod through the holes in the battery casing and the trailer floor. The other battery was screwed down with nylon, luggage strapping material. There are no holes in the casing for mounting and no available battery cases for this battery, because it is also larger than most car batteries. I topped off the whole rig with a plastic storage container purchased at Lowes for $12.00. This holds all the extra stuff such as retriever line, turnaround, tools, foot switch, etc.

This past winter, I made a cover for the entire rig by first constructing a 1"x1" oak frame, then covered the top of it with 5/8" AC plywood, and the sides with 1/4" AC ply. 5/8" triangle gussets were screwed and epoxied in all the corners for strength. All the joints and plywood were applied using screws. The corners were sanded, and I applied 6 oz. fiberglass cloth using 3-M spray adhesive, and then applied a 2 part marine epoxy. (If I had this part to do over, it would not have gotten completed. What a stinky mess! You could not go into my condo

for two days because of the epoxy odor. About got divorced over that move! If you do cover with fiber and use epoxy, don't do it in your garage; do it outside when no rain is in sight, or do it where the smell will not get into your living quarters.) All the rough edges were again sanded, and two coats of Tub and Tile white, epoxy paint were used to give the unit a hard, high-gloss, waterproof finish. 4" door hinges were used to secure the cover to the trailer frame. This worked out to be very convenient, because if you want to remove the cover at the field for everyone to sit on, make a picnic table out of it, or just to put together planes on it, all you do is pop the pins in the hinge and lift it off. Cost for all the materials in the cover was $97.00.

This spring I added a set of Real Balls to the winch. In order to save my starter motor for as long as possible, and its bearings, this was an added feature that was worth the cost. The winch even runs faster, due to the lubricated bearings, and I don't worry as much about all the sideways torque that the motor receives on launch. Cost of the Real Balls is $125.00.

So, the final tally for my winch and retriever system: $1502.95! So what, golf cart rental for one year cost that much! Not to mention dues and assessments! Plus, I do not have to ask a slow moving foursome, looking for their balls, if I can fly through!

I now have a system that is used every weekend by all the glider guys, in the recently chartered, Appalachian Soaring Association. We fly every weekend with an average of 8 guys flying per winch set-up. The system has been is use now for over a year, and thousands of launches have been completed. There have been no major breakdowns and no disappointments. Amazingly, it only requires approximately eight minutes to load up my planes and hook up the trailer. The same amount of time is required to unload, when I get home. The whole unit is easy to roll by hand, because the batteries and winch units are centered over the axle. So all I do now is "Hitch Up and Go..... Soaring!"

"May you get your wings in the air and your face in the Sun!" ■

The Saga Begins

In Search of W.D. Williams

...by Gordy Stahl
Louisville, Kentucky

My job in sales has me driving all over the country, and I try to take advantage of my locations and free time by visiting hobby shops and flying sites. Another resource for my adventures is the contributors to our magazines. If I am headed near the source of an article I have enjoyed, I usually attempt to stop by for a visit.

I have been to visit Chuck Anderson, Mike Fox, and Eric Sanders; on my last trip I was traveling through Kentucky toward Lexington when I noticed that Gravel Switch was on my way. W.D. Williams had an article in *RCSD* on Hexcell, a new building material that really sounded interesting to me and had recently been a topic of discussion between Russ Whitford (one of Milwaukee's top composite experimenters) and myself. Fate seemed to be sending a clear message for me to make contact.

By the time I got to the highway exit for Gravel Switch at Bardstown, it was already eight o'clock. So, I stopped at the closest motel to get a room and to call W.D. I should have known things were going to get a little strange when they told me the phones were not working. I asked about directions to Gravel Switch; they said they'd never heard of it, in spite of the fact it is only approximately 15 miles southeast. I checked the phone book hoping to find a number for W.D., but it did not include Gravel Switch.

I wasn't tired, so I decided to continue to the next town of size, Springfield, in the direction of my destination. It was very dark and the road wound like a snake, but I made it without a glitch. I stopped at a restaurant to check the phone book, still hoping to make contact yet that night, but again no listings for Gravel Switch. With the promise of a new motel in the next town of Lebanon, and assurances that Gravel Switch would be listed in their phone book, I continued onward.

At this point, I was low on fuel, so I stopped at a gas station hoping I would be successful in what had become a quest to find W.D. Williams of Gravel Switch. Things were looking up; the attendants were two extremely attractive women, the coffee was fresh, the rest room clean and the phone book listed Gravel Switch numbers. To add to my luck, one of the attendants knew a W.D. Williams in Gravel Switch, and she agreed to call them to see if they could help me.

She dialed the number and introduced me to a Mrs. Williams, married to Bill D. Williams, but not the W.D. for whom I was looking. She went on to explain that coincidentally, in the tiny town of Gravel Switch, there were actually four W. Williams and that none were related. She said she knew of the W.D. I was searching for because she sometimes had received his mail. She wasn't sure he actually lived in town, and seemed to have heard he was a transplant from Colorado. She said she had heard of people who *had seen* him, but did not know anyone who actually *talked* to him. For certain, there was no phone listed for him. She recommended I come to town in the morning to visit the post office, and that they would surely be able to help.

I headed to the new, town motel, a chicken dinner and thoughts of interesting sailplane discussions with the mysterious W.D. Williams of Gravel Switch, Kentucky. I was determined now that I would find him...

The next morning the weather was clear, warm and a perfect day to make a new sailplane friend. Onward on the winding, two-lane road, marked Hwy 52, I was on what I thought was the end of my quest; next stop Gravel Switch. A sign directed a road right toward the town. I pulled over on the shoulder, hesitating and thinking, "Should I give it up? Will my anticipation cause disappointment if W.D. turns out to be a Gentle Lady fanatic or still building his first poly ship?" (After all, I did have business calls to get to in Lexington.)

I decided I had to find him and drove into town. The first thing you notice coming into town is the store and the post office. It's very quiet, with not many houses. As I got out of my truck, the store owner happened to be walking toward the post office, so I asked him to take my picture. He naturally asked what brought me to Gravel Switch, and I told him my story. He said, according to his clerk, that my W.D. had been in their store a few times and was described as "quiet and somewhat mysterious".

He proceeded to tell me that, at one time, the railroad had a station/rest stop there and, since there was a gravel creek near by, the train would take on water and gravel for building and repairing the track beds. When the rail system died out, so did Gravel Switch; now it's mostly original families who enjoy the town and work in the cities.

I continued into the post office with even more anticipation than ever. I could not for the life of me figure out why a sailplaner from Colorado (if that part was correct) would move to an extremely hilly, no hobby shop town, with no slope and too many trees.

The postman knew of my W.D. Williams because he had seen the model airplane catalogs and magazines, but that, "No, he didn't live in Gravel Switch; he did have a P.O. box here, but his address was in the next town of Perryville. Fortunately, it was also on my way.

The address indicated an apartment right on the main road through town, so it was easy to find. When I pulled in front, the first thing I noticed was (You guessed it!) an apartment for rent sign; apparently, I had missed him again!

Well, I haven't given up after all that; it's become sort of an obsession and, as of March 1, I am moving to Louisville, Kentucky. No, not to find W.D., but for a new job, warm weather and great flying conditions. Besides, maybe W.D. is onto something moving to Kentucky.

People sometimes don't understand our interests in RC model aircraft; little do they know what adventures we experience because of it.

W.D.! Stop in for a visit. I'll be in Louisville or Milwaukee.... Really...

■

The Saga Ends

Finding W.D. Williams

...by Gordy Stahl
Louisville, Kentucky

(When Gordy Stahl first began searching for W. D. Williams, he wrote the first article and sent it in. Studying the article led us to the conclusion that W.D. might not want to be found. After all, not too many folks, sailplaners or not, make it a quest to track down another soaring enthusiast. So, we dropped a line off to W. D., and put Gordy's story on hold. Eventually, we received an update saying, "Well, I finally met W. D. Williams! I also got his permission for you to print the story if you'd like. He's a neat guy and really into the hobby. Meeting him was as mysterious as trying to find him. Here goes....." And the Saga Ends, ED. Or does it?)

As I stated in my story, "In search of W. D.", my quest started out with no particular goal other than to visit a fellow sailplaner on my way from one business to another. It was my habit to see if there was someone who was featured in RCSD's pages on my route. If time and target permitted, I would stop in and compare hobby notes, and hopefully gain a new friend. Among my victims were Chuck Anderson of Tennessee, Eric Sanders of Ohio (both airfoily famous), Mike Fox of Iowa (Nat's Champ), and Bob Sowder of Tennessee, a Mid-South hero.

W. D. had written about Hexcell, a new composite material and, by chance, was on my way from Tennessee to Lexington, Kentucky. Gravel Switch was the only address in the article, and I managed to locate it on the map... But all that was in the first part of this tale. I didn't find him, and I looked pretty hard.

