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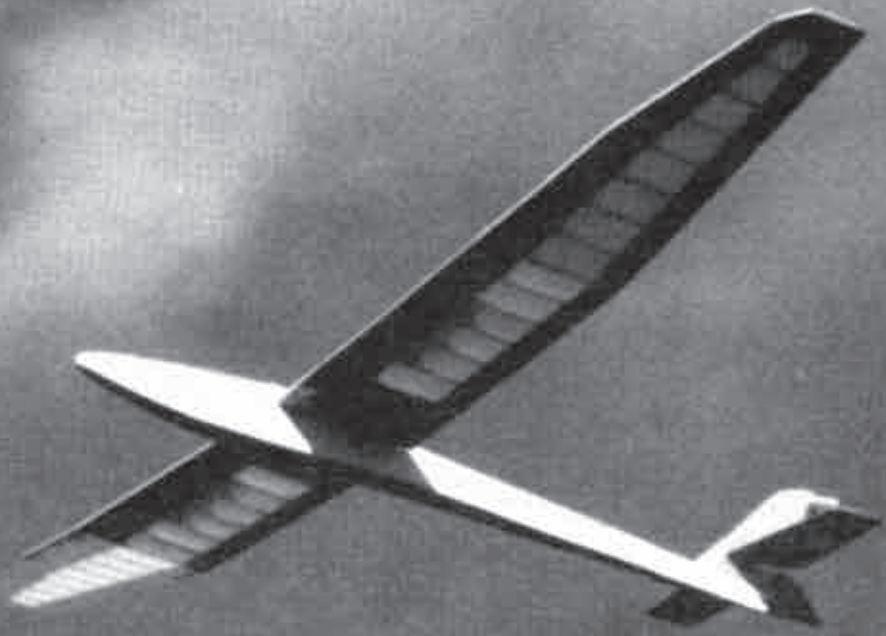
R/C SOARING DIGEST

Radio controlled

THE JOURNAL FOR R/C SOARING ENTHUSIASTS



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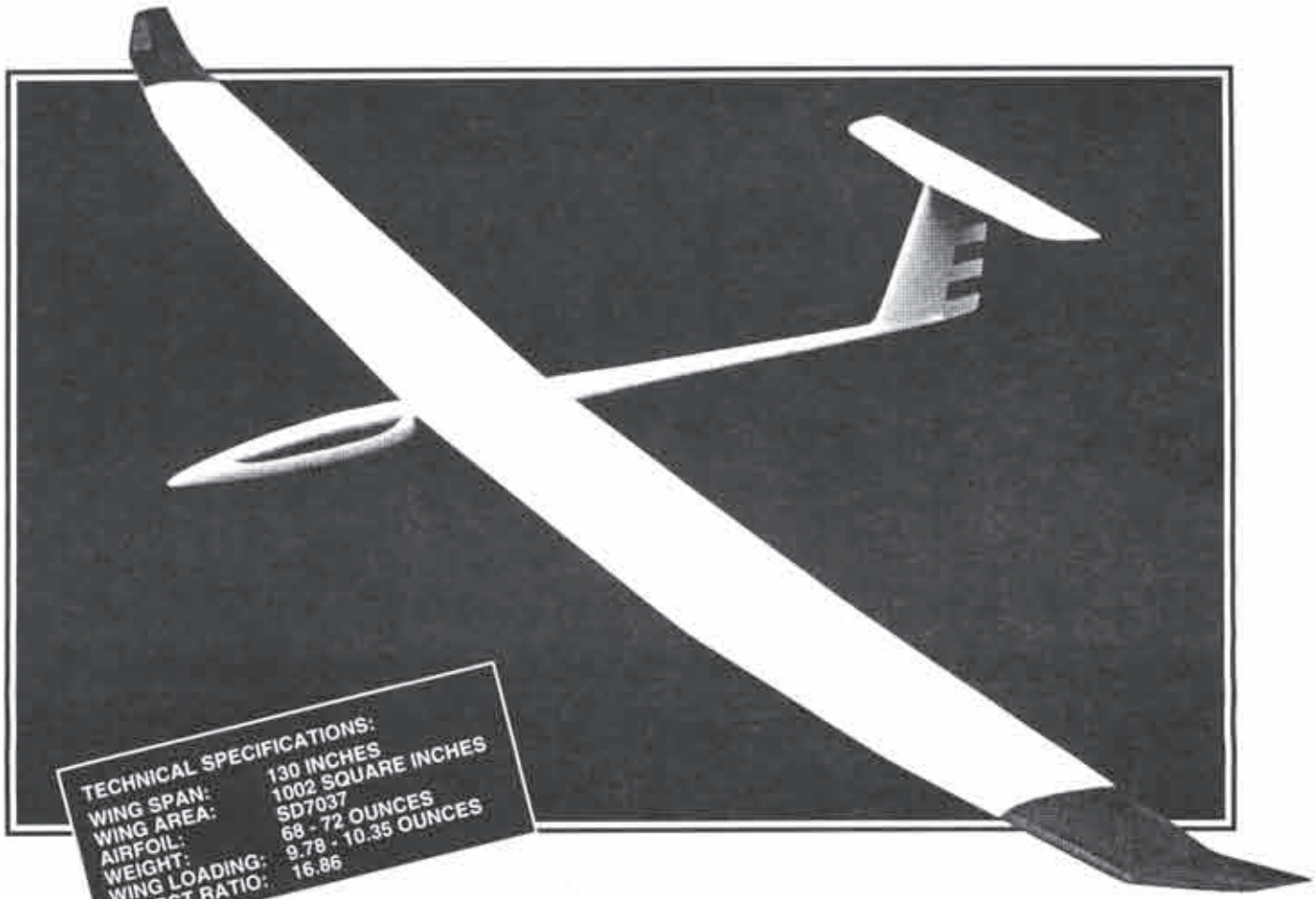

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APOGEE

An example of a basic RES design, this Apogee in flight was built by Dale Uecker. Dale's modifications to improve performance and durability were discussed in the June 1999 issue of *RCSD*.

Photography courtesy of Lee Murray, Appleton, Wisconsin.

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. He can be reached at: 210 East Chateau Circle, Payson, AZ 85541; (520) 474-5015, <jimpeg@netzone.com>.

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Artwork
Gene Zika is the graphic artist who designs the unique ZIKA clip art.

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The Soaring Site

Web Updates

June has come and gone, and July is well on its way to becoming history, as well. We still have yet to get back on our old schedule, but hope to do so soon before becoming *too* old and gray!

In addition to getting each monthly issue out the door, we also have web page updates that need to be done.

With this issue, you'll find that Dave Sanders takes us to Cajon Pass, with photography by Shelby Sanders; and, Steve Savoie discusses the unveiling of the U-2 at Elmira, New York, most photography by Dave Garwood, of course. Although not ready at the time of this writing, for those of you with web browsing capability, we'll have additional photography in color for viewing at the web site, on-line, soon. *(Famous last words...)*

The "Build Along" series seem to have struck a positive chord for many of you. Maurice Mousseau, Canada, writes, "I really do like your "Build Along" articles and I'm looking forward to reading more of these articles." Thanks for the input, Maurice!

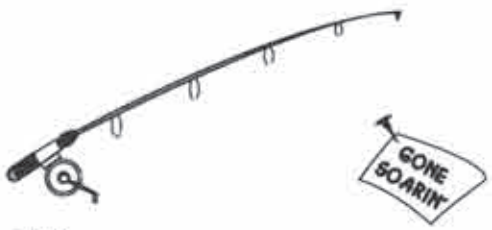
Please remember, for those of you that have not dropped the authors a line, if you really like reading about this sort of thing, please take a minute, and drop them a quick note. We all like to think that we're writing about something of interest to the readers. But, ya gotta let us know!

Of interest, this month, a question was raised about bringing new folks into the hobby. Tom Nagel tackles that question, with his usual casual style. If any of you have additional ideas on this topic, or travel (of course), please let Tom know.

In the meanwhile, Dave Register has begun discussing an airfoil of the month. Recent correspondence from Bill Johns in Washington indicate Dave's hot on the trail of a subject of interest to many of you, as well. Bill wrote, "Continued discussions of airfoils as presented in the most recent issue is a good thing! Keep it up!"

And, so we shall! Thanks for the input, Bill!

Happy Flying!
Judy & Jerry Slates



ZIKA

Club Building for Small Groups

By Tom Nagel
Columbus, Ohio
tomnagel@iwaynet.net

When I started flying about six years ago, the local sailplane club was full of talented, experienced people, but there were only about six of them! They got me safely into the air, and welcomed me into the group.

But I was scared silly that the city and the metro parks system (which owns our flying field) would figure out there were only six or seven of us in the club, and that shortly thereafter soccer goals would sprout all over the sailplane field. I made it my job to promote membership.

This was not entirely a selfless task. I didn't want to lose the flying field, and I got tired of being the "new guy." Club membership is now up to about 18. Most are active fliers. Here's some of the things learned over a six year process.

1. Keep a club roster, including name, address, AMA number, phone number(s), e-mail and frequencies. Computer spreadsheet programs are great for this. Keep a bunch in your car or flight bag.
2. Pass out the club roster to all members, and anyone who shows the slightest interest in joining.
3. Have a club flier, with a map to the field, contact names and numbers, and some sailplane graphics. Make lots of copies and keep them in a big manila envelope in your car.

   Make sure every hobby shop your members visit has a nice pile of these. Keeping hobby shops stocked is a continuing project.

   Drop a big pile of club fliers at the freebie table at all local RC shows, events and swap shops. This too is a continuing project.

   (It helps to have the guy in charge of flyers have free access to a copier. Recruit a bureaucrat.)
4. List your club on the Soaring Resources page of *Radio Control Soaring Digest*, RCSDigest@aol.com. If your club has a web site, ask us to add a link from the *RCSD* web site, *Links to Clubs and Organizations*.
5. List your club on the sailplane internet yellow pages, now maintained by Emperor Karlton Spindle, the Multiplex USA dude.
6. NETWORK! The best thing that has happened to the Columbus thermal sailplane club in six years is that we teamed up with an informal group of guys from Newark who flew mostly slope. Now, they come over to fly thermal, and they have shown us where the local slopes are. Our club has grown, we fly year round, and the Newark fliers have use of our thermal expertise, winch and so forth. Find other local sailplane groups and cooperate, run competitions, have joint meetings, do whatever it takes to NETWORK. You might even talk to some (shudder) power guys, and try aero-towing.
7. Talk to the berry pickers. Translated, this means talk to anybody that shows up at the field to watch, run their dog, pick berries, whatever. Don't be defensive, ready to run off anyone who isn't a flier. Spend time with anyone who shows an interest. Give them a flier, tell them that if they want to fly, the club will help them get started.
8. Call the new guys when you are going out to fly. The old farts all know the routine and recognize a good day to thermal or slope. But the new guys need to be alerted. Drag the thermal dudes out to the slope, if they have never been there. Show the slopers how to use a winch on a flat field.
9. Keep an e-mail list for slope alerts, events, meeting notices, etc.
10. The Pieces Parts Plane: buy a cheap foamie, and take donations of parts (servos, linkages, covering, an old TX, etc.) from the club members. Buy a buddy chord to go with the Pieces Parts Kit. Somebody in the club will have an old van they drive to go flying (it never fails) and you can put them in charge of keeping and charging the Pieces Parts Plane. And when a new guy shows up, you launch it and hand him the box.
11. "Go to the schools." Collect a bunch of old model magazines from whoever has them to get rid of. Spray the back cover of each with M-77 and laminate a flyer onto the outside back cover. Drop these off at school libraries. Schools are also good nesting places for retired models. Dust them off, assemble them, and ask the librarian or science teachers to hang them from the ceiling.
12. Membership is a long term project. Divide up the jobs, do them routinely and don't expect instant response. Nothing listed here is very hard to do, and over time the results are significant. My impression is that the successful clubs are the ones who do this stuff more or less instinctively, without planning it out. Imagine what you can do if you plan it! ■

A Note on Beginner Training

By David M. Sanders
Capistrano Beach, California

If you can just sacrifice 4 to 5 flying days with a beginner, he or she can learn to fly. I've had best results teaching 'em one at a time - just a brief kernel of wisdom. I've found group training sessions to be much less productive, myself. Our big problem is that the experienced fliers are selfish... They want to go out and fly themselves, not train beginners. I'm just as guilty... I have to force myself to teach guys once in a while. In the end, the few days of missed flying for myself are worth it, as I always gain a new flying buddy. Gotta' be patient! ■

Jer's Workbench

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RCSDigest@aol.com

Low Tech Design & Construction Rudder, Elevator, Spoiler Model RES - Part IV

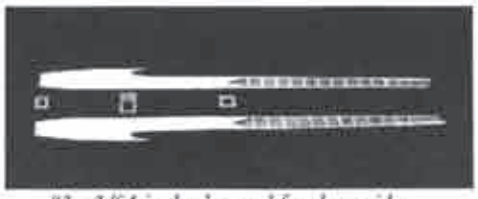
Now that most of the parts have been cut out, the actual construction has begun. The wing is usually the most time consuming part of building a model of this type; however, in this case, the fuselage will be time consuming, as well. So, I elected to start with the fuselage, first.

I want a light, yet very strong fuselage. Having nixed the balsa wood, plywood, spruce, and bits of pine have been selected, instead.

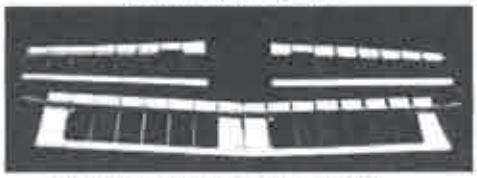
Photograph #1 shows the inside of the fuselage *sides*. The outside skin of the fuselage is 1/64" plywood. 1/8" plywood was laminated onto the inside of the fuselage sides, from the nose through to the mid section of the fuselage. The back half of the fuselage sides were reinforced with 1/8" square spruce. Note that there are a lot of little bits and pieces that had to be cut and glued in place. The top and bottom of the fuselage will also be constructed of 1/64" plywood skin.

Photographs 2 and 3 denote typical wing construction, nothing fancy or different. However, the model will sport a one piece wing. Since I have sufficient room to build a wing of this size, and can transport it easily, the length is not a problem. However, for those of you that are designing and building along, you might consider building a wing that can be broken down into 2 or 3 pieces.

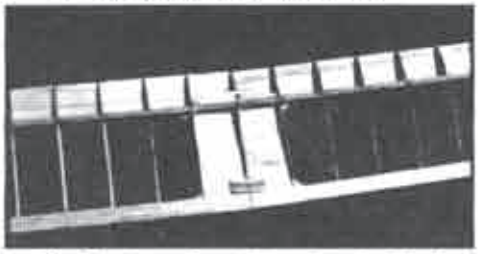
The wing ribs were cut from 1/16" hard balsa wood, while the spars are 1/8" x 3/8" spruce, with 3/8" vertical grain, medium balsa wood for sheer webbing. All sheeting and rib cap strips are 1/16" medium balsa wood.



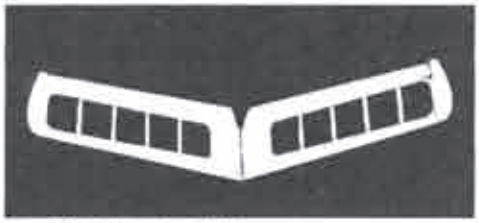
#1 - 1/64 inch plywood fuselage sides, reinforced with 1/8 inch plywood and 1/8 inch square spruce.



#2 - Wing center section and tips.



#3 - Center section of wing showing hard points for wing hold down bolts.



#4 - Simple stabilizer.

Photograph 3 shows the center section of the wing, with hard points installed, for the hold down bolts. Sheeting will be completed, adding cap strips, and installing spoilers. We'll cover the subject more, next month.

And, of note, photograph #4 shows a very simple stabilizer with elevator, all made of 3/16" stock. Nothing fancy here.

Let's go fly! See you next month! ■

on the Wing

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http://www.halcyon.com/bsquared/

Modifying and Building
The Model Builder Raven
Part 2 - Constructing the Wing

We like to begin construction of any airframe with the wing. There are a couple of psychological reasons for this. The wing usually has many more pieces than any other major part of the airframe, yet wings are perceived to build faster than real time. This may be because the skeleton looks to be a lot more than it really is - sort of like framing a house. But the biggest reason for building the wing first is (with apologies to TWITT) "The wing is the thing!"

After the preliminary decisions were made, and before actual construction commenced, we once again looked at the plans in detail. We wanted to make sure all potential problems could be resolved before construction progressed to the point where solutions would be forced upon us. One significant change to construction was a switch back to wing jigs made of balsa blocks and trailing edge stock. Despite having sufficient foam on hand, the utter simplicity of using scrap balsa was just too enticing.

