February, 1999
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R/C SOARING DIGEST

Radio controlled

THE JOURNAL FOR R/C SOARING ENTHUSIASTS

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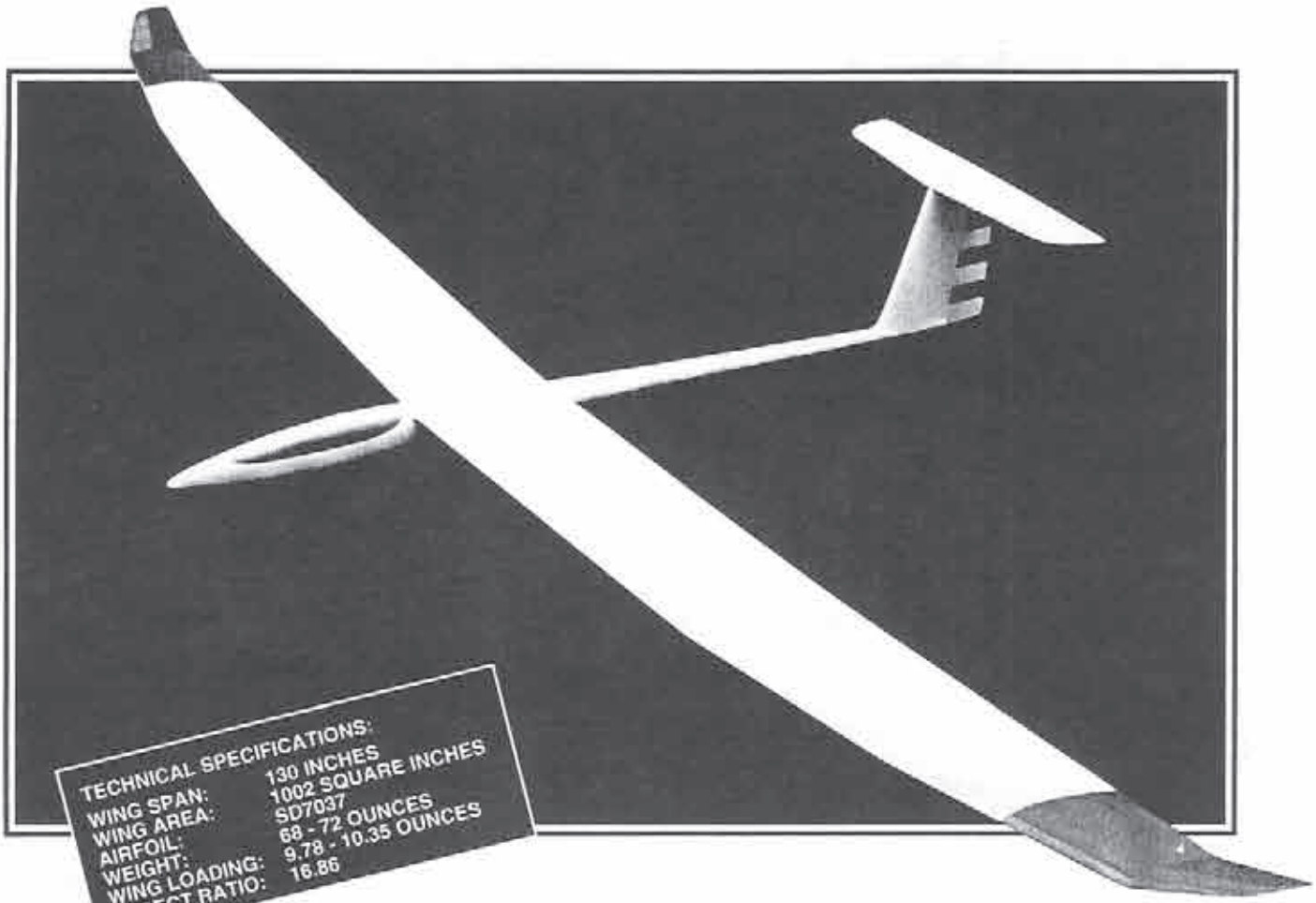

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MORNINGSIDE FLIGHT PARK A GREAT PLACE TO SLOPE!

Rich Loud's BOB at Morningside Flight Park, North Charlestown, New Hampshire. The Morningside travel saga is written by Jim Davis of New Hampshire for Tom Nagel's "Have Sailplane Will Travel!" column.

Photography by Dave Garwood, Scotia, New York.

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

RCSD ON THE WEB!

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

Subscription Information
Highlights & Mailing Status of the Current Issue
RCSD Feature Columnists, Reporters, and Editors
..... E-mail/web addresses, plus general information about their areas of interest.
"Building Along" Construction Aids
..... **1/5 Scale Pilatus B-4** ..... Jerry Slates
..... **1/12 Scale U-2R/TR-1** ..... Coming Soon
Links to Clubs & Organizations

Hot Topics

New This Month
RES - Where Are We Headed? by Bob Johnson

Event Coverage (Color Photography!)

New This Month
First Annual Montague Cross Country Challenge, by W. Stewart Tittle

"In the News" - A compilation of news items of interest to soaring enthusiasts.
On-Line Articles - Great articles originally written for the printed version of *RCSD*.
Bookshelf Listings - A listing of recently published books of interest to aeromodelers.
Complete RCSD Index, 1984-1998

The Soaring Site

About the New, On-line Articles

This last month, we added 2 new articles to the *RCSD* web site. The first article, written by W. Stewart Tittle of Klamath Falls, Oregon, covers the First Annual Montague Cross Country Challenge, which took place at the Siskiyou County Airport, Montague, California. It also sets the stage for the upcoming, second annual cross country event. For those of you not into e-mail, additional information can be obtained by calling Dean, Scott, or Randy at (541) 899-8215 (days) or Dean at (541) 899-7034 (evenings).

The second article is a rules proposal by Bob Johnson; a complete copy of the proposal is also included in this issue, excluding the photos, which are only on-line. It's a "Hot Topic", and Bob's looking forward to lotsa feedback!

TULSOAR's Tulsa Tow

TULSOAR's Inaugural Tulsa Tow was held last October, 1998. D.O. Darnell says it was so much fun that they plan to host *two* events in 1999. If you'd like more details on the 1998 and upcoming 1999 events, coverage can be viewed at the TULSOAR web site: <http://www.mccserv.com/tulsoar>.

Address Change

The mailing address and telephone numbers for Hobby Club changed this last month. The new information is included in their ad.

B^2 Streamlines

They're at it, again! Our own B^2, who do all the web site work for *RCSD*, have expanded their book offerings. In addition to the specialty books they offer aviation modelers, they now offer pre-read aviation books. You'll find their used book listings on the B^2 web site at: <http://www.halcyon.com/bsquared>.

Happy Flying!
Judy & Jerry Slates

Jer's Workbench

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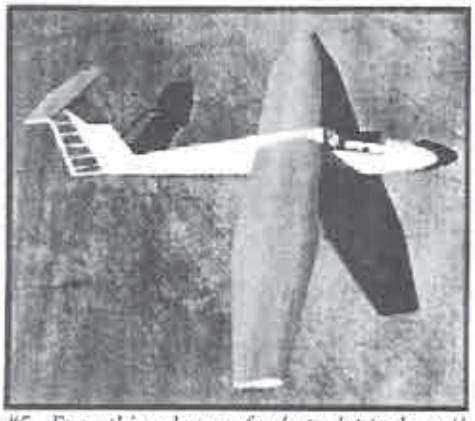


#5 - Everything done so far, but a lot to do, yet!

Pilatus B-4, Part V

Since last month, all the strip planking on the Pilatus B-4 has been completed. Once done, it was time to commence sanding.

100% of the sanding was done using sanding blocks and sticks as shown in photo #1. Hand held sandpaper was not used, because I felt more in control using the blocks and sticks. One of the pitfalls in using the paper is that I could accidentally sand a flat spot into the fuselage, before realizing it had been done.

Before commencing the sanding process, however, I did study the fuselage, visualizing how it would look when the sanding was complete. After sanding for about 20 minutes, I stopped to study the fuselage, again. "Oh, no," I thought, "The nice, clean lines were disappearing!" The fuselage was starting to look real bad... "What had I done?"

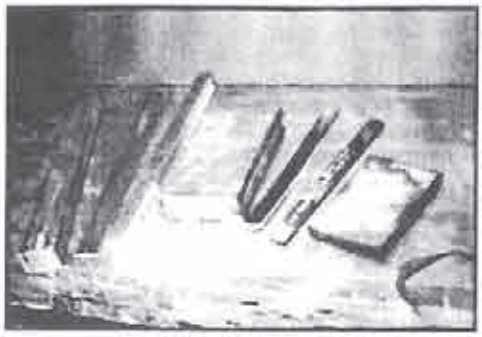
"Oh, well, Jer," I mumbled to myself. "Keep sanding." After sanding for about an hour, the clean lines began to reappear, thank goodness, as I stopped to study the fuselage, again. It was time to fill in the pin holes, dents, and voids. When done, the filler was allowed to dry, and sanding was resumed...

Having completed about a gazillion hours worth of sanding, I figured it time to work on the wing roots. (See photo #2.) The scrap box yielded enough 3/8" scrap balsa wood to meet my needs. These were cut into blocks; filling was completed on the wing root as shown in photo 3. Note that the wing root is covered with masking tape, which protected the wing skin as the wing root was sanded on the fuselage. Photo #4 depicts the finished fit.

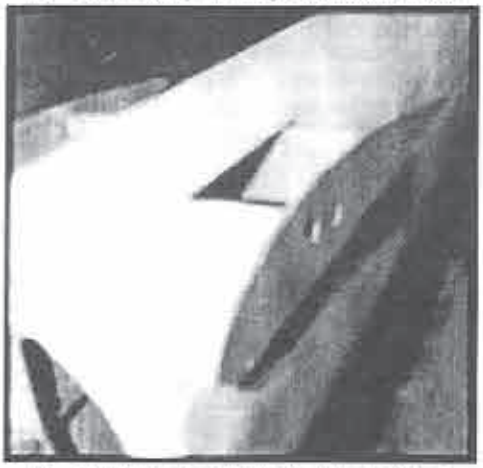
Well, there's still a bunch to do, as the ailerons have yet to be cut from the wings, and wing tips need to be added. And in addition to doing yet more sanding, servos and controls must be installed. Then, it's on to constructing the canopy tray and canopy, and applying the finishing touches, painting, and iron-on film.

So, it's back to work, and we'll see how much has been accomplished by this time next month!

■



#1 - Collection of sanding blocks and sticks.



#2 - Fuselage wing root before back filling.

#3 - Fuselage wing root after filling.

(Left) #4 - Completed fuselage wing roots after sanding.

RCSD Index Update

from Lee Murray

The *RCSD* index for 1984 through 1998 has been posted and is available for downloading. The index can be obtained through hyperlinks on the *RCSD* page, http://www.halcyon.com/bsquared/RCSD.html , or directly from the PC-Soar web page, http://athenet.net/~atkron95/pcsoar.htm. Packed into the zip file are index files that can be opened and searched in two or three year packets. The files are ASCII type files that can be loaded into any word processor where they can be searched using the "Find" feature common to all modern word processors. A typical reference is shown below. Among the files is a list of key words used in creating the index. Usually there is one entry per article, but for larger articles 2 entries are sometimes used. The lines of each entry are up to 80 characters wide, so if you see folded lines try a smaller font or decrease your margins. (There are 4 lines/entry but may show as more than that in this *RCSD* article.)

Vol: 14 No: 1 Jan-0-97 Pg: 5
Contributor: Slates, Jerry
Key Words: Construction, Wing...
Pt V of series on molded hollow core wings. Molds are waxed, buffed, PVA mold release applied, painted w/ K&B Superpoxy. The epoxy is applied...

Vol: 15 No: 4 Apr-0-98 Pg: 10
Contributor: Stahl, Gordy
Key Words: Radio, Clubs
Gordy visits Sacramento Valley S.S. and is impressed with the skill of this group of flyers. Volz servos provide a new standard of performance for

Vol: 15 No: 4 Apr-0-98 Pg: 10
Contributor: Stahl, Gordy
Key Words: Radio, Clubs
[cont.] strength, speed & longevity (5 yr. warranty). There are models for wings and a dual servo.

■

on the Wing

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Adding a "plank" center section to a swept 'wing

Several readers of this column have recently contacted us concerning the addition of a "plank" center section to a swept 'wing. In one case, the modification had already been accomplished, and the builder was lamenting the loss of roll response and wondering why it felt tail heavy in flight. Another correspondent was wondering about the change in location of the neutral point, as he was attempting to determine the new center of gravity. Such questions usually generate another "On the 'Wing..." column, and this time was no exception.

Let's take the case of the second correspondent first. "How does the addition of a plank center section affect the neutral point?" Simply put, the neutral point moves forward in proportion to the span of the additional constant chord panel. That is, the greater the span of the new panel, the further forward the neutral point will be.

Figure 1 depicts the original swept wing configuration. For simplicity, we chose a swept wing with a chord of ten units and a tip chord of five units. The leading edge is swept back ten units, and the half-span is 20 units. To determine the neutral point, we used a method described by Richard Moran in the March 1994 issue of *R/C Soaring Digest*. Using this method, the neutral point is found to be at 6.12 units from the apex of the leading edge. (Remember, the center of gravity (CG) is always placed in front of this point.)

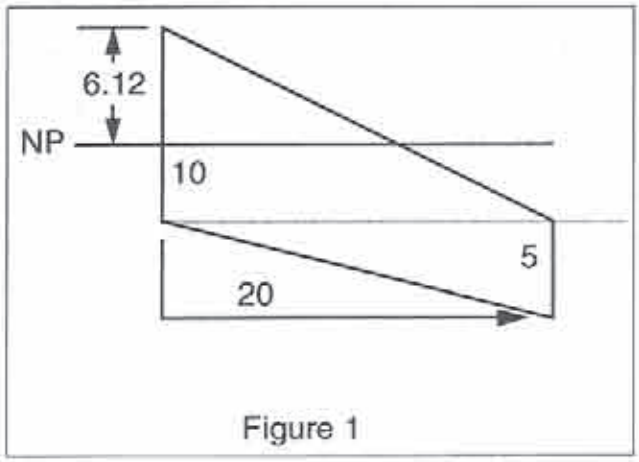


Figure 1

Figure 2 shows the plank center section which will be added to the swept wing planform described above. The semi-span of this segment is denoted by V. Because the chord is constant, the neutral point will be at 25% of the chord, 2.5 units behind the leading edge, no matter the span.

