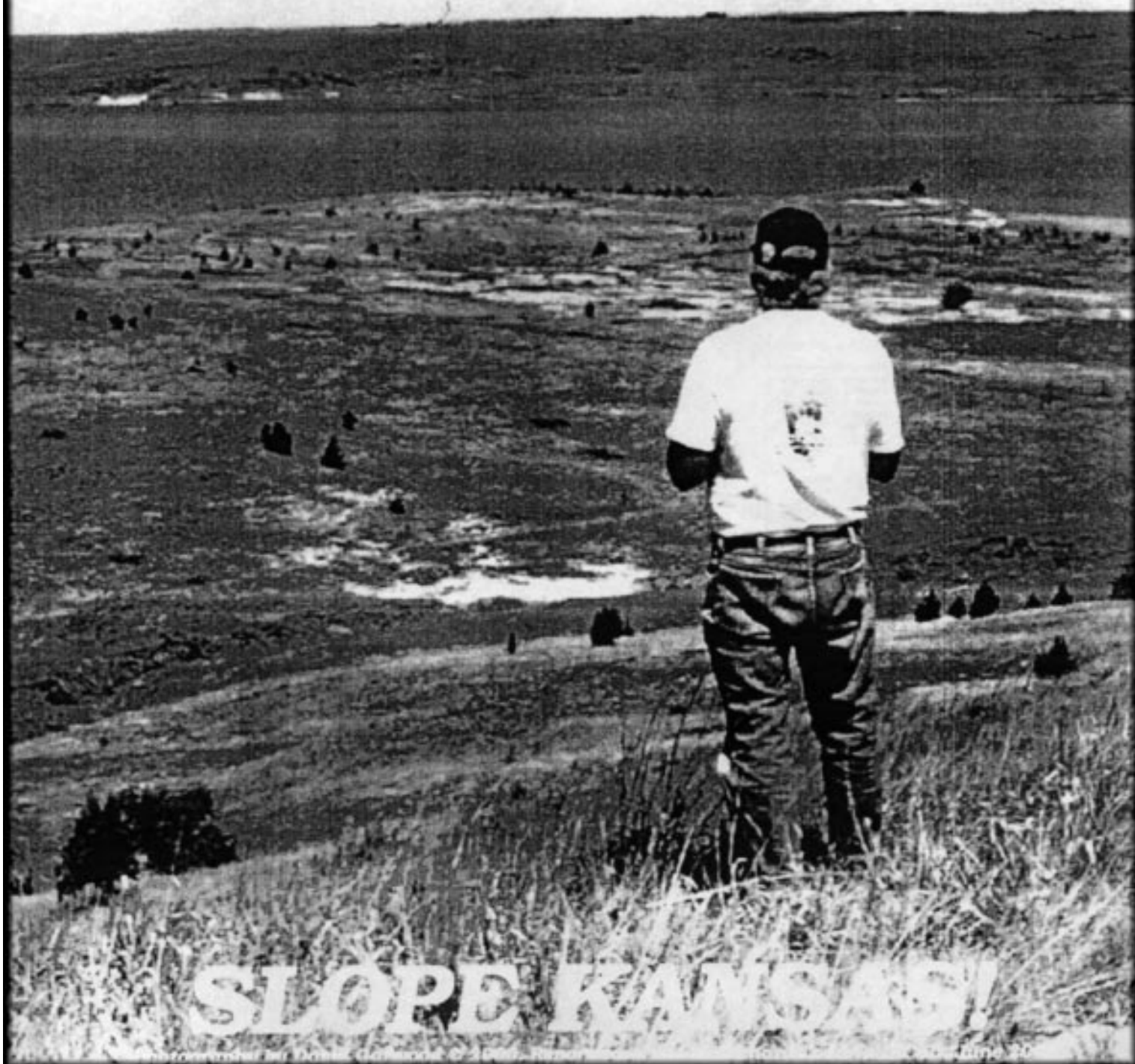


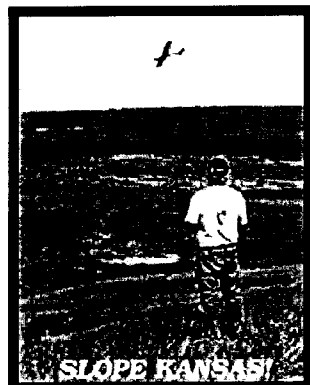
R/C
SOARING DIGEST
Radio controlled
THE JOURNAL FOR R/C SOARING ENTHUSIASTS

June, 2000
Vol. 17, No. 6
U.S.A. \$3.50



R/C *Radio controlled* SOARING DIGEST

THE JOURNAL FOR R/C SOARING ENTHUSIASTS



SLOPE KANSAS!

Alden Shipp flies his DAW Foamie 1-26 over one of the prettiest slopes in the Midwest with Minooka Park and Wilson Lake off in the distance. The lift there has been described as magical, which is reported on in-depth this month by Richard Loud in Tom Nagel's column, "Have Sailplane Will Travel!"

Photography by Dave Garwood, Scotia, New York.

R/C Soaring Digest (RCSD) is a reader-written monthly publication for the R/C sailplane enthusiast and has been published since January, 1984. It is dedicated to sharing technical and educational information. All material contributed must be exclusive and original and not infringe upon the copyrights of others. It is the policy of RCSD to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of all articles, model designs, press & news releases, etc. are the opinion of the author and may not necessarily reflect those of RCSD. We encourage anyone who wishes to obtain additional information to contact the author. RCSD was founded by Jim Gray, lecturer and technical consultant.

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TABLE OF CONTENTS

- 3 "Soaring Site" Judy Slates
Editorial A Sad Day, About the Cover
..... Slope Soaring in Texas, RCSD Index Update
- 6 "Jer's Workbench" Jerry Slates
Construction Techniques The Baby Albatross - Part IV
..... Strip Planking 101
- 8 "On The Wing..." Bill & Bunny Kuhlman
Flying Wing Design & Analysis Nemesis
- 10 "The Electric Connection" Mark Nankivil
Kit Review HobbyFlite Electric Flying Wing
- 13 "Short Cuts" Steve Savoie
Construction Techniques X-4 Part 4
..... Vertical Fin Design
- 14 "Short Cuts" Steve Savoie
Event Coverage Elmira Aerotow 2000
- 16 "Have Sailplane, Will Travel" Tom Nagel
Travel Saga Flying in Kansas
..... Richard Loud Reports on Slope Flying at Wilson Lake, Kansas
- 19 "Cross Country Soaring" Scott Gradwell
Cross Country Soaring Basics & Techniques Montague Cross Country Challenge
- 20 "On The Wing..." Bill & Bunny Kuhlman
Flying Wing Design & Analysis Suggestions for First 'Wings - Parts 1 & 2
- 24 "Gordy's Travels" Gordy Stahl
Servo Design Servos, Warranty, Damage & 'In-General'

OTHER GOOD STUFF

- New Products
- 27 Classified Ads
- 26 Schedule of Special Events
- 28 R/C Soaring Resources
- 31 Advertiser Index

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RCSD ON THE WEB

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Highlights & Mailing Status of the Current Issue
About RCSD

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"Getting Started in RC Soaring" Getting started guide - Adobe Acrobat PDF format

Links to Organizations, Special Interest Groups & Clubs

On-Line Articles - Great articles originally written for the printed version of RCSD.

..... "Trimming Your Sailplane for Optimum Performance" by Brian Agnew

..... "Flies Faster" by Dr. Michael Selig

..... "The Square-Cube Law and Scaling for RC Sailplanes" by Dr. Michael Selig

..... "Modifying & Building the MB Raven (Parts 1-4)" by Bill & Bunny Kuhlman

Bookshelf Listings - A listing of recently published books of interest to aeromodelers.

Complete RCSD Index, 1984-1999



The Soaring Site

A Sad Day

As most of you know, Jim Gray created RCSD, the first issue was printed in January, 1984 and, in his first editorial, he said:

"R/C Soaring Digest is a dream, a challenge, and a long time ambition of mine... a monthly newsletter devoted to RC Soaring and Sailplanes - and to the pilots who fly them."

"Before telling you about my plans as editor and publisher, I'd like to tell you a little about myself. First, I love the sky and all manner of things that fly. I've been a pilot of full-size aircraft since I was 16 years old, and I have flown many hours in both sailplanes and powered aircraft over the last 40 years.

"I've been a model builder since I was 8 years old, and I've enjoyed many phases of that wonderful hobby: free flight, scale, RC, rubber power, glow fuel power, sailplanes, kites... and plenty more. During those years, I've not won much of anything, but I have gained something far more important to me than trophies - friends!

"In 1972, I discovered something new and different - RC Soaring. I had just sold my full-size sailplane and was looking around for something new and different. Well, I found it... and have been challenged, absorbed, frustrated, and fascinated by it ever since.

"In 1976, I began a column in *Model Airplane News* for the then editor, Walt Schroder. He decided to call the column Soar Subjects, and it's been going ever since, although it's now called Soaring News.

"In every pilot's life there comes a time to 'solo', to strike out on one's own, whether it be flying alone for the first time, flying a new type of aircraft for the first time, or starting a new and untried venture like *RC Soaring Digest*.

"People are important to me as persons; that is, individuals. I'm going to try to meet all of you in one way or another as soon as possible: at shows, at meets, and through the pages of this newsletter. I hope that you plan to write to me, because I want you to know that this venture is yours, too, and that your ideas, opinions, suggestions and criticism are important to its success. Together, we can make it a go."

Happy Soaring,
Jim

In that same issue, Jim also said:

"In this and future issues, *RC Soaring Digest* will make every effort to bring you the latest, best, and most up-to-date information about this hobby/sport of ours. It will, like any good newspaper, cover the who, the what, and the why of RC Soaring and Sailplanes. We'll talk about airfoils, about F3B, about 2-meter sailplanes; and we'll try to bring you soaring personalities and 'guest spots'. There will be some contest reports, and a contest calendar, if possible, covering at least the major events. We will have a beginner's corner with simple ideas, building hints, and help for the newcomer to RC Soaring. You will find a lot of information from abroad... with the reasons behind why they do what they do, and how it's different from our approach. I'll make a real effort to bring theory and practice closer together, but I'll need your help to even come close to these goals."

Today

When we took over the reins of Jim's 'Baby', many years ago, we did not attempt to reinvent the wheel, but rather worked hard to build off of that which Jim and his wife, Peggy, had worked so hard to provide the soaring community. While some things have evolved over the years, much of Jim's dream still exists today. And, we'd sure like to know what he thinks of the full size color photo that currently resides on the RCSD web site. It was one thing that we always wanted to do on the cover of RCSD, but the budget never let us. Unfortunately, Jim can't tell us.

We regret to inform all of you that knew him, and all of you that benefited from his 'dream', that he passed away Friday morning, June 23rd of this year. Our most sincere condolences go out to Jim's family, friends and associates. His absence will be profound.

About the Cover

This month's reporter for Tom Nagel's column "Have Sailplane Will Travel!" is Richard Loud of Ballaston Spa, New York. He made the trek to the annual Midwest Slope Challenge this year, and gives us an in-depth look at one great slope site: Wilson Lake, Kansas!

Well, Richard, and sidekick ace photographer, Dave Garwood, took HSWT one step further when Rich asked a simple question, "If I could beg and plead here for a minute, photo #1 would make a great poster for

Slope Kansas! If you use only one photograph, this should be the one."

Now, how can one ignore any gifted writer that starts off by begging and pleading? The answer, of course, is that we didn't.

Richard's simple request to add the words "Slope Kansas!" to the photo for the cover of RCSD was easy to do. However, we also knew that the quality of our printing simply won't do it the justice it deserves. So, for those of you with computer ability, simply go to the RCSD web site, and the first thing you should see is the poster, in color, available for downloading to your laser printer, in color if you have the ability to do so! Currently, our web weavers plan to provide you with a fast loading home page, so you'll have to click on the image to obtain the 8X10 image for printing.

And, the entire article is also available on-line, with color photos, as well!

Does this establish a precedent? Yup! Each month we plan to provide you with a full size color poster photograph, which may or not be the same as what's on the cover of RCSD each month.

We realize that many of you do not have web access, nor a computer, but likely have a friend that does. We'd like to hear your thoughts on the subject, and if any of you have difficulty downloading, we really need to hear from you so we can fix any bugs in the process!

Thanks go to Rich for begging, and ace photographer Dave Garwood for granting us permission to do this for all RCSD readers. Thanks also go to B² for doing all the web weaving and making the changes necessary to provide the poster on-line.

Slope Soaring in Texas?

We received an e-mail from John Frakes in Texas regarding slope sites in Texas. John asked, "This is a shot in the dark, but do you know of, or could you point me in the direction of someone who might know of a good slope that works when the wind is out of the south east, that is within about a 1-2 hour drive of Ft. Worth, Texas? Does anyone have a web site of Texas slope sites?"

Response:

We have not been able to locate much by way of slope sites in Texas, but have been hoping to find someplace just over the border in Oklahoma.

However, Ivan Via (Dallas/Fort Worth

area) flies a bit of slope, although as I understand it, the site leaves a bit to be desired. Perhaps he can help: <vvvia@home.com>.

There was a club announcement several years back about an event that took place mid-state at a state park, and there was some slope flying possible. I can't locate the announcement, but it came from Fred Mallett: <FrederM@aol.com>.

Soaring League of North Texas web site (SLNT) out of Dallas is accessible off our club (links) web page: <<http://www.halcyon.com/bsquared/RCSD.html>>.

Back around 1998, Joseph Galletti of Torque & Recoil Club out of Austin talked about some slope flying down that way: <foameron@aol.com>. (I don't know if this address is still correct.)

I've heard that there is some excellent thermal activity off some of the dams, again around mid state. I plan to turn your question over to the RCSD readers to see if we can get some additional information on the subject.

Thanks for asking! We'd like to know, too!

And, John said:

"Thanks for the help and the links; we are currently flying Zagi's at Lake Worth, but the wind direction window to make the slope work is narrow, and it has LOTS of trees! (boo hiss hisss) GRIN. I'm wondering about something out by Mineral Wells; topograph (thanks for the article) shows some interesting stuff out that away."

Response:

You're welcome!

Keep us posted! We agree that there's gotta be something around! We've noted that there are far too many glider ports in Texas for there not to be something! Any glider ports out your way? Hang gliding?

And, John's response:

"When you say glider ports I'm guessing you mean full size? If so, yes we have two maybe three (I don't know if the one in Denton is still active.), thermal type flying. One is commercial operation out at Caddo Mills, Texas (east of Dallas), and one is a club, which is Texas Soaring Association, south of Midlothian (south of the DFW area 30 miles approx.). I am a member there. We celebrated our 50th anniversary a couple years ago. We have about ten club owned gliders, plus all the private ships. We paved our runway last year. Our fleet includes a PW5, couple Grobs, couple "pooches" szd-50, couple Russias, 1-26, and 2-32. Plus two tow planes. I'm currently not that active. You should come to the club for one of the meets."

Response:

Yes, we've been out to Caddo, and Martin Simons flew there when he last visited. Jer couldn't find anything in the area, as you likely already know, suitable for flying R/

C. Ah, well. Jer says he'll try to attend one of your club meets. Keep us posted!

And, for any of you readers that can help us out with slope sites here in Texas, please don't hesitate to let us know!!

RCSD Index Update

As most of you know, Lee Murray has been indexing RCSD since the beginning, which dates back to January 1984. That index is available on the RCSD web site or from the LJM Associates home page. This month, Lee dropped us a note to say, "A friend that I know because of RCSD, Greg Ciurpita, is a talented programmer at Lucent Technologies, a.k.a. Bell Labs. He took the RCSD index and created an instant search feature that readers could access directly on line. He said he can do more to improve it, but it looks pretty good to me."