Formal construction of the wing began with fabrication of the rib templates. The Raven S plans gave us a detailed drawing of Barnaby Wainfan's BW 05 02 09 airfoil. We scanned the drawing and then erased all of the extraneous lines, leaving only the section profile. The resulting TIFF image was then imported into Foil 1.2, and that application did a good job of deriving a coordinate set from the digital image. MacFoil was then used to generate a large on-screen image, and the coordinates were modified until the resulting profile was smooth and MacFoil prints of the section matched the image on the plans. The resulting coordinate set is included in this column, along with a print of the section profile.

MacFoil was then used to generate profiles with 1/16" allowance for sheeting and cap strips. These paper plots were glued to aluminum flashing material using a spray adhesive, and the rib templates were then cut out. Since MacFoil also printed out percent chord marks on each plot, locating the spar caps and control surface hinge points was relatively easy. Sharp #11 X-Acto blades made relatively quick work of the wing ribs and the partial ribs required for the ends of the elevator and ailerons. Eight of the sixteen center section ribs were


Photo 2

drilled to hold the 1/2" inside diameter paper rocket body tubes used for ballast. (See the Photo 1.)

The wing was constructed in three parts - a center section and two outer wing panels. All three major parts were constructed in the same basic order. The bottom spar cap was pinned to the work surface and the two end ribs were pinned in place using machinist blocks to assure proper alignment. The 1/4" square leading edge stock was then blocked into place using a 45 degree triangle and the pre-cut notch in the rib leading edge. With the wing jigs in place, most of the ribs were glued into position. A 1/16" plywood plate seals the end of each ballast tube. Once these plates were glued in, the ballast tubes were pushed into place and glued securely. The remaining ribs were then glued into place. Balsa sheet spar webbing was installed using a plywood and spruce template to

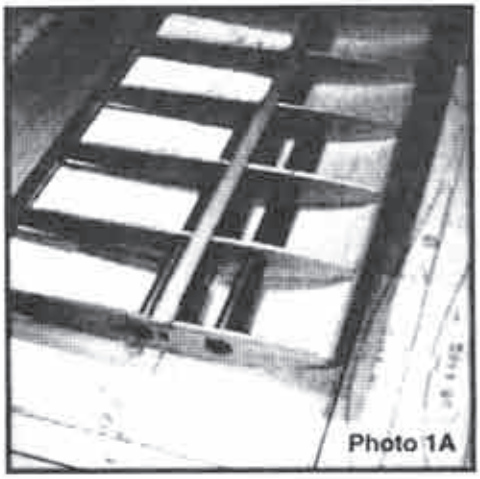
Photo 1A

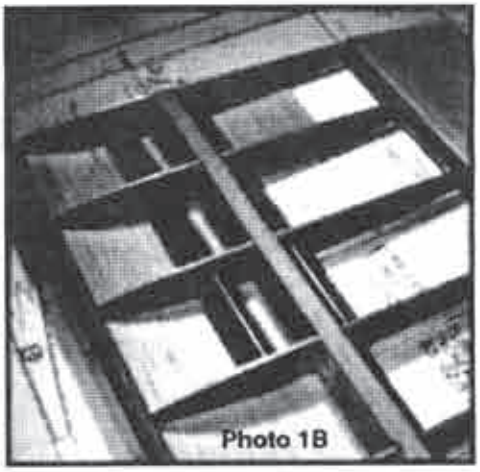
Photo 1B

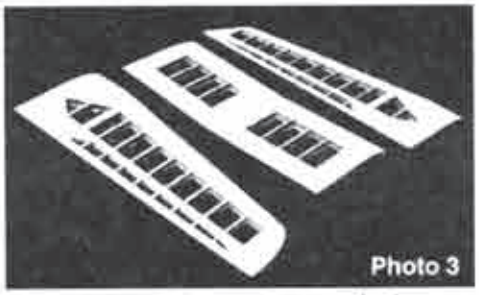
Photo 3

position the webbing relative to the lower spar cap. The upper spar cap was then glued in place.

The ailerons on this model are rather large, so standard JR 101 servos with ball bearing inserts, one in each outer wing panel, are used to drive them. Plywood was used to provide a mounting surface for the aileron servo and to strengthen the rib in the area of the cutout. See Figure 1. Some portions of the wing top surface required sheeting so that the aileron push rods would go through slots in solid material rather than through covering alone. Servo leads were routed through the wing such that a connection is made at the wing disassembly joint.

The dihedral braces for the outer part of the wing are different than what is shown on the plans, as there is no longer a bend in the wing at that point. Also, since the outer panel now has D-tube sheeting and cap strips, the height of the outboard section of the dihedral brace is less than that of the original. The new dihedral braces retain

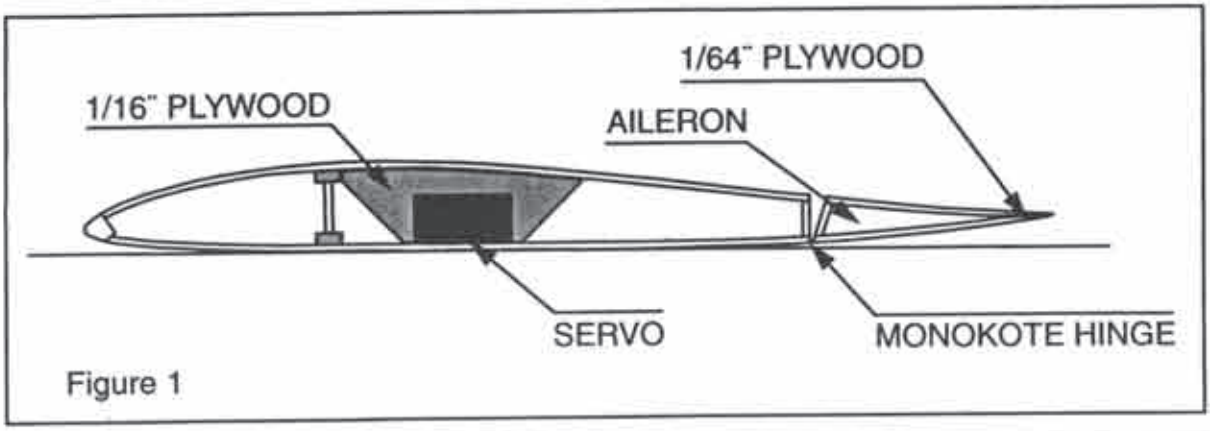

Figure 1

width of the rear fuselage. We finally decided to use one control horn for each elevator side, a single servo and a split pushrod. This is often done on pattern 'ships, so we're sure it will work for the Raven.

The original servo to elevator connection was "pull for up." This placed the elevator control horn

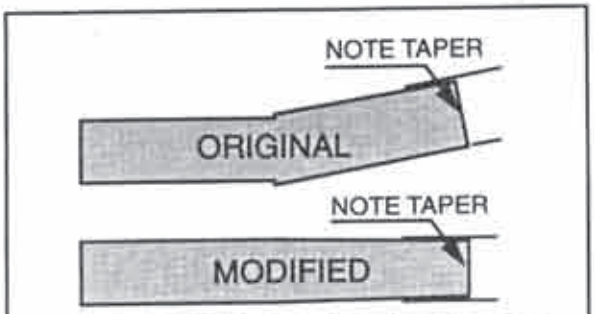

Figure 2

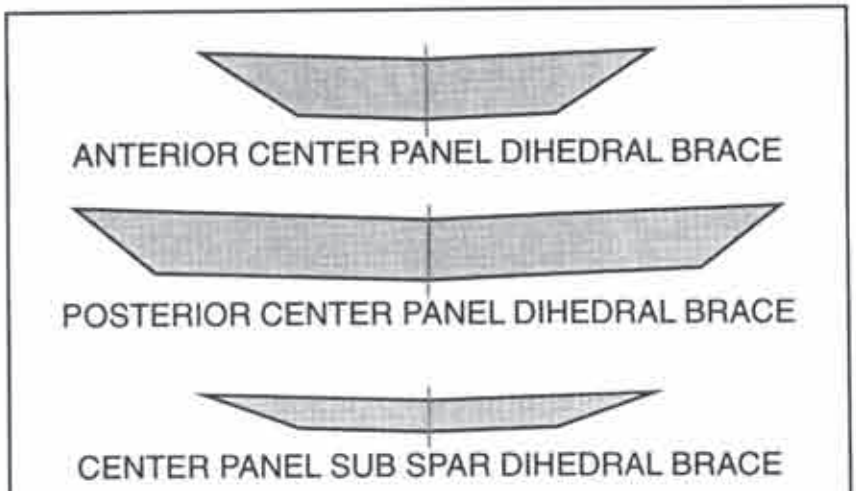

Figure 3

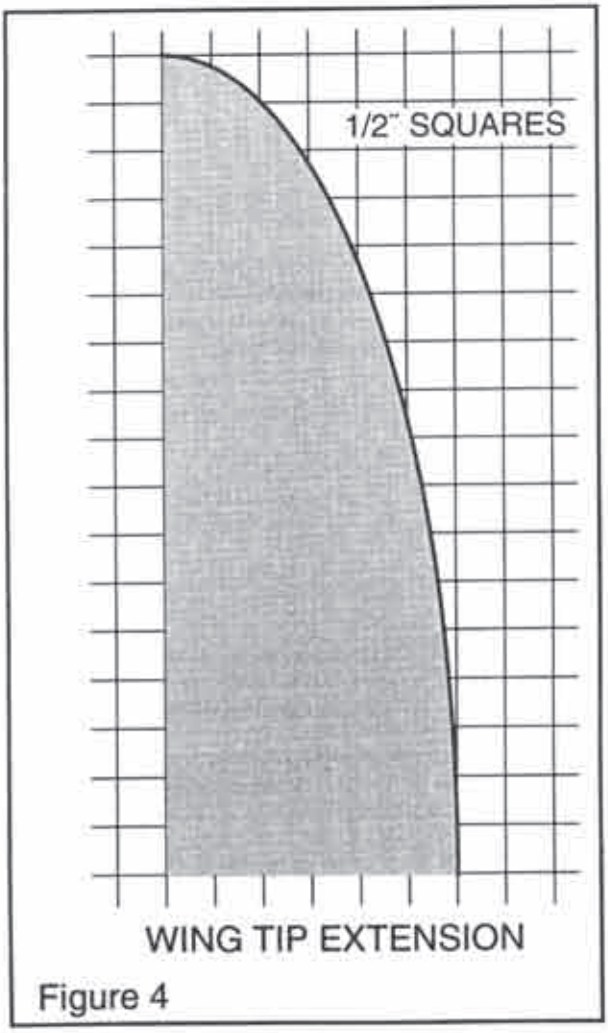

Figure 4

parallel top and bottom edges over the portion which fits into the center panel, while the portion which fits into the outer panel has a very slight taper. See Figure 2.

Simple dihedral dictates the addition of plywood bracing in the center of the wing. A straight wing with tips raised 2.5" gives 2.5 degrees of dihedral. We be made two 1/8" plywood dihedral braces for the wing center section. The brace at the front of the spar goes across one rib bay on each side, the rear brace goes across two bays on each side. There is also a sub spar dihedral brace at the elevator hinge line. See Figure 3.

The original MB Raven, which has a flat center section, maintains control linkage to the elevator even when the aircraft is disassembled for transport. We wanted to keep this positive feature, but, since we had settled on simple dihedral, the simple spruce joiner which connects the two elevator halves could not be used. We looked through our boxes of hardware and found nothing which provided an ingenious solution. One of the limiting factors is the narrow adjacent to the top deck. Moving the wing higher on the fuselage eliminates even this small amount of clearance, so we'll be using a "push for up" connection with the control horns on the bottom of the elevator.

Allowance also had to be made for the aileron hinging, not at all part of the original design. We used 3/32" sheet for the sub spar at the trailing edge of the wing, and the leading edge of the aileron. This is similar to the elevator structure. For lightness, the ailerons use 1/16" balsa sheeting to form a C-tube at the leading edge, plus cap strips. The entire trailing edge of the wing has a 1/2" wide strip of 1/64" plywood where the upper and lower surface sheeting meets. This allows the trailing edge to be finished to a sharp edge. While the elevator is hinged from the top, the ailerons are hinged from the bottom. This has proven an effective way to eliminate adverse yaw due to aileron deflection. See Figure 1.

The wing tip extensions were constructed of 1/16" sheet balsa. We used the arc function of our desktop publishing software (FrameMaker®) to create the elliptical curve. Figure 4 provides the shape superimposed over a grid for easy duplication. Because of the upper and lower surface curves, and the angle at which the two sheets meet along the outer edge, this structure is both light and strong.

A note on the Raven wing construction is in order, as it directly affects final assem-

bly. As can be seen from the plans and has been mentioned previously, the wing is composed of a center section and two outer panels. During initial construction, the center panel is made 48 inches long. The wing tips are built separately. Once complete, a wing tip is slid onto its dihedral brace and glued in place. The center panel is then cut six inches inboard of the resulting joint line, where two ribs have been placed directly adjacent to each other and the brass wing rod receptacles have been pre-installed. This construction method assures accurate alignment of the wing rod receptacles and mating of the wing surfaces. The shortened center panel (36" span) and fuselage, complete with elevator and rudder servos and linkages, form one major piece. The two outer panels complete the three piece breakdown for easy transport. See Photos 2 and 3.

The last thing to be done is to cut the elevator and ailerons free of the main wing components. This is easily done with a razor saw, but some amount of concentration is required. A few minutes with a sanding block finishes off the wing framework, and it's now ready for covering.

Some parts of the wing construction were delayed because we lacked the ballast tubes. Your local hobby shop can order these either directly from Estes or from a wholesaler, but it's helpful if you have a description and part number and order these ahead of time. Relevant information has been included at the end of this column.

We'd like to recommend Superior Balsa and Hobby Supply, Hawaiian Gardens California, as a source for balsa, plywood, music wire and brass tubing, and other items needed for construction. We've ordered from a number of balsa suppliers over the years, and have found Superior to indeed live up to their name. The prices are more than reasonable, and we've never seen better wood. The balsa is light weight but not at all spongy, the grain is straight with no aberrations, and everything is cut true. If you've not ordered from Superior before, please give them a try.

The plan set available from Bill Northrop's Plan Service includes a copy of the magazine construction article. If you have specific questions about construction of the modified MB Raven, please contact us at either P.O. Box 975, Olalla WA 98359 or by e-mail at <bsquared@halcyon.com>.

Next month: Building the fuselage, fin and rudder.

References and sources:

Aileron differential, Part 1. Bill & Bunny Kuhlman. *R/C Soaring Digest*, May 1996, and On the 'Wing... the book, Volume 2. B^{2}Streamlines, 1998.

Bill Northrop's Plans Service, 2019 Doral Court, Henderson NV 89014-1075; PH (702) 896-2162 M-F 10A-5P, Pacific, FAX (702) 897-7775 any time.

Estes Industries, 1295 H Street, Penrose CO 81240. Rocket body tubes, BT-5, 0.544" ID, four 18" lengths per package, part number EST 303084, about $6.00.

Foil 1.2 by Gregory Payne, <kgpayne@aol.com>. Available at the Foil 1.2 web site, <http://members.aol.com/kgpayne/foil.html>.

FrameMaker® is a product of Adobe Systems Inc., 1585 Charleston Rd, P.O. Box 7900, Mountain View CA 94039-7900. FrameMaker® information is available at the Adobe web site, <http://www.adobe.com>.

MacFoil by Dave Johnson, 58 Chenery St, San Francisco CA 94131 and <davejohnson@kagi.com>. Available at the MacFoil web site, <www.sirius.com/~djohnson/macfoil.html>.

Model Builder Raven. Dave Jones. *Model Builder*, January 1982.

Personal correspondence, Barnaby Wainfan.