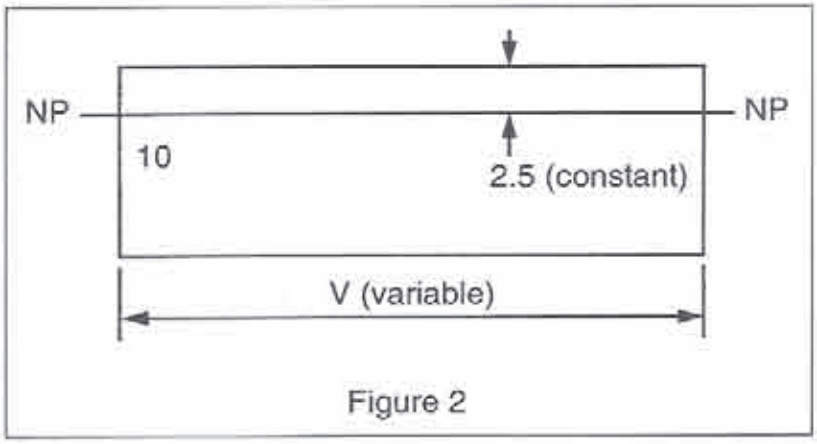


Figure 2

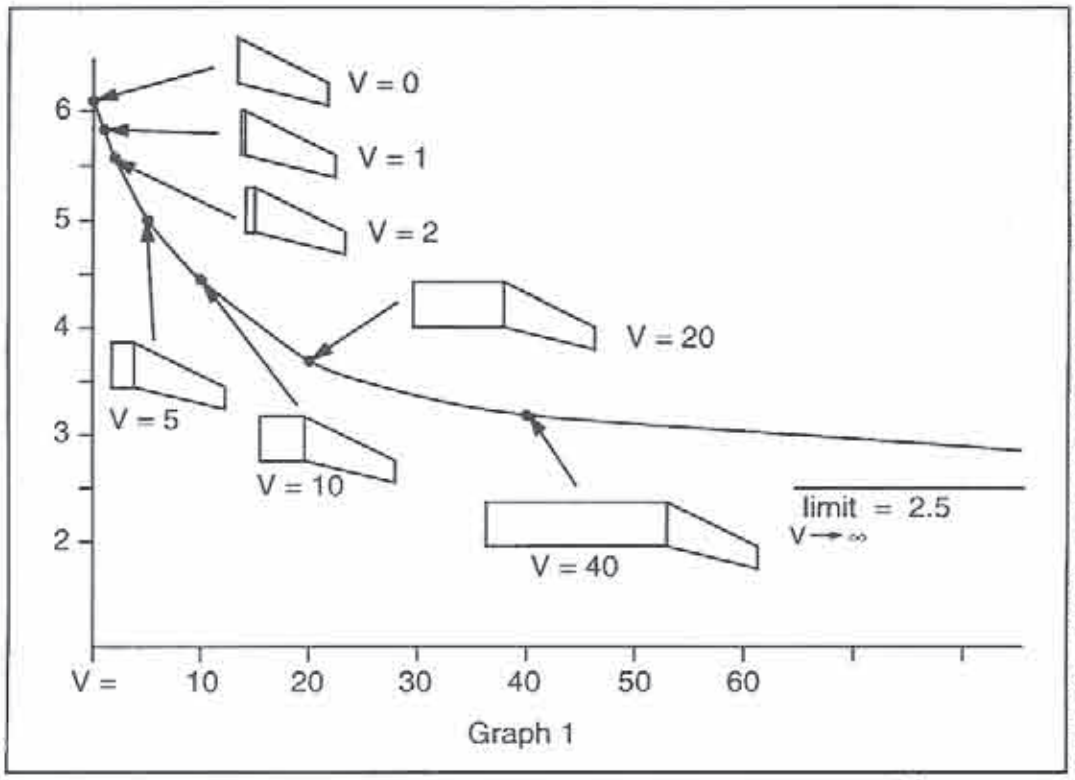
TABLE 1: COMPUTATION OF NEUTRAL POINT FOR DEFINED COMPOSITE AIRCRAFT

V	plank area, A2	A1 + A2	$Z = \frac{A1 + A2}{4}$	$X^2 + VX - Z = 0$	$X_{NP} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	X_{NP}
0	0	150	37.5	$X^2 + 0 - 37.5 = 0$	$X_{NP} = \frac{-0 \pm \sqrt{0 - 4(-37.5)}}{2}$	6.12
1	10	160	40	$X^2 + X - 40 = 0$	$X_{NP} = \frac{-1 \pm \sqrt{1 - 4(-40)}}{2}$	5.84
2	20	170	42.5	$X^2 + 2X - 42.5 = 0$	$X_{NP} = \frac{-2 \pm \sqrt{4 - 4(-42.5)}}{2}$	5.59
5	50	200	50	$X^2 + 5X - 50 = 0$	$X_{NP} = \frac{-5 \pm \sqrt{25 - 4(-50)}}{2}$	5.0
10	100	250	62.5	$X^2 + 10X - 62.5 = 0$	$X_{NP} = \frac{-10 \pm \sqrt{100 - 4(62.5)}}{2}$	4.35
20	200	350	87.5	$X^2 + 20X - 87.5 = 0$	$X_{NP} = \frac{-20 \pm \sqrt{400 - 4(-87.5)}}{2}$	3.69
40	400	550	137.5	$X^2 + 40X - 137.5 = 0$	$X_{NP} = \frac{-40 \pm \sqrt{1600 - 4(137.5)}}{2}$	3.18
—	—	—	—	—	—	2.5

NOTE: V is the semi-span of the added "plank" center section. The area of the swept portion is 150 square units and constant; the area of the added plank section is A2. Z is the wing area which lies in front of the neutral point. The quadratic equation defines Z in terms of a segment of the swept portion and a segment of the plank portion.

The composite aircraft is shown in Figure 3. Note the original swept portion of the wing remains constant, as does the chord of the center section. To reiterate, the neutral point of the swept section is 6.12 units from the apex of the leading edge; the neutral point of the constant chord center section is 2.5 units from the leading edge.

In computing the neutral point, we find the relationship between the span of the center section and the distance of the neutral point from the leading edge is not directly proportional. Table 1 shows that as the added center section span is increased, the neutral point



Graph 1

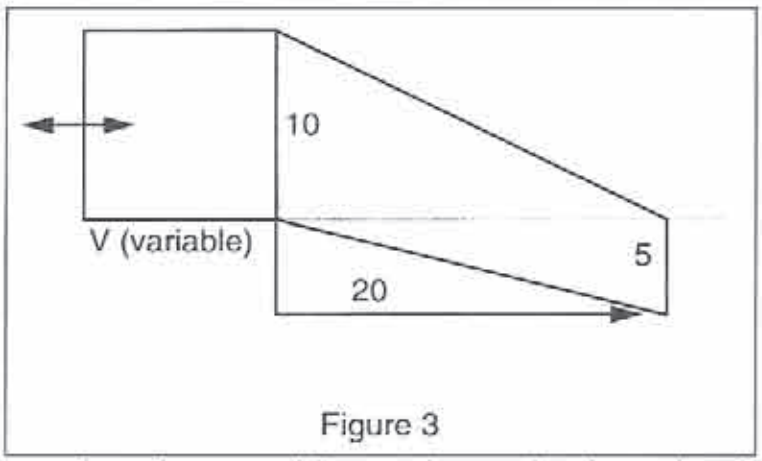


Figure 3

moves forward, as expected. But a graph depicting the relationship between V and X_{NP}, the two variables, shows a slightly non-linear relationship. See Graph 1.

Why would such a composite planform, once constructed, feel tail heavy during flight? Probably because it IS tail heavy! In the example case shown here, the addition of a center section of 40 units in span (20 units semi-span) dictates that the neutral point will need to be moved forward from 6.12 to 3.69 units aft of the leading edge apex. This is nearly 2.5 units! Since the added section has a constant chord, the volume of the composite aircraft is more than doubled as well. Little wonder so much weight is required to place the CG in front of the neutral point.

Finally, why is the composite aircraft relatively non-responsive in roll? There are three reasons which come immediately to mind:

Inertia - The lengthened span has more inertia than before the modification. This tends to prevent the roll motion from starting, and, once started, from stopping. The inertia for the entire wing will grow at an exponential rate if the mass of the wing is distributed evenly along the span. While this is not true for the given example because of the swept and tapered outer panel, it does provide some idea of what may be expected as the wing span increases.

Sensitivity - Since the elevons are now further outboard, away from the center of gravity, the aircraft is less sensitive to control surface deflections. Aerodynamic control surfaces are in control terminology velocity control devices. That is, the velocity of the surface to which they are attached (in a direction perpendicular to the free stream velocity) is proportional to their deflection. As the distance of the surface from the CG is increased, the control sensitivity is reduced in inverse proportion. Thus "twice as far" equates to half as sensitive.

Roll damping - As soon as the rolling motion begins, the effective angle of attack changes. The change in effective angle of attack is different at various locations along the span. The greatest change takes place at the wing tip, where the rolling velocity is greatest, while at the center line there is no change at all. For the downgoing side, the effective angle of attack increases, increasing lift in the direction which is against the rolling motion. For the upgoing wing, the effective angle of attack decreases. The resulting negative lift is against the rolling motion as well. These changes in effective angle of attack damp the roll. Roll damping increases as the wing span is increased.

These three factors — inertia, sensitivity, and roll damping — create a situation where roll response deteriorates as span increases. Aileron area must be larger or deflection angles made greater in order to maintain control authority in roll.

So, is adding a constant chord center section to a swept wing design a good idea? Probably not. A better alternative is to take the same planform and simply make a bigger 'wing!

Suggestions for future columns are always welcome and may be sent to us at P.O. Box 975, Olalla WA 98359-0975 or <bsquared@halcyon.com>.

References:

Moran, Richard. Beyond the Mean Aerodynamic Chord. *RC Soaring Digest*, March 1994, pp. 44-49

Special thanks to "Pat King," Arthur Kresse, and Gregg MacPherson, members of the Nurflugel-l, an e-mail special interest group based at <http://www.nurflugel.com>, who made suggestions and provided helpful information concerning inertia, sensitivity, and roll damping.

■

TECH TOPICS

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Let's Talk About Templates

The last couple of columns, we've talked about custom cores and who can supply them. Then we went into making your own foam cutting equipment. However, the most important part of the whole operation, whether you make your own cores or some one does that for you, is the set up and proper use of a template.

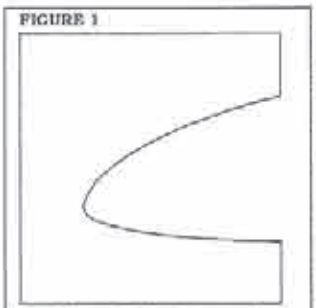
What is a template? Well, it's the actual outline for the core you want to cut but placed on a material capable of supporting and guiding the cutting wire. Once you've picked your airfoil and planform for the wing, you have to cut the sections of that wing to the specifications you've chosen. There are a lot of details to be filled in here. They depend both on the type of construction you'll use and the template style.

Leading and Trailing Edges

In the early days of core cutting, most folks used some form of leading and trailing edge stock. These were normally a half-round (LE) or tapered (TE) pieces from balsa or spruce. If you are using this construction method and have chosen 0.5" leading edge stock and 1" trailing edge stock, for instance, then your airfoil outline needs to be cut from a point 0.5" behind the true leading edge to a point 1" ahead of the true trailing edge. For an 8" chord the actual foam core would then be 6.5" from core leading edge to core trailing edge.

What's been a lot more common lately is to cut the core all the way from true leading edge to true trailing edge. The use of carbon reinforcement and either obechi or composite skins has allowed much better quality (and strength) in the leading and trailing edges than could be obtained by balsa or spruce stock. Of course, it comes at a price of some complexity in the lay-up, and higher performance vacuum bagging equipment. So there is a trade-off.

FIGURE 1



Leading Edge Template
SA7038

When cutting to the true trailing edge, you come across another problem - the material becomes so thin you can burn through it and leave a scalloped or uneven trailing edge. The best way around this problem that I've found is to increase the TE thickness a bit (usually around 0.010" is enough for a double template set up).

When cutting to the true leading edge, you've got another problem. The tangent to the surface at the true leading edge is vertical. For most template setups, you just can't do this. You wind up having an abrupt change in direction on the entry for the template and this will often hang up the wire and cause uneven burning at the LE. The way around this that works best for me is to make what I call a tangent entry (and exit) in the first 0.125" to 0.25" of the core at the leading edge (more on this in just a bit). Then finishing off the leading edge with a sanding 'T' to match the contour of a leading edge template (Figure 1).

Skin Thickness

If you've got your general outline setup, now you have to consider some of the details of your chosen wing construction. Is the skin going to be obechi, balsa or a composite type lay-up? Whichever way you do it, you need to subtract the upper and lower surface skin thickness from the true airfoil outline. That is, your core at every point will be two skin thickness less deep than the final wing section. Now if you were doing this by hand (as in the old days) it's almost impossible to get this right. That's because the correction for skin thickness is not a simple vertical offset from the airfoil outline. It's an orthogonal offset to the surface at every point along the surface. And that vector points in a different direction everywhere.

To illustrate the point, if you could cut a true core around the leading edge, the skin offset at the exact leading edge would be along the core axis (we'll assume that's the horizontal direction). However, at the trailing edge, the offset is almost perpendicular to that same axis (essentially the vertical direction). Doing that correction by hand is a real pain. However, template plotting software can calculate the local orthogonal to the surface and then project the skin thickness along that line to get the true coordinate location for the core. The arithmetic is a little ugly but once it's coded, it's a pretty simple calculation. An example of a skin correction is shown for the single template set-up (Figure 2). In this case, the solid line is the true cutting outline but the dashed line is added to indicate the true thickness which includes the wing skin (in this case, 0.025" thick obechi).

KERF

One more thing to worry about before you set up your core is to account for 'kerf'. (I don't know where this specific word comes from - probably the same folks who came up with 'gnarly'.) Kerf is simply a correction for the fact that the cutting wire melts a bit wider path in the core than the actual wire thickness. This kerf correction changes with the temperature setting and speed with which you're pulling through the core. So if you want to get a really true core, you really need to measure and correct for this for the cutting conditions you prefer.

One way to determine the kerf value is to first measure (with a micrometer!) the thickness of a small piece of the foam you'll be using for your core. Then cut a straight line through this piece and measure the thickness again. The difference will be the kerf value. Now keep in mind that this number includes the width of the wire and the little bit of extra melt zone around the wire.

To use this number in a single template setup, remember that the wire will be riding on the surface of the template so you don't need to add the wire diameter part of the correction. Since you're only interested in the amount of material that will melt inside the core outline, the thickness correction you'll need in this case will be the difference between the kerf value you measured and the true diameter of the wire. That's because half of it will be lost on the upper surface and half on the lower surface. For a double template setup, kerf isn't nearly as much of a problem since you can set up the cutting sequence to pretty much eliminate this correction. More on this in just a bit.

Types of Templates

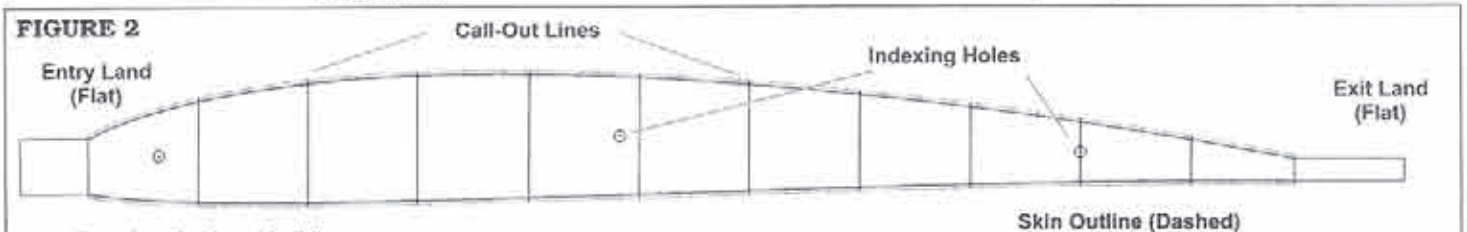
We've referred to single and double templates several times. What do I mean by those? Well, a single template is one in which both the upper and lower surface are cut using the same (single) template (Figure 2). A double template system uses one template for the upper surface and one for the lower. This type of template is shown in Figures 3 and 4. Note that the upper surface template (Figure 3) uses a 'tangent' entry and exit while the lower surface template shows an example of a straight entry and exit.

Although a single template seems the simplest, I personally don't recommend them. First you need to make a kerf correction. Second, if the template slips just a little bit while cutting, you'll ruin your core. And third, this type of template is quite difficult to use with a core cutting machine.