Fate seems to have taken control of my life, because the delay caused by my search ended up with me being in the right place at the right time to receive a job and relocation to Louisville, Kentucky, a long way from my origins in Milwaukee. That was December of '95.

It didn't take long to get involved with the great group of sailplaners in Louisville, do some serious flying and, in my spare time, move the family, buy a house, and get a new dog.

Occasionally, my thoughts still wandered to the mysterious W. D. Williams.

A year had passed by, and it was time for our club's annual swap meet. I had some motor ni-cads for sale, and Frank Foster had shown up from Lexington with news that their club had a member who was intending to come in search of electric sailplane goodies. However, he didn't show up.

Near the end of the event, Frank stopped by and mentioned that it was a shame his electric friend didn't make it and, also, that this guy was a little mysterious, because the only way to get in touch with him was to write him at the Gravel Switch Post Office...

I couldn't believe it; I told him of my Gravel Switch adventure. He confirmed that it was the W. D. Williams. I told him that explained why he didn't make it to the swap; we weren't destined to meet!

The next day Frank called to tell me he had talked with W. D., and he would be at their mall show that weekend. I told him there was no way I could make it, and I made sure that I didn't tell anyone that I intended to go, so as not to jinx meeting W. D. Williams.

Finally, I would meet the elusive W. D. Williams... But not at the mall show. I sat in the Lexington Sailplane Club's display for a few hours when Frank arrived with news that W. D. was at a member's house nearby. He told me he had given W. D. a copy of my "In Search of" article, and that he was waiting to meet me, too.

Meeting him seemed like meeting an old friend; I went over my story and he filled in the blanks: why he used the Gravel Switch Post Office, why he was living so far from everything, where he came from, what he was working on. We talked for quite a while.

Just like I planned to do a year ago, it was fun and worth waiting for. I've got another new friend now, with lots in common. The mystery is solved! ■

Composite Wing Construction Tips Part II

Lee Sayers
Cocolalla, Idaho

Last time, I discussed tips on the preliminary processes of preparing the wing core and mylar carriers. This time, I'll cover various aspects of the vacuum bagging process itself. I would like to digress for a moment first, and talk about the layup schedule. There are probably as many layup techniques as there are composite wing builders, and most will yield a suitable wing. The main attributes we are looking for in a thermal wing are light weight and enough strength to hold up under hard contest launches. I use a refinement of the Frank Weston method of wing building, which advocates a wing whose skin thickness tapers from root to tip. This is accomplished using multiple layers of light fiberglass and unidirectional carbon fibre (up to five layers on both top and bottom) near the root, gradually tapering to two layers of glass on top and bottom near the tip. The strength of the resulting wing follows the load curve, keeping the tips light for better turning response and thermal indication. A typical, 60 inch, painted wing panel made in this way has a finished weight around 16 ounces, excluding servos and wiring. Whatever technique you choose, make sure it includes some means of increasing the wing's strength near the root where launch stresses are focused.

Preparing the Vacuum Bag

Bags are normally set up with a layer of breather cloth on the bottom, covered by peel ply to absorb epoxy squeezed out of the layup when vacuum is applied. Even with efforts to get the surface of the layup dry before bagging, you may have epoxy getting through the peel ply and adhering to the breather cloth. This is not only a mess to separate, it may ruin the breather cloth and prevent its re-use. This can be avoided by placing a layer of wax paper between the peel ply and breather cloth. Put another strip over the leading edge to make the bag easier to separate from the layup after you are done.

There is nothing more aggravating than putting a wing in the bag, only to find that you cannot get a good seal and the pump is cycling constantly. Always test the seal on the bag just before you begin doing the layup.

To avoid punctures in the bag after the wing is in, round off or tape over all mylar corners, and sand off all ridges that form if you have cut the mylars with a utility knife or razor. (I learned this lesson the hard way.) For best results, always use 14 mil mylar for your layups. It's readily available from all the composite material suppliers.

Vacuum Bagging

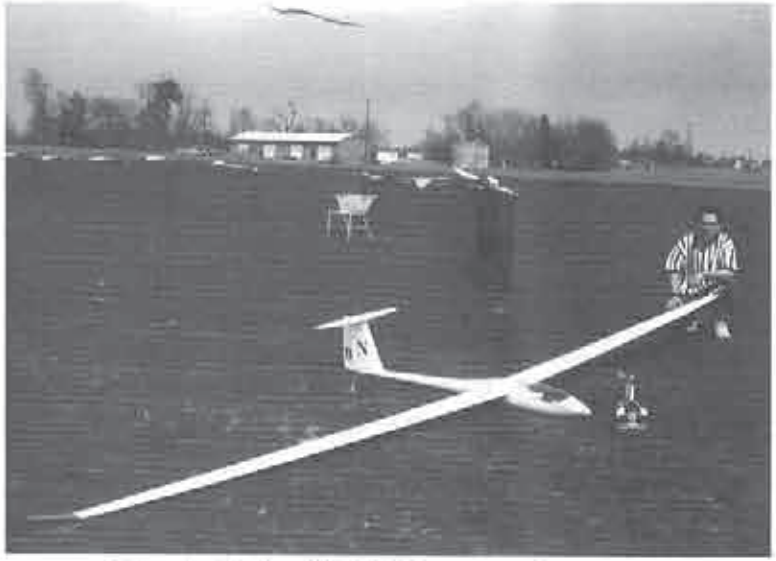
After the layup is wet out and excess epoxy is removed, using paper towels or other means, cut off the leading edge of the layup material flush with the mylars before taping the carriers shut. This will greatly ease the process of sanding the leading edge to shape.

To prevent finger dents in the new wing, leave the mylars on at least 24 hours and during the initial shaping of the leading edge. Also, I find it beneficial to handle the wing with latex gloves the first few days to avoid fingerprints in the finish.

A wavy trailing edge is a common problem with composite wings, and is caused by the bag pulling inward, as well as flattening when vacuum is drawn. To prevent this, place the wing in the bag top side down (top foam bed underneath) with the trailing edge in the natural crease at one side of the bag. Turn on the pump, and pull sufficient vacuum to flatten the bag against the wing. Turn off the pump, and clamp straight edges on both sides of the trailing edge along its entire length. I use two pieces of 1/2" aluminum V-channel (available at any hardware store) clamped together with small black binder clips every four inches or so. Turn the pump back on and continue pulling vacuum to the desired setting. Re-clamp the trailing edge after the wing comes out of the bag until the epoxy cures (usually about a week). It is a good idea to put tape along the straight edges to avoid marring the wing's finish.

I hope these tips have been helpful. Like myself, you may also find it useful to maintain a running log of do's and don'ts as you progress with your wing building projects.

Good Luck! ■



The 1/4 scale, NIMBUS-4 has a very impressive 6.25M span, and incredible glide ratio. The isolated maintenance shop in the background often triggers tremendous thermals when the weather condition is just right.

Electrifying A 6.25 m Span NIMBUS - 4

...by Joe Enhuei
Laurenceville, New Jersey

After I successfully electrified 4 to 4.5 meter span, R/C scale gliders, I was eager to explore the possibility of electrifying larger, scale gliders. So, a phone call was made to my good friend, Robin Lehman, who has been importing scale gliders for me and many other modelers. Robin advised me to consider 1/4 scale, open class gliders, because they have relatively light weight, with a span of over 6 meters. Light weight is a crucial factor, if the glider is intended to be electrified for hand-launching. There are several 1/4 scale, open class glider candidates available in the market and they are: ASW-22B, ASH-25, SB-10 and NIMBUS-4. Since the 1/4 scale, Schempp-Hirth NIMBUS-4 is a high performance, although rare, model, I decided to order it through Robin. Robin contacted the manufacturer in Germany and discovered that there happened to be one in stock. About 8 weeks later, the model came into New York. Robin told me that he was very impressed by the quality of the kit, and its cost definitely matches the quality.

The 1/4 scale Nimbus-4 is an ARF produced by EMS (Exclusive Model Schelfele) of Germany. A full line of accessories, including cockpit details, can be purchased separately from EMS. This model is built to order. EMS also custom makes other large scale gliders such as the 7.0 m NIMBUS-4D, 6.25 m ASH-25, 6.25 m ASW-22, 4.85 m Ventus C and numerous smaller semi-scale gliders.

NIMBUS-4 Kit Contents

The wing is completely finished with sheeted obechi; wingtip and leading edge are in place. The spoilers, all the control surfaces, and Robbe wing servo trays & servo wires are already installed. Each wing can accommodate 5 sub-micro size servos for control of flap, flaperon, spoiler, aileron, and winglet-aileron. The already trimmed out, blue canopy and fiberglass tray are furnished. The fiberglass fuselage is coated with gel and is completely done with T-tail bell-crank and control tubes in place. The fiberglass tail pieces are also finished. A hardware package including Robbe servo tray covers, control horns, and wing rod is furnished.