Superior Balsa and Hobby Supply, 12020-G Centralia, Hawaiian Gardens CA 90716. (800) 488-9525, Monday through Saturday, 7 AM - 7 PM. On the web at <www.superiorbalsa.com> and <balsa@ix.netcom.com>. ■

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0.30000	0.0665
0.25000	0.065
0.20000	0.061
0.15000	0.0555
0.10000	0.0460
0.07500	0.0395
0.05000	0.0315
0.02500	0.02125
0.01250	0.01425
0.00750	0.01035
0.00375	0.0065
0.00200	0.0045
0.00100	0.00285
0.00010	0.00155
0.00000	0.00000
0.00010	-0.00050
0.00100	-0.0015
0.00200	-0.0025
0.00375	-0.00375
0.00750	-0.0055
0.01250	-0.00725
0.02500	-0.0105
0.05000	-0.0145
0.07500	-0.01725
0.10000	-0.01945
0.15000	-0.02231
0.20000	-0.02350
0.25000	-0.02477
0.30000	-0.02547
0.40000	-0.02655
0.50000	-0.02755
0.60000	-0.02699
0.70000	-0.02576
0.80000	-0.02184
0.90000	-0.014
0.95000	-0.00777
0.99999	-0.00100
1.00000	0.00000

end
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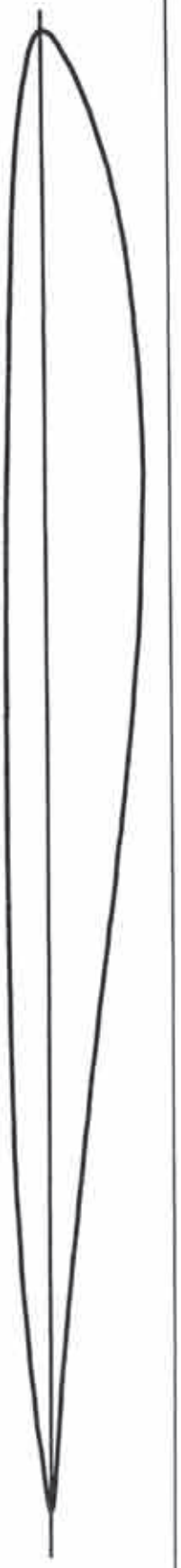
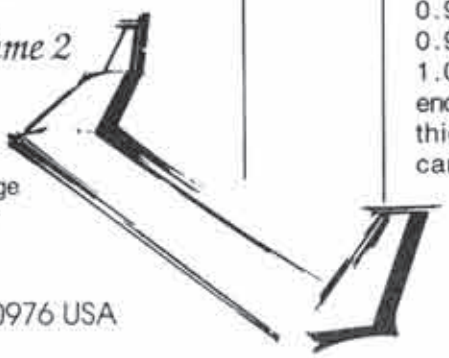
camber 2.02%





"A Bug's Life"

by Asher Carmichael
Spanish Fort, Alabama

We usually find reasons not to fly during the summer months along the upper gulf coast. High temps and humidity make being outdoors unbearable unless you're in the water, and fast growing grass makes an otherwise acceptable model aerotow airfield a morass of obstacles placed by fate to grab the wingtip of your pride and joy. Besides, there's too much fun to be had with the great beaches and rivers which offer their cooling environment and bountiful harvest for those willing to partake; so we mirror our northern brethren's pattern and build in the summer and fly in the winter. Maybe we are slower than we're willing to admit, but we think we have managed to get the seasons to conform to our lethargy.

It's little wonder then that I am pleased to announce another reason we have discovered for not aerotowing in the summer months - bug guts. Let me explain.

We had just finished our annual thermal duration contest and the hardcore among us were not going to let one of the last flyable weekends of late spring go without a tow or two. Site 8 had been bushhogged by the contractors the day before and the cut "hay" that remained on the ground was low enough to afford reasonable ground clearance for our models, as well as great cover for the grasshoppers that call the field home.

We rigged everything and Fred Rettig hooked up his Fox as I flipped the King 140 to life in the 1/3 scale Wilga. Then things really started "hopping". As I directed the Wilga along the flightline, I noticed what I thought was debris respond to the massive thrust of the 30/10 prop. I didn't pay too much attention as the clipping noise made by the intersecting prop didn't seem harmful.

The first tow was textbook even though the "debris" showers followed the rollout of the Wilga and the Fox. This scenario continued for several more tows until I stopped the process to check the gas and batteries. To my amazement, the front half of the Wilga was covered with green goo that had no resemblance to oil residue or anything else that I could identify. Then I spotted it. A lone inch-long piece of grasshopper, pasted to the leading edge of the left wing with a telltale sign of the "innards" trailing to the rear. THE WILGA WAS EATING GRASSHOPPERS - AT AN ALARMING RATE!

You can't imagine the mess. It was everywhere...

Well lucky for me, Rusty (Mr. obsessive/compulsive, clean everything in sight) Rood saw this as a challenge, in fact a duty; so, with a gleam in his eye he set about to help me clean the big green towing machine. A squirt of auto magic here, a lot of elbow grease there, and a half-roll of paper towels left the Wilga in like new condition. It was obvious that Rusty was in his element. The Wilga was none the worse for wear and we had another reason to go fishing instead of flying. Unfortunately we couldn't find enough of a bug left over to even think about covering the tip of our hooks!

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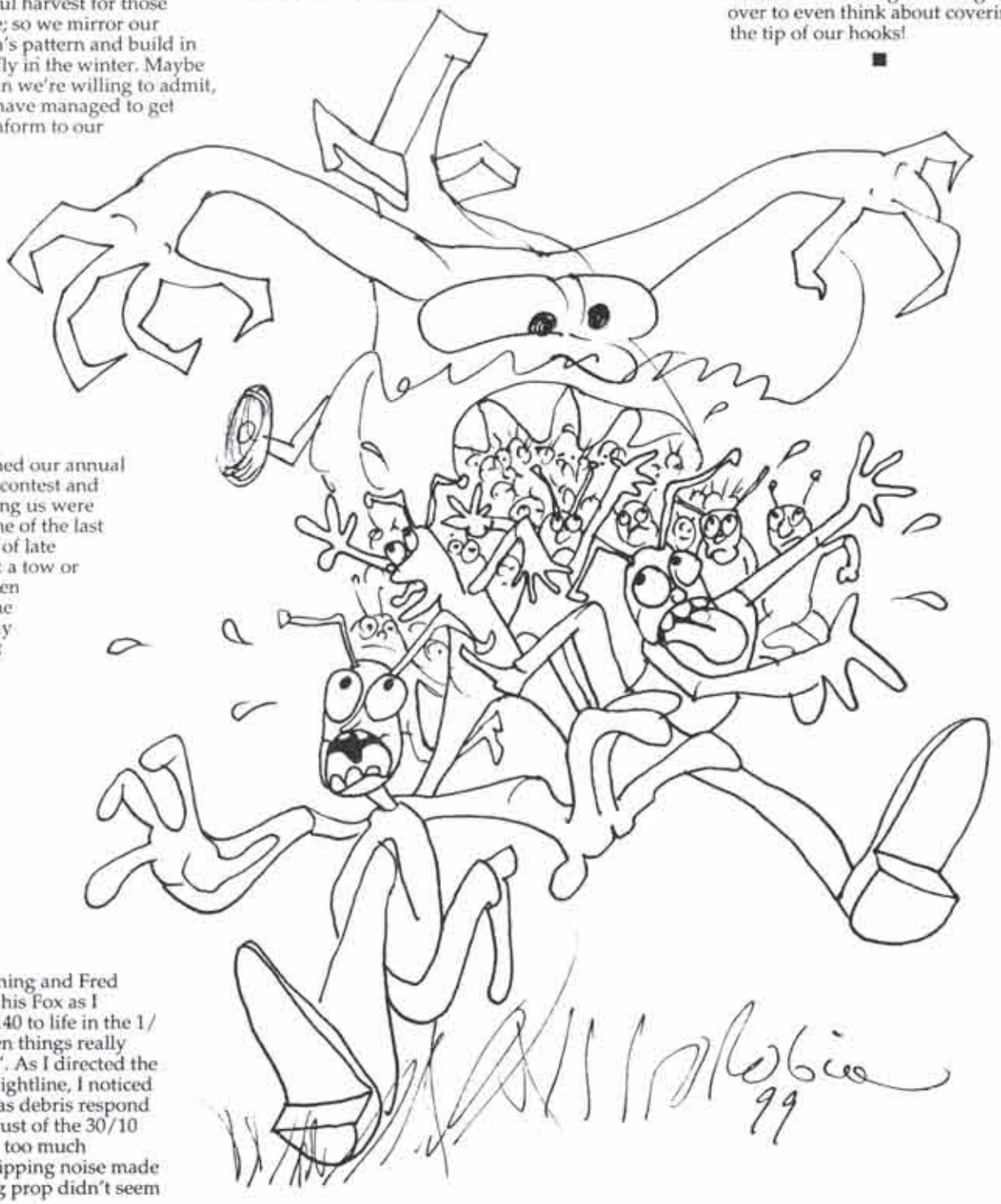

TECH TOPICS

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Somewhere around the time this issue of *RCSD* gets to your door, the LSF/AMA soaring Nationals will be underway in Muncie, Indiana. With a little good fortune, I hope to be there with the rest of you for one of RC soaring's great get-togethers.

Also at this meet, someone will again be awarded what I consider the most prestigious trophy in our hobby - the Hi Johnson Memorial. This is given to that individual who achieves the highest combined score in 2 meter and open class competition.

Some of you would argue that the FAI World Champs is the pinnacle. I mean no disservice to the outstanding pilots who have advanced the technology and quality of our sport through pursuit and achievement of that very challenging goal.

However, there are still some of us around who knew Hi and what a trophy like this, presented in his name, would have meant to him. I only knew him for a few years, but let me tell you what I learned.

Hi's presence permeates aeromodeling. For those of you who go WAY back, the Johnson 35 was one of the classic engine designs of its day. Hi was also in the carburetor, bellcrank, U-Control linkage and other aspects of the business. He was an inventor, engineer, manufacturer, salesman and general promoter of our sport in many forms.

By the time I caught up with him in Southern California (– 1977), he had retired from his 'full-time' job, was an elder in his Church, and opened two new companies: "Hi Johnson Model Products" and "SuperWings".

Many of the items you bought in bubble packs, the canopies that came with your kits, arrowshaft and early cable pushrods, solder links, fuel filters, etc., during that time, came from Hi Johnson Model Products. He sold many of these under his own name, but he sold a lot more to other suppliers. Some he made, many he contracted with others and provided delivery and distribution. For all the time I hung around his shop, I don't EVER recall hearing a complaint that he didn't resolve - always to the advantage of the customer.

But it was the SuperWings shop that was the treasure trove of ideas. At that time, Hi was pushing foam wing construction REAL hard. It was an idea who's time had come. Perhaps to the detriment of the concept, certain parts of the system were not yet available. We didn't know how to vacuum bag back then. Composites weren't available. CA adhesives were a military option, only.

So, Hi did what he always did. He innovated. Balsa sheeted wing skins weren't very rugged and required splicing. Obechi hadn't been discovered by modelers yet. 1/64" ply was available, but VERY heavy and very expensive.

So, Hi went with high density foam for the skins and used a spar system and glass lined reinforcing tape to add structural strength and rigidity. He played around with aileron ships, but realized those systems weren't ready yet for the typical modeler; so he concentrated on designing the best polyhedral ships he could come up with.

With a true airfoil now available across the entire wing chord and span, a number of problems came up. Built up wings had 'turbulator' spars or other irregularities that we now know helped trip the boundary layer. A good finish on one of Hi's designs didn't do that - performance had to be built into the airfoil.

So, we (Hi and several others of us) went on a building spree. We'd lay out templates and Hi would cut them out and make wings. We'd fly and report. The donut shop off the runway at Sunland airport was a favorite hang-out for these post flight analyses. Mainly, because we'd fly down at Sunland dam early in the morning, grab a bite while we discussed the results, and then each split to make it to work by 8 a.m. If you happened to work for NASA and could convince your boss that this was valuable flight research, you were occasionally cut a little slack on showing up a titch late.

Based on this work, the popular Wortmann and Eppler series were found to be good, but somewhat stall sensitive (the Wortmann's in particular). This could always be cured by an appropriate trip strip; so, Hi gravitated towards sections that were known to be primarily turbulent flow. The NACA 4-digit sections worked well, a derivative of which was the RxxxC series. One of Hi's favorites was the J612A. Having flown it, I still preferred the analogous sections from the 4-digit or R series. As with all the work with Hi, he was ecumenical. He had his way and, if you had yours, that was OK, too, as long as we were having fun.

Among the things that were learned were:

- If you put the high point in the camber line behind 40% of the chord, you were looking for trouble.
- If you put the high point in the thickness distribution past – 32.5% of the chord, you were also looking for trouble.

Many of the airfoils used after that were in the 35-40% range for camber position and around 27.5 to 30% for thickness position. Then the next step began.

The early foam ships from SuperWings were not well received at the field. We broke a few at contests until Hi got the spar structure and poly braces worked out. The philosophy was to keep making it lighter until it broke and then back off a bit. We did!

Next, it was apparent that these ships would always come in a bit heavier than others. So Hi started looking at higher camber airfoils - up to 8% in some cases. At that time there was no wind tunnel data available except the NACA tests from the '30s and '40s. So we took that data and put together a model that fit the drag bucket and the lift curve, and scaled things for camber and thickness. Next, we needed some type of flight simulation to guide the design process.

A polar type calculation was needed, so one was flanged up on the Tektronix 4051 at the lab; the plots were compared against each other to try and find a 'sweet spot'. One of the things that was immediately apparent was that the high lift sections that were needed to compete with the SoCal floaters had to recover some of the drag disadvantages of the high camber.

Aha! A concept was born. Use foam and plastic construction for simplicity, true airfoil shapes and strength. Use higher camber airfoils to compete with the SoCal crowd (remember, the Windrifters and Paragons ruled the skies in that era). Then add high aspect ratio to reduce drag at the high lift coefficients.

About that time, Blaine Beron-Rowdon organized the SFVSF club and others to carry out polar flight measurements. We had access to that data and plugged in the models for airfoils, aspect ratio, wing loading and general parasitic drag - and by gosh, the models fit the data almost perfectly. The only outlier of the whole set was the 'Goose', but we had to guess at the airfoil so that could easily have been the problem.

Hi was off and running at that point. About 4 years of field research had culminated in a design concept that was validated by both calculations and the excellent work done by Blaine and the gang over in the Valley.

Where the real difference now came in was that after accumulating all this hard earned experience, Hi gave it all away. Go read a SuperWings catalog if you can find one and you'll find every scrap of knowledge Hi and the rest of us ever learned in the pages of that book. By the way, try and find something called a catalog for R/C soaring products prior to Hi's. He didn't invent the term, but he sure put it to good work earlier than a lot of others.

The catalogs were chock full of airfoils and comments on their performance gained from work at the field by Hi and his many friends. They listed every construction trick he had learned. Since gluing wing skins wasn't popular, he went to the aerospace industry and bought what became known as SuperTape. (Very much different from carpet tape - it was used at Lockheed and others to hold metal wing skins down until they could be riveted.)

He put a number of these designs together in his catalogs (Little Eagle, Golden Eagle, American Eagle, etc.) and told you how he calculated the volume coefficients and tailplane angles. And, what range seemed to work well. It was all there.

I asked Hi on more than one occasion why

he put it all out in the open like that. His comment was very simple - "I've had so much enjoyment and fellowship from this sport that I just want to give something back." It was that simple and that honest. In your 30s, that's a hard concept to swallow. In your 50s, it makes a lot more sense.

The last time I saw Hi he had just finished a new ship. It was an Eagle series, but I don't know if it had a name yet. We went down to the Rose Bowl of a Friday evening. The plane was gorgeous. Double taper poly design of about 160" span. A 19:1 aspect ratio with an 8% camber airfoil (~ 12% thickness). Wing loading was somewhere around 10.5 oz/sq. ft. That 8% camber kind of threw me since we hadn't calculated that high with that wing loading, but up the line she went. What a gorgeous flight. Turned on a dime, but covered tremendous ground when asked. Hi brought it down to ground effect level way out in the middle of the field and that sucker just kept going and going and going. Finally had to dump it in the ground to keep it from hitting the big tree where we used to stand when it rained during a contest while we watched all the soaking wet, lady joggers bounce by...

We talked a bit about his new interest which was full size soaring. Hi had soloed and bought part ownership of a homebuilt and was going out the next weekend. Why take up soaring at his age? 'Cause it was something new and different and fun. When asked for his goals, the answer again was simple - "There's an old f—t down in Florida that's 6 months older than I am. If I can outlast him, I'll be the oldest soaring pilot in the country!"

So yes, Hi loved to give away his counsel, but he also really loved to compete. Sadly, the next weekend we got the call from Tommy (one of his soaring partners) that the wing broke just off tow and...

So to whoever wins the Hi Johnson trophy, that's a little thumbnail of the inheritance you've earned. If you value Hi's traditions, take what you've learned and pass it on to the next generation. Hi did, and we're all better off for it.

Postscript

Although Hi Johnson was ahead of his time in many of his ideas, and contributed many innovations and concepts to the sport, he remains among the few of his stature who has not been admitted to the AMA hall of fame.

I had heard that Dave Thornburg put together the necessary information a number of years ago and the petition was turned down. I'm a little puzzled by that rejection, given the breadth of Hi's experience as an engineer, manufacturer and innovator.

Maybe it's time to ask that question again?