So, we checked out Greg's work, and B², our web weavers, immediately added another link off the RCSD web pages! It's a

great addition; thanks go to Lee, Greg, and B²! So, how does it work?


About the same time that we found out about the new search feature, we received an e-mail from a fellow called Rick, who said:

"I posted a question on the RC Soaring Exchange that provided a response referring (to) a detailed article regarding winglets. Can you help me identify this?"

So, what follows is a listing of all articles covering 'winglets' from the RCSD index, as summarized with the new index search engine available through the RCSD main web page:

Search String: Winglets

- * Instructions for designing winglets given **Montreal S.C., The 84-Jul**
- * Control scheme for aileron & flap servos controlling flaperons & winglet Winglet rudder is coupled to flaperon **Sawyer, Ty 86-Jul**



The Great Midwest Oc-Tow-Berfest 2000

Three Days September 29 - October 1
St. Louis, MO. area Fun Fly Aerotow
for Giant Scale R/C Sailplanes.
Sponsored by the Midwest Air Wing R/C Club.
Pilots Choice Awards for Best Modern and
Vintage Sailplane as well as Best Towplane.
Food available on Saturday and Sunday.
Field open to early arrivals on Thursday.
\$20 Entry Fee / Towpilots Free
Event Coordinator Peter George 314 664 6613
twometer@worldnet.att.net
Flying begins after 9AM pilots meeting.

The design of several models is discussed Elfe II, Nurflugel, JustInTime 87 Sweep and tip/winglet design is an issue as well as control surface placement **Kuhlman, Bill & Bunny 89-Aug**

20 degree sweep with winglets is recommended for performance and stability. Avoid high sweep because of stability and launching problems. **Kuhlman, Bill & Bunny 89-Dec**

Winglet design and location is discussed as it relates to stability. Mounting angles are discussed.

Kuhlman, Bill & Bunny 90-Jan

Nanosaur Flying Wing is discussed w/13.5 inch chord, 122 inch span, 20 deg sweep with winglets covering last 750f wing tip. Area:1620 sqin **Kuhlman, B^2 92-Jan**

Winglets seem to be most beneficial to scale models where wing tips are smaller. Several examples shown. Also excellent photos of scale ships. **Lehman, Robin -Jun**

Winglets at tips seem to predominate on winning thermal ships while center fins seem to control best for slope flying. **Kuhlman, B^2 -Jul**

DG800 from EMS has styrofoam/Balsa/Oracover wing, Plug in winglets, 3.7 & 4.2 M spans. HQ 2.5/14 Airfoil. Also Roke DG202 & Roedelmodell Ka6E. **Sailplanes Unlimited 96-Aug**

Review of winglet use of full size, scale model use. Benefits: higher lift low speed turns, less tip stalls. Photos included. **Lehman, Robin 96-Sep**

[cont.] design has a higher sweep (25 deg), Semicrescent planform, winglets in middle of wing, complex twist geometry. **Kuhlman, B^2 96-Sep**

EMS DG-800 kit went together precisely without adjustments. Tip stalls could be forced. Straight stalls

easily recovered. Winglets & Extensions **Lehman, Robin, Meeks, D.E. 97-Feb**

* [cont.] discussion on Beech 1900D winglets. Elmira Aerotow event will take place during June 13-15. Full scale activities described. **Lehman, Robin 97-Mar**

* [cont.] Kit has many features. Wing extensions and winglet options. Winglets make the plane more responsive. Performance and quality excellent **Savoie, Steve 97-Mar**

* [cont.] How to publish and how to select the best route to sell your work. Stab Design and comments on winglet design. **Slates, Jerry, et.al. 97-Aug**

* 13 tips on how to fly a large scale glider and avoid tip stalls. Tips include, CG, positive linkages, winglets, coordinate turns, fly faster. **Enhuei, Joseph 97-Sep**

* 66 of 74 sailplanes in St. Auban Fr contest had winglets. One turned down with rub strip, some had Horner winglets, one turned up tip. Design of **Simons, Martin 97-Sep**

* (cont.) winglets was the topic of OSTIV Congress held during the contest. Bug wipers for leading edge. Ballasting. Model flown discussed. **Simons, Martin 97-Sep**

Neat, huh!

More Web Page Changes?

Yup! We're making more changes and hope to make the site as value added as possible.

One thing that many of you can help us out with is the "RC Soaring Resource" section in RCSD. Quite a few of the current listings are for folks that are not subscribers, and some listings could be out-of-date. If any of you are aware of an out-of-date listing, please let us know.

We plan to make the resource listings

available on-line, likely as a pdf document. Currently, we are evaluating whether or not to continue including the listing in RCSD every month. Rather, we could print it once a year, providing a copy to new subscribers as they 'check in'.

We'd like to hear any thoughts any of you might have on this subject, as well.

**Happy Flying!
Judy Slates**



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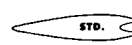
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Glider Type	\$5.00 - \$18.00
Standard Type	\$4.00 - \$12.00
Detailed Type	\$4.00 - \$12.00



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C.O.D. \$10.00 additional. Prices subject to change without notice.

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- tailless and flying wing design
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- polar diagrams explained
- sailplane aerodynamics
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Jer's Workbench

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Bowlus Baby Albatross - Part IV

Last month, I completed the lay-up of the fuselage-pod formers, as shown in photo #1. In the next step, the formers needed to be added for the top half of the fuselage-pod. The top half of the fuselage-pod needed to be constructed in such a way so as to be removable.

So, how does one construct the top half in such a way that it can be removed?

This was a bit *tricky*, indeed!

First, using 2 inch packing tape, the top surfaces of the *bottom* half of the fuselage-pod were taped. Although the tape is not apparent in photo #2, it is indeed taped. If you look closely at photo #2, you'll likely note that I glued stand-offs on each of the formers for the top half of the fuselage-pod. These stand-offs hold each former in its proper location, and they are **NOT** glued to the lower fuselage-pod.

Photo #3 depicts the addition of 5 stringers which hold everything together. Once the glue cured, the stand-offs were cut off, and the removable top half came off easily, as shown in photo #4.

Strip Planking 101

Strip planking is the next step in the process. But before proceeding, let's review the subject of strip planking a bit.

For some model builders, strip planking is a 'lost art'. For others, such as boat builders who still construct wooden boats, it's not. There are also carpenters who install wood siding on houses, etc., etc.

In my opinion, when it comes to model building, it is pretty much a 'lost art'. After all, why do strip planking when one can

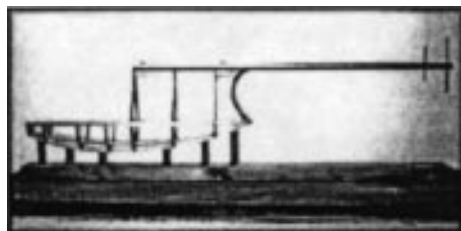


PHOTO #1

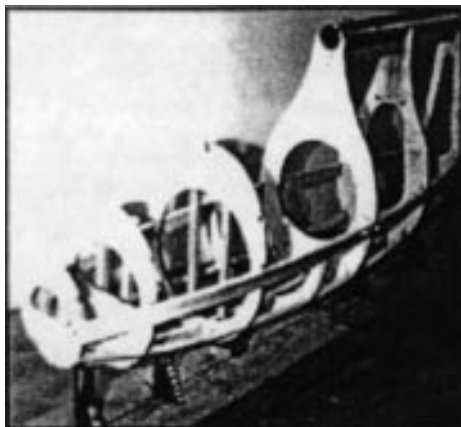


PHOTO #2

purchase a fiberglass fuselage? However, the question arises, "How was the fiberglass fuselage made?"

Indeed, in order to make the fuselage, someone, somewhere made a strip planked fuselage plug, in order to make the mold. So, for these folks, the art of strip planking is not lost.

While strip planking is not hard work, it is time consuming. Once one accepts the fact that it's gonna take awhile from a few days to weeks, the undertaking itself is not that difficult.

That said, let's tackle the construction. First, we need a fuselage to strip plank. (See photo #1.) Next, we need a supply of wood, and I'm using wood cut 1/8x3/8x36 inches.

There's a couple of ways to start the construction. One can start at the top of the fuselage and work down, or start at the

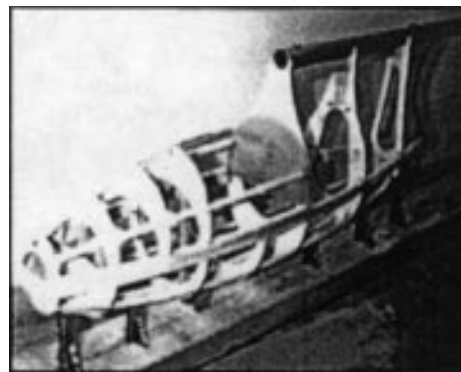


PHOTO #3

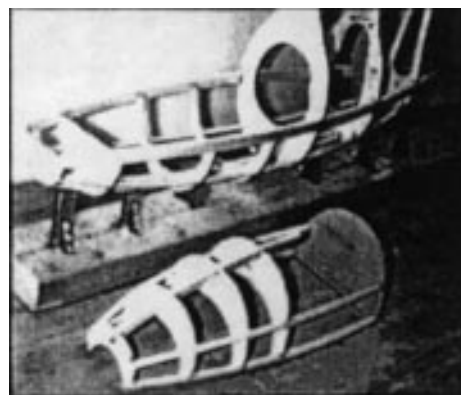


PHOTO #4

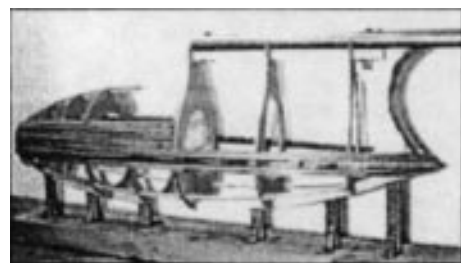
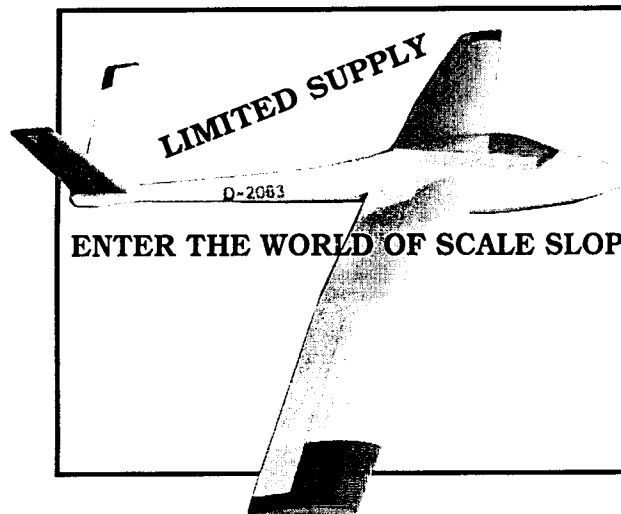


PHOTO #5

bottom and work up. Being different, I prefer to begin in the middle, working up first, and then down as shown in photo #5.

Glue the first strip in place, followed by the second, which will need to be trimmed so that it will fit perfectly next to the first



H101 SALTO SPECIFICATIONS:

Wing Span	90"
Wing Area	540 Sq. In.
Flying Weight	Approximately 64 oz.
Airfoil	Modified E-392
Controls	Ailerons, V-Tail Mix
Kit Price	\$399.95 + \$25.00 S&H USA (Texas sales tax: 7.25%)

KIT FEATURES:

- Epoxy Kevlar™ reinforced fuselage with wing rod tubes installed.
- Obechi covered wings with ailerons cut out and faced.
- Obechi covered stabilizer with elevators cut out and faced.
- Complete hardware package & construction manual.
- Easy construction - kit is designed to be completed in a matter of days, as opposed to weeks.



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FIGURE 1

NOTE
SMALL
GAP

strip. This is where the *time consuming* part starts!

As shown in figure #1, note that the edges of each strip will need to be beveled. And, some of the strips will be straight as shown in figure #2A, while some need to be tapered, as shown in figure #2B. Figure #2C depicts the double taper. It is impossible to explain exactly how to tackle this aspect of the construction, as each strip will be different. However, each strip must be beveled and tapered to fit.

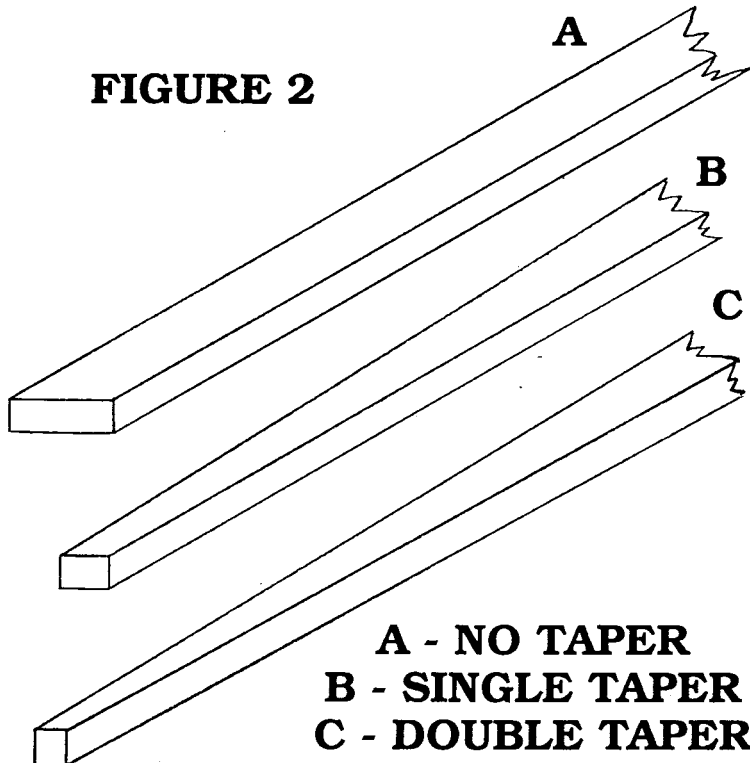
Before getting too far into the strip planking process, it's important to think things through:

- Where and how will the servos be ultimately mounted?
- Where will the push-pull control cables be run?
- How will the mono wheel be installed?
- Is there anything else that needs to be considered in the final fit?

Between now and next month, I plan to give a lot of thought to each of these items, and *THAT'S* a lot of work; for me, that's *time consuming*!

Happy Flying! ■

FIGURE 2



Windows Plotting Programs

Airfoil Plot 8 \$35

Model Design 8 \$50

Airfoil Plot and Model Design are now available for Windows 95, Windows 98, and Windows NT. Features include the ability to use airfoils downloaded from Michael Selig's airfoil data base, export airfoils in DSF format for use with CAD programs, and plot airfoil templates for cutting foam cores upright or inverted.. Nothing else to buy Over 400 airfoils plus NACA and Quabeck airfoil generators are included. Airfoil Plot 7 and Model Design 7 are still available for MSDOS and Windows 3.1 users. Shipping \$5. Send #10 envelope with 55 cents postage for demo disk.

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CURTISS P-40 WARHAWK

The Curtiss P-40 Warhawk accepts standard size radio equipment.

This foamie warbird flies in light lift and is exceptionally fast. This plane can be enjoyed by the scale sport or combat flyer with pure enjoyment. It is very scale looking and has been turning heads at the slope. Again, this kit comes with all of our kits, comes with a comprehensive manual and all the hardware necessary to finish your P-40.

ME P.1111 FLYING WING

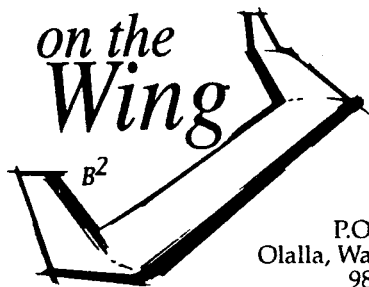
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Nemesis

An all molded hollow core F3B machine by Vern Hunt.