Construction

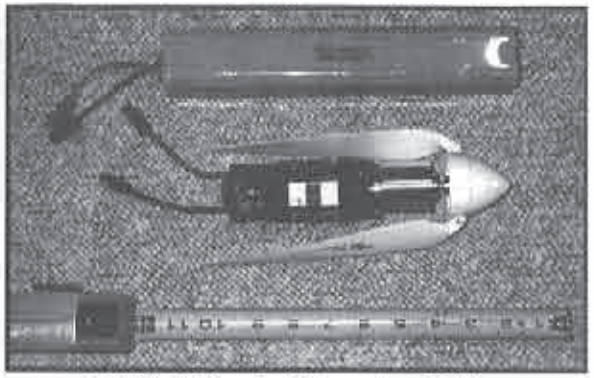
The NIMBUS-4 can be built as a pure glider, or it can be electrified. EMS recommended an ULTRA-2000 motor fitted with KRAUSE-1000 gear drive (2 to 1 ratio), 16.5x15 inch prop, and a 24-cell battery pack if the model is intended for hand-launching. Direct drive Ultra-2000 motor, along with the retract devices for motor and landing wheel, is recommended for self-launching. I followed the recommended gear motor system, and ordered it through Kirk Massey, New Creations R/C. Kirk ran the gear drive motor on 24-cell with a 16.5x15 inch prop; the recorded rpm is 5200 with 50 amp draw. The static thrust should be greater than 11 to 12 lb. with this.

I used Hitec HS-80MG servos for all wing control surfaces, and HS-605MG servos for elevator and rudder. I elected not to use the winglet-aileron control and, therefore, there are 4 servos in each wing. I covered the wings with heat-shrink film, cub-yellow on the bottom and white on the top, and red on the wing tip to enhance the visibility at altitude. I cut the glider nose off, glued in a plywood bulkhead, bolted in the motor, and about 10 degrees of down thrust is built in. Because the motor is probably over-powered, 10 degrees of downthrust would be on the safe side to avoid possible ballooning on hand-launch. Kirk Massey custom made a 24-cell 1700 mah battery pack for the motor power supply, and the battery pack is used as ballast to balance the model. The electric motor run time is about 2 minutes. Throttle control is regulated by Steve Neu's FAI controller. The radio system I used is JR-388X, with all 8 channels used up for full-house controls. The receiver battery pack has 4-cell, 1400 mah capacity. The take-off weight of the electric NIMBUS-4 is 17.5 lb. If the model is built as a pure glider, the take-off weight could be reduced to about 16 lb, and is considered very light for its size.

Flight

After about 80 hours of labor, the

A low pass over the flying field. Note the spinning prop and built-in down thrust. In flight, it is hard to tell if the NIMBUS-4 is a full-scale or a model. The high aspect ratio wing is beautiful to watch.



ULTRA-2000 motor, 2:1 gear box, 16 1/2-15 prop, 24-cell, 1700mah battery pack. Assembled by Kirk Massey.

Contents of EMS NIMBUS-4 kit. Imported by Robin Lehman, Sailplanes Unlimited, Ltd.

Specifications:	
Wingspan	6.25 m
Aspect Ratio	over 37
Length	2.0 m
Take-off weight	16 to 18 lb
Airfoil	E68

NIMBUS-4 was ready for the first flight. I called up my flying partner, Phil Thayer, who has been successfully test flying all my gliders for the past 4 years. We picked an early spring, Saturday afternoon, and we met at the West Windsor Flying Field in central New Jersey. The weather condition was overcast with wind blowing from 15 to 25 mph, and nobody at the field was flying. After Phil examined the model and the radio functions, he deemed it OK to fly. I picked up the fuselage just behind the CG with my right hand, while my left hand was holding the left wing in order to keep the wings level. Phil gave me a signal, turned on full throttle and I ran few steps; up it went. As soon as the Nimbus-4 left my hands, it gained speed very quickly, due to the strong pull from the very powerful motor. Nimbus-4 can climb to 1000 ft in about 45 seconds and can penetrate unbelievably well even in gusty wind, due to its high efficiency. Its stability and glide ratio are awesome and beyond description. When the flaps are down, Nimbus-4 becomes a floater and the controls are still positive.

Nimbus-4 is a fast model and even impresses my good friend, Phil Thayer, who is an F5B type flyer. Phil flew around for about 15 minutes, and he deliberately set up a long base leg for a safe and predictable landing. Everyone at the flying field was very happy with the results, because Nimbus-4 is, no doubt, one of the ultimate R/C gliders in existence.

Summary

The 6.25 m Nimbus-4 is by no means an everyday model for average modelers. I consider it an ultimate challenge to my passion for flying large, R/C scale gliders. I would like to express my deep appreciation to Robin Lehman, Phil Thayer, Kirk Massey and last, but never the least, my family for their continuous support and encouragement. I think that good teamwork is the key to success.

Robin Lehman, (212) 879-1634

Kirk Massey, New Creations R/C, P.O. Box 496, Willis, TX 77378, (409) 856-4630

■

The Electric Larva

What to do with your butterfly wings if you are over 50, Part III.

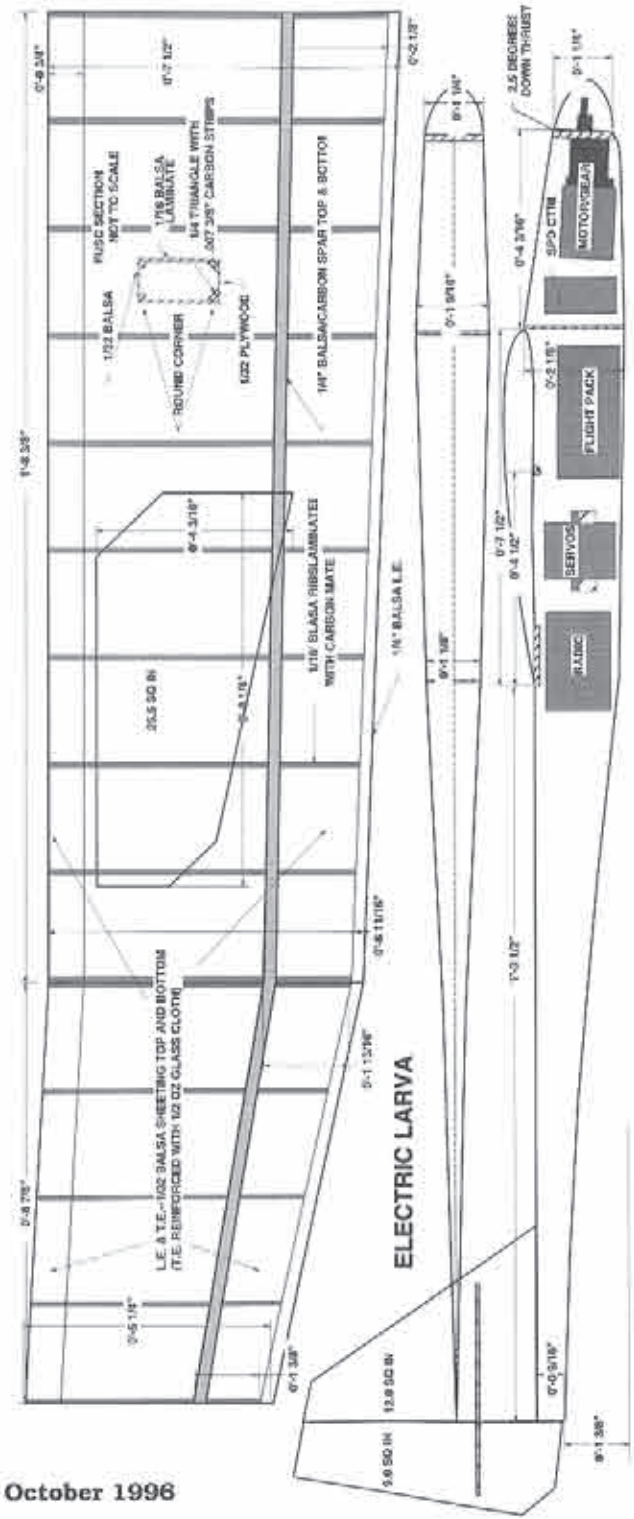
...by Clark Bowlen
East Windsor, Connecticut

I am over 50, and no great hand launch pilot, so it doesn't take long to wear out my arm. Even a nice flier like my Pupa (*RCSD*, December 1996) doesn't give much relief when used as a sink probe. I need an efficient way to hunt for small thermals. I had a Monarch wing left over from my first vain attempt at hand launch, and an ugly, strong fuselage, called the Larva (*RCSD* January 1995), to go with it. A little razor saw work, a Speed 400 with a 2:1 gear drive, and 500mah battery pack slipped right in. After some test flights, the Electric Larva was born. Like the planes before it, it has:

- Slab sides of 1/16 contest balsa laminated with .2 oz. carbon mat and .75 oz. glass cloth on both sides (with some Kevlar mat up front for good measure).
- 1/4 triangle stock longerons with 3/8" .007 carbon strips the length of their hypotenuse.
- An empennage of 1/16 contest balsa, laminated with .25 oz. Kevlar mat.