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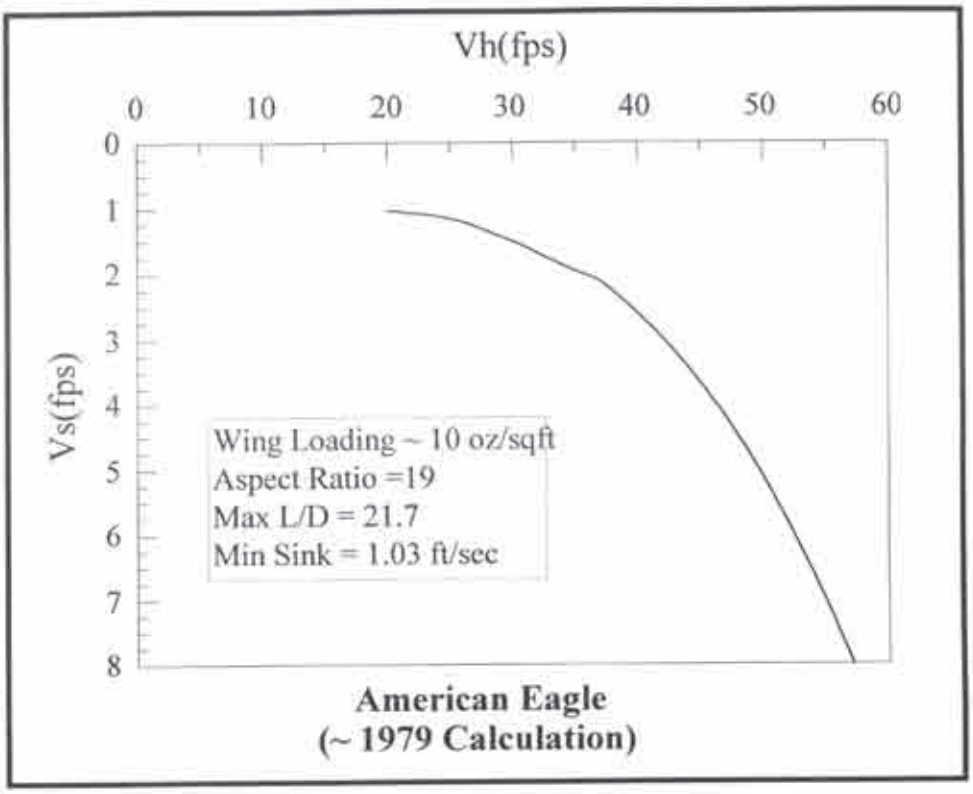

THE NATURAL SIDE OF THERMAL SOARING

By Lee Murray
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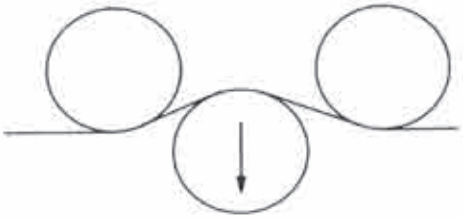
Actual Winch Line Force Study

For a number of years, I have been planning to acquire actual data on winch line tension. There were two strategies I thought about, but had not made much progress until now. Strategy One was to use a thread-line tension device I had seen that uses three wheels with one out of line so that when the line tension increases, there is a measurable force between the center and outer wheels.

STRATEGY 1

Line Tension Device Diagram



Advantages:

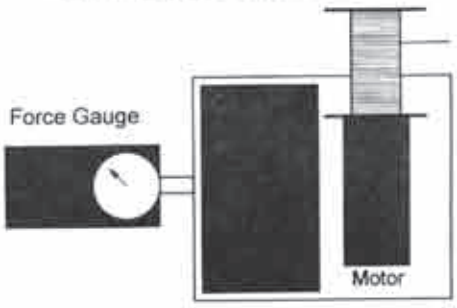
1. The device is relatively small and does not require firm mounting and can be anywhere between the winch and the turn around.
2. With some additional instrumentation, line velocities can be measured.

Disadvantages:

1. Winch line breaks could cause havoc with the device being ripped out of place along with the instrumentation.
2. Electronics would require power sources, data loggers or recorders.
3. Long set up and calibrations.

STRATEGY 2

Winch Force Measurement:



Here the whole winch is placed on a bearing and a force gauge measures the tension the winch is applying to the spool end of the winch line.

Advantages:

1. Line breaks do not risk the safety of the equipment.
2. A mechanical force gauge was available.
3. Calibration of the gauge is already done.

Disadvantages:

1. Only one piece of information is obtained, force at the winch end of the line.
2. Line friction on the grass is measured but not applied to the model.

During a **"wife mandated"** clean up effort, I got motivated to assemble the parts I had accumulated. I picked up a 50 lb. mechanical force gauge from an obsolete tensile tester during a clean up day at work. It had an optional maximum hold feature. I salvaged a ball bearing mounted metal drawer that was part of some equipment being discarded. It had low friction even with side loads and top loads on the drawer.

A platform was made for the Fab-Tek Sport Winch. It was fit into the drawer and was mounted firmly to it. The sport winch was then attached to the platform with 1/4" bolts. The force gauge was connected to the drawer so that a minimal amount of slop existed in the assemblage. The force gauge only moves about 1/4" to register 50 lb. of force.

The day of the trial came June 5, 1999 when on our normal Saturday flying session I brought the contrivance to the sod farm. A hand truck with balloon tires was used to move the now large and rather awkward package. We flew three full house designs, my Mariah, Bob Johnson's Laser 2M, and Matt Barbian's Victory C. Fran LeClercq had a Falcon 800 to fly but it was not flown. Fran stayed busy operating the VMC Flight retriever as he usually does. The wind was blowing 15-20 mph. The first few launches went OK but then we started breaking the braided Nylon winch line. Replacing the line had been on the "to do" list, but had not happened. I suspect that the #12 line I used was the same size as was originally supplied on the Fab-Tek Winch. The length of one pound spool (1800 ft.) came out very close to the original.

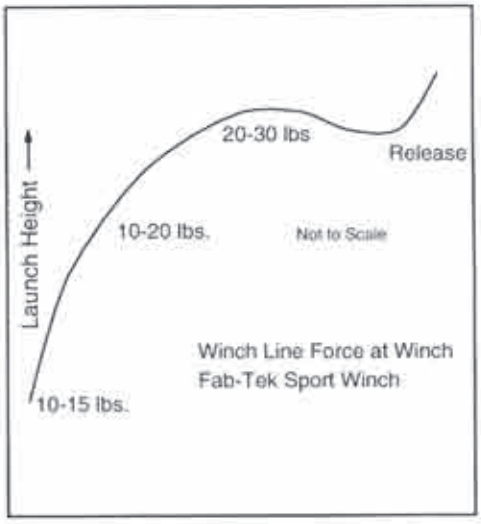
Results:

Bob Johnson, Matt Barbian, and I all tended to hold the model until winch line tensions reached 10-15 lb. On the first part of the launch, the line tension was about 10 to 20 lb. The maximum force that occurred near the top of the climb was 20-30 lb. The little winch groans at this point. The speed part of the zoom had lesser amounts of line tension. The Victory C, while obviously limited by the winch power, launched OK (not great) with only 20 lb. of tension. During a more aggressive launch, the Victory C generated 30 lb. of tension at the same point as the two meters ships. Good launch height was obtained in all cases with the two meter ships. Without the retriever, even higher launches were experienced.

The #12 original Fab-Tek sport winch line (about 15+ years old) was failing at 23-26 lb. vs. the 115 lb. specification value. In the middle of our test, we changed winch lines and were able to generate slightly higher winch forces without breaks due to localized weakness caused by mechanical damage. A section of line taken in an area without repair knots proved to be considerably stronger as shown in the table of winch line strengths tested. #24 Winch line sampled from line replaced at the regional contest a few years also showed lower strength than specification. One might question if the knots are a source of weakness. Also there was a correlation between breaking strength and absolute rate of extension for the lighter line. This might mean that the heat generated during extension also weakens the line.

Thoughts for future tests:

- Mount a larger winch on the platform.
- Test a wider range of models.
- Measure altitude.
- Get, build or borrow a higher range force gauge hopefully with an electronic readout and data collection. ***Any help someone can offer would be appreciated.***



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Line #	Listed Strength	Age	Measured Brk. Str.	Elongation to Break	Weight of 1000 ft.	Length of 1 Lb. Spool
12	115 Lbs.	~15 Yr.	67 Lbs.	12.1 %	0.59 Lbs.	1,708 Ft.
24	220	~3	130	14.6	1.19	840

Figure 1 - Breaking Strength and Elongation Performed Using Loops of Winch Line Pulled between Smooth Pins. (Breaking strengths are for corrected for single strands.)

"SHORT CUTS"

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Bottom side shows a yellow hatch, which is for visual orientation, aerotow.

U-2 Building Project, Part 7

For those of you that haven't heard, the first U-2 was completed and flew at the Elmira Aerotow event last month. The Elmira article in this month's edition touches on the flying aspects of this project.

We're going to jump out of sequence here and by-pass molding and joining the fuselage halves. This will be covered next month, as we make Dave's fuselage. That way we'll get some good pictures of the process.

So, here we go with the final assembly. The first step was to bond in the nose release. (I only use the nose releases supplied by Sailplanes Unlimited because, for me, they are simple, durable and reliable.) A 5/16" hole was drilled to accept the nozzle, which protrudes forward. I also drilled out a small clevis hole to accept the music wire used to actuate the release, as well as Z bend the music wire. The bond surfaces on the fuse and release were roughened with 80 grit; a 2' length of 1/4" music wire was lead into the nose through the 5/16" hole; a small piece of masking tape joined the two together. Five minute epoxy/microballons mixture was dabbed onto the bond area and the 1/4" rod with the nose release attached was slowly withdrawn until it mated up with the inside of the nose.

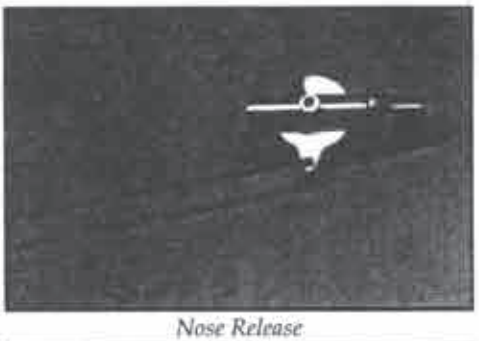
Once mated up, the actuation wire was gently run in and out while the epoxy set up, just in case a goop got in the wrong spot. That done, the next step was to drill out the 1/8" carrier rods for the horizontal stab and 3/16" hole for the torque rod. The tail was set at 0° to the fuselage and the wing set at 1.5° positive. Dave Garwood built the stabs using 1/16" balsa, white foam cores (SD8020), full span 2.4 oz. glass, with maple leading edges and tips. They are "slope tough" according to Dave. The elevators were hinged with fabric film hinges and are actuated via 1/8" torque rods, fitted with brass tubes on the end, to increase the diameter to 5/32".

When the stabs are slid onto the 1/8" carrier rods (which pass through the fuse and extend 3" on each side) the torque rods extend into the inside of the fuselage, where they are captured by a 5/32 Rocket City steering arm, which actuates the elevator and keeps the stab from sliding away from the fuse. I was concerned that this system would not be reliable, but it really grabs well on the brass tubing. The root fillets for the stabs were made by waxing up the fuse (still not painted) and mixing microballons with the body fill ("Icing", previously discussed.) until it reached the consistency of cake frosting. This mixture was spread onto the roots and pressed onto the fuse. The excess was scraped smooth with a radius guide to establish a nice blend. Once hardened, the fillets were finished to shape with 320 grit.

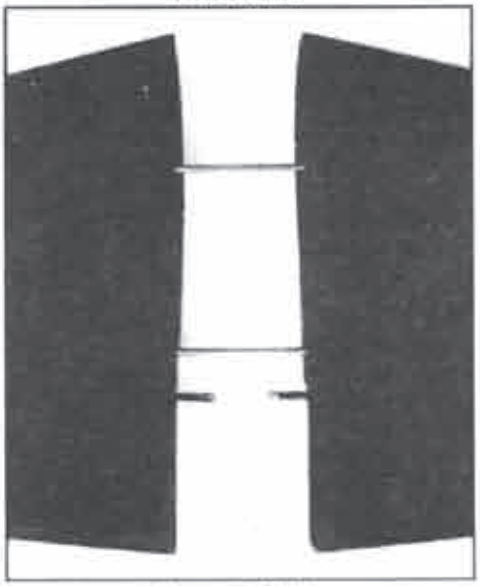
Dave built the vertical fin/rudder in the same manner as the stabs except that the cores were cut using SD8020 at 12.5% to match the three views and keep the scale look. I added a 3/4" high base to the bottom of the fin that was fitted with two 1/4-20 blind nuts. The vertical fin was then attached to the fuse using two 1/4-20 nylon screws accessed with a long screw driver from the bottom of the fuse. The three steering arms are secured onto the brass sleeve via set screws accessible through the open 3" tail cone on the back end of the fuselage. The elevator and rudder were oversized 10% over scale to enhance control. Both were controlled via music wire fed through antenna guide tubes which were glassed to the fuselage using 1" tape.

Now on to the wings.

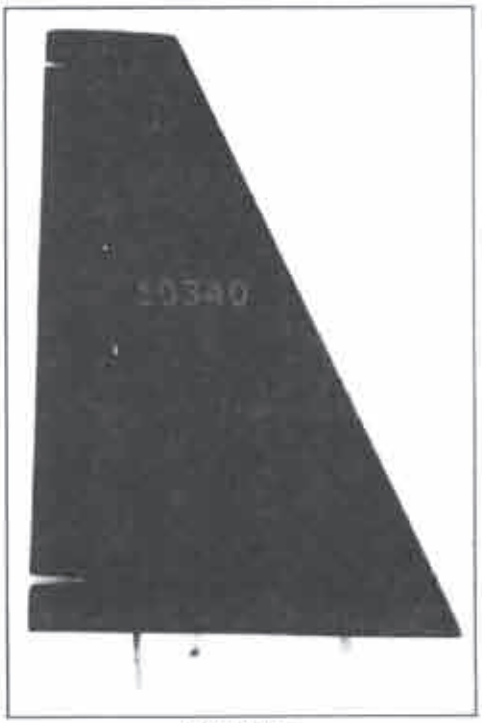
I changed the wing design to cut down on building time and improve the airfoil profile. The white foam planform blanks were cut and then had a full length wedge cut out of them from root to tip, centered over the spar area. This wedge was 3" wide at the root and 1" wide at the tip. A similar piece of Spyder foam was then cut to the same size and bonded to the white foam with 3M-77 spray. The blanks were the hot wired using conventional methods. This process produced light-weight cores that had high compressive strength over the thickest part of the airfoil just where it's needed. I used 3/16 lite ply for the root and sub-root (set in 4"), because the lite ply allowed itself to be flexed to match the curvature of the root where it takes a slight S bend along its 14.75" length along the fuse. Plans were to fit the spruce spar caps into the Spyder foam inserts, but I changed it at the last minute.



Nose Release



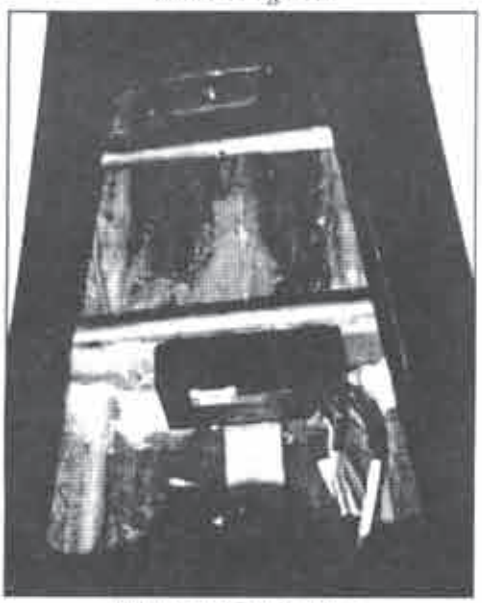
Horzontal Stabs



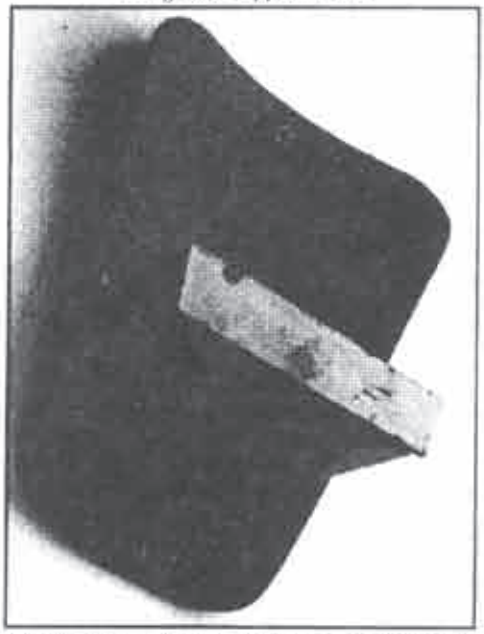
Vertical Fin

The change was to use 4 oz. glass that overlapped the Spyder Foam insert by 1/2" on each side. Extra plies of 4 oz. wrapped the root and sub root, top and bottom. I also used 3 oz. satin weave glass to

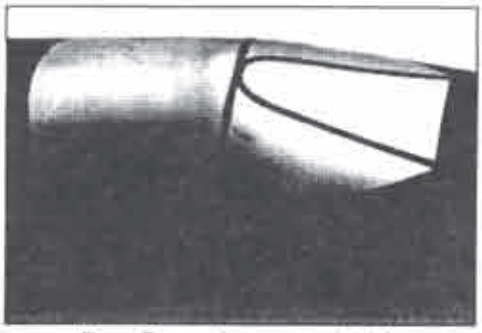
14.75" Wing Root



Wing Rod Support Tubes



Hatch, wing rod contact pad for landing loads.