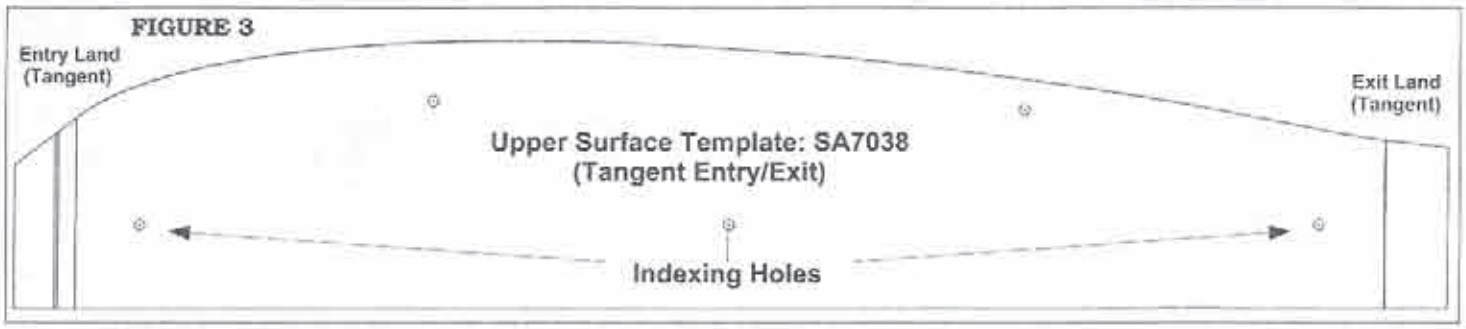
The advantage of the double template approach is that you don't need to correct for kerf, you can very easily set up a tangent entry and exit to the core and it's the easiest way to go for a core cutting machine.

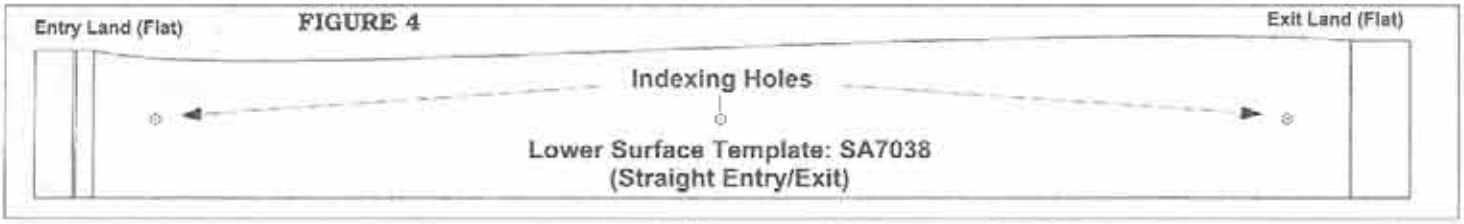
Why don't you need to correct for kerf?

FIGURE 2



Single Template: SA7038





Well, if you cut the lower surface first, the upper part of the core will drop down by the kerf width after the cut is done and thus fully correct for this offset when the upper surface is cut. The only thing you have to watch out for here is build up of 'angel hair' on the cores. This is simply a very fine fiber type surface caused by the wire melting and then drawing some of the foam as it passes through the core. In my experience, this seems to be much less of a problem with thin cutting wires and is another reason why I prefer the 0.016" steel wire discussed last month.

One More Thing

We're almost done with the lecture but there is one more thing that you may encounter in your core cutting experience. Remember we mentioned that kerf was different for different wire temperatures? Well, this leads to another correction worth thinking about. When the wire is riding along the surface of the template, it's actually losing some heat to that material rather than to the foam. Thus the cutting wire is a little bit cooler right at the template than it is inside the core. So it's going to have a smaller kerf value at the template than it will just a little bit inside the core. Consequently, the area right near the template will be a little thicker than the rest of the core at that station.

There are two things you can do about this. Since this effect is usually restricted to a region within ~0.25" from the edge, it's easy enough to knock this down with fine sand paper on a long, flat sanding bar. The other method is to avoid the problem entirely by mounting your template about 0.25" off the core surface. If you mount the template to the core with nails or pins, then use a 0.25" thick piece of balsa to space it back a bit. In my core cutting system, I've got a little jig to hold the template and it stands off from the core by about 0.25". This seems to eliminate the problem completely. If you're cutting a very steep taper on a short core, this stand-off will affect the true chord at each end of the core. But in all of my designs, that correction is small enough that it's just not worth worrying about.

Template Material

You'll get about as many different opinions as there are folks who do this process. Several of the materials I've seen used are Formica, aluminum sheet (the hardened aluminum used in offset printing), phenolic circuit board and various grades of wood. All of these work well. If folks in your club already cut cores, I'd advise using the material they use since you'll have a ready source of experience nearby. If not, here's my technique.

I don't like Formica or phenolic because they're a little too brittle for hogging out the blanks. I'm not real high on the hardened aluminum sheet. It cuts with metal shears just fine but is a bit tough to get a real smooth surface. So I prefer wood.

The best thing I've found is pine trellis stock. This is available in any lumber store and in most of the larger home improvement and hardware stores (Lowe's, Home Depot, Builder's Square, etc.). It's typically 1.75" wide, 0.25" thick and available in 8 ft. to 16 ft. sections. Last 16 footer I bought cost about $4.

Once you've printed out your template, cut the trellis stock a little longer than the template print out and then carefully attach the template paper to the wood blank with 3M77 spray adhesive. Be careful to line up the bottom of a two template system with the bottom of the wooden blank. Being careful here will save you a lot of grief later.

Now cut out the template with a jig saw or coping saw leaving maybe 1/16" of excess material. If you have a jig saw, there's a great way to get a really good finish on the surface. Get some of Chris Adams' Scrollsanders (http://www.scrollsander.com). They're really neat sanding strips that mount in your jig saw in place of the cutting blade and allow you to do a really nice job of both matching the contour and smoothing the surface.

So now you've got the template pretty much finished and you want the smoothest surface possible so your wire won't hang up anywhere. There are two things you can do now. The first is to order some high temperature film strips from Taylor Collins (Soaring Stuff - http://www.soaringstuff.com) and tape them on the cutting surface of the template. That works very well.

The second approach works as well or better for me. (Secret trick mentioned last column now follows!) Cut some 3/8" wide strips of 1/64" thick plywood and glue them to the surface. The grain should run along the chord direction. The reason it's cut 3/8" wide is so you can hold it down on the surface and run a bead of thin CA along the overlap and not get too attached to your work. Then just cut or sand off the excess width. Lightly sand the surface of the ply with 400 grit (or finer) paper and you're ready to go. This is by far the best system for me and has been used very successfully for quite a few years. When used with a tangent entry/exit to the core, this provides as smooth a cut as I've ever been able to make.

Template Software

To wrap this up, you really need to have something that will transfer your chosen airfoil to a piece of paper so you can do something with it. Although there are a number of 'freeware' codes out there, the commercial codes give you much more flexibility and user support. If you want to go the freeware route, drop a note to *RCSE* (e-mail: soaring@airage.com) and ask who's got a code they're willing to share.

If you're buying (recommended approach), CompuFoil (http://ourworld.compuserve.com/homepages/compufoil) and Airfoil Plot (e-mail: canders@edge.net) are two very good ones - please see their ads in issues of *RCSD* for more information. I do not own a copy of these codes since I write all of my own software. A demo version of CompuFoil is downlodable from the website and a free demo disk of Airfoil Plot is available from Chuck Anderson. Both codes have a long and successful track record with modelers.

And of course, if you need any coordinates that aren't supplied by the software vendor, check out the UIUC website (http://amber.aae.uiuc.edu/~m-selig/). Last I looked, it was up to about 2000 airfoils and growing.

Hope this series has helped you with questions on cutting cores and how to either do it or get help from commercial suppliers. Now, wonder where we'll go next month.....?

■

"SHORT CUTS"

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Birdworks Zipper Servo Upgrade

Several years ago, I completed a review on the Birdworks Zipper and have put many flights on this unusual sloper since then. Though the plane is more suited for the west coast slope environment, they will fly good on some of the larger east coast sites. Mine has served me nicely, but I don't fly it routinely enough to land it well. On more than one occasion I've come in a little too hot and, in the excitement of the moment, I end up landing the little guy in a fashion not intended by its designer, Steve Hendricks.

More often than not I usually strip out one of the HS-80 nylon geared servos. Changing out the servo gears isn't a big deal, but it's not to be done on the slope. My last landing was much more spectacular than most since the wind has really howling and I knew my reputation precluded me when my sloping comrades ran for cover when I told them I was coming in "hot". The resulting deceleration was followed by a comment from Dave Garwood, "Steve, did you really want to do that?" The bottom line was that both servos got stripped, one control surface detached, and a 4-40 control rod bent 60 degrees.

I told Dave that I would not fly the plane again until servo savers were installed. That would be easier said than done, because servo savers (often used on R/C cars) are too big to fit in the fuse as currently configured; I was also told that they don't even come splined for HS-80s, which I had not confirmed. I opted for linear servo savers similar to ones I saw advertised years ago by Hobby Lobby.

These are nothing more than a servo arm connector that allows the control rod to freely slide through a drilled hole and two sets of wheel collars and springs that center the rod while still absorbing heavy shock loads. I managed to build my own with readily available components. First, I got a set of wheel collars from the UBG (used but good) box and then visited the local hardware store to pick up several small springs.

The components are assembled as shown in the photograph. Spring tension is adjustable by positioning the wheel collars closer to each other, which reduces the shock absorbing capability of the system; however, this does provide more positive control for those +100 mph passes but, at the same time, increases the shock load on the servo in the unlikely event of a crash. Moving the collars farther apart reduces the spring tension and allows for control surfaces to float a bit more while increase servo gear survivability.

The dilemma I had installing this arrangement in the Zipper was *room*. I needed to keep the servos side by side to retain my existing CG with the present radio and battery arrangement. To achieve this, a small V block was made out of scrap Rohacell foam. The Rohacell along with the servos was installed via a hot glue gun. This may be crude, but removal is easy if dental floss is installed in the glue line; just tug and cut. The other trick was to reduce the vertical height of the control rods as they pass through the cut out in the bulkhead. This was accomplished by installing the linkage connectors upside down on the servo arms. This would ordinarily be a problem because you would not have access to the set screw; but in this application, the set screws are not installed so the rods can float.

This arrangement could be used even if the intent was not to provide a servo saver but to lower the effective height of the control rod, because the set screws on the wheel collars are still accessible. This set up works well for flap servos that often get stripped out on hot landings. I hope the pictures help depict this arrangement.

When Is a Servo Not a Servo?

The answer is when it's a *retract* servo. Several weeks ago, I purchased an unused Airtonics 94734 servo from a good friend at a great price. He said the servo was the same size as a standard servo, but was high performance; he was originally going to use it in a scale ship. I received the servo a few days later by mail and hooked it up to the trusty, old 4 channel Vanguard. It was not until then that I realized the special nature of this servo; it was a retract servo. Never having used one before, I found it quite unique.

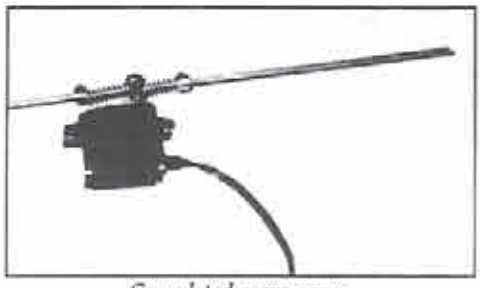
First of all, it did not center like a regular servo when plugged into the elevator channel. It also has a preset slewing rate, which appears to go from stop to stop in about 1.5 seconds. This was a bit slow for anything other than a retract. I considered using this servo for an aerotow release application, but what if I needed to get off right away, while still on the ground being towed? This would not work, because when things go bad on a tow you need to get off immediately and a 1.5 second delay would not do.

The moral of this story is to know what you are getting and ensure the servo fits the application. Me and my friend are both the wiser; maybe I will install landing gear on the U-2...

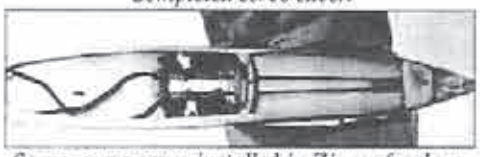
U-2 Building Project, Part 3
(Where Did All This White Dust Come From?)

Boy, has this been a learning experience! I'll never think twice about the price of a glass fuselage, again.

Another month has gone by and still no fuselage, but we are a lot closer. This month, the 4 slabs of Rohacell foam were cut to outline and bonded together. Sounds easy, right? My first mistake was being cheap. I didn't want to waste the WEST



Completed servo saver.



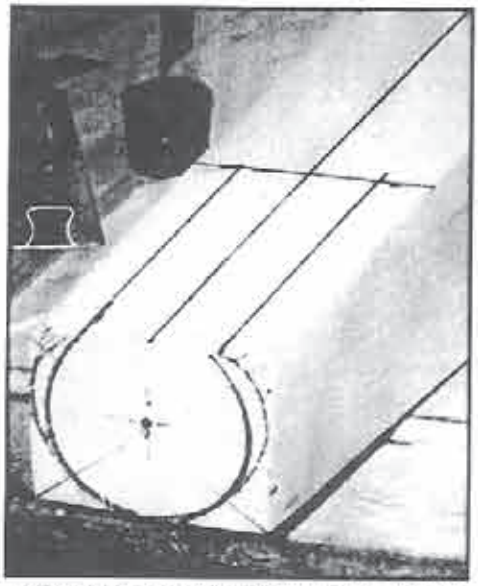
Servo, servo saver installed in Zipper fuselage.

epoxy bonding the 4 slabs of foam together, so I decided to use the Titebond wood glue. This was done once all 4 slabs of foam (2.25" x 6" x 62") were cut to side profile with a scroll saw and planed flat. I hate clamps, so decided to use the vacuum bag to bond all the slabs together at once (*second* mistake). Does anyone out there see the problem with this idea? Look at a bottle of glue, and ask yourself why it does not harden up in the bottle. That's right; it's capped over, and doesn't dry out in the air. What is not in the vacuum bag? AIR!!!! Three hours after mucking the yellow (*&^%) onto the foam, it was still slimy; and to make things worse, the glue was seeping into the foam pores. What a mess. The stuff just did not want to cure in the bag and, to make things worse, when I took everything out of the bag and began cleaning up each contact surface, the glue began to air cure; another (*&^%$$) mess.

Lesson 1: Don't be cheap. I did eventually manage to bond all 4 pieces together to form the raw plug, which was then cut to shape using outline print outs bonded to the foam with 3M 77 and a large band saw (work). The vertical fin was omitted because we planned to cut a core, sheet it, and then glass it on later. Before rounding over the plug, I first cut the outlines for the jet intakes while the plug was still square.

A print out of this area was bonded to 1/4" ply and then cut to shape. Two holes were drilled to accept 6D common nails. The template was then positioned on the fuse plug and the nails set it into the Rohacell. I used the Dremmel router to transfer the outline deep into the foam. The template was removed and the same procedure used on the other side of the fuse for that jet intake. The next step I will dread forever: rounding over and detailing the plug.

The next time I see a fuselage plug builder, I will drop to my knees and kiss his feet; these guys are really gods. What a job I had rounding over this fuselage. I had reference books at the ready, and first marked out a basic 45 degree edge line onto the top, bottom and sides. The next step was to use a surform hand file and 80 grit paper to slowly begin rounding the corners while remembering it is much easier to re-sand foam than to put foam back on the plug. Rohacell is quite messy, so goggles and a good NIOSH dust mask were used along with coveralls.



(Above) Use care when shaping foam. Mark it before you cut it. (Right) Note the use of masking tape as a sanding guard. Sand filet, not the foam.

This rounding and detailing process took hours and hours. Finally I had a fuselage with flat segments on the sides and bottom. The bottom also was getting a wave in it. This was fixed by gluing 6 sheets of 80 grit paper in a row onto a building board and sliding the fuse back and forth onto it to knock down the high spots. This worked well and the fuselage was really starting to look good except for those epoxy bond lines that did not sand as nicely as the foam.

A good investment I made to help me with the rounding was several grades of flex sanding pads; the stuff looks like 1/8" soft foam with grit on one side. The other good investment was a contour tool which could be used to check the curvature against drawings and comparing from side to side. With well over 15 hours of just sanding the fuse, I took it to Dave Garwood to see what he thought.

"Hey, isn't there supposed to be a small elevation over the canopy?"