The Monarch wing, like me, had seen better days, and the Pupa has made me a fan of the Selig 4083. A new wing was in order. *Model Builder* had just published S4083 templates, and winter had set in, so I tried a built-up wing using the Monarch planform. Covered with clear Micafilm, the wing looks pretty and is surprisingly rugged, but I would recommend it only if you winter north of the Arctic circle and have nothing else in the building cue. Compared to an identical foam core wing, and built with the same materials — 1/32" contest balsa, carbon and glass — the built-up wing is much more labor intensive (227 parts versus 46 parts), and at 4 1/2 ounces, it is heavier by 1/2 an ounce.

But, winter-induced judgment lapses did not affect the way the plane flies. If you judge 'best' by average flight lengths, this is my best electric ever — better than planes with geared 05's and 1700 mah packs, and better than a 10 cell, FAI 15 driven Falcon 550. Besides, flying low and close is more fun and much easier on my waning eyesight. The drawing will give you a general idea of what the Electric Larva looks like. You can fill in your own details, while I pick up my new glasses. ■



Slegers International Laser 2 Meter Review

...by Rick Eckel
Winter Springs, Florida

OK, I'm coming out bragging. I just won my first Expert class contest last Saturday with a brand new, Slegers International Laser 2m.

But, first things first. I purchased my Laser kit a couple months ago, because I wanted a two meter ship with a two piece wing, removable stabs and slip-on nose cone. I wanted one that would fit back into the box it came in, so that it would be easy to transport. Besides, Ed Slegers had brought one down to a contest here in Florida earlier this year, and I kind of fell in love with it. To my eye, it's a simple ship with clean lines that looks really nice from all angles.

The kit was vintage Slegers International, which means quality parts, well made pre-sheeted wing panels, and a fine fuselage with kevlar reinforcing. Not so vintage were the instructions that came in the kit. Although not completely accurate as to the supplied kit pieces, they were well organized and liberally illustrated. A real plus. The construction is pretty much standard for this type of ship. My buddy, Ed White, took me into his shop where he was finishing up his Laser and showed me the steps he goes through in order to get the wing rod and incidence pins properly aligned. Between his tutelage and the good instructions, getting my Laser right was a snap. Thanks Ed and Slegers International!

Anyway, my work and a hot garage kept me from making really fast progress on the Laser, even though it really went together easily. Finally, on Friday night, I got the servos installed and tuned up the ol' 388 for the control throws recommended in the instructions. I must admit that I thought they had too much aileron throw, and I reduced them. The CG was placed by fingertips at the recommended 'Friendly' position. Saturday, I took it to the field and assembled it. After a range test, it was ready for a hand toss.

It launched straight ahead requiring only a touch of down trim to keep it moving. Everything looked fine, so off to the winch I went. The club guys were all wondering what would happen next. They've seen me launch my Vulcan, and scatter when I approach the winch. Don, the winch guy, asked if I had butterflies. I really didn't. This bird was ready to fly and I knew it. That first launch was straight up the line, but resulted in a pop off when the plane went up too steeply and stalled the wing. No problem recovering, a couple clicks of down and the second try was fine. The only problem was that I had forgotten to put any elevator compensation in the landing flaps! Luckily, the Laser really didn't want to land anyway, so I kept it up and tested flaps well before landing. The landing was uneventful, but about 20 feet behind me.

After that it was pure joy. The Laser is responsive and shows lift well. It will travel across the field to far lift, and slow to a crawl with some camber. It's a sweetheart to fly. On Sunday, I let it fly itself for almost 5 minutes in high green air. It accelerated through the sink, slowed and turned slowly in the lift, and just kept flying itself around the field. I never touched the sticks!

The Rabble Rally was the next weekend, and I was undecided whether to fly my tattered Vulcan or the new Laser. So, I took both. At the field, I decided that the Laser would get its baptism in contesting. To make a long story short, the Laser flew exceptionally well through seven rounds of 10 minute duration, and I edged out a very good pilot flying a really nice Vulcan to capture first place. I think this Laser and I are going to be friends for a long time! ■

Sailplane Homebuilders Association (SHA)

A Division of the Soaring Society of America

The purpose of the Sailplane Homebuilders Association is to stimulate interest in full-size sailplane design and construction by homebuilders. To establish classes, standards, categories, where applicable. To desiminate information relating to construction techniques, materials, theory and related topics. To give recognition for noteworthy designs and accomplishments.

SHA publishes the monthly ***Sailplane Builder*** newsletter. Membership cost: $15 U.S. Student (3rd Class Mail), $21 U.S. Regular Membership (3rd Class Mail), $30 U.S. Regular Membership (1st Class Mail), $29 for All Other Countries (Surface Mail).

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21100 Angel Street
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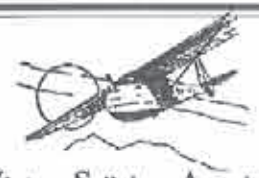

The Vintage Sailplane Association

Soaring from the past and into the future! The **VSA** is dedicated to the preservation and flying of vintage and classic sailplanes. Members include modelers, historians, collectors, soaring veterans, and enthusiasts from around the world. Vintage sailplane meets are held each year. VSA publishes the quarterly **BUNGEE CORD** newsletter. Sample issue $1.00. Membership is $15.00 per year. For more information, write to the:

Vintage Sailplane Association
Route 1, Box 239
Lovettsville, VA 22080
http://www.iac.net/~feguy/VSA

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(The Wing Is The Thing)

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The LSF program consists of five "Achievement Levels". These levels contain specific soaring tasks to be completed prior to advancement to the next level.

League of Silent Flight
10173 St. Joe Rd.
Ft. Wayne, IN 46835

R/C Soaring Resources

These contacts have volunteered to answer questions on soaring sites or contests in their area.

Contacts & Soaring Groups - U.S.A.

Alabama - North Alabama Silent Flyers, Ron Swinehart, 8733 Edgehill Dr. SE, Huntsville, AL 35802; (205) 883-7831.

Alabama - Central Alabama Soaring Society, Ron Richardson (Tres.), 381 Stonebridge Rd., Birmingham, AL35210; (205)956-4744, e-mail: lamreht@concentric.net.

Alabama - Southern Alabama & NW Florida Aerotow, Asher Carmichael, (334) 626-9141, or Rusty Rood, (904) 432-3743.

Arizona - Central Arizona Soaring League, Iain Glithero, (602) 839-1733.

Arizona - Southern Arizona Glider Enthusiasts, Bill Melcher (contact), 14260 N. Silwind Way, Tucson, AZ 85737; (602) 325-2729. SAGE welcomes all level of flyers!

Arkansas - Northwest Arkansas Soaring Society, Tom Tapp (President), RT 2 Box 306, Huntsville, AR 72740; (501) 665-2201, eve.

California - California Slope Racers, John Dvorak, 1063 Glen Echo Ave., San Jose, CA 95125; (408) 287-0375.

California - Inland Soaring Society, Robert Cavazos, 12901 Forman Ave., Moreno Valley, CA 92553, RCAV@ aol.com.

California - Northern California Soaring League, Mike Clancy, 2018 El Dorado Ct, Novato, CA 94947; (415) 897-2917.

California - South Bay Soaring Society, Dave Burwell, P.O. Box 2012, Sunnyvale, CA 94087; ticedoff@ix.netcom.com.

California - Southern Calif. Electric Flyers, John Raley (President), 1375 Logan Ave., Costa Mesa, CA 92626; (714) 641-1776 (D), (714) 962-4961 (E), e-mail: E-Flyer@ix.netcom.com.

California - Torrey Pines Gulls, Ron Scharck, 7319 Olivetas Ave., La Jolla, CA 92037; (619) 454-4900.

Colorado - Rocky Mountain Soaring Assn., Phil Weigle, 1290 Salem St., Aurora, CO 80011; (303) 341-9256 eve.