Dave Garwood canopy paint job.

reinforce the flap and aileron areas. With all this reinforcement, there weren't too many areas of the core that weren't reinforced with glass. It would have been easier to just wrap the core full length with 4 oz. glass.

The cores with glass reinforcement were then sheeted and vacuum bagged. I used .035" poplar veneer, which did not work out well. I used poplar because the price was right, the widths were 12" and needed scarfing only at the root area. The problem was that I'm not a wood person and my building space (basement) had a relative humidity of 85%. This caused the grain to lift and, from there, it all went down hill. Especially when the wings were filled and allowed to dry outside the basement during a relatively hot, dry day. This got worse when that black paint sucked up the day's hot sun. I'm not knocking the veneer because others have used it with great results; it's just not for me, and my wet basement, and black wings...

I called Ed Slegers at Slegers International to get some basswood, custom cut for the leading edges and control surface caps. The caps had to cover a vertical height of 1" to cap the open foam faces near the root. It took a lot of 1/8" basswood to cap over the slot left by the 1/4 router bit, used to cut away the flaps and ailerons. The flaps had a max width of 3.5" at the root; the break with the ailerons was brought in 3" to improve roll control. Per scale, the flaps should have been 35" and the ailerons 24" in length. The flaps and ailerons were hinged with fabric film hinges using an unusual double bevel. The top surface bevel was only 1/32" in height and the remainder taken up by the bottom bevel. This allowed the hinge line to be positioned just under the top skin and made a nice detail.

Wing tip skids were made with .080" carbon fiber plates; 1/2" diameter dowels were cut on their length to match the full size units. The roots and sub-roots were then match drilled to fit up to the fuselage, using two 5/16" carbon fiber wing rods sheathed with brass tubing that butted up to the inside edge of the sub-root. This allowed the brass tube to remain centered between the sub-roots on each wing. The carbon fiber wing rods were 20" long, with brass sleeves 16.5" long centered on the carbon. The dihedral was set at 0° along the top surface of the wing, which gave a natural droop when at rest, similar to the full size.

The flaps were controlled by standard size Tower servos, while the ailerons used HiTec HS-81 servos. These are thinner than the HS-80s and have a tougher gear set. The two wing rods negated the need for an incident pin at the trailing edge. Brass tubes were fitted into the fuselage; the forward tube was strengthened by a 3/8" Rohacell bulkhead fitted above the tube and glassed over. The access to the fuselage was by a 3" by 5" hatch, under the wing area. A third mold was cast from the fuselage plug so that the hatch could be laid up separately from the fuselage. The lay up for the hatch was 3 oz. glass, 2 plies of .010" carbon fiber fabric, 5 oz. Kevlar cloth, and 3 oz. glass. The hatch was trimmed to match the access cut into the fuselage and fitted with a 3/8" partial bulkhead that would transmit landing loads onto the aft wing rod. The wings are held in place by their tight match drilled holes and tight fit to the wing rods. It took two persons to tug the wings away from the fuselage for disassembly.

The remaining steps involved mounting the servos for the nose release, rudder, and elevator. The rudder and elevator servos were mounted in the forward sections of the jet intakes and did present a challenge. The nose release servo was mounted on the centerline of the fuselage, just forward of the access hatch. The 1300 mAh battery was wrapped in duct tape and sheet lead, eventually mounting in the nose just aft of the nose release. The on/off control for the receiver was accomplished by using two 1/8" N/C stereo jack switches wired in parallel and located just under the right engine intake.

All up weight ended up just over 7 pounds, which was acceptable for the 1150 square inches on the HQ airfoil. The access hatch opens up to a large internal cavity in the fuselage, 7.5" across and 4" high; more than enough room to mount a point and shoot a 35mm camera; possibly a molded lexam hatch cover could be used to support the camera. For final finish, the plane was shot with Krylon Ultra Flat Black and rubbed down with steel wool. Dave helped out and shot the canopy outline with silver using an airbrush, which added a nice finishing touch.

Next month, we'll go over the molding of the fuselage halves under vacuum and hope to have some updates on the flying characteristics, as well as control surface deflections and center of gravity position.

'Til then. ■

Steve Wilcox' 19 lb. Glassair Falcon won Best Civilian. Joe Chovan photo.

Slope Scale A6M5 Zero makes a quick pass.

MAD Aircraft Me P-1111 foamie.

Chris Whynaught's EPP P-38 designed and built by Tom Ramirez.

Brian Laird's Spitfire from his own Slope Scale kit.

Slope Scale P-39 Airacobra in Reno colors.

ISR CAJON PASS SPRING POWER SLOPE SCALE FESTIVAL '99

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The 2nd Annual 1999 Cajon Pass Spring PSS Festival, held the weekend of May 22-23 at Cajon Summit in Southern California, was another stunning success for the Inland Slope Rebels club. With a turnout of 45 registered pilots and over 120 PSS models of every description and construction type, it was a visual feast for the hardcore PSS enthusiast.

Saturday's weather started off a little dicey, with thick fog rolling over the Cajon Summit site, but pushed by promising 15 to 20 MPH winds. Many of the fliers already present saw fit to test their luck in the fog with EPP airframes and the guys from the beach areas felt particularly at home.. It's not unusual to fly in the fog at coastal sites. How do you fly in thick fog? Well, fly along until the plane fuzzes out, then turn. When the aircraft pops back on your radar screen, fly along 'til it goes away again! It's a sort of test of your muscle memory for sure, but if you do it with indestructible planes it's pretty darn fun. As the day wore on, the fog began to break, and the winds picked up to around 25 MPH which brought the big fiberglass speed machines out to play. The ridge at Cajon is separated by the organizers into three zones; one for the fast, heavy planes, one for the average loaded slope ships and an area for Dynamic Soaring between these. With the three-zone system, accidental mid-airs are reduced to a minimum, and separate zones can be utilized for different flying disciplines ranging from speed runs to combat. All three zones are in close visual proximity and frequencies were controlled by a pin-board.

Sunday started off threatening a little precipitation, but it soon cleared into a beautiful blue sky with big, puffy cu's rolling overhead, and winds picking up to the usual Cajon standard. That's the beauty of this site - it's almost 100% reliable. Static judging for the awards was conducted on Sunday by the ISR's hand-picked panel of judges from various clubs. For the first time, an EPP model walked with two major trophies - Pilots' Choice and Best WWII going to Greg Matson's Durable Aircraft Models P-51D Mustang. Greg's model possessed many features including landing gear and propeller for static display, a radio actuated sliding canopy, machine gun sound effects and functional bomb/drop tank rails on the wings. Greg's model duplicated the best WWII winning entry at the EAA's last Oshkosh Fly-In, including the two-tone polished aluminum and silver painted areas of the full-scale aircraft.

Steve Wilcox took home the best civilian trophy for his giant, home brewed 1/3 scale Falcon - also an all-EPP model. These EPP airframes competed head- to-head with traditional 'crunchy' models which speaks to the level of finish that can now be achieved by modelers on EPP foam models. It's not just for combat anymore!

Best Prop was awarded to Carl Maas for his beautifully finished and weathered F6F Hellcat from the Slope Scale kit, and Best Jet was awarded to Brian Laird for his own-design Lockheed P-80 also sporting outstanding panel line and weathering details, as well as a clear canopy with detailed pilot figure gritting his teeth as Brian tortured him with high-G maneuvers. (Best Crash: Dennis Duncan - Me-110.)

Congratulations to the ISR crew for another outstanding event! Next year's is being planned now, so watch the pages of *RCSD* for the Inland Slope Rebels' announcement for the 2000 Spring PSS Festival, or check their website at <http//ourworld.compuserve.com/homepages/ISR/>. With the event now well established, you can be sure to see some spectacular models on the scene next year!

■

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ELMIRA '99

Non-stop action, with glider pilots lined up, sometimes 8 deep - 2 tugs going all the time.

Foreground shows a Piper Pawnee, with 1/3.5 Bruckmann Pawnee.

Pete George with 1/3.5 EMS DuoDiscus. Pete wowed the crowd with low level 4-point rolls, fast fly bys, and huge, graceful loops.

(L) View of the servo being slid into the servo rail in the fin. When the rudder is held in place, the servo works perfectly. A very neat way to install the rudder in such a way that one can easily get it out again, if necessary.

Tip

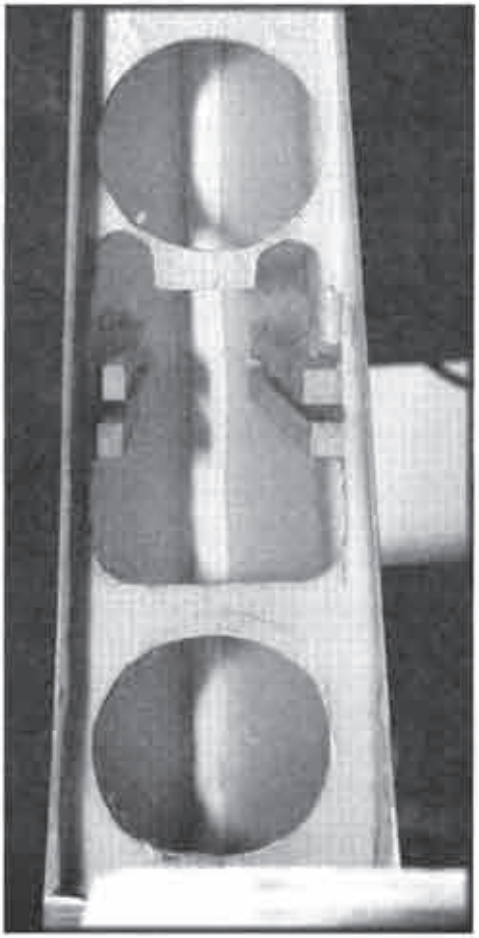
Bruckmann Fox Rudder Installation

from Steve Dentz

As you'll see, the servo and linkages are attached to the rudder prior to inserting the servo/tray assembly into the fin. There's no need to have the servo tray hard fastened, since the pins hold the rudder in place. There's no binding, and I get full throw in both directions. ■

(R) View of the rudder and the servo ready for installation. Very simple, but effective way to install the rudder servo!

(Right) View of the servo out of the fin, which is hooked up to the rudder.



View of rudder post with the servo rail glued into the fin.

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Exactly ten years ago this month, the very first article about airtowing appeared in *Model Aviation*. At that time, there were perhaps two or three very small groups airtowing in the USA. Certainly less than ten people were doing it! In 1989, airtowing was already extremely popular and growing in Germany and Switzerland while here in the USA, it was all but unknown.

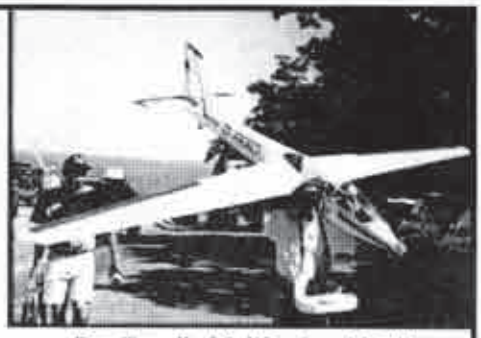
Happily, as you all know, airtowing is growing in leaps and bounds. Most folks have at least seen it done. Many new pilots will get hooked on it this summer. Soon, thanks to the many great events to be held this flying season, airtowing will be so common that we no longer will have to speak about it.

By the time you read this, Elmira will have come and gone. This is the one event where East meets West and beyond. Many new friendships will be forged. Many new sailplanes will have taken to the air. Hopefully, a great time will be shared by all!

Aerobatics is also alive and well. I know that several new addicts are out there practicing as I write this. No doubt they will be showing their stuff over the summer (and perhaps at Elmira). Sooner or later, like-minded stunt pilots will get together and have some fun!

We're nearing the end of our aerobatics discussions. We've only a few very choice stunts left to talk about. One of these is my old friend, the slow roll. This maneuver is one of the more difficult to do well. Some of you will have noticed that the slow roll is featured in the 1999-2000 German Akro-Cup, so I guess it's about time that we discuss it here and now, so fasten your seat belts once again and here we go...

A full-size Nimbus 4 lets off water ballast before landing at Elmira '99.



Dan Troxell of California, with 1/3 Bruckmann Fox treated the crowd to aerobatics. He and Eric Myers did a tandem duo aerobatic demonstration with two 1/3 Foxes. Eric also did a low level water ballast drop, which made the Fox look like a jet, what with the water streaming out!

ELMIRA '99

The weather was just about perfect, with light winds straight down the runway every day! Some 70 pilots from 21 states (quite a few from California), 3 Canadian provinces, Germany, Chile, and the UK came to fly and enjoy the excellent flying conditions this year.

With the exception of a couple of breaks in the flying to allow the full sized gliders to get airborne, there was non stop airtowing every day from morning into the late afternoon.

Brute force got most of the sailplanes to height in quick order, with some tows lasting under a minute! Most of the towplanes were non-scale Schleppers, with motors ranging from the Brison 3.2 (8-Ball Special) on up to the 6.4 Brison twin in the Pegasus and the 3w 80 in the Schlepper.

There were many excellent first flights over the weekend with two of the three scale winners getting airtowed for the first time. This year, the scale judging was done by three full scale pilots and Schweizer Aircraft employees.

- Pete DiStefano took the "Best Schweizer" award with his simulated all-metal scratch-built Schweizer 1-26.
- Alan Wasserman was awarded the "Best Modern" with his very nicely scaled out all Kestral 19.
- Gary Brokaw won "Best Vintage" with his well-known and well-flown giant, one-of-a-kind, scratch-built Austria Elephant, and "Best Overall" with his scratch-built Condor 2a.

All in all, I thought that this was the smoothest-running and most relaxed "Elmira" yet. Everyone got to fly just about as much as they wanted. I attribute this to the wonderful weather and to the many towpilots who were ready, willing and able to keep the lines of eager sailplane pilots moving all day long, every day. We all look forward to a better and equally relaxed Elmira 2000 next year. ■

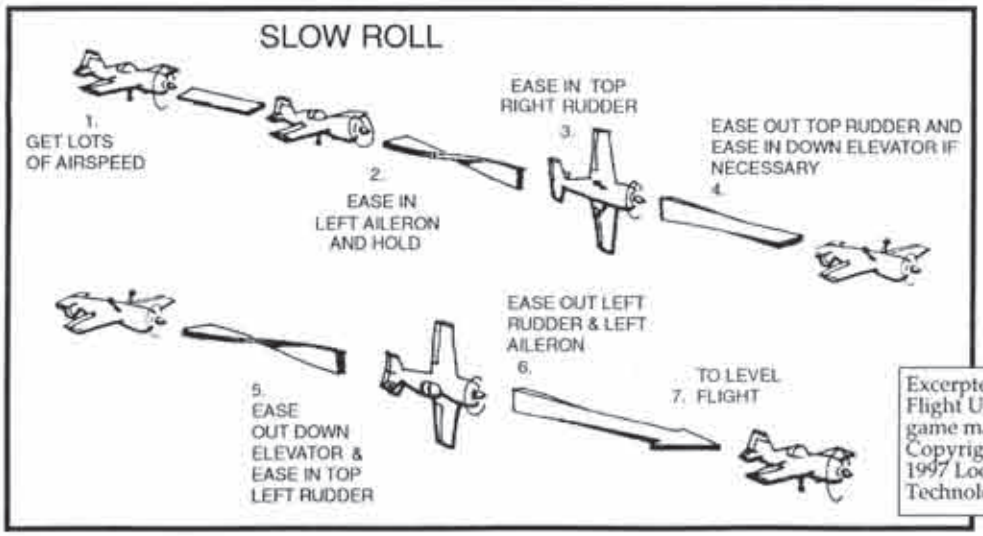
The Slow Roll

When you see a slow roll properly executed it looks smooth and easy to do, but the slow roll is perhaps the most difficult of the rolls to perform. The slower the roll rate, the harder it is to perform correctly.

The four-point roll makes abrupt transitions from 90°, 180°, 270° and back to level flight, while the slow roll does all of these same transitions, but in one fluid motion from start to finish. All of your inputs are the same as for the four point roll (we discussed in August of 1998), but the *difference* is that you add all your controls *smoothly* (meaning little by little).