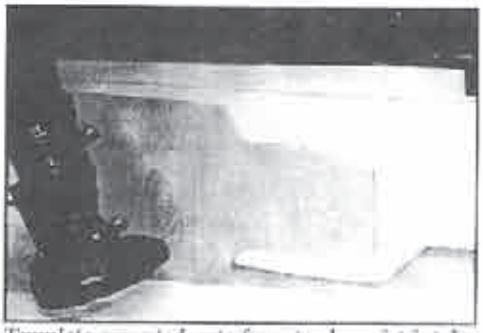
"Well no, not in these books," I said, remembering the 1" dusting of Rohacell still on the basement floor.

"Ya, here it is. Look at the picture in the other book," which was the book I didn't have.

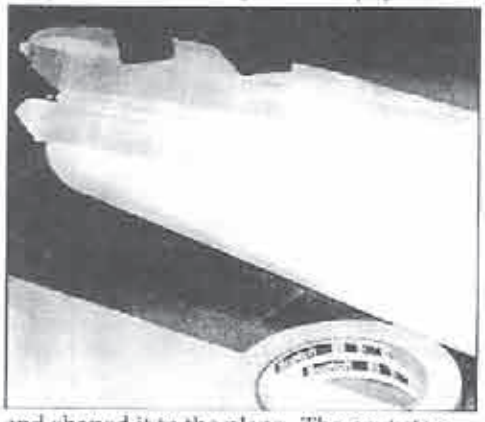
"But it's not shown on the three views in the books you loaned me," which were still laden with Rohacell dust, a bit of spilled coffee and a drop or two of midnight oil.

"Oh, well. Those 3 views must be wrong. Let's do it right, and hey, isn't the nose a bit pointed? It's also pointing up a bit. Looks like it's lonely and needs a friend." The moral here is to get another opinion before you decide you're done; Dave was right in both cases; the fuse had to be reworked.

Reworking was easy. Just saw out the part in question and re-bond on a new piece of foam with 5 minute epoxy. Rohacell is great to work with even though it's so messy and gets everywhere when it's being sanded. Had this been wood, it would have taken much longer which may be justified for a production type mold. Once the fuse was to an acceptable shape, I bonded on the tailplane transition module



Template mounted onto foam to shape jet intake.



and shaped it to the plans. The next step was to cut the cores for the fin and stabs.

Don't ya just hate rework? The vertical fin was cut out of Spyder foam, from Aerospace Composite Products, using the SD8020 airfoil. When we looked at it in comparison to the fuse it just didn't look right, as it was too thin. This was easy to fix by using 3/16" balsa skins instead of 1/16". However, the day I bonded on the skins, the 3m 77 nozzle clogged, so the balsa didn't bond well near the leading edge; I was tired, knocked over a coffee cup, spilled coffee onto the plans and myself, the dog ate my homework, and the hard disk crashed. It was just one of those days. "Hey Dave, why not design the vertical fin so it's detachable and make the plane easier to transport?" Problem solved.

We were finally getting close to the end of the month and my deadline so there was no time to waste. My next step was to finish off the sanding and then glass over the foam plug. To do this, a small jig was made that looked like a rotisserie for a barbecue. I hoped to use 3 oz. satin weave glass and WEST epoxy. Then another set back. I had done most of my sanding under 5 sets of florescent lights which, by there placement, give off little shadowing and thus the fuselage looked pretty darn good.

Just last night I was doing a bit of last minute filling (spakling compound) and sanding when the basement lights were accidentally flipped off; then I saw it. It seems that a small light on the extreme end of the basement was not on the same circuit as the lights over my head and it remained on. My beautiful white Rohacell fuse that looked so nice under those 5 shop lights now looked like the surface of the moon when lit at a low angle from the other side of the shop. I knew that once it was glassed and primed, any small imperfection would be highlighted, but this was ridiculous.

Well, just a few more nights of sanding and filling should be enough. The bottom line is, when is *good* enough *good* enough? (I better hide the better U-2 reference books from Dave.) Or should I use the old 10 foot rule or the 3 cups of coffee at 10 p.m. rule?

We are hoping to get the fuse plug completed by next month, including paint and wax, and possibly getting ready to pour the molds. 'Til then. ■

Kit Review

ELECTRIC CONNECTION

Vortex SP Electric Sportplane Review

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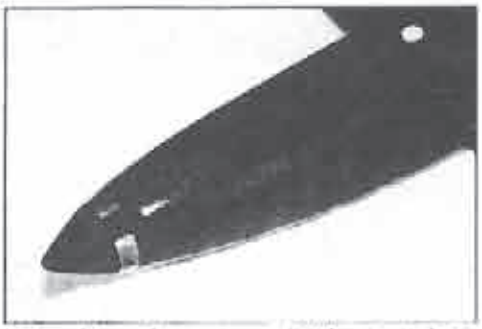
I had the opportunity to obtain an early production kit of a new sportplane called the Vortex SP from Cavazos Sailplane Design. Cavazos Sailplane Design has one of the hottest Speed 400 pylon racers on the market today - the Switchblade 400 Race (1st place in Speed 400 Pylon at '97 and '98 NATS) - and they are also producing the Whip 60" slope racer designed by Daryl Perkins. The Vortex is much like an electric pylon racer (a Switchblade on steroids!) and is meant to be flown with a Speed 600/ Astro 05 Cobalt motor or, if you really want to go wild, a brushless motor! The model's specifications are:

Wingspan - 46"
Wing Area - 273 sq. inches
Airfoil - Thinned RG-14 (7% thick)
Weight - 39 ounces
Wing Loading - 18.5 ounces/sq. foot

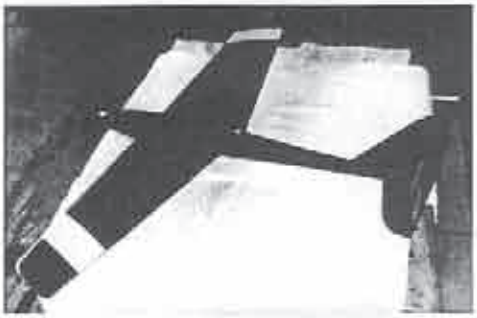
The kit comes well packed in a small cardboard box that survived shipping nicely. When opened, you're presented with a set of CAD generated half size plans and a photo illustrated construction manual, pre-sheeted obechi/white foam wing halves packed in their core beds, a very nice fiberglass fuselage, a laser cut motor mount/bulkhead, balsa parts for the tail feathers, wing tips and leading edge, and a small bag of fiberglass tape and assorted hardware for completing the model. The quality of the wing halves is excellent. The wing has some carbon fiber tape layered between the obechi and foam for additional strength and they also have the aileron hinge line routered out. The CAD generated plans are well done and are a useful reference when building. The manual with my kit was adequate but had a few errors and references to other versions of the Vortex that are not available today. I requested an up to date manual from Robert at Cavazos Sailplane Design prior to writing up this review and it was much improved.

I proceeded with construction by first preparing the wing halves for joining. I sanded the roots to match the required dihedral. Setting the dihedral is easy as the upper surface of the wing should lie flat on the table top when the wing halves are joined. With the wing taper and airfoil thickness change, this works out to around 2 degrees of dihedral per panel. Before joining the wing halves, you need to cut the panel tips at an angle to achieve the final wing tip shape. I decided to attach the balsa tip blocks at this time so that I could shape them and be sure the wing tips matched each other. Once I was satisfied with this, I cut out the ailerons as shown on the drawings and installed the aileron torque rods. The ends of the ailerons you see in the photos are different from what is shown on the drawing supplied with kits



being shipped at present. With a straight leading edge to the wing, the airflow is more or less along the chord of the wing and I felt that the end cut of the ailerons should be a close match to that. As shown on the present drawings, the end cuts are at right angles to the trailing edge. It's a personal choice and I would bet it is next to impossible to tell the difference in the air. Once that work was done, I joined the wing halves with a bit of 5 minute epoxy, being sure to get a even match between the halves. After the epoxy had cured, I sanded the leading edge to ensure a straight line across the full wingspan and then attached the hard balsa leading edge in place with Sig's SigBond glue. I like using this for gluing as it sands well and acts as a filler for the inevitable minor gaps between the leading edge material and sheeting. With the leading edge firmly attached, I sat down at the PC and used CompuFoil Pro to make up a set of leading edge templates that I could use to sand the leading edge to the proper shape. Once shaped, I went over the wing one more time with 400 grit and sanded it to a smooth finish. I used a 1/2" brass tube cutter to make a hole for where the forward hold down bolt is located. Once the hole was made, I taped the upper surface to seal it and then mixed up a thick batch of epoxy and microballoons to fill the hole. Once cured, I sanded the surfaces flush to the obechi and then drilled out the hold down bolt hole. I cut a slightly larger diameter hole on the upper surface to recess the bolt head. The drawing shows this protruding above the surface and I want a cleaner looking installation. I drilled the hole for the rear hold down bolt after the fiberglass tape was applied to the centerline joint. The reinforcing tape was placed on the centerline joint using Aerospace Composite Products' laminating resin. I brushed it on very sparingly and used a heat gun (oh so carefully!) to get the 'glass cloth wet and no more - excess weight you know! Take care not to lock up the aileron torque rods with excess epoxy. To help eliminate this, I use a spot (and I mean a small spot!) of vegetable oil at the point where the torque wire enters the brass tubing. The wing was then set aside and allowed a full cure of the epoxy prior to sanding, smoothing out the 'glass tape and applying to the covering.

I started on the fuselage by washing it in warm soapy water to remove any residual mold release agents. I then went about wet sanding the mold line and getting a smooth overall finish. Once done, I installed the laser cut motor mount/bulkhead in the nose. There is a small amount of down and side thrust needed and the method outlined in the instructions to accomplish



this works very well, so don't hesitate to use it in gluing the motor mount/bulkhead in place. Once this glued in and curing, I went to work on shaping the stabilizer and vertical fin. These are made up from solid 3/32 balsa and in my kit, the balsa was on the firm to hard side. Considering the possible abuse these will take in landing, I felt that this was a good choice. I spent a fair amount of time sanding these to a symmetrical, airfoil shape which also goes a long way to minimizing the finished weight. Note, there is no rudder on this model, just a vertical fin. Once done, I chose to fill the wood grain with a thin mixture of microballoons and laminating epoxy. Two coats were applied, being sure to scrape/wipe off as much excess as possible and sanding between coats after it has cured completely. With the tail feathers ready to mount, I did a trial fit of the horizontal stab to the fuselage and then glued this into place. A fillet was applied to the join line on each side of the fuselage to smooth this out and make a stronger final joint. Next up was the vertical fin and the base of the fin was sanded to match the top of the horizontal stab and fuselage. The fin was then glued in place and a fillet applied to both sides of the fin/stab joint. Once done, I mounted the wing to the fuselage, marked and drilled the locations for the wing mounting bolts. The wing mounting blocks were glued into place within the fuselage and after curing, drilled and tapped to accept the hold down bolts.

I painted the model using Coverite's 21st Century Paint primer and color. I used their dark red paint which has a great color match with their iron on film of the same color and besides, that's what was on the workshelf! I went about covering the wing using neon yellow and green Ultracote on the tips (upper surface only). Considering the size and potential speed range of the Vortex, I wanted a color scheme that would stand out and tell me at a glance which side was up!

Motivating power for my Vortex consists of an Astro 05 FAI cobalt motor, an Astro 211 speed controller and 7 - Sanyo RC2000

cells. This is spinning a Graupner 5.5x5.5 Cam carbon prop with Graupner's GR1304 Precision Spinner. I originally was planning on using an STW 40amp speed controller w/BEC but fried the unit just prior to mounting the motor and speed controller in the Vortex. This happened with a freshly charged pack and the heat and smoke generated when it shorted out would have destroyed the fuselage if it had occurred in the model. To guide this small missile through the air, I used a JR X388S radio and receiver with FMA S100 servos on the elevator and ailerons. The drawings show using one servo for the ailerons but I chose to use two FMA S100 servos with each driving a single aileron. This added a bit more weight but I wanted to play with the idea of setting up the model for flapperons and using them in flap mode to allow for slower landing speeds. The Astro 211 speed controller is not a BEC (battery eliminator circuit) unit so I have used a 50 mah or a 110 mah receiver pack to power up the receiver and servos. Fully assembled and ready to fly, the Vortex weighed in at 36.25 ounces, 1.25 ounces over my target weight. I can account for this extra weight in the use of the extra aileron servo and the non - BEC speed controller than other speed controllers that could be used. Wing loading for my Vortex works out to 19.1 oz./sq. ft. The C.G. was set as shown on the plans.

Prior to first flight, I ran the numbers for the Vortex through ElectriCalc to get an idea of flying speed and motor duration. ElectriCalc is a computer electric flight prediction program that gives you the ability to look at different model/motor/cell combinations and look at airspeeds, climb rates and prop, cell and motor set ups. It appears to be fairly accurate and hence useful when setting up your model. The program showed a stall speed for the Vortex of 16 mph and a top speed of 66 mph at full throttle. Peak climb rate was 1346 feet per minute at 40 mph. At full throttle, duration would be approximately 3.7 minutes but could be extended to just over 7 minutes at 75% throttle. With a small prop and a prop to pitch ratio of 1:1, the prop will be cavitating and very inefficient at low speed and the model would expect to be sluggish until the speed picks up and the model gets up "on step". I definitely wanted to be sure it was thrown with some energy!

First flights were delayed by weather and scheduling but finally everything lined up and it was time to head out to the field. I asked club member Pete George to join me and help out with throwing, photos and his impressions of flying the Vortex. After range testing the model and transmitter, it was finally time to put the Vortex in the air. Pete gave it a good wings level toss and the model settled just a bit before picking up speed and heading skyward. I had to put in a couple of clicks of up trim during the climb and the ailerons were right on. This is not a particularly large model and with the sky being a low, gray overcast, keeping it in sight was imperative. This is a fast model but it does track solidly and goes exactly where you point it. Aileron rolls were axial and quick (1-1/2 to 2 rolls per second). With judicious use of the throttle, I had a 6+ minute first flight. The landing was a bit hot and the model covered a lot of ground on approach. Even though the landing was smooth, I ended up breaking the Graupner 5.5x5.5 Cam prop. These are great props but with very thin blades, they are quite brittle. I later used both Master Airscrew Scimitar and G/P Series props in 7x5 and 7x6 sizes. Performance with these is similar and the props are far more durable (and less expensive!). I'll try some APC props soon. It appears from ElectriCalc (and I've read it somewhere else too) that I will need to go up in prop diameter an extra inch to pull the same amps with the APC props that I do with the Master Airscrew props.