Eastern Soaring League (VA, MD, DE, PA, NJ, NY, CT, RI, MA), Jack Cash (President), (301) 898-3297, e-mail BadIdeas@aol.com; Bill Miller (Sec./Tres.), (609) 989-7991, e-mail JerseyBill@aol.com; Michael Lachowski (Editor), 448 County Rt 579, Milford, NJ 08848, e-mail mikel@airage.com.

Florida - Florida Soaring Society, Mark Atzel (President), 1810 SW Terrace, Ft. Lauderdale, FL 33312, (954) 792-4918.

Georgia - North Atlanta Soaring Association, Tim Foster, (770) 446-5938 or Tom Long, (770) 449-1968 (anytime).

Hawaii - Maui Island Slope Soaring Operation, MISO, Hank Vendiola, 10-C Al St., Makawao Maui, HI 96768; (808) 572-5283.

Illinois (Chicago Area) - Silent Order of Aeromodeling by Radio (S.O.A.R.), Jim McIntyre (contact), 23546 W. Fern St., Plainfield, IL 60544-2324; (815) 436-2744. Bill Christian (contact), 1604 N. Chestnut Ave., Arlington Heights, IL 60004; (708) 259-4617.

Illinois (Northwest) - Valley Hawks R/C Soaring Club, Jeff Kennedy (President), 414 Webster St., Algonquin, IL 60102, (708) 658-0755, eve. or msg.

Iowa - Eastern Iowa Soaring Society (Iowa, Illinois, Wisconsin, Minnesota), Bob Baker (Editor), 1408 62nd St., Des Moines, IA 50311; (515) 277-5258.

Indiana - Bob Steele, 10173 ST Joe Rd., Fort Wayne, IN 46835; (219) 485-1145.

Kansas - Wichita Area Soaring Association, Pat McCleave (Contact), 11621 Nantucket, Wichita, KS 67212; (316) 721-5647.

Kentucky - Bluegrass Soaring Society, Frank Foster (President), 4939 Hartland Pkwy., Lexington, KY 40515; (606) 273-1817.

Maine - DownEast Soaring Club (New England area), Steve Savoie (Contact), RR#3 Box 569, Gorham, ME 04038; (207) 929-6639. InterNet e-mail <Jim.Armstrong@acornbbs.com>.

Maryland - Baltimore Area Soaring Society, Russell Bennett (President), 30 Maple Ave., Baltimore, MD 21228; (410)744-2093.

Maryland & Northern Virginia - Capital Area Soaring Association (MD, DC, & Northern VA), Steven Lorentz (Coordinator), 12504 Circle Drive, Rockville, MD 20850; (301) 845-4386.

Michigan - Greater Detroit Soaring & Hiking Society, Greg Nilsen (Sec.), 2163 Highsplint Dr., Rochester Hills, MI 48307; (810) 651-8598, GNilsen624@aol.com.

Michigan - Great Lakes 1.5m R/C Soaring League & "Wings" Flight Achievement Program & Instruction. Ray Hayes, 58030 Cyrenus Lane, Washington, MI 48094; (810) 781-7018.

Minnesota - Minnesota R/C Soaring Society, Tom Rent (Contact), 17540 Kodiak Ave., Lakeville, MN 55044; (612) 435-2792.

Missouri - Independence Soaring Club (Kansas City area, Western Missouri), Edwin Ley (Contact), 12904 E 36 Terrace, Independence, MO 64055; (813) 833-1553, eve.

Missouri - Mississippi Valley Soaring Assoc. (St. Louis area), Ken Trudeau, 3033 Plum Creek Dr., St. Charles, MO 63303; (314) 926-3537.

Nebraska - B.F.P.L. Slopers, Steve Loudon (contact), RR2 Box 149 E1, Lexington, NE 68850; (308) 324-3451/5139.

Nebraska - S.W.I.F.T., Christopher Knowles (Contact), 12821 Jackson St., Omaha, NE 68154-2934; (402) 330-5335.

Nevada - Las Vegas Soaring Club, Jim Allen (President), 7117 Caprock Cir., Las Vegas, NV 89129; ph (702) 658-2363, fax (702) 658-1998.

New Jersey - Vintage Sailplane R/C Association, Richard G. Tanis (President/Founder), 391 Central Ave., Hawthorne, NJ 07506; (201) 427-4773.

New York - Elmira - Harris Hill L/D R/C, aerotowing & slope, John Derstine, (717) 596-2392, e-mail 2076482@mcimail.com.

New York, aerotowing Long Island Area, Robin Lehman, (212) 744-0405.

New York, aerotowing Rochester area, Jim Blum and Robin Lehman, (716) 367-2911.

New York - (Buffalo/Niagara Falls area) - Clarence Sailplane Society, Lyn Perry (President), (716)655-0775; e-mail perryl@sstaff.sunyerie.edu; Jim Roller (Competition Coordinator), (716) 937-6427.

New York - Long Island Silent Flyers, Stillwell Nature Preserve, Syosset, NY, Joe Coppola (President), (516) 798-1479, or Taylor Fiederlein (VP), (516) 922-1336.

New York - Syracuse area, Central NY Sailplane Group, Dave Zinteck, Minoa, NY, (315) 656-7103, e-mail Zinteck@aol.com.

North Carolina - Aerotowing, Wayne Parrish, (919) 362-7150.

Northwest Soaring Society (Oregon, Washington, Idaho, Montana, Alaska, British Columbia, Alberta), Roger Breedlove (Editor), 6680 S.W. Wisteria Pl, Beaverton, OR 97005; (503) 646-1695 (H) (503) 297-7691 (O).

Ohio - Cincinnati Soaring Society, Chuck Lohre, 3015 Beaver Ave., Cincinnati, OH 45213; (513) 731-3429, lohre@iac.net, http://www.iac.net/~lohre.

Ohio - Dayton Area Thermal Soarers (D.A.R.T.S.), Walt Schmoll, 3513 Pobst Dr., Kettering, OH 45420, (513) 299-1758.

Ohio - Mid Ohio Soaring Society (MOSS), Hugh Rogers, 888 Kennet Ct., Columbus, OH 43220; (614) 451-5189, e-mail tournagel@freenet.columbus.oh.us.

Oklahoma - Central Oklahoma Soaring, George Voss, (405) 692-1122.

Oregon - Salem Soaring Society, Al Szymanski, 8991 Edcliff Ct. SE, Aumsville, OR 97325-9549, e-mail aszy@teleport.com, (503) 585-0461, fax (503) 585-6929.

Oregon - Southern Oregon Soaring Society, Jerry Miller, 3431 S. Pacific Hwy. TRLR 64, Medford, OR 97501, e-mail jmill@cdsnet.net, ph/fax (541) 535-4410.

Tennessee - Memphis Area Soaring Society, Bob Sowder, 1610 Saddle Glen Cove, Cordova, TN 38018, (901) 751-7252, FAX (901) 758-1842.

Tennessee - Tullahoma (Southern Middle Area), Coffee Airfoilers, Craig Logan, 147 Stillwood Dr., Manchester, TN 37355, (615) 728-5446, jclogan@edge.net.

Tennessee - Soaring Union of Nashville, Terry Silberman, PO Box 17946, Nashville, TN 37217-0946, (615) 399-0846.

Texas - Texas Soaring Conference (Texas, Oklahoma, New Mexico, Louisiana, Arkansas), Gordon Jones, 214 Sunflower Drive, Garland, Tx 75041; (214) 271-5334.

Utah - Intermountain Silent Flyers, Bob Harman, (801) 571-6406. "Come Fly With Us!"

Virginia - Tidewater Model Soaring Society, Herk Stokely, (757) 428-8064, herkstok@aol.com.

Virginia - Appalachian Soaring Association, Virginia's Southwest (Bristol area), Greg Finney, 266 Plumb Alley West, Abingdon, VA 24210; (540) 628-4469 (H), (540) 676-3788 (W), (540) 676-3094 (fax).

Washington - Seattle Area Soaring Society, Waid Reynolds (Editor), 12448 83rd Avenue South, Seattle, WA 98178; (206) 772-0291.

Outside U.S.A.

Australia - Southern Soaring League, Inc. (SSL), Mike O'Reilly, Model Flight, 42 Maple Ave., Keswick SA 5035, Australia. Phones: ISD+(08) 293-3674, ISD+(08) 297-7349, ISD+(018) 082-156 (Mobile). FAX: ISD+(08) 371-0659.

Canada - Greater Niagara Area Thermal Soarers (GNATS), Flat Field Soaring & Aerotowing, Gerry Knight, (905) 934-7451 or Don Smith, (905)934-3815.

Canada - MAAC Men Gliding Club, Jim Holland, 168 Verona Dr., Winnipeg, Manitoba, Canada R2P 2R8; (204) 697-1297.

Canada - Southern Ontario Glider Group, "Wings" Programme, dedicated instructors, Fred Freeman, (905) 627-9090, or Bill Woodward, (516) 653-4251.