A computer will help!

Incidentally, this is where the computer flight simulation



ABOUT GERASIS KITS

ASW 27 & ALL KITS

from Robin Lehman

It's very important to make very certain that the elevator pushrod is properly glued to the (inside of the) fuselage. Drill a hole in the rudder post and put some PFM (or similar) glue along where the elevator pushrod in installed in the fuselage. Make very certain that the front end (servo end) and rear end (elevator end) of the pushrod is firmly glued in place. The best glue for this job is PFM (sold by Hobby Lobby).

• • •

Ventus

from Hans Wiederkehr

"Please be advised that the installation for the retracting wheel should be beefed up with some ply bracing along the sides of the fuselage.

"The 6m Ventus needs two bulkheads installed forward and aft the landing gear. Do this carefully and only glue the bulkheads to the gear tray. Fixing these types of problems and figuring out the best way to install different components is half the fun. What a great time in Elmira, when is the next one??"

• • •

from Steve Ward

"There were 2 failures of the elevator pushrod in the Gerasis ASW-27 at Elmira - luckily, one of them was caught *before* towing, the other (mine) happened after the pre-flight check and resulted in a lost plane.

"The failure in my plane was either a failed glue joint or broken housing. I'd have never suspected a housing failure until I found out that was the failure on the other plane.

"My recommendation is to replace the factory installed pushrod and housing with something you know and trust.

"As for me, I think it's elevator servos in the tail from here on out - extra nose weight is a small price to pay for a more direct link to this critical surface."

• • •

from Richard Behrends

"Steve Ward and I had the elevator pushrod problem. My elevator housing actually had split in half. Only seconds before tow did I notice that. Can't emphasize enough the need to check over the integrity of the pushrods.

"Don't trust them. Steve Ward's suggestion is worth noting. Problem solved. I also noted a problem in respect to incidence. Two other pilots with the ASW27 confirmed what I had found. Check to see that the incidence of the stab as it relates to the wing is between 2 1/2 and 3 degrees neg. Mine came in at about 1 degree. It just won't fly well. Robin told me that the CG must be on the wing rod, and he is right. What a performer this model is."

• • •

from John Anhault

"I have removed the pushrods from my Gerasis ASW27. The pushrod housings themselves are not particularly brittle. However, they are brittle where they are attached to the fuselage. The glue used seems to be a cyanoacrylic type, as it is brittle and dissolves in nitromethane. I was able to remove all traces of the glue by placing a towel dampened with nitromethane (from engine fuel) over the spots for a few minutes. My guess is that "CA debonder" would work as well or better. CA seems to react with the plastic used and makes it brittle. Most builders will not want to bother with this clean-up. But, Gerasis may be able to solve the problem simply by switching to an epoxy, PFM, or something similar."

• • •

from HansPeter Keller

"In several of my gliders I am using the following procedure to secure the pushrods in a fuselage. This is not my idea but I adopted it and have not been disappointed so far.

"I inject insulating foam out of the spray-bottle (available at hardware stores) into the entire tail-boom of the fuselage. Not only does this method lock the push-rods in place for good, it also acts against vibrations and resulting fiberglass fatigue because the foam prevents the cross section of the fuselage from collapsing during hard landings and ground loops. There is basically no weight penalty. I prefer having longer pushrods instead of servos in the tail. I had two models with servos near the control surfaces, and both models displayed signal interference, which disappeared when I moved the servos to the front. Possibly the antenna location close to power cables may have caused this.

"My ASW 27 performs beautifully and I had no need to adjust the angle of attack with the CG at the proper location."

• • •

Further Comments

There are some problems with this Gerasis model which may also arise in some of his other ships.

1) The spoiler linkages have very LARGE Z-bends on the wing end which can push past the endpoint and jam the action of the wire. It was necessary to remove a flap servo to remedy this problem. Check before you seal your servos.
2) "Build a support system which transmits landing gear forces to the wing rod. I was able to use this as a mounting point for the spoiler servo."

–Alan Wasserman

■

program, *Flight Unlimited* (with the Dave Brown Flight Box), or *any other* computer R/C flight program, really comes into its own (the Great Planes *"Real Flight"* simulator is excellent). If you practice these more difficult maneuvers on a computer, where you're not afraid to crash, you will quickly learn how the sticks should move on your radio. As a result, when you try this with a real sailplane, you will already know how to move your fingers. That sure helps!

Tricks of the trade

If you are going to do hesitation rolls, slow rolls, or even if your fastest possible roll on your particular sailplane happens to be very slow, knowing where and how to put in top rudder (to keep the nose up) can be extremely helpful. Here are a couple of tips which, once learned, will help you know which way to steer with your rudder no matter how or in what direction your glider happens to be flying. The real trick with aerobatics is to know how to *control* the airplane without having to think too much. The more automatic your finger movements become, the easier this is.

What is "Top Rudder"?

Top rudder means that when the airplane is sideways on (in knife-edge position), the rudder acts like an elevator and can keep the nose up.

Top Rudder from inverted flight

Let's say you've been flying around INVERTED for awhile and you turn 90 degrees to knife-edge one way or the other with ailerons. How the heck do you know which way to steer with your rudder to help keep your nose up (to get top rudder)? It's simple: you steer the rudder stick in the same direction as with your ailerons. Now let's say you've been flying around inverted and you wish to roll 90° to the RIGHT. To get top rudder, you need to add RIGHT rudder.

So when inverted and you roll to the LEFT, you will need *left (aileron) and left* (top rudder). When rolling to the RIGHT, you need *right (aileron) and right* (top rudder). It's simple *left-left*; and *right-right*.

Top Rudder from right side up

The other little trick, which you may have already gotten from what you've read, is that when you are right side up, whenever you roll in one direction to knife edge, the top rudder control is always in the OPPOSITE direction (from the ailerons). For example, if you're flying around and roll RIGHT, your top rudder will always be to the LEFT. Roll LEFT (when right side up), the top rudder is RIGHT.

So when right side up it's: right (aileron) with left (rudder); and left (aileron) with right (rudder). And so we have: *right-left*; and *left-right*.

Fly without thinking!

If you can imprint these two little tricks on your flying brain, so that your fingers move automatically no matter which way your glider is pointed, you will always be able to safely input your top rudder (to keep the nose up) and *control* your airspeed during a slow roll or a hesitation roll.

When you're able to properly *control* your airspeed, you'll execute your maneuvers efficiently and, more importantly, safely.

On your first few practice sessions, and especially your first try with a roll, it's easiest to fly the maneuver flying away from you.

Making mistakes safely

As I've said many times over, fly one mistake high!

Also, buy, borrow or beg a little computer time from a friend who has a flight program that works with an R/C transmitter type radio box. If this option is not open to you, do some ground training.

Ground Training

Do you remember the first time you tried to fly R/C? If you were lucky, you had a friend who patiently showed you how to move the sticks on your radio to make your trainer fly where you wanted it to go. If you were *very* lucky, your teacher showed you what to do when the airplane was coming at you. He might have told you not to think "right" or "left" anymore, but to think "prop up the wing that's down". If you were very, very lucky, he gave you a bit of ground training until you could steer your bird when it was pointed at you. If you could do that, you could fly!

Anyway, somehow and somewhere you learned to fly. Now it's your turn to tear up the sky! A little ground training will help you overcome any hesitation you might have trying to think about how to input top rudder no matter which way your R/C bird is flying.

In order to gain familiarity with point rolls and slow rolls, have a friend hold your model right side up and tilt it sideways randomly one way and the other in every possible direction. Your job is to know whether the top rudder is right or left. Once you've mastered this skill, try the same exercise starting from the inverted position. Just a few minutes of this practice will gain you a lifetime of joy!

This sort of ground training is an invaluable tool. You can practice your aerobatics without any danger of crashing.

Once your flying fingers instinctively "know" which way to move the stick and you no longer have to think about which control you need to get your bird to do what you want, you will be well on your way to mastering aerobatics.

Rolls will be fun for you and much food for thought for a lifetime of flying! Others will enjoy watching you enjoy yourself!

Remember, practice makes perfect.

TOWLINES
Variations on a theme

Some of us are using towlines without flags at the glider end without bungee chords (to take the jerks out of the line), while others are using flags with and

Dan Troxell Reports

(He seems to be bitten bad by the aerobatics bug!)

"We have been blessed with 25 kts winds at Torrey, coming straight in, and the lift has been nuclear. My 1/3 Bruckmann Fox has been a stellar performer! As a novice akro pilot, I had a chance to practice knife-edge, humpty-bumps, Cuban eights, negative snaps, and four and eight point rolls. The Fox (and I assume the Swift, also) is like a sports car: it makes you a better driver.

"All I can say, if you've ever felt boredom creeping into soaring activities, you probably don't own or haven't flown a Fox! Having a nice standard or open class, or even vintage sailplane handy makes a real nice counterpoint to the intense akro flying, giving you the best of both worlds.

"I'd like to encourage you all to try your hand at even the beginning akro figures like the loop, the roll, the square loop, and those interesting four point rolls. You might wish to start with a "beater" sailplane in case the learning curve gets a little steep! If you have a short aspect ratio, it also makes it easier to do aerobatics. You'll also need plenty of aileron throw.

"The stunt routine I am working on is:

1- diving 1/2 roll into a push (outside loop)
2- inverted to negative snap and back to inverted
3- 360 degree knife-edge
4- Cuban-eight
5- humpty-bump with a quarter climbing roll into a push
6- finish with a four point roll and then the landing.

"I estimate it will take 2000 ft. of altitude to fly this routine.

"At Torrey I can string together the last three maneuvers from about 500 ft., but the first three really eat up the altitude so I put them first.

You would NOT BELIEVE Torrey Pines the last two weeks. It's like two 747s nosed into the beach below and left their jets running on high throttle. This weather pattern usually comes in March. This year it's just a month late."

Jim Blum Reports

...And on a related but different subject, from Jim Blum we have:

"I am pleasantly surprised how interested the general public is in full scale glider aerobatics. For a number of years I have attended a local airshow in Geneseo, NY, which mainly features WWII heavy metal (P51, P40, P38, AT6) as well as aerobatic flybys by F16's, F18's, etc.

"Every year they have had Oscar Bosch perform his aerobatic glider program. Oscar flys a mild but spectacular stunt routine (loops, chandelles, low pass, no inverted moves) using an ASW15. The crowd response is always enthusiastic and, in fact, the organizers told me he is their most popular act!

"I can only imagine the reaction if they saw a program performed by a professional stunt pilot flying an aerobatic glider (i.e., Manfred Radius with his Salto or Steve Coan in his Windex1200). The ASW15 while exceedingly graceful was never intended as an aerobatic glider. The fact that Bosch uses it as such, is testament to his flying skills.

"Most folks are not used to seeing gliders, full scale or models, do much other than float around. So it's always impressive when an accomplished pilot does a few nice aerobatic moves with his machine. I believe if there were more proficient pilots flying the "new" breed of aerobatic sailplane (Foxes and Swifts, etc.) we would see a lot more people getting into scale gliders. Aerobatics after all, is what a great many R/C power pilots enjoy, and sailplane aerobatics are perhaps even more challenging.

"While most of us true, long-term sailplane aficionados are attracted by the beauty of a graceful sailplane soaring in a thermal or efficiently working a ridge, many flyers of the power plane persuasion might prefer the speed and aerobatics that are possible with today's superb modern sailplane designs.

"Aerotowing makes it possible to attend scale and fun fly power plane events. A couple years ago John Derstine and I went to a long running scale event in Olean, NY. There were lots of interest in our gliders even though we certainly did not do any spectacular maneuvers. I did do one high speed low pass with my Krause Discus and people actually applauded! I can only imagine the reaction if I'd done a nice 8-point roll right on the deck as I have seen done by one accomplished German pilot (Theo Arnold).

"As you all know, sailplane aerobatics are challenging, beautiful and quite addicting. If more flyers saw this activity, I think we would increase our ranks. So this year, let's let our hair down a bit and show off our beautiful machines. Try to end your thermal flight with a little pizzazz!

"You might do something easy like a low, high speed pass into a Chandelle, or stall turn, or whatever. Try to do something besides setup and a square approach to a (good) landing.

"As a kid I remember hanging around at the full scale glider club in Dansville and seeing John Seymour (now a highly ranked, full scale, standard class pilot, ex Airforce fighter pilot, and full-time 747 pilot) who was 16 years old at the time, fly his father's Ka6-CR. All eyes were on John when he entered the landing pattern, because he usually would do a fast low pass followed by a stall turn or wing over. It was a nice change from the 100 conventional landings I had seen that day! Everyone enjoyed seeing it; in fact, it was the highlight of the day."

Jim usually does something interesting at the end of his flights. You can usually hear his glider coming. The oral aspect of sailplanes has been quite overlooked and I must say that I really enjoy hearing these birds fly! Jim rarely disappoints!

■

without bungee chords. While there now seem to be two different approaches to how towlines are constructed, we are all in agreement on the following:

- All of us are using towlines more or less 120 feet long.
- For up to 1/4 sized gliders, use 100 lb. test towline; use at least 200 lb. test line for larger sailplanes.
- We all have a "weak link" in the line – usually (but not always) at both ends. We *always* put a weak link at the glider end by means of a loop, which is inserted into the tow release in the sailplane. This loop is attached to the towline by means of a "snap".
- We all use some sort of "snap" tied to the towline at the glider end. This snap (normally used with heavy-duty fishing tackle) makes it very easy to hook the sailplane up to the towline. This is especially important when towing numbers of gliders. In that case, each glider should already have the loop attached to the tow release *before* coming to the flight line. After the tug lands, the glider is carried to the takeoff spot and hooked up to the towline (by means of the snap). This procedure takes but a few seconds (as opposed to sometimes fiddle, fiddle, fiddle while inserting the loop, if the glider is finicky about getting the tow release to accept the loop). It sure saves a lot of time to come to the flight line – and especially to the takeoff strip - with the loop already attached to the glider! We do this even on weekends when towing only two or three gliders. It's not only a matter of courtesy to others and to the towpilot (who lends his time and energy towards getting up airborne), but it saves a lot of time. Don't forget that the tug is on the field and the motor is running. Batteries and gas are being used up and this has important consequences: *less time for the tug to tow!*

In short, by spending the time to get the loop attached to the tow release in your glider before going out for a tow, you will be giving yourself more flying time! Now that ain't so bad, is it?

Towlines with Flag and Bungee

The flag serves two purposes: the flag shows you when the glider is flying way out of position on tow (too high or low, etc.); it also makes it easy to see when the glider is released at height.

If you do use a flag, the minus is that it flutters around and tangles the hookup loops on the snap at the end of the towline. The way around this is to attach a badminton bird (pointing forwards) just in front of the loop. The bird will keep the line tight and it won't tangle.

The bungee chord helps to dampen jerks on the line. We've also found that "stretchy" line does the same thing. If you are starting out, the bungee might be a good idea. The bungee chord (if used), should be attached to the towline some 20 feet behind the tug. It should be no closer to the tug because should a glider release while pulling on the line, the bungee chord might slingshot the towline into the propeller. We wouldn't want that!

Towlines without Flag or Bungee

The Germans and Swiss don't use either bungees or flags. Instead, they use a rather thick (1/4 inch or thicker) line which has at least three feet of stretch while at the same time being rather visible. This towline is very easy to make up. It has room for error with plenty of stretch. It's easily seen on the ground, doesn't tangle and has an added scale aesthetic value of not having the flag fluttering in front of the glider while on tow. While it's true that it's harder to see the line part company with the glider at 2,000 feet, if you're careful not to tell the towpilot that you're released until you're absolutely certain that the glider has let go of the towline, then this simpler towline might be the way to go.

Where to find towline

You can purchase a whole variety of towline at your local hardware store. Nylon is excellent because of its built in "stretchability". You can find surveyor's line in day glow colors, but this stuff is only good for the smaller sailplanes. Perhaps in time, colored 1/4 inch line will be locally available, but until that time comes, you can purchase made up colored towlines (imported from Germany) from myself at Sailplanes Unlimited, Ltd.

You Choose

Obviously, any combination of the above elements will do as long as the towline is roughly 120 feet long, and you use additional (breakaway) loops at either end. Use whatever works best for you!

■

HAVE SAILPLANE, WILL TRAVEL!

Tom H. Nagel
904 Neil Ave.
Columbus, OH 43215
tomnagel@iwaynet.net

This column is dedicated to soaring vacations.

Scattered around the planet there are a few hallowed places dedicated as shrines to the dream of soaring flight: the Otto Lilienthal Memorial in Berlin, Harris Hill and the Sailplane Museum, Kittyhawk North Carolina, the Wasserkuppe, and Joe Wurts' storage closet...

This is a story about one of those places.