Robert Cavazos and Cavazos Sailplane Design have a great model in the Vortex SP. This is a quick building, well made model that you can tailor the performance of by your choice of motor. The use of a Speed 600 size motor will give one a fun sportplane with reasonable performance, an Astro 05FAI will give you even more performance and the use of an Aveox or Kontronic motor will give you ballistic performance nearing that of specialized pylon racers. Check out the Cavazos Sailplane Design website and read up on some of the other motor/prop combinations being used. You can reach Robert at:

Cavazos Sailplane Design
12901 Foreman Ave.
Moreno Valley, CA 92553
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http://members.aol.com/rcav/

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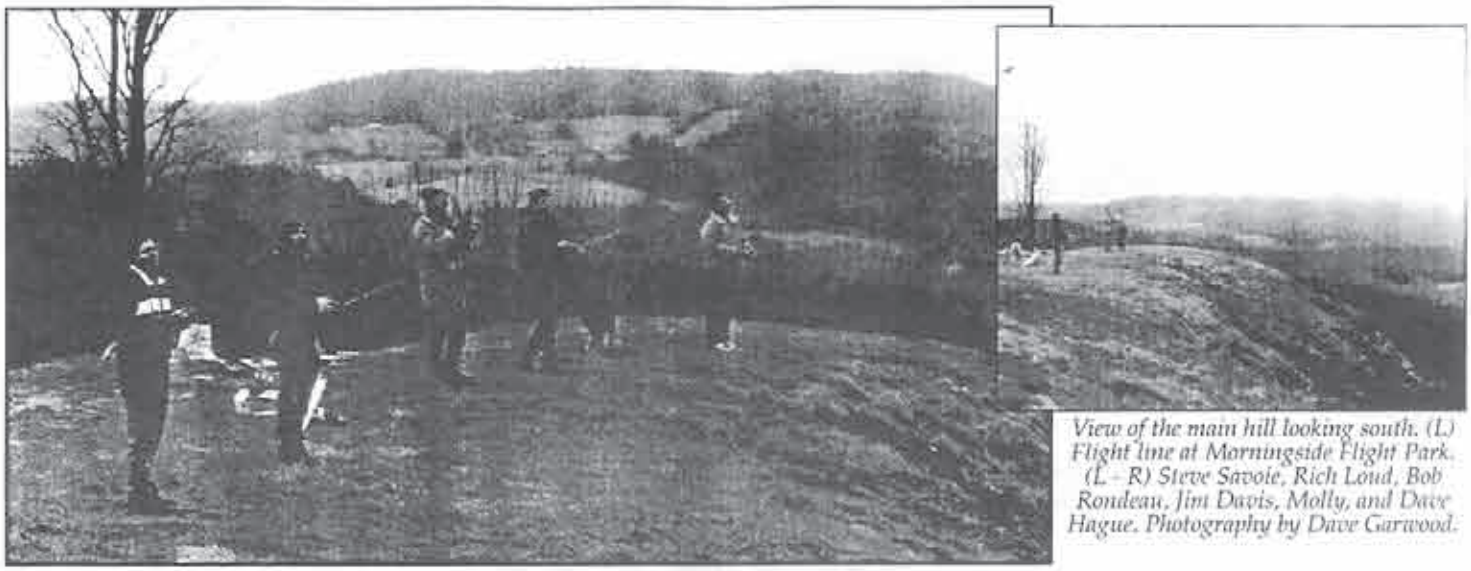

View of the main hill looking south. (L) Flight line at Morningside Flight Park. (L - R) Steve Savoie, Rich Loud, Bob Rondeau, Jim Davis, Molly, and Dave Hague. Photography by Dave Garwood.

HAVE SAILPLANE, WILL TRAVEL!

Tom H. Nagel
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This column is dedicated to soaring vacations. This month, Jim Davis of Ballteboro, New Hampshire shares information about a great place to slope, a place that not only welcomes RC sailplanes, but was designed from the ground up as a slope flying site. Thank you for volunteering this article, Jim!

Morningside Flight Park

By Jim Davis
Ballteboro, New Hampshire

I have developed a passion for R/C soaring, and especially slope flying, in the last two years, ever since taking a model aviation course offered by the University of Vermont. The instructor, Bob Rondeau, became one of my flying buddies. I live in the northeast which presents a pretty big problem for a sloper: where to fly? Like so many of us, I dream of the day when I can get to the west coast and give that new composite racer a toss off some 200 ft. cliff that goes north and south as far as the eye can see. But the reality is that 3000 miles separates us East Coast folks from the shores of California. So off I went in pursuit of a slope that meets some pretty tough criteria in these parts. First of all, it has to face the direction of the prevailing wind. It has to be accessible by car. It has to have a grassy (or not too rocky) place to land and stand while flying, and it has to be owned by someone who understands the obsessive behavior of the slope junky.

Fortunately, I have a job that permits me to travel around Vermont and New Hampshire with a great amount of freedom. (I hope my boss doesn't get his hands on this magazine!) And, of course, I keep a sailplane or two bungied up in my car, typically my Great Planes Spirit for slope testing, and my NSP Sparrow for the speed rush.

I believe my slope requirements and a bunch more are met at Morningside Flight Park, which is located in North Charlestown, NH. just four miles south of Claremont, NH on New Hampshire RT 12. On the surface, Morningside Flight Park is a hang glider and paraglider park, but after my flying buddy, Bob Rondeau, told me about the place, I began spending a lot of afternoons and lunch hours standing around and talking with Jeff Nicolay. Jeff manages Morningside for Phil Haynes, owner of the property, and the person who converted it from a dairy farm to a flight park back in 1977. Jeff is a tall, gangly hang glider pilot who has been very welcoming to me and my RC sailplane friends.

Morningside is a whole lot more than just a hang glider hang-out. The 80 acre park includes camp sites at the summit and nice sized pond to swim and cool off in on those hot summer days. There is also a concession stand and landing strip for ultralights.

And they let RC slopers fly there! The fee for a day at the park with your glider is $5.00, which gives you access to the whole park. Camp sites cost $5.00 per person per night. This is a place you can take the whole family, or a group of slope addicts.

There is no frequency control and there are no known radio restrictions at Morningside, but there is an R/C club that, in the past, was active on the opposite side of the road. That group has not been active recently, but it would be a good idea to check for pilots at the field, which is visible from the top of the park and when driving in.

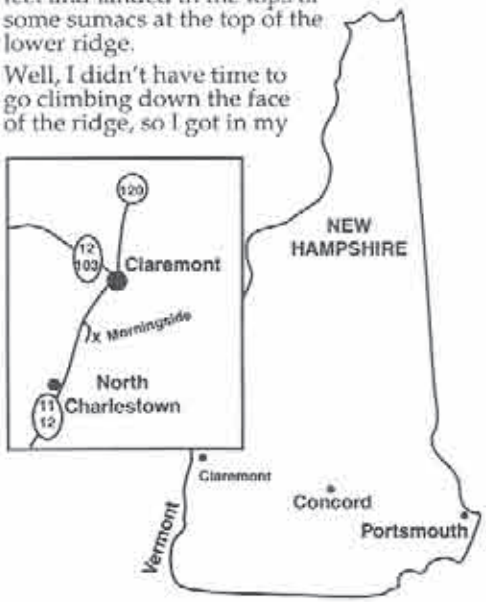
The hill itself gives you many choices depending on the wind conditions and of course hang glider activity at the park. There is a 150 foot southwest facing slope that is mowed grass top to bottom, and there is a 250 foot west-northwest facing launch site, which is my favorite lunch hour flying spot. When you look north you see Ascutney Mountain in the distance and to the south you see rolling hills that follow the Connecticut River down along the Vermont - New Hampshire border.

The weekends naturally are the busiest times at Morningside, but it has never been so busy that I couldn't get in some flying. And like the owner Jeff says, if it is too busy to fly your glider then there will be an awful lot to see. Morningside has hang glider contests and fly-ins which bring people together from all over the world. I have flown there on days when there were 10 hang gliders soaring 2000 feet above me in the monster thermals that are generated by all the freshly mowed hay fields surrounding the park. I have also flown there on a lot of days when I have had the whole place to myself. Those are the days that I like to fly off of the 250 foot west-facing slope.

One of the things that adds character to Morningside is the animals. There are ducks, geese and sheep wandering the grounds. My personal favorites are the mountain goats that wander up and down the slopes. Their presence adds a lot to the alpine soaring experience.

This past summer I was enjoying a lunch hour flight with my brand new DG-200 from Unbeaten Path Imports. It was a beautiful sunny day with a steady 5 to 10 mph west wind. I flew a couple of passes really low and then went for some altitude so I could get far enough out in front of the hill to try some slow thermal turns with a couple of eagles that had come in to check out my plane. Just as I was going to settle into some lift, my glider made an erratic left turn and spiraled in from about 600 feet and landed in the tops of some sumacs at the top of the lower ridge.

Well, I didn't have time to go climbing down the face of the ridge, so I got in my



car and drove down to the check-in area and told the guys in the hanger what had happened. They told me to go ahead and go back to work and they would retrieve my plane for me later on in the day. Fortunately, my schedule allowed me to get back to Morningside the next day, and there was my glider waiting for me in the hanger. These are the kind of people running Morningside.

Naturally I was the butt of their jokes for a couple of weeks, but I can take a joke especially when my new glider was back where it belonged.

Following a short inspection of my glider, I discovered that the loss of control was caused by a bad connection at the wing root. Since that day I have switched to a wider tape for securing the wings.

There are lots of other stories I have heard about some not as fortunate as me. A deer hunter reportedly found the remains of a couple of gliders way east of the hill. Remember to make sure you have a good charge on your batteries if you fly Morningside, because the thermals out front of the slope are really big.

In October of 1998, Bob Rondeau, Dave Hague, Dan Ridgeway and I met at Morningside a little after noon to find just about perfect conditions: 20 mph west to northwest wind and mostly sunny skies to warm us as we stood in the wind on the 150' southwest slope. The SW slope is best for a group session because of the large grass landing area and beautifully mowed slope all the way to the bottom. I had finished a new Sparrow from NSP and was really anxious to see how she would handle. Bob brought his usual gaggle of planes including a Foaminator, a Freedom, and his pride and joy P-51 which was a real treat to see fly. Dave had a Spirit fully loaded up with lead, and he had more time in the air than all of us I think. Dan brought an experimental design of his own, with a 48" symmetrical wing and a really slick tail with double vertical stabilizers. It looked a little like an A-10. There were as usual a lot of transmitters passed around, which always makes things interesting.

I am very glad Bob brought his foamy because I planted my Sparrow in the ground and stripped out an aileron servo. Having the foamy on hand meant I didn't get stuck without a glider, again thanks to Bob. We all stood on the ridge contemplating some combat, but as a group decided to just enjoy the day without any mid-air contact, or even worse the dreaded walk of shame to go retrieve a glider at the base of the hill. We flew for a couple of hours joined occasionally by two wandering hawks. It was a truly great day for us all.

I went home and put a new servo in the wing of my Sparrow, re-adjusted the throws and the dual rates and went back the following Thursday for some high speed fun. I put my radio down on the ground after a soft landing at my feet and my hands were shaking so bad I couldn't zip up my jacket. I looked north and then south and the grass below me suddenly turned to sparkling blue ocean and a bright orange sunset warmed my face with the sound of breakers below the 250 foot ridge. Who needs California?

***

Morningside Flight Park is located at 357 Morningside Drive, North Charleston, NH 03603; phone (603) 5452-4416, fax (603) 543-9577. Their web address is http://www.cyberportal.net/morningside/morningside.htm. The site is full of pictures, facts and some excellent graphics. Morningside e-mail: <morningside@cyberportal.net>.

With the help of *RCSD* contributor, Dave Garwood, and the Brattleboro Area Flyers, Jim Davis hopes to organize an East Coast slope event at Morningside next spring. You can contact him at jdvrmnt@sover.net or watch the Morningside web page.

***

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

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FIGHTING FOAM & HEAVY IRON
VOLUME 3, NUMBER 2

Chris Whynot pilots this Pacific Airborne Model's Protage in the 48 inch wing class at Poway event.

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Pump and Punch at Poway

Like to fly for speed? Like bashin' foam airplanes together and laughing 'til you can't breathe? Or need some real fun that does not require removal of any clothing? Try what an un-official group of San Diego County fliers did at the Poway slope site in Poway, California a few weekends ago! They held a thing called a 'Combat Slope Race', this one being the first in what is planned to be an annual event. What in tarnation is this, you say? It is what it sounds... Turn laps on a short pylon course in a crowd of ten to twelve crash-proof combat planes and try to score the highest lap count possible.

Sounds easy? Well, let's sweeten the pot a little. How about making it so you have to *round* the far pylon, not just break its plane on the slope... With no caller, either... Yeah, the *far* pylon, where your depth perception stinks! I heard more cuts called at this event than any other slope or power pylon race I'd ever seen.. It was absolutely devilish in its treachery! And that's not counting the ones that actually imparted some energy to the pylon itself... Heh, heh, heh.. It's pretty funny seeing the plane sink like a dead fish after hitting a PVC pipe pole! Now, you're also navigating to avoid collisions the whole time. Although collisions and deliberate aerial sabotage of your fellow competitors is happily endorsed, think twice, because it's a time waster.. Remember, you want to score *laps*, not *kills*. This means you have to stay cool as a cucumber, have muscle memory hardwired for that far pylon, and be ready to take evasive maneuvers while maintaining energy to stay in the running!

This was a LOT of fun, and was fairly simple to structure, as you could run several pilots in a heet. Each flier flew two heets, and the highest scorers proceeded to a final heet, with accumulated score determining the winners. As is normally done for combat events, there were separate classes for different airframe configurations: 48 inch wings, 48 conventionals (tailed airframes), 60 inch plus Giant scale warbirds, and a micro warbird class. Surprisingly, my own winning lap count in the 48 inch conventionals matched the first place finisher's in the 48 inch wing class, so the divisions may blend next time. A hearty thanks to Terry Trimble for his CD duties on this one. If you want more info on this format or info on attending next year's contest, contact Terry at <terytrimble@msn.com>.

Patton Aircraft Me262 at Poway. Slick looking ship flies smartly even with its large frontal area.

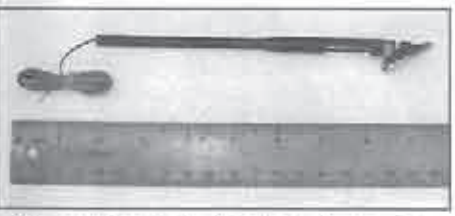
Looking for More Combat Foam?

There's a relatively new maker on the block: Patton Aircraft. They made a strong showing at the recent Poway Slope Combat Race, and Steve Patton flew well for the camera, so I thought I'd tell you guys a little more about them and give you a look at some of their products. Their lineup of standard conventional class warbirds includes several unusual models including the Mitsubishi A6M5, an Me262 and a Bell P-63 King Cobra. The models are nice and simple, utilize 1.3 lb. foam for the wings, 1.9 for the fuses, and coroplast for the tail groups. These planes are all 414 square inch areas and weigh in between 32 and 38 ounces all-up weight. They're a bargain at a $59.99 retail (plus S/H and tax), with the exception of the Me262 at $79.99. Why the big difference in price? The fuselage is pre-shaped on the '262 to insure that classic, shark-like look.

(Below) Paul Krieger does the honors for Ren at Torrey Pines Glider Port in San Diego. Big planes like the DAM '109 can be a mighty fistful of plane to launch, so a helper is always handy!

(Right) Ren DiLeo and his beautifully done Durable Aircraft Models Bf109G. Awesome paint and detailing; see text for how it was done!

F-21 Predator rounds pylon at the Poway Slope Combat Race.



QE covering iron by Bass Lake Aeronautics. Ideal for field use, as it'll run off your car or field box battery. See text for additional info.

The extra bucks aren't such a bad deal for having this major step done for you by an expert builder, Steve himself. Steve is also offering a series of micro-size EPP warbirds for $39.99 each. These are definitely cute little devils with 32 inch spans, 160 square inch area, and weighing in at about 10 ounces. Currently available are a Focke Wulf Ta-152, Curtiss P-40 Warhawk and a North American P-51D. Steve says they're snappy and fun in light or heavy lift. They sure had a good time with 'em at Poway! Check out Patton's stuff on the web at <http://home.earthlink.net/~pattonacft> and see their stuff, or give Steve a call at (909) 987-4240 for hard copy data.

Handy Travel Companion

Check out this little gem! The QE covering iron by Bass Lake Aeronautics. At a mere 8 inches in length, this little iron is small enough to keep in your field box and it'll run off 12 volt power! That means you can make repairs to covering material on your planes right at the field, which can be a good thing at remote sites or if you're on a trip. It's part of my own field equipment now, and will definitely go for the ride on all my trips, where in the past I've had to lug an ordinary iron with me and needed to wait to get back to the hotel room for even basic little repairs. Instead of slapping tape all over a wounded warrior, now you can make it perfect again right on the spot.

Remember, diligent maintenance of your foamie planes can greatly improve their longevity! Get yourself one of these handy little buggers from Craig at Bass Lake Aeronautics, 40730 Foxboro Court, Bass Lake, CA 93604; phone: (559) 658-8429. They go for $22.50 plus S/H and California kids gotta' pay the Governor his 8.25%.