England (Thermal Talk & Europe), Jack Sile (Editor), 21 Bures Close, Stowmarket, Suffolk, IP14 2PL, England; Tele. # 0449-675190.

England (southwest) - Sean Walbank, Woolcombe Hays, Melbury Bubb, Dorchester, Dorset, DT2 0NJ, phone 01935-83316.

Hong Kong - Robert Yan, 90 Robinson Road, 4th Floor, Hong Kong; (852) 25228083, FAX (852) 28450497, yanr@asiaonline.net.

Japan - Dr. Paul "Sky Pilot" Clark, 2-35 Suikoen Cho, Hirakata Shi 573, Osaka Fu, Japan; IAC+(81) 720-41-2934, fax: IAC+(81) 6-954-4144, e-mail: 76055.3546@compuserve.com, http://chaos.fullerton.edu/~jclark/skypilot.

Scotland - Ron Russell, 25 Napier Place, South Parks, Glenrothes, Fife, Scotland KY6 1DX; Tele. # 01592 753689.

BBS/Internet

Internet - Email list/resource of RC soaring related folks, including US and international club contacts, vendors, kit manufacturers/distributors, software, equipment and supplies. Also a resource for aeromodelling related WEB sites on the Internet. Contact Manny Tau at taucom@kaiwan.com, or on CompuServe: 73617,1731.

Internet soaring mailing listserve linking hundreds of soaring pilots worldwide. Send a msg. containing just the word "subscribe" to soaring-request@airage.com. The "digestified" version that combines all the msgs. each day into one msg. is recommended for dial-up users on the Internet, AOL, CIS, etc. Subscribe using soaring-digest-request@airage.com. Post msgs. to soaring@airage.com. For more info., contact Michael Lachowski at mike@airage.com.

The Frequent Flier's Info. Hot Line, San Francisco Bay Area - Box 1 (lost & found airplanes, helpful tips, upcoming events), Box 2 (questions), Larry Levstik, (415) 924-4490.

Reference Material

Still a few copies available of some issues of the printed transcripts of talks given on RC Soaring at the Previous Annual National Sailplane Symposium. Prices reduced to clear out stock. Talks were on thermal meteorology, flying techniques, hand launch, cross country, plane design, airfoil selection, vacuum bagging, plastic coverings, flying wings, etc., etc. Send SASE or call for flyer giving details. Many copies of most recent (1992) transcript left. Clubs have found them good for raffle prizes, gifts, etc. Al Scidmore, 5013 Dorsett Drive, Madison, WI 53711; (608) 271-5500.

"Summary of Low-Speed Airfoil Data - Volume 1" & "Volume 2", Michael Selig wind tunnel testing results. Cost for each: $25 USA (includes postage), $29 surface outside USA, $31 air Western Hemisphere, $38 air Europe, $42 air all other countries. Computer disk, ascii text files (no narrative or illustrations), is $15 in USA; $16 outside USA. Source for all "SoarTech" publications, also. Contact Herk Stokely, 1504 N. Horseshoe Cir., Virginia Beach, VA 23451. Phone (757) 428-8064, email: herkstok@aol.com.

RCSD Index/Database

If you aren't connected to the internet, please send 3.5" high density disks and SASE with stamps for 2 oz. Files can be loaded onto any word processor; search for a word or phrase and references pop up by issue, author, date, page, and comments. If you are connected, the index is available on-line. Lee Murray, 1300 Bay Ridge Rd., Appleton, WI 54915; (414) 731-4848 after 5:30 pm weekdays or on weekends, 74724.65@compuserve.com.

Seminars & Workshops

Free instruction for beginners on construction & flight techniques, week-ends (excl. contest days), "AJ" Angelo, South Bay Soaring Society (San Jose area), (415) 321-8583.

THANK-YOU FOR KEEPING YOUR LISTINGS UP TO DATE!!

Special Events

Schedule of Special Events

Date	Event	Location	Contact
Oct. 12	Fall Soaring Tournament	Memphis, TN	Bob Sowder, (901) 751-7252
Oct. 12-13	Fall Soar	Bristol, VA	Greg Finney, (540) 676-3788
Oct. 19-20	CSS STD & UNL (Sanct.)	Cincinnati, OH	Chuck Lohre, (513) 731-3429
Oct. 19-20	2m, Unl	Williston, FL	Bob Wargo, (813) 938-6582
Nov. 29-1	Tangerine	Orlando, FL	Ed White, (407) 321-1863
June 19-22	1997 MSSC	Huntsville, AL	Ron Swinehart, (205) 883-7831

(If you have event dates available for 1997 that you would like listed, please send them in.)

Don Bailey launching Bird of Time at club field, 60 Acres, in Redmond, Washington.

Love Them Gasbags!

...by Don Bailey
Bothell, Washington

I am a closet polyphile. I love them big, dang, bent-wing floaters. I get off on all those ribs and stringers and the look of drum-tight monokote stretched across those balsa bones. I like the way they fly, like mayflies in the morning sun, light and lively, and eager to climb. In fact, I want a whole fleet of 'em, piled up like cordwood, all charged up and ready to fly. There. I've come out. No shame in it. Heck, what are they gonna do, fire me? Lock me up? I know that the modern convention is that if it isn't obechi-sheeted, vacuum-bagged, six-servoed and sexy, then it just isn't hip. So sue me; I'd rather be pushing it around the sky with a big wagging rudder the size of Texas.

Go ahead, call me a heretic, but I don't really care for the glass and obechi ships. They seem so coldly focused and task-oriented, with no personality or character. Aileron ships are designed to punch holes in the sky, to drive around thermal turns like a fine-tuned sports car, to climb out smoothly and then rocket on home, hit the brakes, and poke the sod right on top of the tape. Contest ships are thoroughbreds, dedicated to the job at hand, which is to launch high and stay up there and then get back down again precisely on time and on target.

Maybe I'm just plain old-fashioned, admittedly iconoclastic, but nothing gets me off like the sight of brilliantly colored sunlight bursting through an open-framed structure. I dig those big floaty airships that can climb out on the wake-up yawn of a field mouse and then cruise around like a great big yacht in the sky, sails unfurled and luffing through the tack. I like the way they fly, the way they tip up into a bank with those big poly wings, and sweep around the turn with ease and aplomb. You can play them against the wind like a sloop, heeling hard over into the lift, and sheeting in mightily as the delicate craft hoists itself skyward. This is when you discover why we call them sailplanes. There's a broad spread between minimum sink and best L/D, and you can feel a surge in control authority as you drop the nose and fly away at the top of the column. A big floater will toy with subtle lift that an aileron ship will blow right past with barely a wiggle, and when you get way up there you can set the transmitter down and have a sandwich, as you watch your bird track majestically across the sky.

Nowadays, the usual course of development for the beginning neophyte in this hobby is to start out with a Goldberg Gentle Lady or a Great Planes Spirit for the basics, and then to progress to something with ailerons like a Dynaflite Bobcat or a Spirit 100, at which point the nuances of the winch launch might be tackled, and then maybe, by the third season, the aspiring glider flyer can progress to something truly sophisticated, like a Thermal Eagle or a WACO Magic. The pressure is on, inexorably, to pursue

this pathway to perfection, whether it reflects the preferences of the hobbyist or not. If you're into your third season, and you still don't have a computer radio and a hot ship with all the right numbers, you're considered a hold-out. You start getting questions like, "You still flying that Oly II? When you gonna get a REAL airplane?"

There was a time in this hobby when even the most coveted competition ships were polys. Remember the Windrifter? The Aquila Grande? How about Ed Slobod's Paragon or the Larry Jolly Pantera? It doesn't seem too long ago that if you wanted to hobnob with the high honchos you had to have a CraftAire Viking or a Sagitta 900. All of these old poly birds have since gone on to join the pterodactyl in forgotten ignominy; and in order to fly formation with the elite today, you need a Spectrum with the RG15 and a Vision with all the upgrades, or a Levoe Super V and a shiny new Stylus on a tray.

I miss the old balsa buzzards. None of these ships had straight foam-core wings with ailerons and landing flaps, and yet they performed the very same tasks we fly today with style and panache. There is an argument in competition circles that the recent advancements in model glider design have reached a plateau, with the result that the average contest has become a battle over landing scores, and the convergent evolution evident in the latest crop of hot ships is almost ludicrous. (Have you noticed how much they all look alike? The same phenomenon can be noted in full-scale competition sailplanes, incidentally; just take a brief glance through the latest SSA calendar). But this is not my point. I am the first to admit that in a contest situation, particularly when you find yourself pitted against some real talent, you need all the technology you can get. I own a Ron Vann Prism, and it's truly an amazing ship. It has excellent penetration, predictable handling, thermals with the best of them, delivers precision landings, and in the hands of an expert it is a formidable contest winner. But when I fly for sport, I am far more inclined to bring out my Bird of Time than anything else. The old gasbags are just plain more fun.