Vern Hunt has been involved in building and flying tailless models for about ten years, and we've been corresponding with him for some time. Late last year he sent us a photo of his various renditions of Hans-Jürgen Unverferth's CO8. The CO8 design incorporates flaps and has a broad speed range and very low landing speed. Vern's aircraft retain these flying characteristics.

Vern reiterates what we have been saying for many years, "Flying wings, if designed properly, can be extremely stable and can core out a small thermal with the greatest of ease. The ability to stand on a wing tip and tightly turn is a flying wing's greatest asset."

As you'll note from the included photos, he wound up building several of these machines - a 60 inch span hand launch, one with two meter span, and a few full size versions. All but one fly extremely well. The one exception required a rearward CG because of insufficient wing twist, and this created a very twitchy aircraft which was difficult to pilot.

Based on his experiences with those several variations of the CO8 design, eight in all, Vern set out to design and construct the killer thermal 'ship, Nemesis, which would

be capable of participating in the F3B environment. The eight predecessors turned out to be wonderful learning tools, as Vern became a more proficient builder with each one constructed. He finally came to the conclusion that producing an all molded carbon and Rohacell® wing would be faster than foam and balsa, requiring less time in the shop and giving him more time to fly. (The time saving aspect of this plan did not come to fruition, but read on.)

Vern completed construction of the Nemesis plugs in December, and began manufacturing molded parts in January. After the molds were made, another six weeks were spent in experimenting with various fabrication techniques to obtain a light strong structure. After several attempts, Vern felt he had arrived at the proper mix of carbon, Rohacell®, and S-glass.

The result of all of this time and energy is an all molded hollow core swept wing glider which could easily be a small scale prototype for a full size glider. He admits the molding process has taken substantially longer than anticipated, but the pictures of the first flyable model which are included here show that all of that extra effort paid off. This Nemesis is still a bit heavy for Vern's taste, but he's sure some adjustments to the layup schedule will result in weight savings for future models.

The planview contains most of the necessary data, and Vern shared some of the finer points of the design. The fuselage has an elliptical cross-section and is based on the NACA 65,3-019 airfoil (used as the root airfoil on the Northrop N-9M.) The control system consists of elevons and flaps, with one servo for each surface. Two tow hooks are on the under surface of the wings, 25 inches out from the center line and 1/4" ahead of the CG. Winch launching is with a V bridal. The anhedral is necessary - without it the 'ship will not turn.



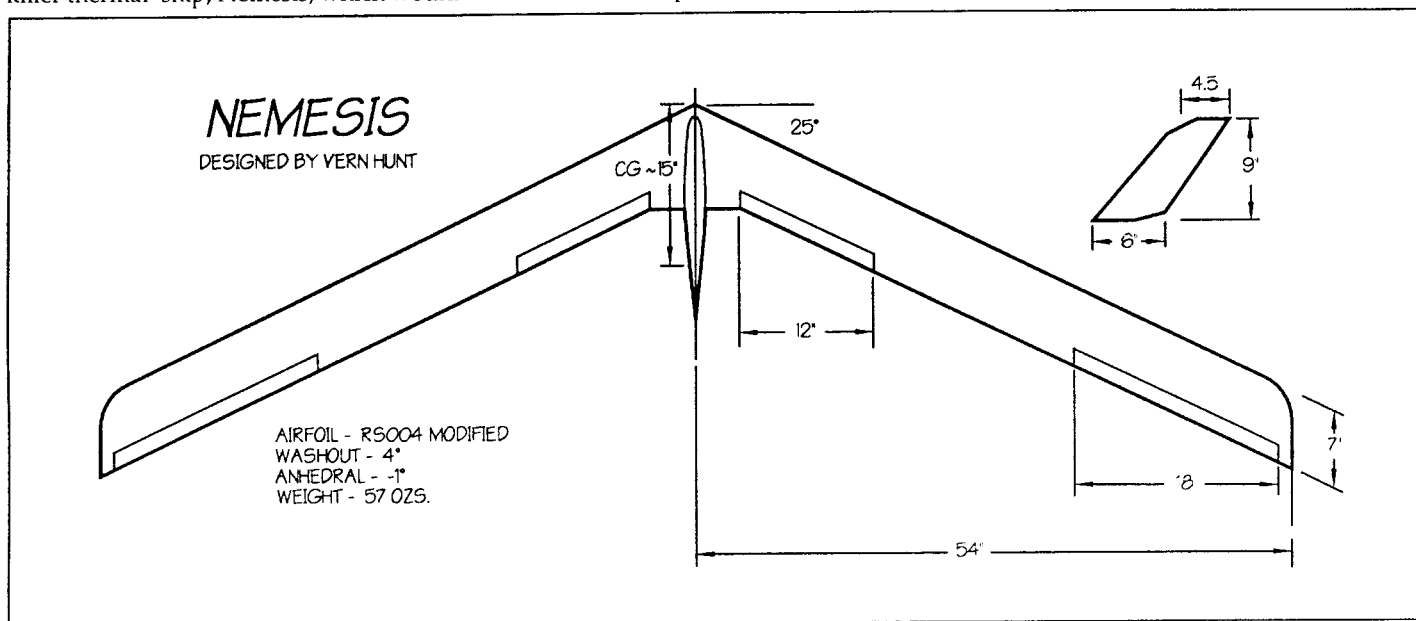
Vern and two of his larger CO8 renditions.



Vern and his CO8 derivatives in various sizes.

Flight testing of the Nemesis is going on now, and the 'ship seems to be fulfilling all of Vern's expectations. He's excited about the prospect of flying some cross-country with the Nemesis and has promised to keep us updated.

Got an idea or project for a future "On the 'Wing..." column? Contact us at P.O. Box 975, Olalla WA 98359-0975 or at [<bsquared@halcyon.com>](mailto:bsquared@halcyon.com).





Nemesis



*Closeup of the
Nemesis fuselage-
wing junction.*



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THE ELECTRIC CONNECTION

The EFW has a unique "Northrop YB-49" look in the air.

By Mark Nankivil
7411 Canterbury Ave.
St. Louis, Missouri 63143
(314) 781-9175
nankmc@QuixNet.net

HobbyFlite Electric Flying Wing

So, you're a company that has a successful all foam, 4 foot span model of the Boeing 747. Your model can be flown either as a glider or as a Speed 400 powered model, so what could be next? Well, due to the ingenuity of modelers and the willingness to use what is already in place, you turn the wing of the 747 into an electric flying wing! Though I'm sure the road to deciding to produce this electric flying wing has more details than what is outlined above, the end result is an excellent model well worth looking at and better yet, to fly.

The HobbyFlite electric flying wing (let's call it EFW for short) is a 48 inch span, 450 sq. in. all foam wing made of R-mer™ foam. This foam has the appearance of ordinary expanded polystyrene (EPS) foam but is a more durable, flexible material and its use in this application is a good match. So what do you get when you open the kit box? A well packaged model meets your eyes as you open the box which, by the way, has an eye catching label showing the model and giving you some of the details of what to expect inside. When opened, you'll find foam blocks glued in the box which act like columns to help keep the whole box being crushed in shipping. The foam wings are well packed and the instructions are bagged and taped to the bottom of the box along with two 8.5"x11" sheets of reflective trim tape. Off in one corner of the box is a Speed 400 6V motor packed into a block of foam and taped elsewhere to the inside of the box lid is a plastic bag containing the plastic motor nacelle, Gunther prop, 2 long servo leads and miscellaneous fittings. Another plastic bag is taped adjacent to it and contains the landing gear for the EFW. And finally, the servo wire pushrods for the elevons are pushed into one of the shipping support blocks. All you need to add are a radio, electronic speed controller, and some tape and glue to complete the EFW.

As you pull out the parts, you'll find that a lot of work has already been done by HobbyFlite. The elevons are already taped to the wings and these have the control horns bonded on. The servo bays are

routed out and the antenna tunnel is pre-cut into one of the wing halves. In addition, the wing halves are already marked for the location of the receiver, battery pack, motor mount and landing gear assemblies. The location of the Center of Gravity (CG) is also precisely located and marked. Nice! The vertical fins are pre-cut (they were the horizontal stabilizers in the 747 kit) to match the upper surface curvature of the wing and finally, the landing gear has the wheels already mated to the gear wires which are then mounted in plastic flanges that mount directly to the wing under surfaces. And all of this for \$65.00!

The assembly instructions that come with the EFW consist of a printed sheet of written instructions and a sheet consisting of color photos and line drawings detailing the step by step construction sequence. Construction (or should I say assembly) starts with the joining of the two wing halves together. You are given the choice of using low temp hot glue or 5 minute epoxy. I chose to use 30 minute epoxy as that was what I had on hand and once glued together, I taped the halves together and ensured that the alignment of the wing panels was accurate. Setting the wing aside, the next step was to solder the supplied capacitor to the motor and mount the motor into the plastic motor nacelle. This motor nacelle is used on the 747 model in a pusher configuration and as mounted on the EFW, allows for plenty of effective cooling of the motor. I chose to go with a Castle Creations Pixie 14 electronic speed controller with BEC because of its small



Specifications:

Wingspan - 48"
Root Chord - 12"
Tip Chord - 3.5"
Wing Area - 450 sq. inches
Flying Weight - 17 ounces
Wing Loading - 5.4 ounces/square foot
Motor - Speed 400 6 Volt Motor
Battery - 7 cell Sanyo™ 500AR or 600AE cells
Speed Controller - Castle Creations Pixie 14
Radio - Hitec Focus III with HAS-3MB receiver
Kit Price - \$65.00 plus S&H

size and weight plus the high reliability of the Castle Creations units I've used on past electric models. Be sure to wire the Pixie 14 to the motor so that the prop is acting as a pusher. Otherwise.....! You may also need to pull the Gunther prop off of the rubber shaft mount and turn it around to use in the pusher configuration. When mounted on the Speed 400 6V motor, the raised molded lettering found on the prop blade should be facing to the rear.

Once the epoxy has cured on the wing halves, it's time to do a bit of foam cutting. I started with cutting the slot out where the motor nacelle will be mounted. I cut this a bit undersize and sanded the foam until I had a snug fit for the motor nacelle. At this point, I mounted the motor nacelle in the slot and flipped the wing over on the workbench to determine the exact location of the cutouts for the battery pack and receiver. CG location on a flying wing is very important! The CG range is much smaller than on most conventionally laid out model designs, so make every effort to get the EFW to balance on the CG is noted in the instructions and even marked on the model. I deviated from the instructions at this point so that I could determine the

location and minimal size for the cutouts. To achieve the correct balance, I installed the servos in their routed pockets and cut the slots for the servo leads, and installed the supplied servo leads up to the location marked for the receiver. I then placed the reinforcement tape on the upper and lower surfaces of the wing as outlined clearly in the instructions. CAUTION! When taping the wings, make every effort to place the tape carefully so as to not induce any twist into the wing panels. Simply take your time, work on a large level surface and check the wing panels often to assure they remain straight and untwisted. You don't have to pull the tape onto the surface, just lay it into place and that will go a long way towards getting it right the first time. I chose to use 3M™ Double Stick Strapping Tape and Double Stick Clear Packing Tape as it has a noticeably better tack/grip adhesive than more standard tapes.

With all of that done, it was time to work

the receiver. Remember, you are removing foam from the center section of the wing which also happens to be the point of highest bending stress. Remove no more foam than is really necessary to get your equipment into place.

With all the work done on the under side of the EFW, it's time turn it over and attach the vertical fins. Be sure they run parallel with the joint line of the two wing halves and glue into place. I used the molded fake flap fairings as a gauge in lining up the vertical fins and this has worked out well. Since I fly primarily on a grass field, I chose to leave off the landing gear assemblies. These are really nice units that weigh very little and will be put to use in another park flyer size project somewhere down the road.

I used a Hitec Focus III/AM radio for the EFW as it has built in elevon/V-tail mixing and the receiver is light and compact. With

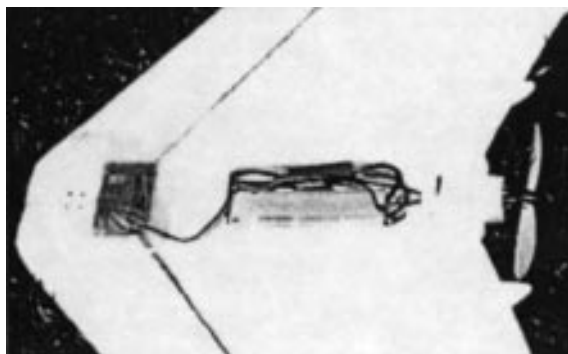
the battery pack installed and taped into place, I powered up the transmitter and checked control surface throws. No elevon throws are noted in the instructions so I took a guess and used 3/8" up and down for elevator and the same for the elevon throws. Actually, that's what the elevon mix on the Focus III gave me and it looked good to me! Be sure to confirm that left is left, right is right... Also be sure the prop is pushing air in the correct direction! Don't ask why I keep harping on this!

Flying

Now it's off to the flying field! I decided to do a test glide first to be sure that the elevons had sufficient throw for flying. Without much to grip on the EFW, I held the model by the leading edge at the nose with an overhand grip (4 fingers on top and thumb underneath) and simply pitched/pull the EFW forward with a gentle pull, trying to be sure it was



EFW at rest. Note the clear plastic elevons which are hard to see when in the air.



Simple layout of the components. From L to R you'll find the Hitec HAS-3MB receiver with elevon servo leads leading out to each wingtip, 7 cell 500AR battery pack and Castle Creations Pixie 14 ESC, and at the tail is the plastic motor nacelle housing the supplied Speed 400 6V motor and Gunther prop.

out the location of the receiver and battery pack. With the wing turned over (upper surface towards the table top), I set the wing on a temporary balancing jig lined up with the CG marks already on the wing. I then placed the receiver on the location marked for it and placed my 7 cell Sanyo™ 500AR pack in the area marked for the battery pack. Don't forget to place the vertical fins and landing gear assemblies in their approximate location. I was able to narrow down the area that I needed to cut out and remove for the battery pack. With the areas then marked for actual cutting/foam removal, I trimmed away the tape and got out my trusty Ryobi™ Moto-Tool. From previous experience, I used a Dremel™ aluminum oxide grinding stone as it works very well in removing foam without tearing or gouging the foam away. I carefully removed the foam to the depth of the grinding stone and then held the wing up to a light to get a feeling of how much foam depth remained. Do this carefully and by checking often, you should be able to achieve the necessary depth to fully recess the battery pack and

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released in a level attitude with sufficient forward velocity. The glide path was pretty decent so a few more tosses were made to check initial turn rates and pitch sensitivity. All looked good so it was time to power up and give it a toss. Power was advanced to about 3/4 throttle and the EFW tossed into the air. Climb out was excellent and the EFW accelerated well - much better than I expected. A turn was made to keep it within the limited flying area I had to work with and the throttle pulled back to under half throttle. A few turns showed that turn rate and coordination were very good and that the elevator differentials using the Hitec Focus III were just fine. About 2 minutes into the flight, I started extending out to farther away when I started getting intermittent radio contact to the EFW. I immediately throttled back and luckily the motor shut down, but the EFW spiraled to the ground with a solid thunk. I dejectedly went over to pick up the model and was very surprised to find no real damage to the airframe. The tape holding the battery in place had peeled away and the motor nacelle had popped loose, but otherwise there was no damage! I walked back to the van and thought about what had just occurred trying to find a reason. Range check had been good and there wasn't any real sign of interference - so what was going on? Sitting there, it dawned on me that the reflective trim tape used on the EFW might be shielding the receiver antenna. Since I used the reflective tape on the top and the bottom of the wing, it was effectively sandwiching the receiver antenna unless the model was heading directly at or away from you. To confirm if this indeed was the problem, I peeled the reflective tape off of the underside of the wing and ran a range check again but making sure that the EFW was moved around to simulate how one would see it in the air from various aspects. Later flights went well and this seems to have solved the radio range problem. One other item to look out for is maintaining a proper CG on the EFW. If the CG gets too far back, the model will stall when flown too slow and fall into a pinwheel type of spin. If there's sufficient height, just push in down elevator and add power to fly out of it. You're really much better off a bit nose heavy than tail heavy!