Ren's Gorgeous 'Gustav'

This month's Reader's Ride nod goes to Ren DiLeo of San Diego, California and his 1/8 scale Bf109G in Russian front livery from the Durable Aircraft Models giant scale EPP kit. I've been fortunate enough to see this plane in person and it's one outstanding example of Ren's building skills. Here's some of his secrets to that killer finish... The airframe was built per DAM's plans for the most part, although a scale cockpit cavity was created and adorned with full detail, including the instrument panel and an Arcadia 1/8 scale German full body pilot figure. The panel was created by copying a photo of a real Bf109 panel, then overlaying it with clear plastic. Rubber O-rings were placed as bezels around the instruments, and the opaque portion of the panel painted gray. This was installed over a balsa backing, then pins were used to simulate knobs and switches. The armor plate seat back was formed from balsa, then filled and painted. Even the gunsight is faithfully reproduced by a shaped balsa body and stem with an acetate plastic reticle. The canopy rails were formed with brass angle stock and acetate plastic panels fitted from the inside. all this yields very realistic detailing. The airframe was covered with silver Ultracote, then shot with a primer coat of silver Formula U paint, which Ren says gives a great base for color coats. Color was applied using Floquil paints capably shot through Ren's airbrush. After color was complete, the plane was shot with clear satin polyurethane to unify the finish gloss and provide some protection for the color coats. Markings are Major Decal contact set graphics by Northeast Screen Graphics (available at most hobby shops). One note to pass on... Ren built his '109 with the flaps and he says it's added a great deal to his enjoyment of the plane; something to think about if you decide to build one. This is a great flying model, and an excellent way to get into a large scale PSS model without the high anxiety level. Congratulations to Ren on a superb model.

(Above) Tom Ramirez and Chris Whynot flying Durable Aircraft Models P-51D's at Poway event. These fabulous models look awesome in formation!

Patton Aircraft P-63 King Cobra at Poway Combat Slope Race.

Inland Slope Rebels PSS Spring Fun Fly, Cajon Pass, California

That's right boys and girls... The PSS Spring Fun Fly will soon be upon us! The ISR guys are prepared to treat us to the manly man's soaring event of the year at spectacular Cajon Pass where combat is not verboten and planes that look like planes are the order of the day! This will be the second year for this event and from the sound of it, attendance of the adrenalin-addicted will again be large. I'll be there for sure, and I know there's several folks traveling from great distance to enjoy a weekend of pure power slope scale flying. Awards will be given for Best Jet, Best Civilian, Best WWII, Best Prop, Best Crash, and Pilot's Choice, so get out your airbrushes and make it count! The event is scheduled for May 22 and 23rd at the Cajon Pass site just off I-15 near Victorville. Contact Brian Laird for complete details: Brian Laird - CD, ISR PSS Spring Fun Fly '99, <Slope_Scale@compuserve.com>, (909) 924-8409.

Peeling Off

Well, that does it for this edition. We're hoping to see some of you at the Cajon Pass event ready to lock and load with the Heavy Iron! 'Til then keep 'em ready on the ramp, and save a shot of the best Scotch for the ones that make it home.

■

During the practice session on Friday, there was plenty of flying to be seen between rain showers. Here, Alex Frisch, with his 1/3 Wilga is getting ready to tow a 1/3 Fox. The gorgeous 1/3 Frisch Wilga towed all the largest sailplanes at the Akro-Cup. This giant is perhaps the most docile towplane around and, with its King 140 up front for power, it's a brute. Look to see one of these at the Pensacola February fly-in.

Robin Lehman
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1998 Akro-Cup

I had the great pleasure of visiting a most interesting and unusual sailplane event in Germany this September: the 1998 Akro-Cup. All I can say is WOW! Organized by the DMFV (Deutsher Modellflieger Verband) this aerobatic sailplane event drew 26 of the hottest sailplane pilots from all over Germany, Austria and elsewhere. Pilots came from far and wide to test their aerobatic skills.

Scale?

There were all types of "scale" sailplanes and towplanes to be seen, from totally scratch-built scale models to ARF all-glass kits. We would call this a "scale" event here in the USA, but the Germans rate this as "semiscale" because although the gliders were required to resemble their full-sized counterparts, they didn't have to be exact scale, with every little detail included. While some of the sailplanes were not completely scaled out, many of the gliders were museum scale, complete with detailed cockpits, retracts, control horns and fully operational canopies. For example, one of these, Harold Seitz's Kobuz 3, won the German *scale* sailplane competition a year or two ago.

Size

Most of the aerobatic sailplanes were 1/3rd scale. The smallest was Marcus Lange's 1/5th Grob G-103 Akro while the largest (and perhaps best performer) was the gorgeous 1/2.2 Bruckmann Swift. At 5.8 meters span and 16.5 kilos, this was a real floater while at the same time capable of any and all aerobatic maneuvers. 13 year old Marcus was the youngest competitor and was given plenty of encouragement by everyone there. As you might expect, modern sailplanes dominated, but there were several "classics" such as the excellent LO-100 and the Habicht from the 1930's.

Comparing the flight performance of these various sized gliders, it was pretty obvious that the larger sailplanes flew better and much more realistically and also, perhaps were easier to fly. Certainly the very smallest seemed the most difficult to control and fared worst.

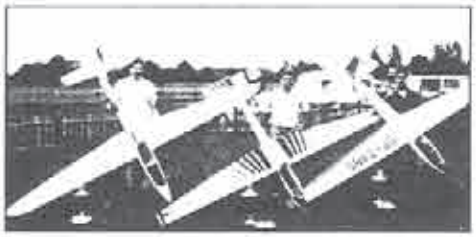
The Best Pilots Seem to Always Fly the Best!

The first day of the event (Friday) was a practice day and many pilots had the opportunity of flying different gliders. Watching these guys fly, it became obvious that the best pilots always flew best no matter what they flew. But again, it was also pretty clear that the larger gliders gave

The largest sailplane at the event was the enormous 1/2.2 Bruckmann Swift, which was also certainly one of the best aerobatic ships there. It put in what was perhaps the best flight of the weekend during the practice session prior to competition. This scale sailplane was majestic, realistic, and wonderful to see performing its aerial ballet!

The 1/4 Finist piloted by Ulf Reichmann towed all the medium sized gliders. A good pilot, he made perfect landings every time. The towplane was powered by a King 70, capable of towing up 1/3 Foxes weighing around 30 lbs. The full size Finist is a Russian utility STOL aircraft, roughly the equivalent of a Beaver.

Jan Kurt Hoffmann is the person in charge of the scale sailplane scene from the DMFV, which is kinda like the AMA, in that all pilots pay yearly dues and, in return, get insurance. Also, with the yearly fees collected, the DMFV organizes the events all over Germany, purchases the trophies, hires the judges, and pays for their travel and accommodations. Here, Jan Kurt is holding the little demonstration model used for a "brush up course" in aerobatics, to make certain that all the judges would know what the maneuvers look like.



...And the winners are (L - R) Thomas Gleissner (3rd) with his 1/4 Fox, Stefan Folker (1st) with a 1/4 Swift, and Harold Seitz (2nd) with museum 1/3 scale, 100% scaled out Kobuz-3.

Akro Cup Results

#	Name	Model
1	Stephan Volker	1/4 Swift S 1
2	Harald Seitz	1/3 Kobuz-3
3	Thomas Gleissner	1/4 Fox
4	Frank Oeste	1/2.2 Fox
5	Hans Wallner	1/2.2 Swift S 1
6	Markus Böhm	1/3 Lo 100
7	Christian Ebert	1/3 Fox
8	Andreas Bindewald	1/3 Lunak
9	Matthias Paul	1/4 DG 300 Akro
10	Gerhard Birkl	1/3 Mü 28
11	Ulrich Seitz	1/3 Kobuz-3
12	Rainer Seiboth	1/4 DG 300 Elan Akro
13	Thorsten Witt	1/4 Mü 28
14	Reinhard Melz	1/4 Swift S 1
15	Detlef Schembecker	1/4 Fox
16	Michael Sommerfeld	1/4 Mü 28
17	Ulrich Wax	1/4 Lo 100
18	Gerhard Bruckmann	1/2.2 Fox
19	Thomas Hoffmann	1/4 Mü 28
20	Enno Scheer	1/4 Mü 28
21	Bernd Zander	1/3.5 Foka Szd
22	Christian Albrecht	1/4 MDM Fox
23	Hans Jürgen Kutz	1/4 Fox
24	Willy Hirsch	1/4 Mü 28
25	Marcus Lange	1/5 Grob G-103 C Acro
26	Martin Krüger	1/4 Habicht

the better aerobatic performances. The best pilots (or those who practiced most) quickly dominated. As long as they flew a sailplane which performed well, it really didn't matter all that much what they flew.

Extra Weight for Extra Energy?

Now that I have seen the Akro-Cup first hand, I've changed my mind about loading an aerobatic sailplane up with a lot of extra weight. I tried adding weight to my Roedel Fox and found that it was *harder* to fly rather than easier. This doesn't mean that some aerobatic sailplanes wouldn't benefit from a little extra ballast, but it does mean that ballast can help some and hinder others; this has to be approached on a case by case basis. In my experience, as long as an aerobatic glider flies well, it may or may not benefit from extra ballast. Of prime importance in either case is proper energy *management*! Just the right amount of speed is necessary for a given maneuver – no more and no less. That's what counts and is perhaps the most important single factor in flying aerobatic maneuvers with sailplanes!

The Aerobatic Routine

The pilots were required to fly a "known" aerobatic routine. This is the same routine flown in last year's Akro-Cup (published on the Internet two years ago) so those who could practice had plenty of time to do so! Having the same stunt routine for two years in a row seems to be a good idea.

The required aerobatic sequence was quite demanding, with plenty of inverted and vertical components to contend with. Consequently, the pilots started their routine as high as they could to give lots of room for errors. The expert skill level of almost all the pilots was evident from the outset. Very few mistakes were made and there were no crashes with three rounds flown. The three rounds were scored with a "throw out" so as not to penalize anyone who had one bad mistake. As might be expected, the best pilots led from the very beginning.

This is what they flew:

1. 2 turn spin
2. Split-S
3. 1/2 roll to inverted
4. From inverted, 45 degrees up and 5/8 inside loop to right side up level flight.
5. Square loop
6. Cuban-8
7. Humpty bump with 1/4 roll going up and 1/4 roll going down then push to level inverted flight
8. 2 point half roll to right side up
9. 180 degree turn climbing up at 30°
10. Landing

These were flown in consecutive order, with one maneuver leading directly into the next, resulting in a sort of three dimensional ballet.

Five judges graded each flight with the highest and lowest marks thrown out. The gliders were required to perform these maneuvers within a flight "box" marked by poles placed in front of where the judges sat.

Every Cloud Had a Silver Lining!

Because the weather report was terrible (rain, *rain*, RAIN!) and it *did* rain every day, flying was done whenever possible. In spite of the foul (and cold) weather, three rounds were completed for everyone.

The cloudy weather did have some benefits; as it turned out, all the flying was done in calm winds and the gray, overcast sky provided excellent conditions for an aerobatic event. The pilots weren't blown off course and enjoyed velvety smooth air for landings. Perhaps most important of all, silhouetted against the clouds, the towplanes climbed to maximum height which gave the gliders plenty of room to maneuver. Almost everyone started their stunt routine as high as they could get (somewhere around 2,000 feet).

It rained off and on every day, and you could never tell when it was going to be OK to fly. This resulted in some pilots flying well past sunset. On Saturday, just as the sun was setting, the last few pilots got a chance to show their stuff. It was a beautiful sight to watch the gliders and towplanes take off into the beautiful reddish sunset! Those pilots had to know their stuff, because the sky was already quite dark overhead where they had to perform their aerobatics!

The Towplanes

Each sailplane was hooked up and towed after the previous competitor finished his routine and landed, leaving the airspace and the landing strip free and unencumbered for the next pilot.

Three pilots shared the towing: Alex Frisch with his magnificent 1/3 Wilga (powered by a King 140) pulled the largest sailplanes; Ulf Reichmann towed smaller sailplanes with his Frisch 1/4 Russian Finist (powered by a King 70); and Frank Traut took care of the rest with his 60 powered non-scale Freddi-2. Each of these guys took turns towing and so, for the tow pilots at least, it was a very leisurely affair.

Alex's 1/3 Wilga was a real beauty and had plenty of extra power to pull the largest sailplanes there. Alex has a most interesting way of "warming up" at the beginning of the day. If you don't know what's coming, it's a real attention-grabber!!!!! He starts the motor, casually hangs onto the top of a wing and goes to full throttle to check things out. With everything OK, he lets go of the Wilga and guns it. After 50 feet or so, right on lift off – no more than 4 feet off the ground - he banks the giant Wilga into a knife-edge and climbs out! The first time I saw this, I thought he had radio trouble or something, and was going to crash! It's quite spectacular, to say the least! Now that's a good way to warm up the eyeballs and the brain!

Other Interesting Towplanes

During the many rain breaks throughout the weekend, some other very interesting towplanes were flown. Gerhard Bruckmann gave many tows with his new, large 1/4 Piper Pawnee and Swiss Trainer. Both were extremely easy to fly, very stable and came in for wonderfully slow and controlled landings. We all fell in love with these two – especially the Pawnee (Sailplanes Unlimited is importing a few of these this spring).

You might just see one or two of these at Elmira '99 this year.

Other Demos

Other demo flights by Stephan Volker and Thomas Gleissner wowed the crowd with full-throttle spectacular *aerobatic* air tows. Diving at the ground at full speed, they performed tandem rolls, loops and Immelmans, with both towplane and glider still attached (1/4 Jodel Robin towing a 1/4 DG-300?). It was great fun to watch! By the way, Stephan won the Akro-Cup event for the second year in a row and Thomas came in third.

Then Frank Oeste, flying the Bruckmann Pawnee, towed 2 DG-300's up at once and, not to be out-done, with his 1/4 Cap 232, Klaus Dettmar flew a flawless, low level aerobatic routine to the accompaniment of music. His rolling circle with 4 perfect snap rolls was something I've never seen before! Klaus is one of the best pilots in Germany and worthy of the Tournament of Champions. He came in second this year at the scale aerobatic championships held last summer. Appropriately, Klaus was the chief aerobatic judge and certainly proved his skill in that regard.

Training the Judges

These guys take their judging very seriously!

All the judges met earlier in the summer to go over the various maneuvers in the aerobatic routine. These guys take this stuff very seriously and they go to great lengths to make certain that everyone knows what the maneuvers should look like. As a "warm up" to the competition, all the judges got together again for a "refresher" with Klaus demonstrating the required routine with a (hand held) small model airplane.

Fun, Food and Drink

Organized by the Ikarus Flugmodellclub of Harsewinkel, there was plenty of wonderful food, drink, warm friendship and spectacular flawless flying to be enjoyed.

The organization was impeccable. The warmth and friendliness of everyone there was unsurpassed and frankly, it was one of the nicest and most interesting events I've ever attended. Don't miss this one if you ever have the opportunity of attending!

Super Sportsmanship!

Although a serious competitive event, a very friendly and relaxed atmosphere prevailed throughout. Competitors always helped out other competitors! When in need, there was always someone willing and able to lend a helping hand! This was the highest level of sportsmanship I've ever encountered at a competitive R/C event anywhere in the world. It was wonderful!

Next Year's Event

It's interesting to note that next year's Akro-Cup (planned for August 27-29 in Bad Neustadt/Saale near the Wasserkupe) will be even more demanding. What follows is a most interesting letter from Frank Oeste:

"Flying season is over and so I want to give you some information about what has been going on in the Akro scene since Harsewinkel.

"Harald Seitz, Andreas Birchwald, the guy who flew Bruckmann's LUNAK in Harsewinkel, and I have been very busy since then, because Jan-Kurt and the DMFV want to have the new Akro program for 1999 + 2000. Some guys met near Frankfurt on the 7th of November, and there we formed the new program. Gerhard Bruckmann was so excited about the new one that he and Hans Wallner decided to fly this program as well in 1999 in Austria, when they have their national championship on the 6 - 8th of August.