I also enjoy building them. Nothing beats working with balsa wood in my opinion. It is light and strong and beautiful. It shapes out well, leaves a nice smooth surface, and it is easy to repair. I have put together so many built-up wings now, that I can do them without thinking, and the opportunities to get the weight out are plentiful. I pushed through a foam wing project for the first time when I built my Alcyone, and I felt overwhelmed. There was far more to do than I was led to believe, and new skills to learn; like butt joining balsa skins and cutting half-inch vertical grain spar webbing with Swiss watch precision, building a balsa and glass and foam sandwich slathered in epoxy and stuffing it into a vacuum bag without letting anything slip out of place. I didn't goof it up, but it was all new to me, and felt more like building a surfboard than a wing. I was really surprised how many tasks must still be undertaken even after the wing is removed from the vacuum bag, like routing and facing the control surfaces and servo wells, installing and shaping the leading edges, and burning a tunnel for the servo wires. I have to admit it makes for a smoother airfoil and a more rigid wing panel, but I question how much time is really saved over the built-up method. My latest project is a Sailaire - a behemoth among bent-wingers, and the wings went together by themselves while I watched T.V.

So, I'm a born-and-bred, blasphemous, beyond-all-hope gasbag fan. For this view of the model glider world, I make no apologies, only more balsa dust. Like anything else, be it music or fine cars or movie stars, everyone has their own idea of what is hot and what is not, but I'm willing to bet that there are a lot of other guys in this hobby who feel the way I do and are simply reluctant to admit it. There are indications, though, that the balsa birds are not a dying breed. Interest is building in Nostalgia events, and in scale contests the Vintage Class gliders more often than not take the trophy away from the modern glass slippers in viewer's choice.

So, if you find that you're like me, that for you slower is better, that anything under 8 ounces per square foot gets you excited, that the bigger the rudder the happier you are, and who needs shark's teeth when you can land from a hover, then pull out that aging stack of balsa and get whittling! Let's put a dent in the world's supply of transparent monokote! Gasbags rule! ■

Article Wish List

...by James E. Keller
2220 Lake Apt. A1
Belmont, California 94002

Probably, most avid readers of *RCSD* are people like myself, isolated intermediate flyers looking to become advanced flyers. Most beginners probably don't know about the magazine, and the truly advanced people glance through, just to make sure nothing gets by that they don't already know.

Here is my wish list of articles. Perhaps you have a lot of knowledge in one of these areas. Ideally, the article would show several methods to accomplish each task.

- Various methods of building plug-in wings, emphasizing the plug-in portion of the wing.
- Wiring of ailerons and flap servos. Do you cut off the connectors and solder them in, or put in additional connectors? What are some good ways to connect the wires from the wing to the fuselage wiring?
- Methods of installing ballast, plus some rules of thumb as to how much.
- In a past article, Brian Agnew mentioned that a certain airfoil should be flown with the CG at 38%. How about a list of airfoils with their best CG points? If enough people sent me their favorite CG's for various airfoils, I would be happy to tabulate the data and submit it to *RCSD*.
- Is there a way to figure CG points from the Soartech data? Is there a way to figure CG from other data?

There are all sorts of areas where you may have built up a storehouse of knowledge. Please share it! ■

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Personal ads are run for one month and are then deleted automatically. However, if you have items that might be hard to sell, you may run the ad for two months consecutively.

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GLIDER RETRACTS - high quality, 1/5, 1/4, 1/3 scale made in U.S.A. 1/4 are standard or heavy duty. Contact Bill Liscomb, 7034 Fern Place, Carlsbad, CA 92009; (619) 931-1438.

PC-Soar Version 3.5 Sailplane Performance Evaluation Program Optional Sailplane Library now expanded to 54 models including: Alcyone, Anthem, Genesis, Mako, Probe, Thermal Eagle, and Synergy-91. Free Library Upgrades. PC-Soar Upgrade to Ver. 3.5 $10, PC-Soar New Purchase $40. New Libraries of Sailplanes and Airfoil Polars $30. Please include $3 P&H for all purchases & upgrades. Also available: *RCSD* Database and Laser cut airfoil templates. LJM Associates, 1300 Bay Ridge Rd., Appleton, WI 54915; ph: (414) 731-4848 after 5:30 pm weekdays or on weekends.

PRECISION AMAP WING CUTTER, replacement parts, and service. AMAP Model Products, 2943 Broadway, Oakland, CA 94611. Butch Hollidge, (510) 451-6129, or FAX (510) 834-0349.

A.M.P. Aerial Model Products, sport, slope, race prototypes - all airfoils. 60" Del Valle Snake, 94" H&K Cobra, AMAP Flair, Kevin Cutler's full house Davenport Monitor. All race tested. Butch Hollidge, (510) 680-0589, eve, California.

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PARACHUTES: $10. Dale King, 1111 Highridge Drive, Wylie, TX 75098; (972) 475-8093.

For Sale - Personal

Robin 99 tow plane, built specially for glider towing, two piece strut braced wing, heavy duty landing gear, Zenoah G62 engine, 1/4 scale servos on all flying surfaces... $650.00 for airframe, engine, servos, OR $750.00 with Futaba 7 ch PCM Tx & Rx. Michael Mellor, (541) 461-7914, Oregon.

Levoe Super V 110, w/Fred Rettig set-up, trimmed and test flown by Mark Levoe, includes JR 341's/351's/Air., 555's in tail, fiberglass carrying case, Air. Rx... $650.00; Mariah built by Brian Agnew, RTF... $350.00; Paragon, RTF, nostalgia w/'91 upgrade of Kraft 5 ch Tx, RCD Rx... $250.00; Vision 3.0 w/PCM Rx, ch 53... $350.00; Shadow 118, built by Doug Buchanan, NIB, RTF... $475.00. Prices do not incl. shipping. Tom Gressman, (303) 979-8073, Colorado.

Super V 100, RTF@51 oz., test flown & trimmed by Mark Levoe, w/all servos & battery pack (just set up for Vision radio)... $600.00 + shipping, OR $450.00 w/o radio gear + shipping. Jay Fullinwider, (303) 973-6436 eve., Colorado.

NSP Secret all composite 2m, built, RTF, perfect condition, CF/gray foam wing, FG/Spyder foam V-tails, FG & Kevlar fuse, w/6 servos and battery installed... $425.00, OR w/o servos/battery... $295.00; Midway Ultra Mk. IV kit for the Astro 05 geared, NIB... $50.00. Both + S&H. Steve Pasierb, (410) 882-7396, Maryland.

Pacific Sailplanes Kestrel 19 kit, 140" W/S, F/G fuse & fin, built-up wings, retract... $229.00; Vernon Springbok kit, 72", classic, all balsa w/factory carved fuse... $59.00; Aquila wing kit... $28.00; Aquila F/G fuse... $49.00; Astro Flight Bushmaster 60" electric kit. Stephen, (310) 860-5881, S. California.

RnR Genesis, includes 4 Airtronics 141's in wing, larger rudder, servo tool kit, original manual, refinished, nice, very fast, aerobatic thermal ship... $325.00. Joe Wellman, (904) 260-3181, after 6 pm EST, Florida.

Multiplex ASW 22, 4m, 5 servos installed, excellent condition, never crashed, set up for ailerons-spoilers-rudder-elevator, nose release installed for aerotowing, scale markings + red stripes on bottom of wing for visability at altitude, winglets included... $500.00 + shipping. John Derstine, (717) 596-2392 eve., Pennsylvania.

Super V 100", w/skin hinges, RTF, your Rx, excellent condition... $500.00; Orbiter II HLG, NIB... $60.00; 2M Spectrum, broken R. wing... $40.00; 100" V-Gilante, salvagable... $35.00; Astro Flight model 110XI. DC peak detector charger, like new, used twice... $80.00 (paid $130.00); KYOSHO field Multi-Charger II, w/Air. & Fut. connectors... $25.00. Dennis, (801) 675-3777, Utah.

Graupner Grob G103 A Twin III Acro, NIB, white fiberglass fuselage, cockpit detail kit, pre-sheeted wings, 4 meter span, including Graupner double tech spoilers, beautiful kit... $750.00 + shipping. David L. Hall, (909) 790-5875, S. California.

Skyhawk ARF, w/6 servos... $500.00; Lancer 2m kit, last 2... $150.00 ea.; Hobie Hawk, NIB... $250.00; Banshee, NIB... $225.00; Dodgson Pixy fuse... $25.00; Pivot... $20.00; RC10 Truck RTR, great for kids (truck, radio, batteries, spares, etc.)... $150.00; RnR Nova, Ready to Rock, w/servos, flown 6 times... $400.00. George Voss, (405) 692-1122, Oklahoma.