Later flights out at the club flying field further confirmed that the EFW is a well made and excellent flying model that will thermal with ease. The EFW reads air well and with the relatively low wing loading, will bump around in gusty air. With the Speed 400 set up, this is not a slow model


and has a good turn of speed. It will slow down reasonable well but I would not fly this in a confined air space. Others have mounted geared 280 size motors and the resultant lower weight and power have allowed for more of a park flyer type capability. If you should decide to go without the landing gear like I did, I would recommend carving a belly pan out of extruded blue or pink foam that you can tape over the battery and receiver cutouts. I have not damaged any components (yet!) but the strapping tape provides little protective cushion in the event of a hard arrival or contact with an unyielding ground based object. Careful shaping of such a belly pan will also add a little clearance and protection for the Gunther prop.

The HobbyFlite EFW is a well thought out and made model that takes very little effort to go from shipping box to the air. It looks great in the air, and brings out many positive comments when it shows up at the flying field. Painted black or a dark gray, it would make a great "stealth" bomber but good luck keeping your visual orientation! The EFW is great value for the money, quite durable and also easy to fly. Anyone up for some formation flying or even flying wing pylon racing?!

HobbyFlite Electric Flying Wing
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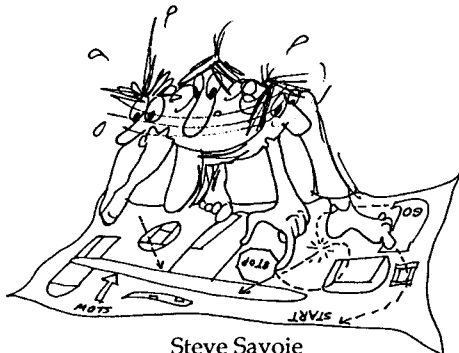
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"SHORT CUTS"



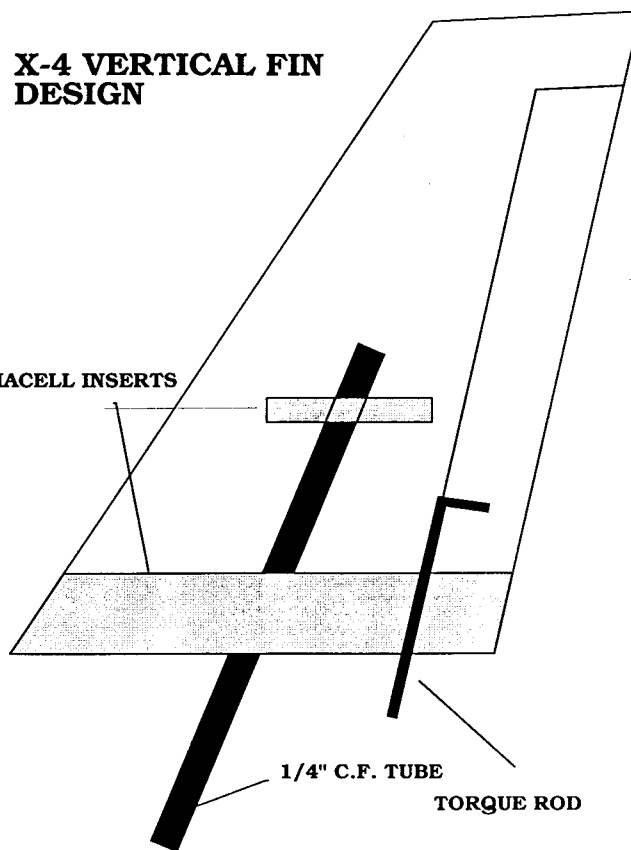
Steve Savoie
926 Gage St., Bennington, Vermont 05201
(802) 442-6959

X-4 Part 4 Vertical Fin Design

Well, another month and not much progress, folks; must be all that flying. I did get the vertical fin core template cut. I used SD8020, and thickened it up to 12% for scale looks. Unlike the U-2, I'm not changing the vertical fin size. On the U-2, we kicked up the size by an additional 10%. I'll try to stick with the original scale size on this one. The vertical fin core will be cut from Spyder foam and then lanced for a 1/4" carbon fiber tube using my melt out jig. (See previous RCSD, May 2000 article.) Two Rohacell inserts will

X-4 VERTICAL FIN DESIGN

ROHACELL INSERTS



1/4" C.F. TUBE

TORQUE ROD

WOW! THE BIRDS ARE REALLY
BECOMING AGGRESSIVE!



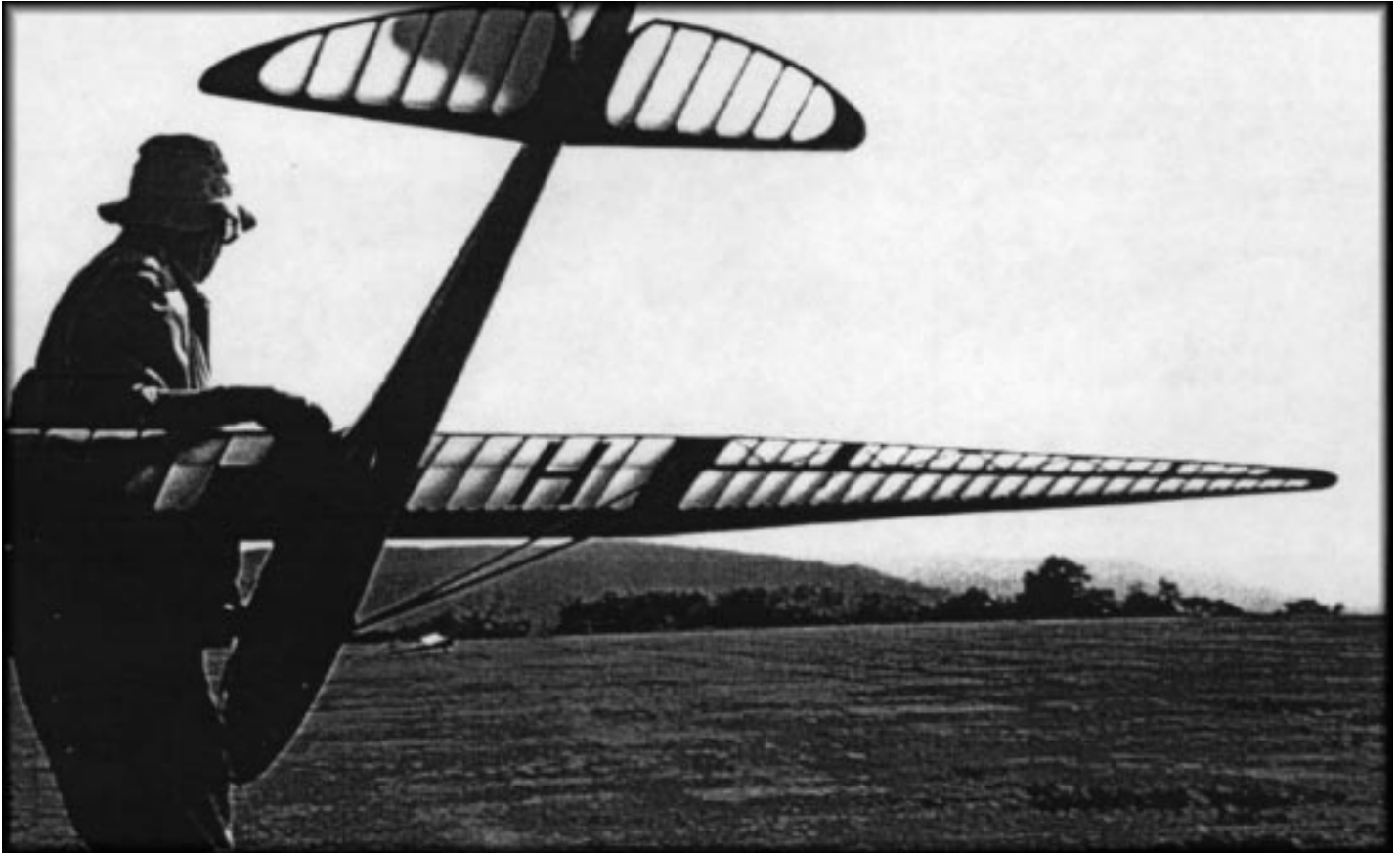
be added to the core to work similar to a root and sub-root system; the CF tube will be bonded in.

I plan to use a torque rod just as I did with the U-2 vertical fin. I lucked out on the original X-4 design because a small access hatch is located on the left side of the airframe in the vicinity of the torque rod where it will tie into a steering arm inside the fuse. I plan to have an aluminum tube bonding inside the fuse supported by a Rohacell bulkhead. The plan will be to size the CF tube so it just penetrates out the bottom of the fuse. I'll cut it to length and bond a small threaded insert inside the tube to take a #6 screw. The torque rod clearance hole in the top of the fuse will be very tight so that it serves to keep the fin aligned.

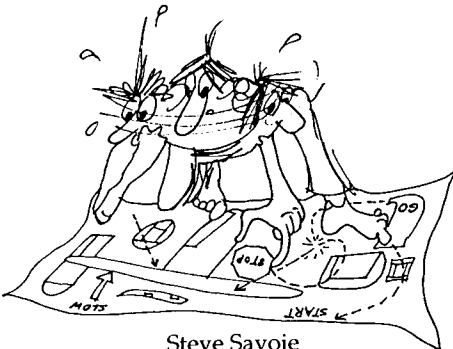
Now the tough part: what to cover the fin with. I'm wanting to use Kevlar with a light glass overlay, but that will be a hassle in way of the torque rod installation. Maybe balsa with a thin glass bagging will be the way to go. We'll see what happens. Well, off to Montana for a much needed vacation!

See ya next month!

ELMIRA AEROTOW 2000



"SHORT CUTS"



Steve Savoie
926 Gage St., Bennington, Vermont 05201
(802) 442-6959

June 7-10, 2000

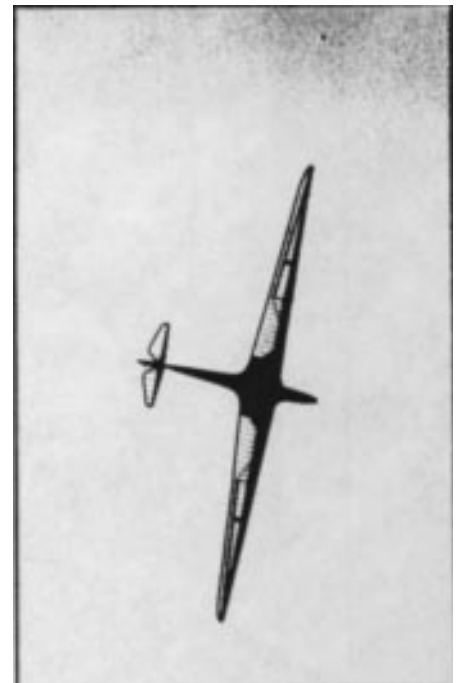
This year's annual event at Elmira, New York was attended by approximately 45 pilots throughout 4 days of mixed weather. Wednesday, June 7, was the first unofficial day of flying and was accompanied by strong winds which generated great lift off the northwest face of the hill. Later in the day, several full size, private pilots joined in to share the great lift with the RC scale planes. The lift band was steady throughout the afternoon and tended to keep the two flying groups separated somewhat. The official, orga-

nized radio impound began Friday under mixed overcast with about 45 participants working thermal lift just west of the hill. There were 12 pilots on the flightline and 13 planes in the lift zone, which seemed a bit odd until we saw a full size ASW27 peel off and head southwest, away from the congestion.

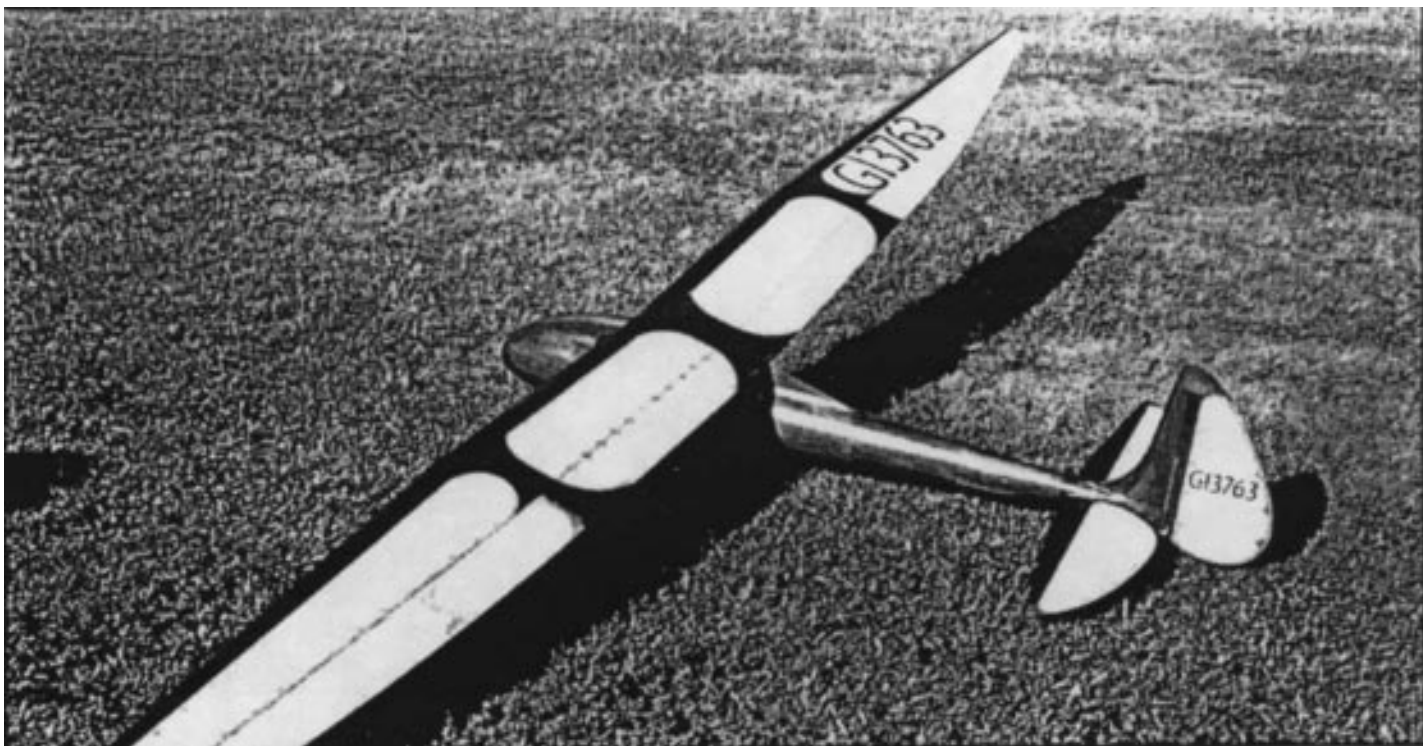
At about noon, the winds picked up and the thunder boomers began to appear on the horizon leading to a mad rush to disassemble planes and head for cover. Many of the pilots headed off to the Corning Glass Museum or off site for lunch. In contrast was a group of diehards who headed to the slope face with an upstart and a gaggle of DAW ME 163 Comet Foamies. The winds were really picking up by then, and these guys had the foamies way out over the face, fighting like a bunch of angry hornets. The little planes performed well and were eventually forced back to land when the rain and distant thunder grew closer in intensity.