Malvern, Ohio

A Slope Shrine

I pulled off a back road in rural Carrol County, Ohio, just past the farm house and cow pen. We didn't have any trouble finding the place; the back part of the farm had the kind of bowl-shaped slope that gives passing sailplane pilots whiplash from doing double-takes. We saw it from a mile away, and found our way back to the farm on township roads that wound through trailer parks and corn fields.

Phil opened the stock gate, and we parked the van next to some other cars, while a half dozen horses eyed us with suspicion from across the paddock. One of them was slobbering on a parked car, rubbing its face all over the hood.

There was a weathered sign board nailed to the corn crib, so I went over to read it.

FIELD RULES

1. All flyers must sign in and complete a waiver form. (Sounds reasonable; where do I sign up?)
2. First time flyers must have permission from an experienced flyer. (That's OK with me; I had an invitation from Clarence Hauck, one of the Newark guys.)
3. All flyers must wear helmets. (Say what?)
4. New flyers must use training wheels, recommended for all flyers. (Training wheels on a Zagi? What the hell???)

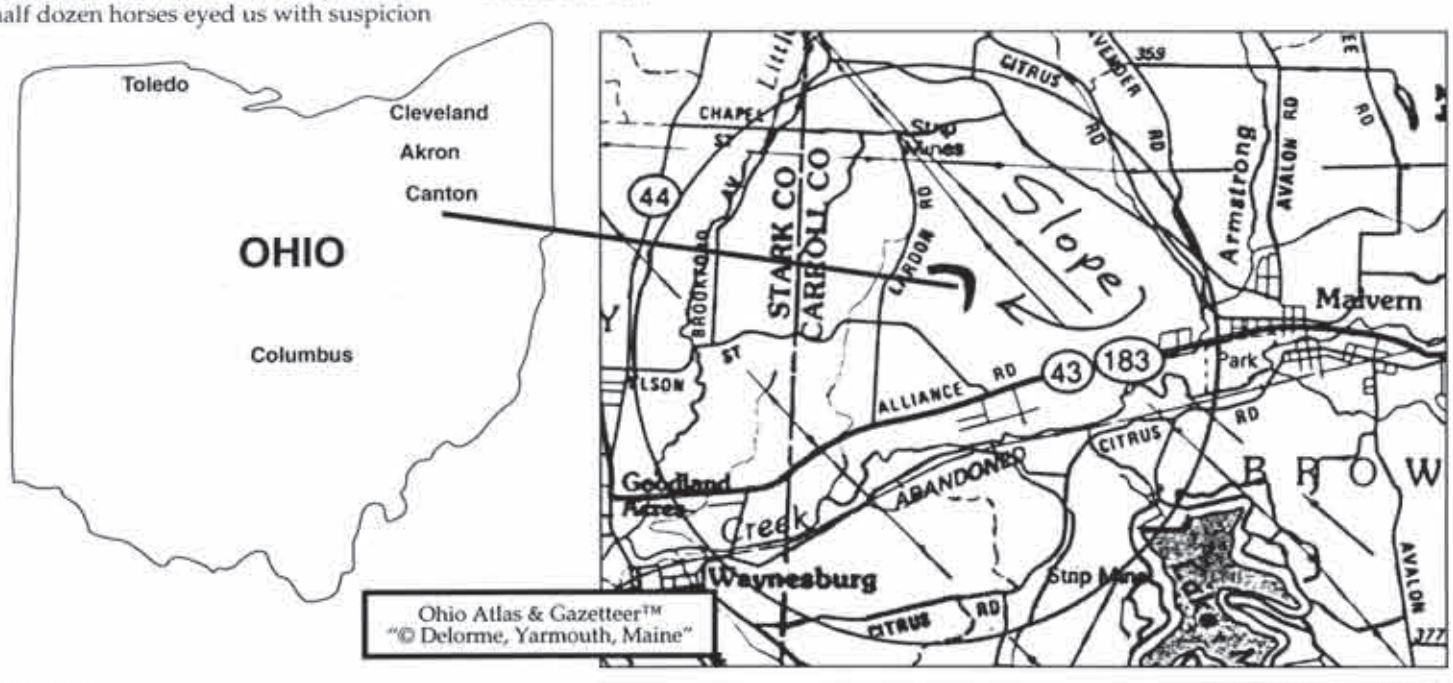
"Hey Tom," Phil yelled. "Did you know the guy who used to own this farm was into hang gliders?" The sign began to make a little more sense. We packed up our planes and started the long hike up the hill, getting ready to fly on a farm that belonged to people we had never met, people whose names I didn't even know. Clarence had said it was OK.

Malvern "Slope Shrine"
Photography by Phil Pepin

Half way up the hill, we met a couple of happy campers from Cleveland who were on their way back to their cars with wind blown hair, drained batteries and bugs in their teeth. We exchanged greetings, admired each other's planes, and pressed on up the cow path. (They have some pretty athletic cows in this part of Ohio.)

I thought I saw Clarence, at the top of the hill, but when we got there it was two more strangers, a couple of flyers from Ravenna, Ohio. It was their first time on this slope, too. It turned out that I had corresponded with one of them briefly on RCSE (radio control sailplane exchange), but we had never met. Clarence was down the ridge a little way taking a break.

We were on the left arm of an immense bowl-shaped grassy ridge that curved around almost a full 90 degrees. The wind was out of the southwest, but the bowl looked to be flyable on any wind direction from due west to due south and anything in between. We had climbed about 400 feet from the front gate of the farm, and were looking out over miles of flat Ohio farm-



Ohio Atlas & Gazetteer™
"© Delorme, Yarmouth, Maine"

land, autumn corn, newly plowed fields, and neat white farm houses. Currier and Ives with sailplanes. Time to get something in the air.

The wind had slacked off a little, so I started with my Zagi-THL and soon had it zooming all over the farm. The lift band seemed very smooth and deep. I tried to fly out of lift upwind, and couldn't do it. The Zagi got invisible first. I would dive a little, pull up into a half loop and fly back to the slope inverted, and then loop under and go out again. I let the guys from Ravenna try a little Zagi while they rested their Kestrel. Phil flew his Buzz Bat, a Harley Michaelis design from a few years go. It does really buzz, and Phil flys it like a bat out of Westerville.

When the wind picked up in mid-afternoon, Clarence unleashed his Sig Ninja, and I switched to a Zagi-LE. This was the best slope lift I had ever seen in Ohio, comparable to what I had seen at Sleeping Bear Dunes in Michigan earlier in the summer. But this time I had fully charged batteries, and grandma had been left at home.

The whole crew ran out of batteries and time around four p.m., just as a local thunderstorm began racing across the flatlands right at us. As we closed the stock gate behind the last car, the skies opened, washing the horse slobber off the hood of my Voyager.

It had been a remarkable day of slope flying for Ohio. And we owed it all to the late Dean Robertson, the former owner of the farm, who never flew a plane but who thought everyone ought to have a place to fly. It took me several months, a lot of phone calls, and another trip back to Malvern to sort out the details.

Dean Robertson, cow farmer, loved to watch planes fly. As early as the mid-1930's he had people flying home made primary gliders off the slope on the back end of his farm. Years later, when the power company wanted to run high tension lines across the front of the farm, Dean opposed it, on the grounds that the sailplanes had been there first, and he had the pictures to prove it. The power company ultimately had to bury the lines.

In later years, a hang gliding group from Cleveland would drive down to use Dean's hill. The fields out front are powerful thermal generators, and it was not unusual for hang glider pilots to do an hour or two off the slope. Dean would sit on the porch and watch, or sometimes drive his golf cart up to the top of the hill and watch from there. The faded old sign on the corn crib dates from those days. Hang glider activity has tapered off in recent years after the leader of the Cleveland group, Mike DelSignore, was killed in an accident at another field. On one of Mike's last trips to Malvern, he led a group of hang glider pilots who cleared brush off the slope for Dean.

Reed Miller and friends in the sailplane club from northeastern Ohio began to fly RC sailplanes on the slope years ago. Dean welcomed RC sailplane pilots to his farm, just as he had the primary gliders and the hang glider club. Then one day, Dean was seriously injured in a farm accident. About a year later, he died of those injuries. Before he passed away he elicited a promise from his wife that sailplane flyers would be allowed to use the hill as long as the farm remained in the family.

Today, Mary Robertson still lives on the farm, and although she has been fighting some health battles, too, her family expects that she will be OK.

Dean's daughter and son in law, Deanna and Dave McMaken, still run the family farm. They have just gotten their certification as an organic farming operation, and they sell freezer beef, as well. Deanna and Dave, following in the family tradition, welcome flyers on their hill.

If you want to fly at Malvern, here are the details:

- The Robertson Family Farm is located in the northwest corner of Carroll County, Ohio near the little town of Malvern. On a map, look about 20 miles southeast of Canton, Ohio, not very far off Interstate 77. Take Langdon Road or Largo Road north off of Ohio Rt. 43 and drive up to the farm house sitting at the base of the biggest slope bowl in the state. The address is 7055 Largo Road, Malvern, OH 44644.
- Park by the corn crib in the horse pasture. Please don't drive vehicles up the hill. Play nice, share your toys, pick up your trash and remember to shut the gate behind you.

Thanks to:

Reed Miller, Clarence Hauck, Jim Carlton and Don Harris for background information, Phil Pepin for photos, and the friends and family of Dean Robertson

Map: copyright DeLorme Mapping Co, used by permission.

Other Area Attractions:

The Football Hall of Fame, Canton, OH

The Hoover Vacuum Cleaner Museum, at the Hoover Historical Center, North Canton, Ohio (Thought to be the world's only collection of historical vacuum cleaners.) ■

"The Original Malvern"

Graham Woods, of Herts, England writes that the original Malvern is in the counties of Hereford and Worcester, England and that strangely enough the original Malvern is also a hotbed of slope soaring. Malvern, England was the site of the F3J World Championships in 1998. It boasts a nine mile long razor-back, east and west facing ridge, with its highest point reaching almost 1400 feet.

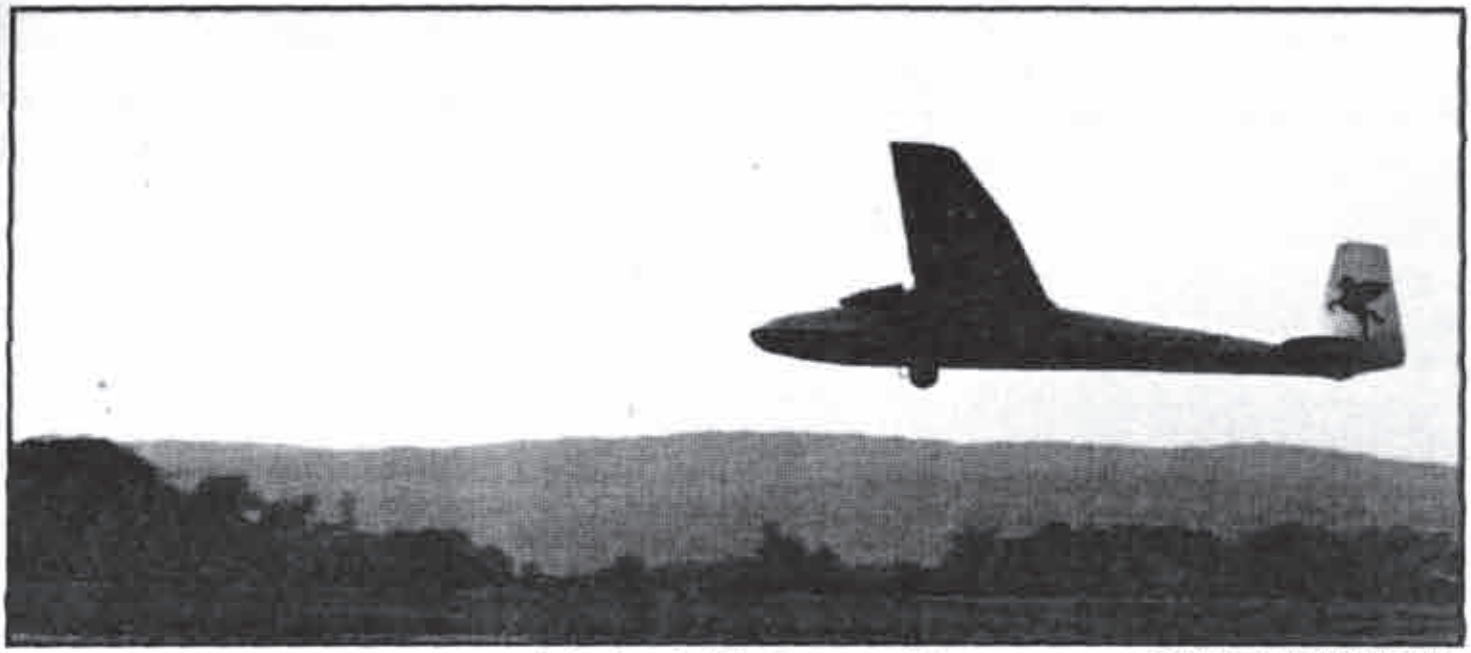
The name Malvern derives from the Celtic "moel bryn" which means "bare hill," which was recognized as a good thing for slope flying apparently as far back as the reign of Edward the First (reigned 1272-1307). King Edward I (who was known to his buddies as "Number One") granted the Earl of Gloucester control of an administrative entity known as Malvern Chase. This is believed to have been a medieval form of slope racing.

The original Malvern Hills were formed by the glaciers of the Pleistocene Epoch moving from the west and depositing extensive amounts of unstratified drift throughout the area. All of this occurred shortly before Chuck Anderson began experimenting with winglets. Unfortunately, slope planes constructed of Pleistocene proved unsuitable, and flying at Malvern became extinct until the modern era. Accordingly, the folks of the Malvern District had to make do with the entertainment provided by such locals as Elizabeth Barrett Browning, George Bernard Shaw and Sir Edward Elgar.

If your wife asks how come you waste your time reading sailplane magazines, you are now entitled to tell her you were actually reading up on Sir Edward Elgar, George Bernard Shaw and Elizabeth Barrett Browning.

Many thanks to Graham Woods for providing this historical and international perspective on sloping at Malvern.

■



Dave Garwood's DAW Ka-6E, flown by Dave Jones.

U-2 at Elmira '99.

ELMIRA 1999
The Year of the Foamies
Unveiling the U-2

By Steve Savoie
Bennington, Vermont
Photography by Dave Garwood

The recent passing of June marked the success of yet another Aerotow event at Elmira, N.Y. This year's event built upon the success of its three predecessors, as well as the hard work of John Derstine, and the L/D Club of Harris Hill, with support from the Eastern Soaring League. Fine weather and an abundant number of tugs kept pilots in the air with only a small wait on the queue (waiting line as our friends across the pond say).

The Year of the Foamies

This was the year of the foamies. Dave Sanders and a host of others unveiled 3 EPP Ka6Es fitted with nose releases, landing gear, flaps, etc. These all EPP aircraft are Dave's entry into aerotow. At 3m (117"), sporting a modified E205 airfoil blend and weighing 85 - 90 oz., these three beauties took to airtow quite well and, upon release, enjoyed respectable flights. From below they looked as equals to their expensive European counterparts, though lacking the speed and detailing. These three little gems flew without incident, though not testing the durability of EPP foam. I have personally flown several DAW combat slope planes, and they are very durable. Days after Elmira, the Ka6Es were clipping the dune grass on the slopes of Cape Cod, MA.

Unveiling the U-2

My 1/12 scale Lockheed U-2 (actually TR-1) was unveiled at Elmira this year. It did grab a lot of attention on the flight line and even more so during its two flights, although not quite the way I had hoped for... The plane was finished at 10:30 p.m. the night before the event took place; thus it was not tested prior to the first flight.

On its first aerotow, it faulted upon release from the tug because of pitch instability, due to misplaced center of gravity. The plane was located 1 hour later, one half mile from the field, 35' up in an oak tree; it was retrieved with the help of Mike Lachowski and the ESL 50' lineman's pole. (Thanks again, Mike!) The plane suffered 2 stripped aileron servos due to the tree retrieval. The CG was later relocated, servos were rebuilt, and the U-2 was ready to fly again the next day.

The second flight was precluded with an uneventful hand toss. That done, the next step was to do a bunny hop (released at 15' altitude to test pitch control). This flight was just as eventful as the first. The pitch control was still a problem; one wing tip hooked the ground and looped the black beast 15' off the grass; it landed on its back. This resulted in a stripped aileron servo and a cracked carbon fiber wing rod.

The final result of the flight tests was the need to reinforce the crash survivability of the air frame, and properly prove a new design under more controlled conditions. I also learned that no matter what the formulas say, if the CG doesn't look right, don't trust the math. Enough said about that!