"My big 1:2,2 SWIFT S-1, which Gerhard delivered at Harsewinkel is mostly finished. I'm looking forward to fly it at the beginning of the new year. After the SWIFT, I would like to start a new project. A dream for me was always to build a big glider from the years before WWII, completely made out of wood. So I calculated for some months, drawing plans, and am working on something... It will be 1/3 in size with a wingspan of 10 meters, 3m fuselage, 0,65 meters high. (*What is Frank building? Can you guess? He left out this vital information. What vintage sailplane has a span of 30 meters?*) I'm not the fastest builder, so it will take a while, but I will finish it some time. There is good information about that aircraft in Martin Simons' "Vintage Sailplanes" book.

"The new program is difficult, but I flew it for about five times - it works. Klaus Dettmer will create an unknown program, designed out of thirty figures, we will present in the next time.

"So, a lot is going on. We have a very cold winter, about -10 degrees Celsius at the moment. That means no flying so far, so we enjoy looking at the videos and pictures from the last season.

"Next year there are some dates, which you should remember. The Akro scene will meet for a training event, one weekend near Frankfurt from 6-8th of August. The Akro Cup of Austria will take place in Feistritz/Gail in the south of Austria near G. Bruckmann's house. From 27-29th August the Akro Cup of Germany will take place in Bad Neustadt/Saale near the Wasserkupe. The week before that Gerhard and Hans will come to the Wasserkuppe to meet with Andreas and me for one week flying in the mountains. And last but not least there will be a model air tow meeting like Elmira about 50 km north of Frankfurt, most probably end of July. It will last a few days, organized by the DMFV."

Getting to know an Aerobatic Sequence

If you want to get a feel for a new stunt routine, get a small model airplane (any little tin model will do) and, holding it in your hand, "fly" it through the maneuvers. In just a few minutes, the aerobatic sequence will become clear to you. Interestingly, this is how the full-sized pilots tackle their "unknown" routines. They "fly" the aerobatics on the ground. You will often see the (full-sized) pilots dancing around with either a small model (sometimes glued onto a long stick) or using their hands to simulate the aerobatic routine they are trying to "fly". This leads to a wonderful sort of slow-motion dance on the ground. You will sometimes see several pilots "practicing" at a time. It helps to get the aerobatic routine established in the mind as well as getting some sort of physical feeling for what's required. It helps the pilots to figure out when and how to fly each maneuver and where to place the airplanes for the easiest and best entry into the next maneuver. It also helps them figure out how much airspeed is required and how much energy it will take to complete each and every maneuver. Practice, practice, *PRACTICE at every opportunity!* The very best pilots do it all the time!

The full-sized sailplanes fly a "known" stunt routine as well as an "unknown". The "unknown" routine is given them a day or so before they are required to fly it, and they are not permitted to practice with a real airplane. As if the new Akro-Cup stunt routine is not already difficult enough, there's some talk of having an "unknown" sequence as well. It's a good bet that the Germans will add this in the very near future.

The Gap Widens

Where are we going with sailplane aerobatics here in the USA? I can't really say. The sad fact is that we couldn't even get our little – and *very* modest – aerobatic competition off the ground last year, and nothing new is in the planning stages for any possible future events. To say that the Germans are light years ahead of us in this regard is an understatement.

STOP PRESS!

I've just had the pleasure of viewing John Derstine and Steve Ramsdell's new Elmira tape. It's their best effort yet! The Elmira coverage is very well done with varied and interesting segments on towplanes, aerobatics and interviews with some of our German friends. The highlight for me (and for many of those who attended Elmira '98), is the demonstration flight of Heinz Weissenbuehler's (full sized) modified extra long-winged ASH25. This ultra high performance sailplane put on quite a show for us. After take off, he does some high-speed turns really stressing the wings. You won't believe just how bent the U-shaped wings really get in these high-G 360s. He then proceeds to fly two low passes before landing!

John and Steve then take us to Germany where we visit the Akro-Cup, Wasserkuppe, Teck and the Seglerschlepp. The highlight of the Akro-Cup is the demonstration (by the chief judge) of the required aerobatic sequence. We are then shown how it's done. We watch a giant Fox fly the routine (piloted by 4th place winner, Frank Oeste), and then Stephan Völker flies the winning sequence. It's the next best thing to being there! This gives you some idea of just how well aerobatic sailplanes can really perform.

Although we are treated to many huge sailplanes and unusual towplanes at then Seglerschlepp event, the highlight has to be the flight of the ASW27.

If you have any interest in scale sailplanes and towplanes, John and Steve's "Ultimate Scale Soaring" is the Ultimate! Don't miss it! ■

Certainly with powered aircraft, we have many superb world-class aerobatic pilots here, but unfortunately it would seem that the same cannot be said of sailplane pilots. Why is that?

Do sailplanes *really* attract none but mediocre pilots? Does no competent pilot have an aerobatic sailplane? Is there no one out there who might enjoy the challenge and gratification of pushing the limits of perfection and flying to the best of one's ability? What to YOU think? Are the only guys who could fly aerobatics alone and have no one to team up with. Do we have no aerobatic pilots because there are no competitions to train for?

Future Scale Events in Europe

There are many scale sailplane events (in Europe) planned for this summer.

If any of you can possibly attend one of these, you will be richly rewarded. You will see a quality of flying which is far beyond anything you might see here in the USA. The Akro-Cup or any of the other scale sailplane events in Germany, Austria or Switzerland are well worth attending. Indeed, I would go so far as to say that attending one of these events will completely change your perspective. Your horizons will be expanded far beyond anything you could possibly imagine. Once you see just how well it *can* be done, I guarantee it will change how you will fly in future!

Oh, and by the way, these guys have a ball when they get together to fly! It is a lot of fun – why not give it a try – you might like it!

Good flying, and enjoy! ■

Elmira Update
from John Derstine

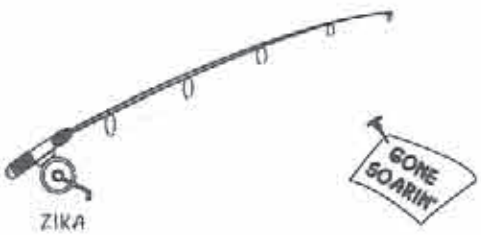
Please note that we have blocked the following frequencies for EXCLUSIVE use by the tugs at Next June's Elmira Aerotow (June 10-13). No one will be able to fly a sailplane on any of these frequencies. Anyone bringing a tug, should make sure it is on one of these channels if they expect to tow.

While this may be an inconvenience to some, the over all management of frequencies and event flow will benefit all who attend.

1. 72.29-channel 25
2. 72.31-channel 26
3. 72.13-channel 17
4. 72.93-channel 57
5. 72.37-channel 29

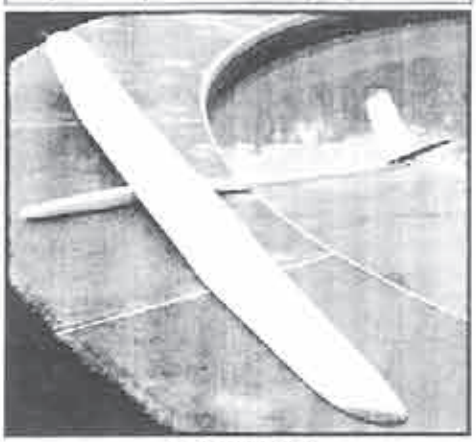
Full info. at The Scale Soaring Page: http://www.Geocities.com/CapeCanaveral/Lab/5739

■



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.



Hera & Hades
...from ICARE Sailplanes

The Hera F3J competition glider has a long tail arm designed for smooth, gentle and predictable handling. It can handle tight, continuous thermal turns with minor input. The Hades is the slope (F3F) or F3B version, with a shorter fuselage and wings, and plenty of carbon reinforcement to withstand the high stress of fully ballasted high speed runs.

Kits contents include strong white fiberglass fuse with removable nose cone and molded servo tray. V-tail pushrods are installed. The Hades has two ballast tubes, on the bottom of the fuse, below the wings, which can accept up to two pounds of lead. The Hera has an adjustable tow hook to optimize hand tows. Hollow core molded wings are in three pieces. Center panel bolts down to the fuse and tips are connected to the center panel by means of rectangular carbon wing joiner and two locating pins. All moving parts are gapless hinged. Molded servo cover and allen keys for the different bolts are included. Radio requirement: micro servos in the wings and regular equipment in the fuse.

Hades (F3B) specifications:

Wing span:	110" (2.8m)
Wing area:	60 dm2
Airfoil:	RG15
Weight:	1.9 - 2.1 kg
Wing loading	35 g/dm2
Price:	599.00U$

Hera (F3J) specifications:

Wing span:	122" (3.1m)
Wing area:	64 dm2
Airfoil:	SA7035
Weight:	1.9 - 2.1 kg
Wing loading:	31 g/dm2
Price:	659.00U$

To order or inquire about other products, contact ICARE Sailplanes, 381 Joseph Huet, Boucherville, Quebec, J4B 2C5, Canada; (450) 449-9094, e-mail: <ICARE@telts.com>, web page <http://www.jonction.net/~icare/icare.htm>.

■

Books by Martin Simons

"World's Vintage Sailplanes, 1908-45"
"Slingsby Sailplanes"
"German Air Attaché"
"Sailplanes by Schweizer"

Send inquiries to:
Raul Blacksten
P.O. Box 307
Maywood, CA 90270
e-mail: raulb@earthlink.net

To view summary of book info.:
http://home.earthlink.net/~raulb

Rules Proposal

RES - Where are we Headed?

Bob Johnson
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During the AMA Rules Change cycle that ended December 31, 1998, I submitted a proposal to redefine Standard Class. My proposal would have transformed it into an event limiting the wingspan to 110 inches and the controls to rudder, elevator, and spoilers. That proposal, along with my rationale for it, was presented in the November 1996 issue of *R/C Soaring Digest*. Some members of the soaring community voiced a substantial amount of opposition and the AMA's Soaring Contest Board voted it down.

Clearly the concept of a rudder-elevator-spoiler (RES) class had merit for Cal Posthuma, President of the LSF, who declared that a RES event would be flown at the 1998 Nats. This was a bold move on his part and one for which I believe he deserves much praise. At the 1998 Nats, there were more participants in the RES event than there were in Nostalgia, which had been flown for several years.

RES will again be flown at the 1999 Nats. Several locations around the United States hosted some form of a RES event during 1998. RES contests are also being flown at various locations in 1999. There appears to be a substantial amount of interest in RES and so movement toward creating an AMA rulebook event is continuing.

It has been argued that there is no need for 'official' rules for RES because the AMA allows clubs to sanction events using any type of rules that they desire. The only requirement is that the rules used must be published in advance. It has also been argued that the RES movement is too new and that we should wait a while to see what evolves out of the efforts of local clubs.

Manufacturers, who must invest a considerable amount of time and money in kit development, will not commit to kiting new designs until there is a set of well-defined rules to guide them. Those who publish in the modeling magazines will also be reluctant to do so until they have rules from which they can design. Those of us who like to scratch-build also need guidelines from which we can design and build. The AMA's rules change process is a three-year cycle and the new one began January 1, 1999. Any new rules that are to appear in the next rulebook must be submitted within a few months. Now is the time to move!

Before presenting my revised RES class proposal, let's look at the AMA rules change procedure, from the Competition Regulations published by the AMA. It goes as follows:

1. A formal proposal detailing the proposed change/amendment/addition and signed by three AMA members, one of who must be a Contest Director is submitted to the AMA.

2. The proposal is forwarded to the Chairperson/Coordinator of the appropriate AMA Contest Board for review, comments, and breakdown into subparts.

3. The proposal is sent to the members of the appropriate Contest Board and published in Model Aviation.

4. The AMA accepts Refinements to the proposal submitted by the general membership.

5. The Contest Board members vote on the refinements and the proposal.

6. The initial vote results and refinements are published in Model Aviation.

7. Comments on the refinements are accepted from the general membership.

8. The members of the appropriate Contest Board cast a final vote.

Sixty percent of the members must approve each time a vote is cast. There are eleven (11) AMA districts. This means that seven (7) members of the Contest Board must cast an affirmative vote for a proposal to advance to the next step and ultimately appear in the AMA rulebook.

The procedure is rather lengthy, as it should be. This makes it impossible for anyone to add or change a rule in an arbitrary and capricious manner.

There were no refinements to the proposal I originally submitted to the AMA. At Step 5, the vote cast by the Soaring Contest Board members was five in favor of and six against my proposal and therefore it died. After the AMA announced the vote, one member of the Soaring Contest Board expressed disappointment with the proposal not having advanced past the first vote. I believe that he saw both strength and weakness in it and was anticipating that any weakness could be corrected with a refinement.

Following the publishing of the article that appeared in *R/C Soaring Digest*, a number of phone calls and letters were received by me that supported my proposal and I was optimistic about the creation of a RES class. The readers of *RCSD* that subscribe to *R/C Soaring Exchange* (*RCSE*), the Internet newsgroup, began posting their views to that exchange. As their postings appeared, it became clear that there was a substantial amount of opposition to the proposal.

I closely examined the postings to *RCSE* and did some reading-between-the-lines in an attempt to identify what aspect(s) of the proposal were unsatisfactory. Two 'themes' appeared to be present:

1. Some modelers wanted to retain Standard Class as it currently existed as a rulebook event.

2. My rules change proposal limited wingspan to 110 inches. This eliminated several larger sailplanes modelers had that they could not fly in my proposed RES event. The Sailaire is one example.

With these thoughts in mind, along with input from other glider enthusiasts, a new proposal was formulated that will hopefully meet with the approval of the soaring community. Standard Class is left alone and a new RES Class is created. That proposal is as follows:

RADIO CONTROL SAILPLANES RULES PROPOSAL

RES Class Sailplanes

a. Control of the aircraft will be limited to three functions: rudder, elevator, and spoilers.

b. Except in the case of tailless aircraft which have a portion of the trailing edge of the wing serve as the elevator, the trailing edge of the wing must remain fixed at all times. In the excepted case, where split elevators are used, they may be driven by separate servos but both left and right halves must at all times deflect in the same direction and by the same amount.

c. Barn door style spoilers and/or blade style air brakes must extend only above the top surface of the wing when deployed. The trailing edge of the spoiler/airbrake must be at least two inches ahead of the trailing edge of the wing. Two or more spoilers/air brakes may be used, but they must all act in unison.

d. The use of landing arrestor devices is prohibited. A smooth surface skid may be used to protect the bottom surface of the aircraft from scratches and nicks.

One open question is building techniques: should they be limited to built-up type structure, especially for wing and tail surfaces?

Last year there was a RES event on the west coast, which stipulated that the wing had to be of built-up construction but allowed the wing to be entirely sheeted. I'm not sure there is a significant difference between that and balsa or obechi over foam construction. There are those who claim that fiberglass over foam construction is faster and cheaper than the more traditional built-up construction methods. My prime motivation for campaigning for a RES class has been to keep the cost at a reasonable level and it would be counter productive to legislate against inexpensive building techniques.

The TG-3 and Highlander (sometimes referred to as 'foamies') have wings and fuselages made from EPP foam. They are rugged, inexpensive, beginner-type aircraft and certainly should be allowed to participate in RES. If the rules were to specify that the wings must be of built-up type construction, then these aircraft would be barred from competition. To legislate against this type of aircraft would be contrary to the concept of keeping the cost low. Also, where does a plane like the Hobie Hawk fit, built-up or composite? Its wings are plywood over foam but have open bays. Rules must be relatively easy for a contest director to interpret and enforce and should not be open to a great deal of interpretation.

The molded aircraft that are appearing in Unlimited are very expensive. Some modelers feel that if not legislated against in the rules, gliders flown in RES will soon

become nearly as expensive as Unlimited. One disadvantage to composite structures is the inertia of the wing when you try to turn using rudder and dihedral effect. Open bay construction means less inertia and therefore more rapid response to control input. This is an important factor that may very well keep molded aircraft out of RES. My personal reaction is to wait and see what happens. Remedial measures can always be introduced in the next rules change cycle.