Prior to the inclement weather, the Mavaro brothers (Joe and Tom) from Easton, CT had a minor mishap getting their 5 meter Nimbus 4 off the ground. The Nimbus has very long, flexible wings, which drag on the ground during the tow out. Absent

Eric Eiche's Bolas Senior Albatross.



from the flight line this year were the dollies routinely used in years past and were previously provided by the event organizers. That afternoon, the brothers drove down the hill to a Lowes Home



1/3 ASH 26.

Improvement Center and purchased PVC pipe, glue, hardware and 4 lawn mower wheels. In less than 2 hours and fifty dollars, they built what must have been the most stable launching dolly ever to visit Elmira. The Nimbus 4 towed up effortlessly off the new dolly without incident.

The bad weather finally cleared and the sun broke through; immediately the tugs began pulling planes into newly generated lift which continued to improve throughout the remainder of the day, until the last tow was declared (3 times) from 7 to 7:30 pm.

Some noteworthy planes to mention were the EMS DG-1000 which was flown to perfection by the EMS demonstration pilots. The EMS team was proud to declare that the full size DG-1000 had not yet flown. Another highlight was Eric Eiche's Bolas Senior Albatross skinned out in beautiful mahogany. Eric is from British Columbia and said the plane has about 1000 hours of building time. This plane is not a hanger queen. Eric flew it many times

Special thanks to Ed Slegers of Slegers International for his overnight, crystal delivery to the Soaring Museum at Elmira, necessary to avoid tug channel conflict!

Steve

throughout the event.

Saturday's weather was nothing but spectacular. The wind did pick up a bit in the afternoon, pushing a rotor off the tree line on the landing approach which did cause a few anxious moments for landing pilots. Eventually the full size flightline was shut down to all but private traffic, due to the cross wind, which did reduce the interruptions on the r/c flightline (not a good idea to tandem tows). The last aerotow flight of the day was Chuck Ehrman from Tampa Florida flying a 1/4 scale DG-300. At 6:30, he was 40 minutes into great flight and still working pockets

of lift through the region, back dropped by the slowly setting sun over the rolling hills of New York. The event was closed out with an informal "German Style" banquet in the National Soaring Museum".

Overall, this year's event drew a smaller crowd than years past, but it also had a more laid back atmosphere with less congestion on the flight line. Restricting 5 channels to the tugs also seemed to keep the flightline moving along without delay. For a short time Saturday afternoon, John Derstine, the event's organizer, was overheard stating, "We finally out flew them." For about 30 minutes, the tugs were shut down because pilots were either already in the air or just plain old flown out, though the high temps and humidity did take a toll on the pilots.

Elmira Aerotow 2000 was well received. Congratulations to all who made it happen!

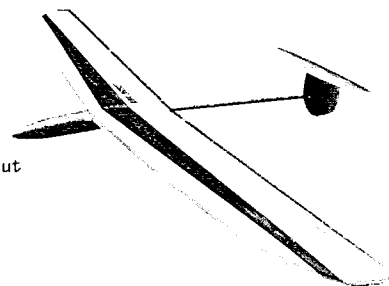


IHLGF Fourpeat

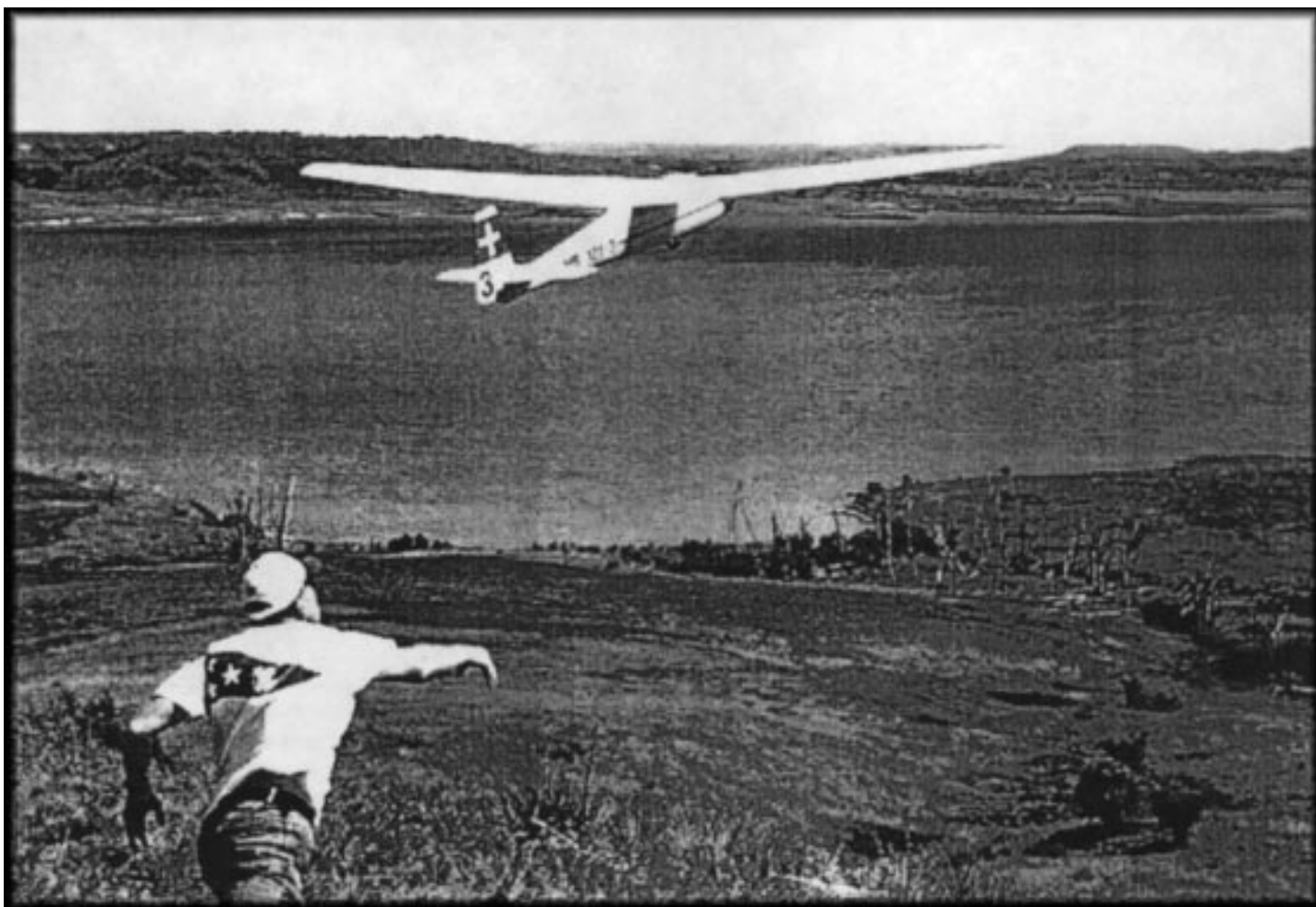
Congratulations to Joe Wurts for once again winning the world's most prestigious hand launch contest flying a Platinum Encore. Isn't it about time you started flying the best?



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HAVE SAILPLANE, WILL TRAVEL!



Tom H. Nagel
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This column is dedicated to soaring vacations. This month, Richard Loud of New York takes us to one of his favorite slope soaring destinations in the heart of Kansas.

Wilson Lake, Kansas

By Richard Loud
Ballston Spa, New York
Rnjloud@aol.com

When I first heard of slope soaring in Kansas, the thought that came to my mind was of a poster I had in high school. It said, "Ski Iowa!" and had a picture of a skier in a flat farm field amidst big bails of hay... going nowhere. Well, I can assure you, sloping in Kansas is not just snagging some lift off a bail of hay, or the side of a barn. All you have to do is seek out Wilson Lake, located in Russell County, Kansas, and you may be treated to some of the best inland slope soaring in the country.

DESCRIPTION OF LAKE & AREA

Wilson Lake, located just north of the center of the state, covers an area of



9,000 acres and has 100 miles of shoreline. The U.S. Army Corps of Engineers built the lake in the 1960s mainly for the purposes of flood control and water conservation. As often happens with man made lakes, it has become a popular recreational area. Among the activities it offers are fishing, boating, water skiing, camping, and... oh yeh... slope soaring.

There are five parks located around the lake, which offer a variety of recreational facilities. Of particular interest to more outdoorsy types may be the overnight

Todd Martin launches Dave Sanders' personal DAW Ka6 in Open Class at the 2000 Midwest Slope Challenge. Although he didn't win, seeing the big yellow bird carve up the sky against sleek fiberglass racers was definitely a crowd pleaser. (Photo by Rich Loud.)

camping facilities complete with free hot showers.

MIDWEST SLOPE CHALLENGE

I've had two opportunities to fly at Wilson Lake. In 1999 and again in 2000, I participated in the Midwest Slope Challenge. This is a slope race that has been hosted for the past seven years by the Lincoln Area Soaring Society (L.A.S.S.) from Lincoln, Nebraska. These guys really know how to put on a race and host an all around good time. The race is held every May on the weekend following Mother's Day.

This year, there were forty-nine registered pilots flying events ranging from foamie combat to One Design racing to Unlimited racing. To give an idea of the efficiency with which the L.A.S.S. crew operates, all three events were completed in one day! And they did it without making it feel like we were being rushed. Hats off to the L.A.S.S. guys for another job well done.

For those of you who may want to come join the party, but can't make it in the springtime, L.A.S.S. also makes a pilgrimage out to Wilson Lake every October on Columbus Day weekend.

HOW TO GET THERE

If you're going to be arriving by plane, we've found the best, nearest airport is Wichita. It's about a two and a half hour drive to get to the lake on Interstate-135 north out of Wichita, and Interstate 70 west from Salina. If you're traveling by car, step one is to get to the middle of Kansas on I-70. From I-70, take Exit 206 to Kansas 232 north. You'll come upon the lake in about five miles.

To reach the main slopes – the ones facing the prevailing south wind – continue on K-232 until you cross over the dam. The dam runs South-East to North-West. On the North-West side of the dam is the entrance to Lucas park (on the lake side). Drive to the top of the hill and there will be a field between the road and the lake. Pull over, hop out and take a walk toward the lake; you'll quickly encounter the main slope and see what makes this a primo site. There are various contours to the slope so, if the wind isn't quite right for the spot you're standing, look around; you can probably find a spot that works.

The secondary slope, just a couple of ticks further down the road, favors more Easterly wind. The main slope and the secondary essentially form a bowl and you can easily see one from the other.

There are other flyable slopes around this side of the lake, and as long as you are on U.S. Army Corps land, you're pretty much free to explore them. Just be aware that there is private land around the area too, so you may want to check with the Corps before venturing too far over some barbed wire fence.

When the wind comes from a more Northerly direction, you can head out toward Minooka Park on the other side of the lake. This is a little more difficult to find, and the flying site is technically on private property, so you'd be safest to ask the Corps how to obtain permission from the owner before flying there. We did, and were given an enthusiastic, "Go ahead and have fun," from the owner, so I wouldn't expect you'd have much difficulty.

To get there from the dam, you head South on K-232 until you see a sign for Minooka Park to the right. It's about three miles south of the dam. Take the right turn. You should pass Bud's Bait & Tackle shop and cross the Hell Creek Bridge within a mile or so. If you don't, you're probably on the wrong road. Continue on this road for about 7.3 miles until you come to the intersection with 200th Blvd (also known as Dorrance Road). Turn right on Dorrance

Rd. and drive about 1.7 miles until you see a sign for the entrance to Minooka Park. Park the car on the side of the road just before the sign. The flying site is across the street. You'll have to climb over, or shinny under, a barbed wire fence; remember, this is private land so you should seek permission first before flying here.

WHAT TO FLY

With the wide-open and relatively flat expanse of land in the surrounding countryside, the wind can really come howling up the slopes. The first day we were there this year, we were faced with 40 mph plus winds coming straight up the main hill. I never wished for a heavy, slope scale bird so hard in my life. Unfortunately, I didn't have one with me on this trip so I made do with my DAW FoAME109. Even



The intensity of slope racing shows in the faces of Charlie Richardson and his caller Paul Naton (left) and Rich Loud and his caller Daryl Huelsman (right) as they go head to head in One Design class at the 1999 Midwest Slope Challenge. Charlie makes the only production kit of a One Design Racer, the CR Aircraft Fun-1. (Photo by Dave Garwood.)

in winds that fast, the vertical component was so great that penetration was not an issue.

It's not uncommon to experience winds upwards of 50 to 60 miles per hour in this area so you can fly pretty much anything you want. We have flown Slope Scale warbirds here before, as well as fully ballasted racers with no problems at all. Even large scale fiberglass sailplanes carve up the sky here on occasion. The large, smooth landing zones behind the main hills give plenty of room to bring down anything, no matter how heavy and fast.

Of course, there are those days when the wind just doesn't want to turn on. Even

then, the hills around Wilson Lake shine as a soaring site. One of our most rewarding days was when the only wind came from thermal activity. Wayne Rigby and I kept tossing his CR Climmax HLG off the slope, hooking thermals and specking out. We'd land and do it all over again. Magic!

The bottom line on glider selection is that you can fly anything at Wilson Lake but if you want to maximize your flying time, bring a range of planes from a HLG to the heaviest thing you have. At some time and at some place around the lake, you should be able to fly them all.

WHERE TO STAY

Most people that come to this part of Kansas purely for the soaring tend to stay in Lucas. Lucas is a small town of 450 people located about eight miles north of the dam. Take K-232 north to the intersection with K-18. Turn left and you're in Lucas. For information about Lucas and places to stay, write the Lucas Area Chamber of Commerce at P.O. Box 186, Lucas, KS 67648, or call (785) 525-6288.

For those who'd just as soon camp at the lake, there are over 250 developed campsites at the various parks around the lake. Some of the parks even have hot showers. For more information contact the Army Corps of Engineers, Wilson Project Office, at (785) 658-2551.

Finally, you can stay at any of the surrounding towns such as Wilson or Russell depending on how far you want to be away from the slopes.

WHERE TO EAT

If you're staying in Russell, or one of the other "large" towns around, you'll have a choice of places to eat ranging from typical fast food joints to somewhat more fancy establishments. If you're staying in Lucas, other than cooking for yourself or grabbing a sandwich and bag of chips from the gas station, you'll have two choices for meals.

Linda's Café, also called the Tavern because it's the only place in town that serves beer, is located at 205 South Main Street. Don't sweat the address, just walk downtown and look around. Trust me, you'll find it. If you don't, you're either not on Main Street or not in Lucas. After a hard day of soaring with the hot Kansas sun, you'll really appreciate a beer that's so cold its got ice on the top. Linda's offers a good selection of sandwiches and lighter fare and they often have a theme for dinner, which can be a treat. I was there for Mexican Night once; not bad at all.

The other place to eat is the K-18 Café. Located on the outskirts of Lucas, the K-18 gets its name from the highway on which it is located, Kansas State Route 18. This is the place to get breakfast, and not just

because it's the only place open for breakfast. They offer typical diner-type fare, but if you like biscuits and gravy, or think you might, don't even bother looking at the menu, they've got the best I've ever had. It'll also hold you quite well until dinner if you find yourself in some good lift at lunch time.