Terry Luckenbach's 3m ASW 20

One of the most interesting planes did not easily catch the eye. It blended in well with the mix of modern glass slippers in the 3 meter range. I'm speaking of Terry Luckenbach's 3m ASW 20. The beauty of this plane is on the inside as much as the outside. This plane is well designed with a very light structure (It weighs only 6 pounds!). The wing is a three piece design with a center bolt down section, and its strength comes from prepreg carbon fiber skins, which were cured in separate top and bottom skin molds, then bonded to a traditional foam core. This wing would make any competition T.D. pilot drool. The other half of the story is the fuselage, which was molded in traditional molds made by Terry, fitted with an extremely efficient internal grid structure surrounded by glass/Kevlar skins. The enclosed pictures show the vertical shear stiffener as well as the cross members which run the entire length of the fuselage and cross brace the cockpit area.

This grid structure was fitted with lightening holes and capped with carbon fiber strips; it consists of light weight plywood skins over a thin foam core. I found this plane to be designed and built exceedingly well, one of the most interesting planes at the event; it just wasn't very noticeable until it was either disassembled, or lifted in order to appreciate its light weight.

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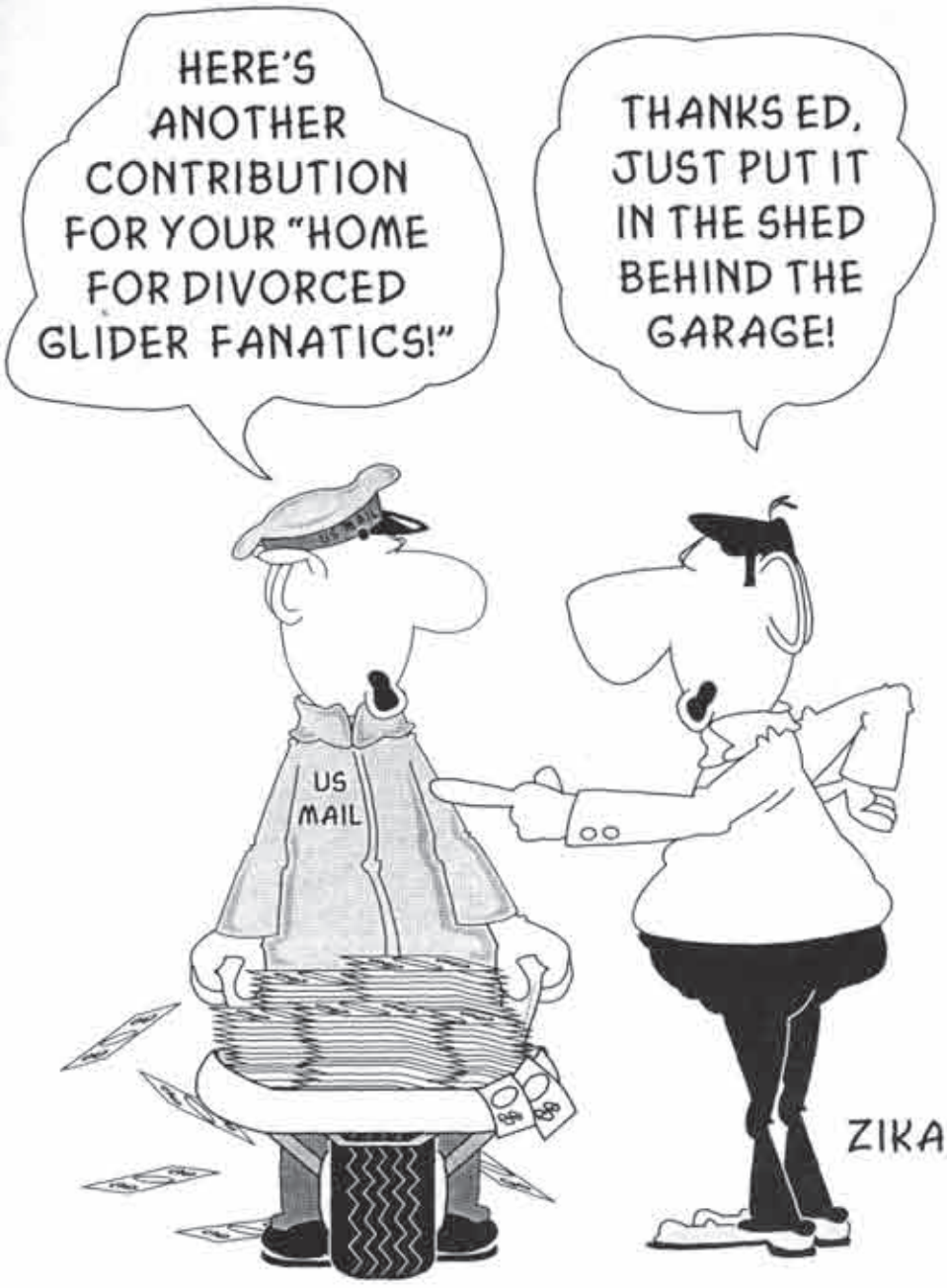
Terry Luckenbach's 3m ASW 20. U-2 in background. Savoie Photos.



NEW PRODUCTS

The information in this column has been derived from manufacturers press releases or other material submitted by a manufacturer about their product. The appearance of any product in this column does not constitute an endorsement of the product by the R/C Soaring Digest.

DISCUS 2a
...from Sailplanes Unlimited, Ltd.

Roedelmodell 1/3.75 Discus 2a comes with a beautiful white epoxy-glass fuselage with wing fairings molded in and location holes drilled for the wing rods. The rudderpost is built in and the balsa/foam rudder is completely finished. Obechi/foam stab is finished and the elevator is cut out and capped. Obechi/foam wings are finished with ailerons cut out and capped and wingrod location holes are in place. The all glass polyhedral plug-in wingtips are finished and ready for installation. This very complete "kit" comes with canopy, canopy tray, accessory pack, decals, spoilers, retract gear and English building instructions.

Like its full-scale sister ship, with its state-of-the-art polyhedral wingtips, this Discus 2a is one of the most responsive and excellent flying scale sailplanes in its class. With its E-207 airfoil, this Discus will thermal with the best of them, has a wide speed envelope and can fly some aerobatic maneuvers, as well. It's very easy to fly; suitable for slope, winch and airtow.

Sailplanes Unlimited, Ltd., 63 East 82nd Street, NYC, NY 10028, (212) 879-1634, <www.sailplanes.com>. ■

SCHEDULE OF SPECIAL EVENTS

August 7-8

MVSF — Princeton, NJ
Bill Miller, jerseybill@worldnet.att.net
609-585-6779

August 14-15

CRRC Open — Boston, MA
Fritz Bien, fritz@spectral.com
(508) 369-1720

August 14-15

DARTS Man-on-Man Challenge, OVSS#5 — Yellow Springs, OH
Bob Massmann, rmassmann@in-touch.net
(937) 382-4612

August 19-21

GNATS Aerotow '99 — Ontario, Canada
Phil Landray, (905) 468-3923,
linden@niagara.com
Gerry Knight, (905) 934-7451
Lou Kleiman, (905) 688-4092,
mistral@niagara.com

August 21-22

Blanco II, The Pilgrimage — Cape Blanco, OR
Mike Shaw, (541) 269-2423
grizzy2@gte.net

August 21-22

BASS Open — Frederick, MD
Jack Cash, jcashjr@cyberun.net
(301) 898-3297

August 21-22

Mid-American Championships — Lexington, KY
Bluegrass Soaring Society, OVSS#6
Buzz Bruszewski, 76722.3421@compuserve.com
(606) 382-4612

August 28-29

SKSS Open — Newark, DE
John Kirchstein, kirchste@voicenet.com
(302) 731-2831

September 4-5

LOFT/OVSS Fall Round Up (2M, Uni, RES) — Muncie, IN
Marc Gellart, isoar2@wcoil.com
(419) 229-3384

September 6

DARTS Aerotow Fly-In — Muncie, IN
Paul Siegel, (513) 561-6872
psiegel@fuse.net

September 11-12

CASA Open — D.C.
Steve Lorentz, lorentz@fred.net

September 18-19

LISF-2M — Long Island, NY
Gordon Stratton, (718) 847-8299

September 25-26

ESL End of Season — Reading, PA
T. Kiesling/J. Glaab, kiesling@ctc.com
(814) 255-7418

September 18-19

CAF's 2M & Unlimited — Tullahoma, TN
Herb Rindfleisch (Sat.), herb@cafes.net
(931) 455-1836
Chuck Anderson (Sun.), canders@edge.net
(931) 455-1836

October 1-3

Great Midwest Oc-TOW-berfest — St. Louis, MO
Scale Aerotow
Pete George, (314) 664-6613
twometer@worldnet.att.net

October 9

NASF Unlimited — Huntsville, AL
Lars Ericsson, lars_ericsson@atk.com
((256) 859-0255

June 23-25, 2000

MSSC 2000 — Louisville, KY
Ed Wilson, (502) 239-3150
ewilson1@bellsouth.net

For detailed information on events outside of the U.S.A., please view www.sailplanes.com event schedule.

MARKET PLACE LISTINGS

VACUUM FORMED PRODUCTS, CANOPIES
Viking Models, U.S.A.
2 Broadmoor Way
Wylie, TX 75098
(972) 442-3910 • fax (972) 442-5258
RCSDigest@aol.com

DATE CHANGE!!

4TH ANNUAL

G.N.A.T.S. AEROTOW '99

"Come fly with us in Canada's beautiful Niagara Wine Country!"

August 19 - 21, 1999

To be held near Winger, Ontario, Canada
(Approx. 30 Miles West of Buffalo/Ft. Erie)

Co-sponsor: Canadian Model Aerotow Society

Emphasis will be on fun and aerotowing. Tow planes and experienced pilots will be available to tow you to altitude. Bring your 3 meter (118") or larger sailplanes, fitted w/ ailerons and tow release, and join the fast growing aerotow movement. Scale Motorgliders will be welcome at this event as will non-scale large sailplanes fitted with tow releases.

Pilots' choice awards include Vintage & Modern sailplanes, and tugs. Proof of 1999 MAAC or AMA membership is required, along with gold sticker radios. Meals and accommodation are available nearby in Dunnville. Registration fee: $12 ($10 US).

For information package & map contact:

Phil Landray, (905) 468-3923
Linden@niagara.com
Gerry Knight, (905) 934-7451
Lou Kleiman, (905) 688-4092
Mistral@niagara.com

ZIKA

Hobby Shops that Carry RCSD

Gunnings Hobbies
550 San Anselmo Ave.
San Anselmo, CA 94960
(415) 454-3087

Gyro Hobbies
23052 Lake Forrest Dr.
Unit C2
Laguna Hills, CA
(714) 583-1775

Gyro Hobbies 2
17431 Brookhurst Unit H
Fountain Valley, CA 92708
(714) 378-8924

Hobbies"N Stuff
9577-L Osuna Rd. NE
Albuquerque, NM 87111
(505) 293-1217

Hobby Town U.S.A.
8060 S. 84th St.
La Vista, NE 68128
(402) 597-1888

Hobby Warehouse
4105 South Street
Lakewood, CA 90712
(562) 531-8383

King R/C
Five Forks Village
King, NC 27021

Tim's Bike & Hobby
2507 Broadway
Everett, WA 98201
(206) 259-0912

Closet Scale Stuff
At Sailplanes Unlimited. Ltd.

1/3 Pribek ASW 27 - 5 meter span (196"), wing profile HQ 2.5/12, ca. 20 lbs.

1/4.2 FiberClassics Nimbus 4 - 6.28 meter span (246"), wing profile E 68-66, ca. 18 lbs.

1/3.6 Roedelmodell DG 800 - 4.15 meter span (163"), wing profile E 207, ca. 11 lbs.

1/3.75 Roedelmodell Fox MDM-1 - 3.8 meter span (149"), wing profile RG 12, ca. 15 lbs.

1/2.77 PriBek ASW 19 - 5.4 meter span (212"), wing profile Ritz 3 mod., ca. 20 lbs.

Please call for additional info: (212) 879-1634.

Classified Advertising Policy

Classified ads are free of charge to subscribers provided the ad is personal in nature and does not refer to a business enterprise. Classified ads that refer to a business enterprise are charged $5.00 per month and are limited to a maximum of 40 words. The deadline for receiving advertising material is the 15th day of the month. (Example: If you wish to place an ad in the March issue, it must be received by February 15.) *RCSD* has neither the facilities or the staff to investigate advertising claims. However, please notify *RCSD* if any misrepresentation occurs. Market Place Listings are $5 a month. Personal ads are run for one month and are then deleted automatically. However, if you have items that might be hard to sell, you may run the ad for two months consecutively.

For Sale - Business

PC-Soar Version 3.7 Sailplane Performance Evaluation Program with Airfoil and Sailplane Library expanded to 60 models including Chrysalis, Anthem, Genesis, Peregrine, Probe, Thermal Eagle, and Spectrum. Airfoil library includes 322 polars with 56 UIUC polars. PC-Soar with Libraries of Sailplanes and Airfoil Polars plus a new Excel utility for working with multi taper wing areas and aerodynamic centers. Reduced Cost: $50 + $3 P&H. PC-Soar library and software Upgrade to Ver. 3.7: $10 + $3 P&H. LJM Associates, 1300 Bay Ridge Rd., Appleton, WI 54915; ph: (920) 731-4848 after 5:30 p.m. weekdays or on weekends. E-mail: lmurray@athenet.net. PC-Soar Web Page: <http://www.athenet.net/~atkron95/pcsoar.htm>.

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

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

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

Custom Cut FOAM WING CORES. White, pink, blue, and Spyder foam available; most airfoils available. Send copy of drawing for quote. Viking Models, U.S.A., 2 Broadmoor Way, Wylie, TX 75098; (972) 442-3910, fax (972) 442-5258.

For Sale - Personal

1/4 Roedel Super Cub (towplane), 2.687 meter span, wing profile Clark Y mod. (suitable motors are 160 T, 300 T, OS BGX-1, Brison 3.2 or similar), NIB... $385.00. Contact Robin Lehman, 63 E. 82nd St., New York, NY 10028; (212) 879-1634.

Synergy 91 w/servos in wings... $420.00; Oden 135" span, battery & all servos, test flown only, red/white/blue, RTF... $650.00; Glasflugel Mosquito 1/4 scale, scratch built w/all servos (8) & battery, set up for aerotowing, wonderful flyer... $950.00; Giant Stinger tow plane, 2 piece wing extended to 96", 3W60 eng, excellent for towing w/all servos, ready to go... $1200.00. Add shipping to all the above. Dale King, (972) 475-8093, Texas.

ASK 18, 5.3m, very nice, w/serrvos... $1695.00; Krause 1/3 scale Salto, excellent condition, w/ servos... $1495.00; EMS Minimoa, white/beige beauty, w/servos... $1995.00. Dan Troxell, (949) 831-8013, So. California.

Please send in your scheduled events as they become available!

R/C Soaring Resources

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

Contacts & Soaring Groups - U.S.A.

Alabama - North Alabama Silent Flyers (NASF), Ron Swinehart, (256) 722-4311, <ron.swinehart @lmco.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 Rood, (904) 432-3743.

Arizona - Aerotowing, slope sites 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>.

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Summary of Low-Speed Airfoil Data - Volume 3 is really two volumes in one book. Michael Selig and his students couldn't complete the book on series 3 before series 4 was well along, so decided to combine the two series in a single volume of 444 pages. This issue contains much that is new and interesting. The wind tunnel has been improved significantly and pitching moment measurement was added to its capability. 37 airfoils were tested. Many had multiple tests with flaps or turbulation of various configurations. All now have the tested pitching moment data included. Vol 3 is available for $35. Shipping in the USA add $6 for the postage and packaging costs. The international postal surcharge is $8 for surface mail to anywhere, air mail to Europe $20, Asia/Africa $25, and the Pacific Rim $27. Volumes 1 (1995) and 2 (1996) are also available, as are computer disks containing the tabulated data from each test series. For more information contact: SoarTech, Herk Stokely, 1504 N. Horseshoe Circle, Virginia Beach, VA 23451 U.S.A., phone (757) 428-8064, e-mail <herkstok@aol.com>.

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

The wings are made in America by Ron Vann, owner of Spectrum Enterprises. Ron is also an avid competition flier, and is considered to be one of the best wing manufacturers in the industry. Taking his years of experience in manufacturing wings, Ron has produced wings and stabs for the Condor that we feel are world class. Starting with the spar that Mark Allen designed, Ron uses only the best and most accurately cut foam cores available. He then uses hand-picked obechi from Kennedy Composites, which is applied with West Systems epoxy.

CONDOR

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This is after he has first reinforced the wing with carbon fiber and fiberglass. The servo wells are routed out, as are the flaps and ailerons. What this means for the sailplane enthusiast is a minimum amount of work before getting the sailplane into the air. The wing is light but strong enough to take "pedal to the metal" launches. Also available as an option is Ron's unique internal capped hingeline. This means even less work for the modeler.

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

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

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