1/4 Roebers Pilatus B4, 3.75 meter span (147"), wing profile Ritz 3, NIB... $495.00; 1/4 Roedel Super Cub (towplane), 2.687 meter span, wing profile Clark Y mod. (suitable motors are 160 T, 300 T, OS BGX-1, Brison 3.2 or similar), NIB... $385.00; 1/4 Rosenthal Ralley Morane (towplane), 2.78 meter span (109"), NIB... $495.00; 1/5 Wik Twin Astir, all glass, NIB... $595.00. Contact Robin Lehman, 63 E. 82nd St., New York, NY 10028; (212) 879-1634.

Roedel PSS A-10 Warthog, all styro, 1.7 meters, E205 wing profile, weight ca. 4 lbs... $100.00. Robin Lehman, 63 E. 82nd St., New York, NY 10028; (212) 879-1634.

Scale: Roke SB-10, 4.84m span, excellent condition... $900.00; Mutiplex Ka-6E, 3.88m span, excellent condition, set up for aerotowing... $850.00; Pilatus B-4, 3.75m span, excellent condition, set up for aerotowing... $850.00. 1/4 scale planes include all servos, and have only been flown by a "Little Ole Lady from Pasadena". Bernie Coleman, (704) 846-5219 after 6 pm, or BIRDBERNIE@aol.com.

Dart, Cumulus, Paramount 14', large tow plane "Stinson Reliant", Stearman Bi Plane, or trade for large gliders, scale, etc. Gene Molnar, 5362 Aurelia St., Simi Valley, CA 93063; (805) 527-8582.

Wanted

Nelson KA6 glider or parts. Large, wood sailplanes, Baby Boas, Albatross, Minimoa, Comet. Broken or not. Kits or plans for gliders. Synergy, 91SE, Samuri, ASK-18; or wings and tailfeathers for DG-600. Primary trainer. Hollow core wings, any size. Racers or scale. Hobie Hawk parts - tail feathers, left wing, or whatever may be available. Gene Molnar, 5362 Aurelia St., Simi Valley, CA 93063; (805) 527-8582.

ZIKA

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Classified Note

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THE CONDOR

MADE IN AMERICA
BY MODELERS, FOR MODELERS

SPECS:	
WING SPAN	112.5"
WING AREA	918 SQ. IN.
AIRFOIL	SD7037
WEIGHT	62-66 OZ.
WING LOADING	9.7 - 10.3 OZ/SQ. FT.

★ VISA ★ MASTERCARD ★ AMERICAN EXPRESS ★ DISCOVER ★

CONDOR

Tomorrow's Sailplane, Technology Today

The Condor is designed by Mark Allen, who is considered one of the best model sailplane designers in the United States, if not the world. Mark has taken all of his previous experience in competition thermal duration flying, plus all the knowledge he has gained from his earlier contest and sport designs, to design the Condor. Mark Allen's previous planes, to name only a few, are: Falcon 880 and 800, Falcon 600, Swift, Thermal Eagle, Vulcan, Night Hawk, Sky Hawk, Electric Hawk, Falcon 550E, Rocket, Pocket Rocket and, of course, the molded, world championship F3B Eagle. By taking the best of these designs and the new construction techniques available today, Mark has come up with, what we feel, is the absolute best open-class sailplane available.

The wings are made in America by Ron Vann, owner of Spectrum Enterprises. Ron is also an avid competition flier, and is considered to be one of the best wing manufacturers in the industry. Taking his years of experience in manufacturing wings, Ron has produced wings and stabs for the Condor that we feel are world class. Starting with the spar that Mark Allen designed, Ron uses only the best and most accurately cut foam cores available. He then uses hand-picked obechi from Kennedy Composites, which is applied with West Systems epoxy. This is after he has first reinforced the wing with carbon fiber and fiberglass. The servo wells are routed out, as are the flaps and ailerons. What this means for the sailplane enthusiast is a minimum amount of work before getting the sailplane into the air. The wing is light but strong enough to take "pedal to the metal" launches. Also available as an option is Ron's unique internal capped hingeline. This means even less work for the modeler.

The fuselage is made by Steve Hug, owner of the Fuse Works. Steve is another master at what he does. Fuse Works makes what we consider to be the best fuselage in the business. Steve uses only the best fiberglass and Kevlar™ available. All fuselages are manufactured using the West Systems epoxy. Steve's fuselages have the least amount of pinholes, if any, that we have seen. In fact, the fuselage is so pretty that many people do not paint it. The fuselage is extremely light, and yet strong enough for very aggressive flying and landing. For those with very little building time, and those who don't like to paint, there is an optional pre-painted, in the mold, fuselage which includes a unique carbon fiber canopy.

All kitting is done at Slegers International's new and larger manufacturing facilities. We have spared no time or expense with supplying the modeler with the best materials available. The kit contains pre-sheeted wings and stabs by Ron Vann, fiberglass and Kevlar™ reinforced fuselage by Steve Hug, 3/8" diameter titanium wing rod from Kennedy Composites, optional 3/8" diameter steel wing rod by Squires Model Products, control horns and tow hook by Ziegelmeyer Enterprises, pushrods by Sullivan, or optional one piece steel rods. All wood is custom cut. Specially cut basswood of 60" is supplied to eliminate splices in leading edge, flaps and aileron capping. All balsa is hand picked, light to medium, to ensure light weight wing tips, stab tips, and rudder. Aircraft ply is used for the pre-fit servo tray and towhook block. A comprehensive instruction manual is included.

The Condor, designed by Mark Allen, wings by Ron Vann, fuselage by Steve Hug, and kitted by Slegers International, we feel, is the best open-class, thermal duration sailplane available, at an affordable price of $395.00 plus S&H.

SLEGERS INTERNATIONAL

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All epoxy fiberglass fuselages include suggested specifications (Wing Span/Airfoil/Radio Channels). We do not carry a large inventory, but rather custom make fuselages as orders are received. Normal delivery time for most partial/short kits and canopies is 10 days. Large orders take longer.

Selected foam cores are available from Dale King, **(972) 475-6003. Or,** foam cores or Ben Matsumoto, custom, glass bagged wings, stabs, rudders and other building services for all Viking Models, U.S.A. fuselages are available thru California Soaring Products, **(800) 520-SOAR.**

Canopies & Accessories

An in-house vacuum form machine allows us to produce our own canopies, which are made using PETG .040. If you are looking for a canopy or other vacuum formed accessories (including sailplanes, power, etc.), please let us know. We have a large inventory of canopies and do short production runs. Manufacturer inquiries are welcome.

Glider type from 11" - 24"
Standard type from 4" - 18"
Detailed type from 6" - 13"
Others - Various Sizes

Price Range:

Glider Type	$5.00 - $18.00
Standard Type	$4.00 - $12.00
Detailed Type	$4.00 - $12.00

Thermal or Slope

Epoxy Fiberglass Fuselages	Price	S&H
Aeolus III (60"/NACA 63A010/3)		
43" fuse, plans	$65.00	$10.00
Condor 3m or V (bolt-on wing mount/up to 10" chord)		
52 1/4" fuse, nose cone	$80.00	$10.00
Contestant (148"/E205/3-4/10.5" chord)		
60" fuse, canopy, tray	$80.00	$10.00
Elf 2m (bolt-on wing mount/up to 10" chord)		
44 3/8" fuse, nose cone	$70.00	$10.00
Facctor (83"/E193/3)		
41" fuse, hatch, plans	$75.00	$10.00
Oden (100-130"/S3021/As Req./10.25" chord)		
51" fuse, canopy	$75.00	$10.00
Raven 3m (119"/Mod. E193/As Req./10.75" chord)		
51" fuse, plans	$80.00	$10.00
Smoothie (100"+/None/Var.)		
49" fuse, hatch	$70.00	$10.00
Special Edition (100-130"/Any/As Req./9.625" chord/bolt-on wing)		
54" fuse, nose cone	$80.00	$10.00
Stiletto I (100-136"/Any/As Req./10" max. chord/plug-in wing)		
49" fuse	$75.00	$10.00
Stiletto II (100-136"/Any/As Req./10" max. chord/bolt-on wing)		
49" fuse, hatch	$75.00	$10.00
Stiletto RG-15 (100-136"/RG-15/As Req./plug-in wing)		
49" fuse	$75.00	$10.00
Stiletto HQ 2.5/9 (100 - 114"/HQ2.5/9/As Req./10" root cord/plug-in wing)		
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Zen (100"+/None/Var.)		
51" fuse, hatch	$75.00	$10.00

All fuselages are Kevlar™ reinforced.