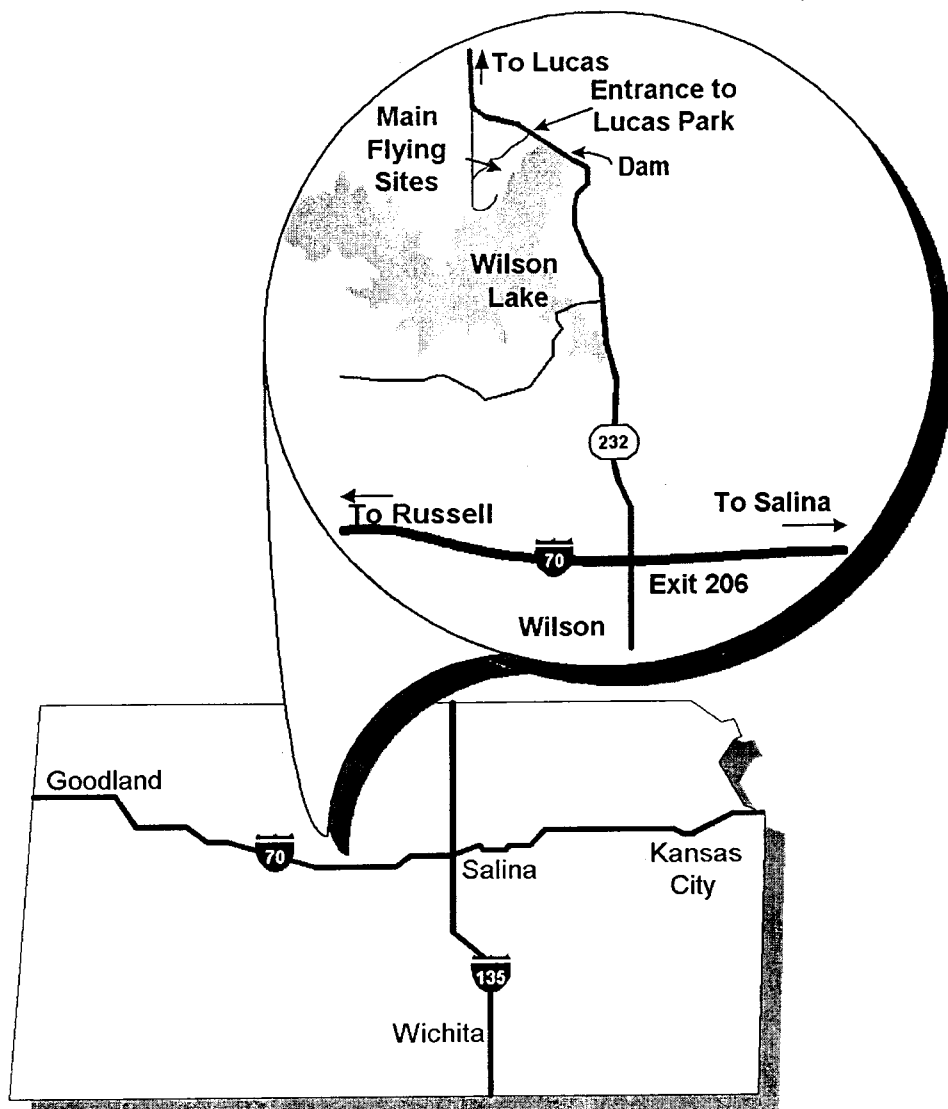
At lunch or dinner, if you're in the mood for beef, the K-18 has a complete steak dinner for around \$7.00, and I think that's the most expensive thing on the menu. Lest you think that for \$7.00 you're going to go hungry, rest assured I spent a few evenings wondering why after so many years away from my parents, I still feel compelled to clean my plate.

OTHER ATTRACTIONS

If you've brought your family with you and they're tired of looking at the slope, or the wind isn't blowing to your liking, don't sweat it. There are lots of cool non-flying things to do. Of course, there are lake-related activities, but there are also some interesting cultural and historical attractions to see.

No visit to this area is complete without a trip through the Garden of Eden in Lucas. Built by S.P. Dinsmoor between 1907 and 1929, the Garden of Eden is one man's interpretation of life, death, politics and religion all sculpted out of limestone and concrete. I don't have enough room here to give a full description, but a quote taken from the advertising brochure refers to it as "the most unique home for living or dead on Earth." On my first trip to Lucas, I walked around the outside, but wasn't able to make it back during normal business hours. I swore that on my next trip I would take the tour to find out the story behind this enigmatic landmark. This year I took the tour and it was more than worth the four bucks for admission. To satisfy your morbid curiosity, the last stop on the tour is at a viewing window in the mausoleum for a peek at Mr. Dinsmoor's mummified remains.

If a mummified eccentric isn't enough, you can take a ride to Hays for a visit to the Sternberg Museum of Natural History. Here you can see many of the dinosaur fossils that have been unearthed in the Kansas countryside. Of particular note is the famous Fish Within a Fish fossil. This one's really intriguing. Evidently, a fourteen foot long fish swallowed a six foot long fish whole and then died suddenly. What you see in the fossilized remains are two fish (heading in opposite directions) with the smaller inside the belly of the larger. What I found most interesting was the video showing the actual excavation and recovery of the fossil. To get there, just get back on I-70 heading west to Hays and look for the signs to the museum. You can't



miss it, it's a big beige dome right next to the highway.

These were the only two side trips I took, but if you need more diversions, look for the brochure called "Explore the Amazing 100 Miles." It can be found at most any gas station, motel, or restaurant and is full of attractions between Salina and Hays, including phone numbers and hours of operation.

I'd have say that Wilson Lake is one of my favorite slope soaring destinations. Of course it's mainly because of the awesome soaring that can be had at most any time of the year, but also because the friendly rural area in which the lake is located offers a refreshing break from the hectic life we all seem to lead these days. Whether you're just passing through on your way somewhere else or planning a vacation in the area, bring along some gliders and take that turn north on K-232 to Wilson Lake. Even if the wind isn't blowing, you won't be disappointed. But if it is, you may just find out what it really means to Slope

Kansas!

Visit the following websites for more information on the places referenced in this article.

Lucas, Kansas: skyways.lib.ks.us/kansas/towns/Lucas/

Wilson Lake: www.mrk.usace.army.mil/wilson/wilson_home.htm

Sternberg Museum of Natural History: www.fhsu.edu/sternberg/

Midwest Slope Challenge: www.alltel.net/~mwsc

Thanks, Rich!

If you have a favorite sailplane saga, consider writing it down for *RCSD*. If you are planning a vacation that includes your plane and transmitter, consider making notes as you go, and working up an article later. Take photos. Collect maps. And send your story to Tom Nagel at tomnagel@iwaynet.net for gentle editing and suggestions. *Tom* ■

CROSS COUNTRY SOARING



Scott Gradwell
Medford, Oregon
rcpilot@cdsnet.net

Well, the 2000 Montague Cross Country Challenge is in the books. I believe this was the best one so far. I was there as a competitor, not as a reporter, so I don't have all the details of every team's flight, but I will pass on what I know.

The task for Saturday was to fly as far as you could, using the turnpoints designated. Even with the imperfect weather on Saturday, over 325 Cross Country miles were flown by 13 teams. Don Pesznecker of Portland Area Soaring Society (PASS) won the day by flying 54.451 miles and staying on course for over 4.5 hours. This truly is the extreme form of R/C flying.

Sunday's task was slightly different. We were to use the same turnpoints available on Saturday, but we would be scored on our average speed. It was patterned after a full scale contest POST, or Pilot Option Speed Task. You must stay out on course for a minimum of 2 hours and you stop counting the miles at 3 hours. If you are able to stay up for more than 2 hours, your actual mileage is divided by your actual time, which gives you your average speed.

Where the penalty comes in, is that if you stay up for less than 2 hours, your actual

mileage is divided by 2 hours, and your average speed takes a hit. On Sunday, Mike Bamberg, also with PASS, was the fastest at 14.478 mph. Sunday's weather wasn't nearly as good as Saturday and only 3 teams were able to stay up the required 2 hours. Mike had fallen out and came back but, right before the launch window closed, the conditions improved and he was able to get out on course and do well.

We were the only team that didn't have to come back for a second try, but all the struggling we had to do earlier in the day hurt our average speed. With Mike's flight on Sunday, he was able to come back from 7th on the first day and win the contest.

The most popular sailplane used at the contest was by far the RnR SB-X/C. Right now, I don't think there is a better value out there for Cross Country flying. For being a large all composite sailplane, it isn't that much money. In a future article I will give a small review of the SB-X/C and show some small improvements I made, that I think help.

I think everyone had a good time and am sure the most everyone that participated this year will be back next year. So far every year the event has grown and improved; I am sure that next year will be no different.

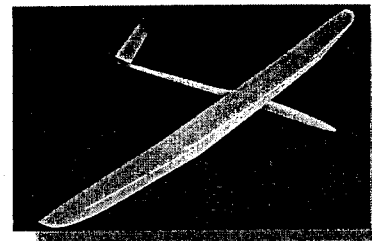
Tentatively, there will be two classes for next year: Open, and 3 function. So start planning now. I want to thank Dean Gradwell, Stu Tittle, Randy Banta, Jerry Miller, and Ron McElliot for all the volunteer work they put in and also thank Paul Gradwell, DJ Buell, and Jeff Allen for being on my team.

This year, two Cross Country contests were scheduled for this weekend and two are scheduled for August 26th. Hopefully, next year, we can work together and get them all scheduled on different weekends.

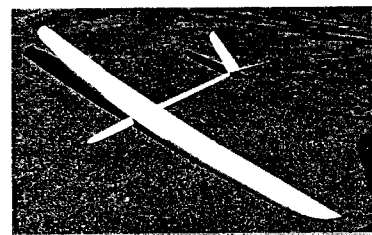
The vital statistics are shown in the charts.

Team Captain

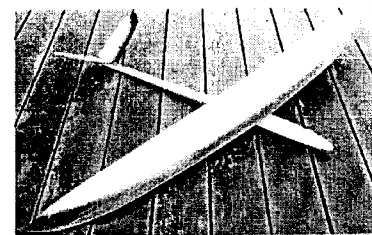
048	Dudley Dufort
195	Mike Gervais
265	Mike Reed
273	Dean Gradwell
408	Don Pesznecker
470	Mark Mills
511	Jim Thomas
561	Rich Beardsley
586	Scott Marcum
738	Bill Rinkleib
765	Frank Leggio
807	Mike Bamberg
927	Scott Gradwell



Hera - Artemis F3J from: \$659.00
All molded, 3.1m, SD7035, 1.8-2kg
Hades F3F from: \$599.00
All molded, 2.8m, RG15, 1.8-2kg



El Camino F3B - F3J from: \$669.00
All molded, 3.2m, MH-32, 2-2.2kg



Nemesis slope racer from: \$299.00
All molded, 1.5m, HN-1038, 0.7kg

www.junction.net/~icare/icare.htm



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ph: (450)449-9094
fax: (450)449-3497
381 Joseph-Huet, Boucherville, QC
J4B 2C5, Canada

Day 1			Day 2			Overall		
Team	Miles	Points	Team	MPH	Points	Team	Points	Place
408	54.457	1000	807	14.478	1000	807	1411	1st
765	51.375	943	927	10.707	740	561	1257	2nd
561	31.391	576	561	9.850	680	765	1254	3rd
195	29.109	535	048	7.731	534	408	1220	4th
470	26.687	490	765	4.502	311	927	1198	5th
927	24.975	459	470	4.463	308	195	839	6th
807	22.394	411	195	4.402	304	048	835	7th
511	21.162	389	408	3.188	220	470	798	8th
048	16.372	301	586	2.575	178	511	539	9th
586	15.083	277	511	2.175	150	586	455	10th
265	14.883	273	265	1.863	129	265	402	11th
738	10.931	201	738	0	0	738	201	12th
273	6.95	128	273	0	0	273	128	13th

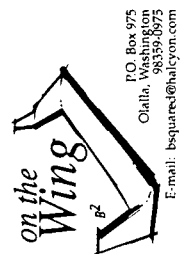
SUGGESTIONS FOR FIRST 'WINGS' - PART I

We've been writing this column for over two years now, and have received an immense amount of mail. Each and every letter received has been answered, and we've enjoyed the whole process tremendously. Many ideas for this column have been derived from readers' questions, and we wish to thank everyone for their positive comments and ideas. Your interest and enthusiasm is very much appreciated.

While many readers have written asking for airfoil data, computer programs, and current sources of flying wing information (hopefully in English rather than German), the most frequent request is for our suggestions regarding a first tailless sailplane.

Those who want to try a tailless sailplane have various motives. Some want a glider which is easily built, fun to fly, and a bit different than what's normally seen at the flying field. Others want to start construction of a flock of 'wings for competition because they believe this is the best method of achieving a particular set of goals. One fellow wrote and said his intention was to go through the whole League of Silent Flight program using only tailless designs! Since the majority have built kits and feel confident a scratch built 'wing will not pose a difficulty, we normally suggest one of two gliders which are available as full sized plans. The main determining factor in making our recommendation is the experience of the builder. If the individual has been building, flying, and enjoying rudder and elevator type gliders, then we suggest Dave Jones' Raven. If the writer has experience with aileron sailplanes, then we recommend Dave's Blackbird 2M. This month we'll discuss the Raven; a description of the Blackbird 2M will follow next month.

The Raven is a plank design which comes in several versions. There's a Mini-Raven of 78" span at the smaller end of the scale, and a Raven-Super with a 124" span at the larger end. Our choice is the Raven version



Reprinted from "On the Wing...the book" Courtesy of Bill & Bunny Kuhlman

published in Model Builder magazine some years ago. It has a span of 110" and a very nice streamlined fuselage. The Model Builder Raven fuselage provides a snug fit for a 500mah battery pack, receiver, and the two standard size servos. Control is by rudder and central elevator. The wing is in three sections, with the center section being permanently attached to the fuselage. This means the two servos in the fuselage can always remain connected to their respective control surfaces. The outer wing panels include the dihedral breaks and are of very light construction so turns are not inhibited by unnecessary inertia. Construction is of balsa, plywood, and spruce; there are no exotic materials used. Neither of the two Ravens that we've built have required significant nose weight to achieve the proper CG location. The plans show an easy ballast tube installation.

We built our two Ravens by following the plans and directions exactly. Although neither has flaps, we recommend the necessary modifications. Use of flaps will allow higher launches and lower landing speeds. Due to the size of the fuselage, the flap servo will most likely need to go in the wing center section. As mentioned above, the center section is permanently attached to the fuselage, so there will be no need to disconnect any of the flap mechanism when disassembling the Raven after a flying session. The flaps themselves should be about 5% of the total wing area, be mounted on the lower surface of the wing with their leading edge at 40% of the local chord, and be capable of 40 degree deflection. Flaps should not be used while thermalling, as to do so markedly reduces performance.

The Raven is a very stable sailplane which we've found will automatically center in a thermal. A few years ago, at a Northwest Soaring Society Tournament in Richland, we launched, flew out, and thermalled for over five minutes while moving the controls only enough to make sure the radio gear was still working. Later we realized our options would have been severely limited had the radio gear not been working, and the flight would have perhaps been even better had we gone ahead and let her fly without any control input at

Part II

Last month we suggested Dave Jones' Raven for those used to flying sailplanes with rudder and elevator. This month we'll cover Dave's Blackbird 2M, our suggestion for a first 'wing for those flyers with aileron experience.

The Blackbird 2M, as the name implies, is a two meter tailless sailplane. It bears only a slight resemblance to other "plank" designs as it has a lower aspect ratio (about 5:1), and a sleek fin but no rudder. Control is by elevons. Performance is noticeably better than the Raven's; it is also faster than the Raven, and does extremely well on the slope as well as in thermals.

The Blackbird 2M can be built with detachable wings, or as a one piece airframe. Detachable wings make transportation easier, and some builders may want to add ballast tubes in the wing roots during construction. A one piece airframe means less overall weight, but the addition of ballast may be kind of tricky. Overall airframe strength for the two versions should be about equal.

Like the Raven plans, these show the CJ-3309 airfoil. Our recommendation, followed by at least two other builders, has been to use the CJ-25²09 instead. This provides better penetration qualities with no loss of thermaling performance. Construction is not affected as both airfoils have flat bottoms and there is no twist built into the wings.

For best performance, the elevon servos should be placed in the wings with direct connections to the control surfaces. This means running cables through conduits, but with the servos moved out to the inner edge of the elevons the fuselage becomes rather cavernous. We placed an antenna tube right behind the leading edge of the wing. Linkage adjustments are a breeze with this configuration, and all of the play resulting from snaked push-pull cables is eliminated. Our Blackbird XC has its standard size servos in its wings, while our two meter, built



all until it was necessary to bring her down to land.

Last year we found the above described realization to be more than completely accurate when, during a winch launch, the receiver battery pack shorted out. The Raven went up on tow without a waver, floated off, went into a nice gentle left turn, and did a picture perfect landing directly next to the winch several minutes later. That experience served to confirm our belief that the Raven makes a great trainer. The performance certainly awed the spectators!

Our first Raven, affectionately called Lenore, is covered with black Monokote on the top and metallic charcoal on the bottom. Our second, Encore, built a short time later, is all white Monokote. Both have a chrome band around the right wing outboard of the dihedral break. We learned to fly proportional with Lenore, and both have had their share of collisions with soccer goal posts and landings in trees. But after more than six years they retain the majority of their original covering, and structural repairs have always been easily accomplished.

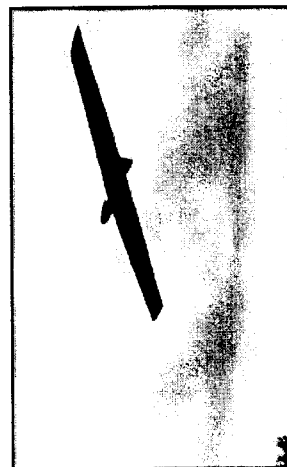
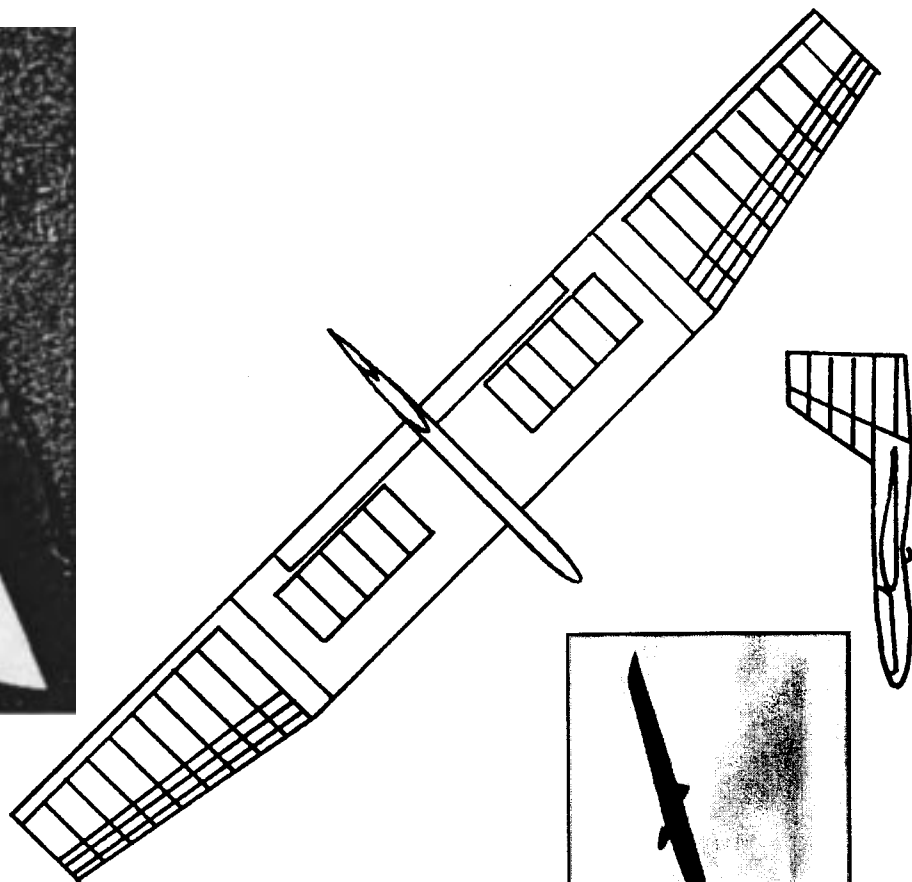
If we were to build another Raven, we would again choose the Model Builder version. We'd add flaps and use the CJ-25²09 section rather than the CJ-3309 shown on the plans. The CJ-25²09, the newer section of the two, has a bit better penetration capability with no noticeable loss of lift. Since both have large flat areas on their bottom surface, there is no change in construction method or completion time.

before we knew better, has its two micro servos in the fuselage. We've intended to move them for some time but have not yet done so, and we curse ourselves each time we go out to fly her. We've never had a bit of problem with glitches caused by the antenna being close to the servo leads. (JR Century VII, FM PPM system)

The most astounding part of flying the Blackbird 2M is the zoom at the end of tow, and in general the stiffer the breeze the higher the zoom. We enlarged the width of the spars to 3/4" at the root, but left their thickness as noted on the plans. The wing rods are as specified. We consistently launch this two meter version without pulsing the winch at all, and the zoom can double the height achieved. We could probably get even more height if we installed flaps on the beast! We're not sure an unmodified spar system could take these sorts of loads. What's so impressive about the Blackbird 2M is the fact it uses no exotic materials; balsa, plywood, and spruce make up the entire airframe.

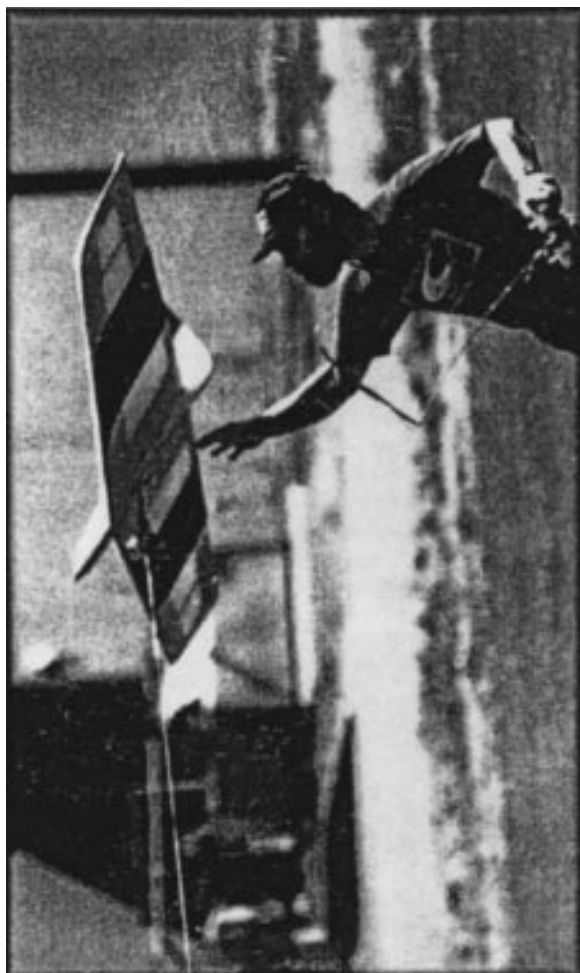
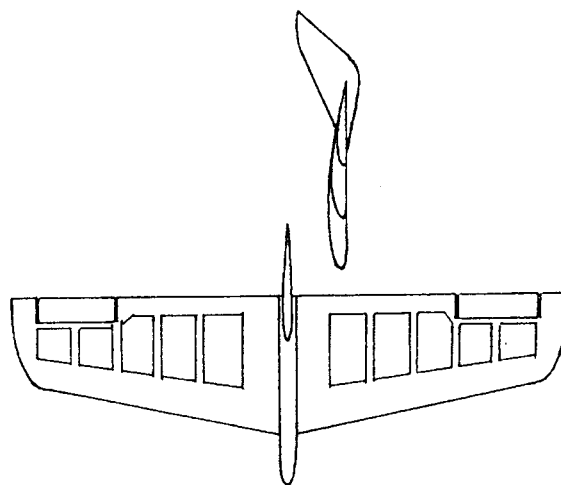
Our Blackbird 2M, which we've called Candide ever since her first flight, is still going strong after more than five years. Why the name Candide? Because that first flight was also our first ever with an aileron equipped sailplane. (We were flying our Ravens exclusively until then.) It was at a Northwest Soaring Society contest in Burlington, Washington, and took place after a single hand toss over tall grass. Actually, she was trimmed out perfectly but the pilot wasn't up to her capabilities. Those of you who have heard the late Leonard Bernstein's "Overture to Candide" have the idea.

We fly in a county park which is relatively long and narrow. Luckily the wind usually comes out of the right direction. One of our favorite flight patterns is to launch to the west, then fly east and downwind over the roadway and trees at the north boundary of the field. Sometimes we get some lift from the line of trees, sometimes from the road. We keep travelling east until we're past the eastern border of the park and well over a quarter mile away. Visibility, even at that distance, has not been a problem. After



circling the trees, parking lots and road at the east end of the field for a while, we most likely will get impatient and a bit carried away by the capabilities of the Blackbird 2M and head her back toward us, traveling west again. Our usual goal is to apply just enough down elevator for Candide to come directly back, always in the same spot in the sky, about 30 degrees above the horizon, but getting larger all the time. The gain in speed is fantastic, and we thoroughly enjoy peeling off at the last moment and watching her swoosh past and go into a graceful climbing arc while bleeding off airspeed. There is very little noise, and what there is most likely comes from the finger holes under the wing roots.

As those who have built the Blackbird 2M can attest, its performance is very good and it's extremely maneuverable. In as few words as possible, it's a real kick to fly. At the risk of being branded heretics, we'd like to see someone build an electric version!



GORDY'S TRAVELS

Servos, Warranty, Damage & 'In-General'

By Gordy Stahl
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This trip came about from my recent visit to the Toledo Model Show, where I got to meet and chat with the Presidents of Hitec, Grand Wing Servos and Volz. Obviously, the topic of discussion naturally was about servos. The one topic I felt that was interesting was that of 'warranty', a topic pretty much misunderstood by most of us, especially when it comes to servos.

Warranties are similar to an insurance policy in that part of the price of a product goes toward 'covering' unavoidable failures of individual components due to faults in materials or workmanship.

Servos consist of components manufactured by various companies and assembled by the servo 'manufacturer'. In order to keep the component supply prices down, thereby keeping the servo price reasonable, the servo manufacturer accepts the losses due to one or more of the component failures.

In the case of a 'warranty', the coverage period paid for at the time of purchase is for a limited amount of time. Warranty claims outside the stated coverage period may seem to the buyer as 'should-be' covered; however, what was actually 'paid-for' at the time of purchase IS the reality.

Damage is not covered under warranty; it is not due to material or workmanship. It is failure due to exceeding the strengths of the design and material... 'you paid for'.

Servo damage is blatantly clear to a serviceman. Servos hooked up with reverse polarity, literally cooking the amplifier, can be seen and smelled.

Stripped gears take force to break the metal components. Gears are considered a 'wear' item, since they are under shock and vibration loads and need to be replaced.

Gears are made of relatively soft metals in order to absorb some of the shocks transmitted to the internal components of the servo, protecting the case, potentiometer and the motor.

High performance sailplanes are particularly hard on servos because of the huge surfaces, high in-flight vibrations, and extremely high shock loads from landings.

You can avoid some of the high-end forces on landings by pulling your flaps up before they drag in the grass. You can delay servo gear wear by keeping your linkages rattle free, and your hinges firm.

Using 5 cell packs definitely increases servo power, but at the cost of higher wear to

servo motor brushes and higher amplifier temperatures... **substantially** higher wear and temperatures. Yes, the box rates the servos for use at "6 volts". That is not the same as a 5-cell pack at peak charge, and it doesn't 'mean' that it is 'okay' to use 5 cells. "Okay" doesn't mean healthy! You end up paying for added performance, by shortened component life.

Servo 'buzzing' is caused by the servo trying to center against a surface load. It is not a problem with the servo; it is a problem with the surface or linkage. Clevis holes that are too tight, stiff hinges, and binding pushrods all contribute to servo buzzing. Buzzing adds to gear and servo component wear and fatigue.

A non-centering servo is often caused by an installation problem as mentioned above. Worn motor brushes, or gear trains can be a factor, but it is often exaggerated by loose or too tight linkages, or by an incorrect 'geometry' of servo location, arm to horn combinations, or pushrods that are 'bowing' along their lengths.

In general, the servo output shaft should be in line with the centerline of the hinge. The servo arms should be as short as possible, to get the movement you want. The surface horn should be equal to or taller. The clevis hole should be snug but allow free movement. In most cases, a 1/16" drill will make the right fit.

Servo arms are supplied with 'hole locations'. That means, while there are holes in the arms, they are not drilled perfectly; that way the user can custom fit to his preferred clevis.

If you have a servo 'fail', don't get angry, condemning the manufacturer; help yourself and the hobby by attempting to analyze what caused the failure or damage. If you are sending it in for service, supply a clear concise explanation of the circumstances at the time of the failure or damage.

If you have stripped your servos gears, order a set and replace them. It's a pretty simple job. Order a spare set so that you don't have to wait if fate fails you again. Gears are wear items. Worn gears cause fatigue throughout your system; hinges, high battery drain, case wear, electronic noise.

But remember, warranty is coverage to insure that your servos will work 'at least' for a pre-paid specified amount of time. Reducing their component quality or reducing the period of warranty coverage can reduce servo costs. Long period warranties can have a double meaning. It can mean that the device doesn't often

have failures. Short warranties can mean the same thing, but that the manufacturer knows that if there is to be a failure it will be in the first few times of usage. Both serve the same purpose; one is 'perceived' to have more value.

Protect your servos and think before you 'expect' a free repair, which should help you get service faster and avoid disappointment.

Servo connectors are virtually the same as they were near the beginning of RC. Yet, with the newer high powered servos (that means higher current draw motors, and the new breed of 'digital servos' which draw even higher continuous current), higher performance sailplanes, stiffer and larger surfaces, and stronger winches, the current those poor connectors have to handle now days is far more than they were ever expected to handle.

Consider this scenario. A guy launches big. At the top of the launch, he dives into the 'bucket' ready to get that big zoom! But his plane doesn't come up and ends up a lawn dart. Upon inspection, he finds that his radio is still working, his battery is full, and the elevator linkage is still intact. He turns back the group and yells, "Don't go on channel X! I got hit!"

Did he get hit or did his connectors lose continuity under the huge spike load monetarily, shutting down his system?

A lot of focus is put on servo gears, centering and power - and nearly nothing on keeping healthy connectors in the system.

I use a lot of servos and have ruined my share over the years. My travels have given me the opportunity to visit some of the major manufacturers' repair facilities, and to chat with many of the servo manufacturers.

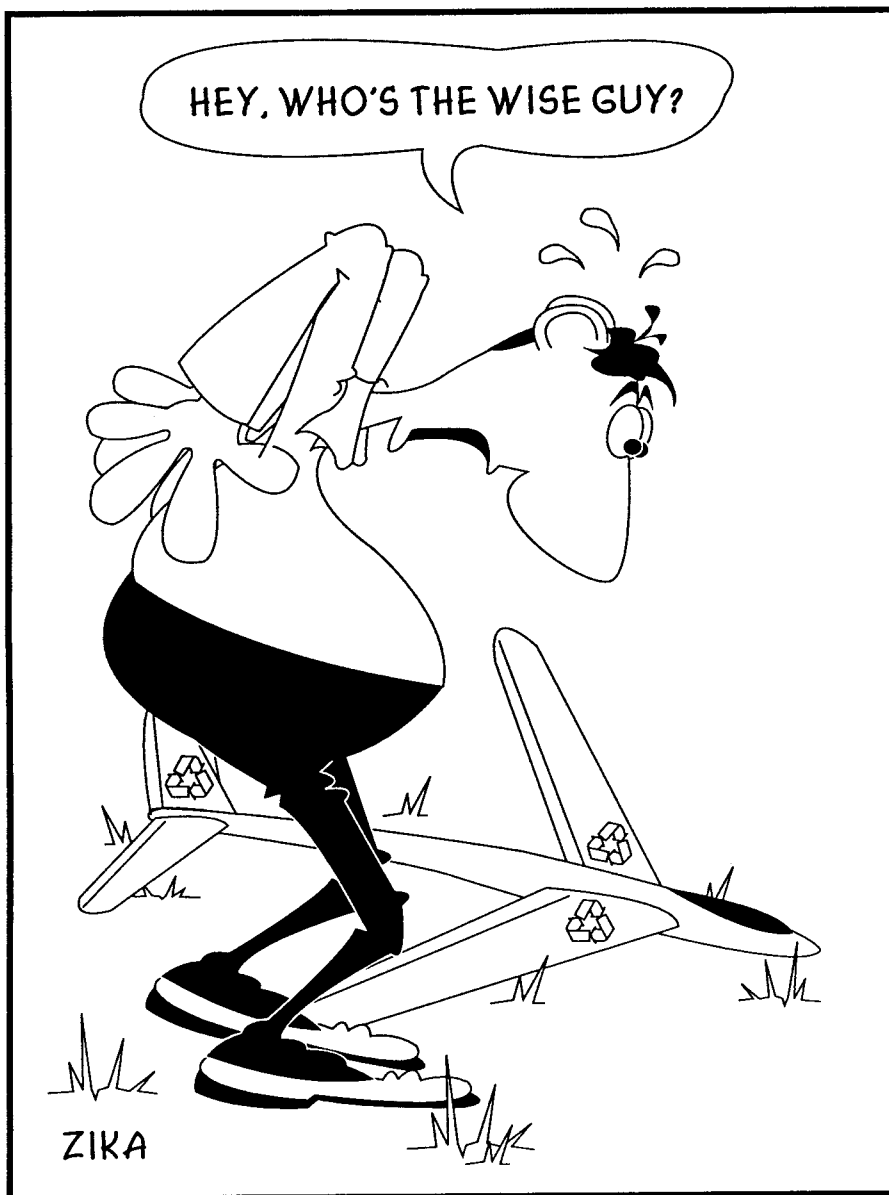
There seems to be three 'classes of servo quality'.

- Very inexpensive, fairly reliable, but not particularly durable.
- Good quality, but within a price range.
- High reliability and durability, but at a price that warrants it.

It can be difficult determining which is what! Buzz words like 'metal gears' or 'high torque' can draw us in like sirens on the rocks.

But if the 'metal' is lead, or...?

There are so many ways that we can be lulled into feeling what is there is 'good': high torque specs, but with motors that



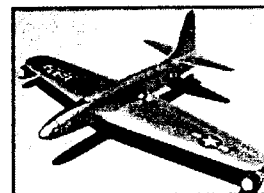
have small, soft brushes, or case material that flexes causing varying gear alignments. Temperature stable electronic components cost more to include, are critical to centering, yet are just as invisible to the discerning servo buyer as the non-stable pieces. The old, big name brands are no guarantee of being even close to some of the smaller name servo values.

Top competitors can be a good indicator of servo quality; looking at that 'class of user' will often show which servos have earned respect in the harsh climate of competition.

Hope you enjoyed this trip with me! I have plenty more interesting trips to take with you ahead! ■

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Gerry Knight, (905) 934-7451
Lou Kleiman, (905) 688-4092
Mistral@niagara.com

July 29-30
MATS 2 Day Soaring Contest Coteau Station,
Dan Gregory Quebec, Canada
(514) 895-9542 anytime

August 3-6
International Electric Flight Festival San Diego, CA
Ron Scharck, (858) 454-4900
Scharck@aol.com

August 6-12
F5 World Championships San Diego, CA
Ren Scharck, (858) 454-4900
Scharck@aol.com

August 12-13
CRRS Soar-In Contest Sudbury, MA
Anker Berg-Sonne, (978) 897-1750
anker@ultranet.com
John Nilsson, (978) 368-7136
nilssonj@rd.simplenet.com
Info. & map: <http://www.charlesriverrc.org/>

August 19-20
Safari 2000 Cape Blanco, OR
Mike Shaw, (541) 269-2423
<http://clubsos.homestead.com/indexweb3.html>

August 26-27
Washington Scale Aerotow Fun Fly Yakima, WA
Gene Cope, (509) 457-9017, gcope@ixpnet.com
Frank Smith, (509) 924-8440

September 2-4
Soar Utah 2000 Salt Lake City, UT
Scott Marshall, (435) 843-9478
marshall@trilobyte.net
<http://www.silentflyer.org>

September 2-4
OVSS Fall Roundup Muncie, IN
Marc Gellart, (419) 229-3384
lsoar2@wcoil.com
Paul Siegel, (513) 561-6872
psiegel@fuse.net

September 29 - October 1
Oc-Tow-Berfest 2000 St. Louis, MO
Peter George, (314) 664-6613
twometer@worldnet.att.net

October 21
SAGE Fall Contest Tucson, AZ
Philip Brister, (520) 394-2121
philipbrister@netscape.net

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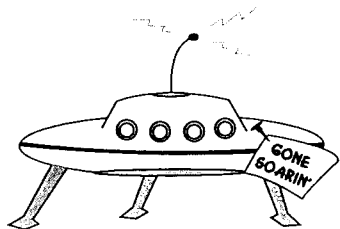
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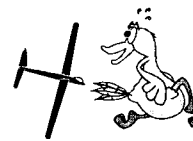
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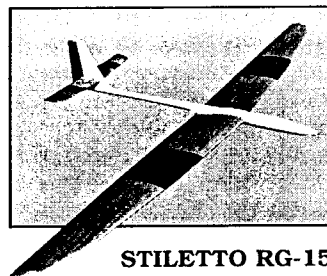
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These contacts have volunteered to answer questions on soaring sites or contests in their area.

Contacts & Soaring Groups - U.S.A.

Alabama - North Alabama Silent Flyers (NASF), Ron Swinehart, (256) 722-4311, <ron.swinehart@lmc.com>, or Rob Glover at AMA3655@aol.com, http://sh1.ro.com/~samfara/

Alabama - Central Alabama Soaring Society, Ron Richardson (Tres.), 141 Broadmoor Ln., Alabaster, AL 35007, <ron_mail@bellsouth.net>.

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

Arizona - Aerotowing, slopesites in AZ (rugged), Arizona Flying Eagles R/C Demo. Show Team, Dave Wenzlick, (602) 345-9232, <azdw@uswest.net>, or visit CASL at <http://www.public.asu.edu/~vansanfo/casl>.

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

Arizona - Southern Arizona Glider & Electric (Tucson area), Philip Brister (contact), philipbrister@netscape.net, (520) 394-2121. 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 - DUST, Buzz Waltz, 68-320 Concepcion, Cathedral City, CA 92234, (760) 327-1775, <buzzwaltzrc@excelfonline.com>.

California - High Desert Dust Devils, Stan Sadorf, 14483 Camrose Ct., Victorville, CA 92392; (760) 245-6630, <Soareyes@aol.com>.

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 - Sacramento Valley Soaring Society, Dudley Dufort, 225 30th St., Suite 301, Sacramento, CA 95816, (916) 448-1266, <www.svss.org>.

California - Soaring Union of Los Angeles, John Bruce, 908 W 245th St., Harbor City, CA 90710, (310) 534-0948, <rcflyinman@aol.com>.

California - South Bay Soaring Society, Mike Gervais, P.O. Box 2012, Sunnyvale, CA 94087; (408) 683-4140 (H), (650) 354-5469 (W).

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), Tom Keisling (Pres./Editor), (814) 255-7418, kiesling@ctc.com; Ben Lawless (Sec./Tres.), LawlessB@ang.af.mil; Anker Berg-Sonne (Scorekeeper), (508) 897-1750, anker@ultranet.com; Josh Glaab (Contest Coordinator), (757) 850-3971, jlglaab@pin.net; <http://www.eclipse.net/~mikel/esl/esl.htm>.

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

Florida (Central) - Orlando Buzzards Soaring Society (www.specs-usa.com/~ingo/OrlandoBuzzards), Jerre K. Ferguson (Pres.), 4511 Pageant Way, Orlando, FL 32808, (407) 295-0956, <jerre@bellsouth.net>.

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

Hawaii - Maui Island Slope Soaring Operation (MISO), Duane A.K. Asami, 262 Kamila St., Kula, HI 96790, pgr. (888) 932-6247, <dasami@mauigateway.com>.

Illinois (Chicago Area) - Silent Order of Aeromodeling by Radio, Jim McIntyre, 23546 W. Fern St., Plainfield, IL 60544-2324; (815) 436-2744. Bill Christian, 1604 N. Chestnut Ave., Arlington Heights, IL 60004; (847) 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.

Indiana (NE Indiana and NW Ohio) - League Of Flight by Thermal (LOFT), Ft. Wayne, Marc Gellart, (419) 229-3384, <isoar2@wcoil.com>, <www.rc-aero.com/LOFT>.

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

Iowa - Eastern Iowa Soaring Society (IA, IL, IN, KS, NE, WI), Ed Harris (editor), 2000 NW 84th Ave., Ankeny, IA 50021; (515) 965-5942, <harris.edwin@mcleodusa.net>, <http://eiss.cnde.iastate.edu>.

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

Kansas - Aerotowing, Jim Frickey, (913) 585-3714.

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

Kentucky - Louisville Area Soaring Society, Ed Wilson (Contact), 5308 Sprucewood Dr., Louisville, KY 40291; (502) 239-3150 (eve), e-mail <ewilson1@bellsouth.net>.

Louisiana - Capitol of Louisiana Soaring Society (CLASS), Leonard Guthrie (contact), 12464 Fair Hope Way, Baton Rouge, LA 70816, (225) 275-2122, flynguts@aol.com.

Maine - DownEast Soaring Club (New England area), <Jamesiii@blazenetme.net>.

Maryland - Baltimore Area Soaring Society, Erich Schlitzkus (President), 52 North Main St., Stewartstown, PA 17363; (717) 993-3950.

Maryland & Northern Virginia - Capital Area Soaring Association (MD, DC, & Northern VA), Chris Bovais, 12504 Circle Drive, Rockville, MD 20850; (703) 643-5513.

Massachusetts - Charles River Radio Controllers, Dick Williamson (past president), 21 Pendleton Road, Sudbury, MA 01776; (781) 981-7857 (W), <williamson@l.mit.edu>, <http://www.charlesriverrc.org>.

Michigan - Greater Detroit Soaring & Hiking Society, Greg Nilsen (Sec.), 260 Rosario Ln., White Lake, MI 48386-3464; (248) 698-9714, 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, (816) 833-1553, eve.

Missouri - Mississippi Valley Soaring Assoc. (St. Louis area), Peter George, 2127 Arsenal St., St. Louis, MO 63118; (314) 664-6613. Mark Nankivil, nankm@quixnet.net, (314) 781-9175.

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

Nebraska - Lincoln Area Soaring Society (Wilson Slope Races), Jim Baker, 920 Eldon Dr., Lincoln, NE 68510, (402) 483-7596, jcbaker@inebraska.com, <http://www.geocities.com/CapeCanaveral/Hangar/1671/lass-2.html>.

Nebraska - SWIFT, Christopher Knowles (Contact), 12821 Jackson St., Omaha, NE 68154-2934, (402) 330-5335.

Nebraska - Ken Bergstrom, R.R. #1, Box 69 B, Merna, NE 68856; (308) 643-2524, <abergst@neb-sandhills.net>.

Nevada - Las Vegas Soaring Club, Ray Dinoble, 10812 Hollow Creek Lane, Las Vegas, NV 89144, (702) 254-7911, <dinoble@juno.com>.

Nevada - Sierra Silent Soarers (Reno/Sparks/Carson City/Minden area), Chris Adams, (775) 345-1660, chris@scrollsander.com, <http://www.scrollsander.com/SierraSilentSoarers.htm>.

New Jersey - Vintage Sailplane R/C Association, Richard G. Tanis (President/Founder), 391 Central Ave., Hawthorne, NJ 07066; (201) 427-4773.

New Mexico - Albuquerque Soaring Association (all soaring & electric), Jim Simpson (contact), 604 San Juan de Rio, Rio Rancho, NM 87124; (505) 891-1336, <jimbonee@aol.com>, <http://www.abqsoaring.com>.

New York, aerotowing Rochester area, Jim Blum and Robin Lehman, (716) 335-6515.

New York - Elmira - Harris Hill L/D R/C, aerotowing & slope, John Derstine, (717) 596-2392, e-mail johnders@postoffice.ptd.net.

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

New York (Buffalo/Niagara Falls area) - Clarence Sailplane Society: http://www.bufflink.com/css/ or Lyn Perry, President, (716) 655-0775, perry@ecc.edu; Jim Roller, Competition Coordinator, 716-937-6427, Rolj98@aol.com.

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

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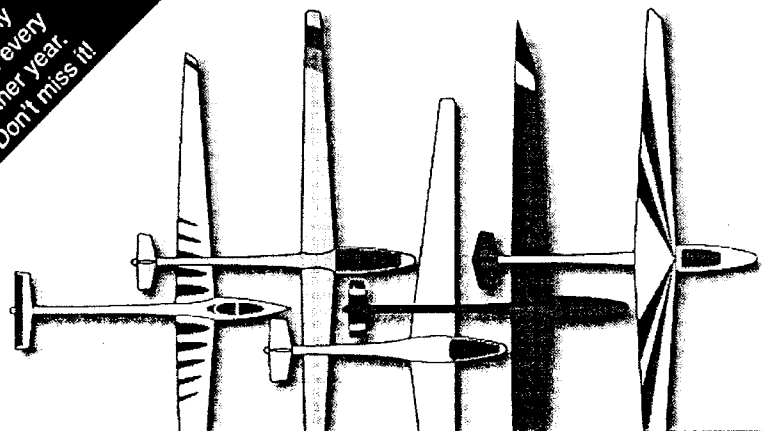
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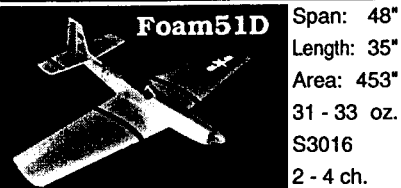
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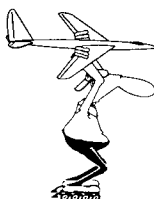
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Advertiser Index

- 26 Aerospace Composite Products
 - 7 Anderson, Chuck
 - 5 B² Streamlines
 - 11 Buzz Waltz R/C Designs
 - 31 Cavazos Sailplane Design
 - 9 Composite Structures Technology
 - 31 Dave's Aircraft Works
 - 29 Eastern Soaring League (ESL)
 - 12 Hobby Club
 - 19 ICARE Sailplanes
 - 30 International Scale Soaring Assoc.
 - 29 League of Silent Flight
 - 7, 31 MAD Aircraft Design
 - 12 Major Hobby
 - 15 Maple Leaf Design
 - 25 MM Glider Tech
 - 30 R/C Soaring Digest
 - 25 RnR Products
 - 29 Sailplane Homebuilders Association
 - 32 Sailplanes Unlimited, Ltd.
 - 31 Sanders, Eric (CompuFoil)
 - 27 Slegers International
 - 28 T.W.I.T.T.
 - 5, 6 Viking Models, U.S.A.
 - 27 Viking Models, U.S.A.
 - 29 Vintage Sailplane Association
- ### Events
- 26 Cape Blanco - Oregon
 - 27 GNATS Aerotow 2000 - Canada
 - 4 Oc-Tow-Berfest 2000 - Missouri
 - 30 Soar Utah 2000 - Utah

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