I am very interested in hearing the opinions of the soaring community and solicit their input. If you feel that construction materials and/or building techniques should somehow be limited please speak up. Also, please suggest the wording for a paragraph in the rules proposal that will accomplish what you desire.

Shark teeth and skegs are another open issue. It is my opinion that landing arrestor devices should not be permitted on sailplanes - any sailplanes. I feel that one aspect of the challenge of flying any aircraft is energy management during all phases of flight, including the landing. With the use of teeth and skegs, there is little need to exercise energy management when landing.

Nostalgia does not permit teeth and skegs. Many of the contestants at the 1998 Nats flew the same plane in Nostalgia and RES. If one event could be flown without them, why should they be needed in the other event? One of my goals has been to make the event appealing to the newcomer. It is my opinion that simpler is more appealing and that no skegs and/or teeth is simpler.

Finally, the language regarding the trailing edge of the wing has been modified. Several people pointed out that the "fixed trailing edge" rule eliminated flying wings from participating in RES. I would like to thank Bill and Bunny Kuhlman for their assistance in pointing out an oversight on my part and for their guidance in the wording of paragraph b so that flying wings can fly in RES.

Whether or not a set of rules ever appears in the AMA rulebook, or if those that finally appear will be as stated above, or if further refinements will be made, remains to be seen. This article will likely stimulate further discussion of RES on *RCSE*. Perhaps there are still oversights that exist that need to be resolved.

Proposals to be part of the next AMA rules cycle will have to be postmarked by October 1, 1999. That gives us several months to continue discussing the proposal and make any refinements that are necessary for it to meet the approval of the soaring community. If you have suggestions or comments, my address, phone number and e-mail addresses are included at the beginning of this article. ■

VMC Retriever Model 20 Update

By Ernest Barter
Saratoga, California

As most of you know, we no longer manufacture retrievers. We supplied parts for a number of years, but business considerations have forced us to end the parts business, also. The following information is given to help the owners of these retrievers maintain and service their units.

Consumables:

1 Retriever line is available from most fishing or tackle stores. The best line for the job is 60 lb. 2 test braided dacron. A 1,200 foot length should work, depending on your winch set-up, but 1,200 feet is nominal. Our recommendation is to strip the old line off the reel, wind on a measured 1,200 feet, and note the amount of flange showing on the drum. Then a subsequent winding won't have to be measured on, just wind to the same dimension of flange showing. Braided dacron line is available from Woodstock Line Company. They are in Connecticut at 860 928-6557. They sell 60# braided dacron in 1,200 yard (that's YARD) quantities for about $22.00 plus shipping. Specify un-waxed white. The 1,200 yard spool should refill your drum 3 times.

2 Line guides (the glass ring on the wiper arm) is a Fuji NHG-16 and should be available from any tackle store. Use an end cutter and remove the stainless mount. An alternate line guide can be made from tool steel and the dimensions are shown in Figure #1. The dimensions are nominal and the material can be most any steel, but the harder the better and the inside bore should be highly polished. Our machinist uses "water hardening steel". The new guide could be C/Ad or epoxied in place. I prefer a snap ring so the guide can shift position on its own, thereby distributing wear evenly on the inside bore. If not rotating some on its own, you can give it a quarter turn or so occasionally.

3 The electrical supply plug is manufactured by Cole-Hersee and should be available from any large trucking supply company. The part numbers are No. 1102F (polarized with plastic cap) or M121F (polarized with rubber cap). The socket is No. 1292 (polarized). (Note: Ed Slegers reports that hard wiring thru a grommet in the case direct to the battery works for him. Nice idea Ed, thanks.) In any event, rewire with #10 wire and reuse the lugs at the battery connection. Remember to mark the "plus" terminal.

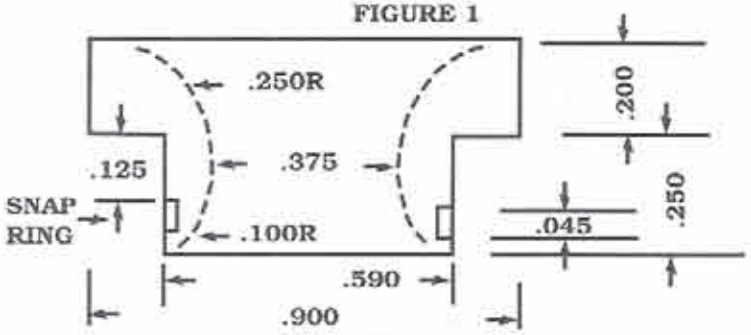
4 The untwister is a saga worth discussing. "In the beginning" we were convinced that a method of untwisting the retriever line was paramount. An absolute necessity of life for successful operation. It seems that others, smarter than us, were using a couple of swivels in the retrieve line and getting good results. (Thanks again to Ed Slegers and the guys out on Long Island, New York.) To make a long story short, it works. We still use the propeller to untwist the line now and then, but you can operate with swivels, only. You get some twists, but the line stays manageable. Figure #2 shows a harness and swivel arrangement that works. Set it up as drawn, and then you can make changes to suit yourself. The swivel size is #6, we use Sampo brand, but any should do. The #6 seems to be durable for extended periods of time. A squirt of LPS or WD40 will keep them clean and working smoothly.

Maintenance items:

1 Wear on the latch assembly seems to be the most evident to date. The notch in the aluminum, where the latch engages the cap screws will wear at some angle, and can cause the swing arm to rotate to the retrieve position during a hard launch. There are probably as many ways to fix this problem as there are retrievers out there, but Fig. 3 illustrates how our club re-worked ours. Be cautious if you make major changes to the latches weight or design. The latch as produced handles the dynamics of latching quite well.

Another maintenance item is the wiper arm that carries the line guide. It is manufactured out of .120" aluminum plate. There are a finite number of times this arm can be straightened without breaking. New arms can be fabricated, just use the old arm as a template. Again try not to change the weight too much (like making out of heavier aluminum or steel), as you can change the dynamics of the arm assembly. Use caution when changing the arm. Do not over torque the four #10 screws that fasten the arm. Also, do not let the arm bushing move inward, as the connecting rod can disengage from the arm drive shaft. ■

FIGURE 1



NOT TO SCALE

FIGURE 2

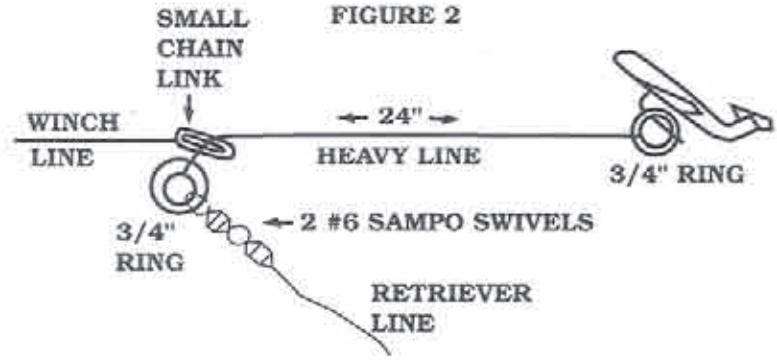
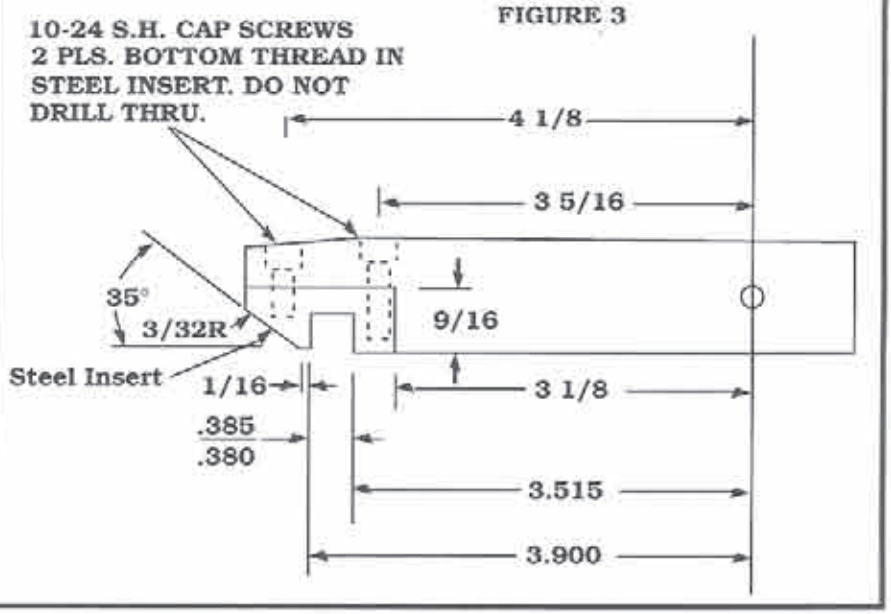


FIGURE 3



SLOPE RACE!
SLOPE COMBAT

May 14-16, 1999

Wilson Reservoir
Russell County, KS

Contact: Paul Wright
(402) 796-2175
paulw@isco.com

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L.A.S.S

1999 MONTAGUE CROSS COUNTRY CHALLENGE

Location -	Siskiyou County Airport, Montague, CA
Date -	June 10th & 11th - Practice and LSF Task Days June 12th & 13th - Contest Days
Time -	Pilots meeting at 9am, flying begins at 10pm
Task -	Free Distance within a prescribed course
Classes -	Open and Sportsman (3.2 meter wingspan or less)
Rules -	All sailplane pilots must be AMA members. The team will decide who and how long each pilot flies the sailplane. Sailplanes must be winch launched. There will be unlimited attempts allowed, no relaunching on course. Each sailplane must be identified with the last 3 numbers of the team captain's AMA number. The numbers must be 3" high and placed both sides of the vertical fin.
Prizes -	Plaques will be given to 3 members of the top 3 finishing teams in each class.
Entering -	Entry fee is $60 per team, each team will receive 3 event T-Shirts, and 3 tickets to a Saturday night BBQ. All entries must be received by May 9th, 1998. There will be a limit of 20 teams, so don't delay.
Lodging -	Camping is available on-site, no services available. Motels are available in Yreka, approximately 12 miles away.
Info -	For additional info please call Dean, Scott, or Randy at (541)899-8215 days, or Dean (541)899-7034 evenings, or e-mail us at dgair@cdsnet.net

4TH ANNUAL

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

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

August 13 - 15, 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

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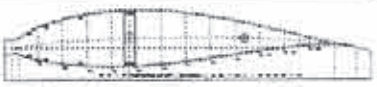

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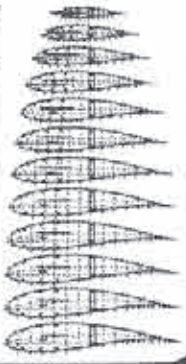

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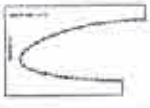

Also available - The Feather/Cut Foam Core Cutting Machine - $149.5[illegible]

SCHEDULE OF SPECIAL EVENTS

April 24
NASF Unlimited — Huntsville, AL
Rob Glover, (256) 883-2988

April 24-25
Aircombat '99 — Los Banos, CA
Michael Heer, Fixostar@aol.com
(209) 951-2902 (eve)

April 24-25
SKSS Unlimited — Newark, DE
John Kirchstein, kirchste@voicenet.com
(302) 731-2831

May 7-9
Fayetteville Airtow Fly-In — Fayetteville, NC
Wayne Parrish, (919) 362-7150 (after 9 pm)
Bernie Coleman, (704) 846-5219

May 8-9
TMSS Unlimited — Southern VA
Josh Glaab, jjglaab@pinn.net
(757) 850-3971

May 15-16
BASS HL — Frederick, MD
John Appling, jappling@qis.net
(410) 374-2463

May 15-16
Gateway Soaring Open, MVSA — St. Louis, MO
Mark Nankivil, nankmc@ibm.net
(314) 781-9175

May 15-17
Midwest Slope Challenge — Lake Wilson, KS
Paul Wright, (402) 796-2175
paulw@isco.com

May 22-23
ESL Fun Fly — Newark, DE
John Hauff, tankman58@aol.com
(718) 767-1369

May 29-30
CAF's 2M, Unlimited — Tullahoma, TN
Kendall McDonald, (931) 455-5779

June 5-6
CASA-2M — Near D.C.
Chris Bovais, bovais@kahuna.nrl.navy.mil
(703) 643-5513

June 10-13
Elmira Aerotow '99 — Elmira, NY
John Derstine, johnders@postoffice.ptd.net
(717) 596-2392

June 10-13
Montague Cross Country Challenge — Montague, CA
DG Airparts, Inc., dgair@cdsnet.net
(541) 899-8215

June 12-13
Land of Lincoln Electric Fly — Springfield, IL
Tim McDonough, tim@mcdonough.net

June 19-20
LISF Open — Long Island, NY
John Hauff, tankman58@aol.com
(718) 767-1369

June 24-27
MSSC '99 (Incl. XC) — Huntsville, AL
Ron Swinehart, (256) 722-4311 (days)
(256) 883-7831 (eve), on.swinehart@lmco.com

June 26-27
ESL-F3J — Long Island, NY
Tom Kiesling, kiesling@ctc.com
(814) 255-7418

July 10-11
LASS Open — Lancaster, PA
John Murr, jmurr@redrose.net
(717) 285-7025

July 10
CAF's 2M & Unlimited — Tullahoma, TN
Herb Rindfleisch, herb@cafes.net
(931) 455-1836

July 24-31
AMA NATS — Muncie, IN
24th: Sport Scale Sailplnae, F3B, XC
25th: F3J
26th: HL
27th-28th: 2M
29th-30th: Unlimited
31st: NOS & RES

August 7-8
MVSF — Princeton, NJ
Bill Miller, jerseybill@worldnet.att.net
609-585-6779

August 13-15
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 14-15
CRRC Open — Boston, MA
Fritz Bien, fritz@spectral.com
(508) 369-1720

August 21-22
BASS Open — Frederick, MD
Jack Cash, jcashjr@cyberun.net
(301) 898-3297

August 28-29
SKSS Open — Newark, DE
John Kirchstein, kirchste@voicenet.com
(302) 731-2831

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 9
NASF Unlimited — Huntsville, AL
Lars Ericsson, lars_ericsson@atk.com
((256) 859-0255

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

Advertising Note

Please note that the cut-off date for classified & display ads is the 15th of the month.

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

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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.

PLANS - R/C Sailplanes - Scale, Sport & Electric. Old Timer & Nostalgia - powered, rubber, and towline. Scale - rubber. All models illustrated. Catalog: $2.00. Cirrus Aviation, P.O. Box 7093 Depot 4, Victoria, BC V9B 4Z2, Canada.

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 Lelunan, 63 E. 82nd St., New York, NY 10028; (212) 879-1634.

Infinity 600, new '98... $300.00; Falcon 880, new 7037 wings w/4 servos... $350.00; 2M Banshee, 7037 wings w/6 servos... $300.00. Add shipping. Bill, (972) 699-3998, Texas.

FVK Silent Dream 2.2 electric sailplane, white gelcoat fuse w/2 piece built-up wings (Wings are a work of art.), plane flies beautifully using 1 elevator & 2 aileron servos, currently set up for geared Astro 05, perfect condition... $195.00 + shipping. Keith, (408) 982-5244, <kglass@cusa.canon.com>.

1:4 Grob 103 Twin Acro, new... $650 + S&H; Opus, NIB; all moulded HLG, 60", RG-15, new... $240; all molded F3J, RG-15, new... $550. Fuselage: L-23 Super Blalik; DG-600; Pilatus B-4; Ventus; Grob 103 Twin Acro; Discus; ASW 24; ASH 26; Opus; Graupner 1:4 Grob 103 Twin Acro; cockpit & canopy EMS DG-800. Peter Zak, (305) 687-7706, (954) 290-3759, Florida.

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>.

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

Arizona - Southern Arizona Glider Enthusiasts, Bill Melcher (contact), 14260 N. Silwind Way, Tucson, AZ 85737, (520) 825-2729. SAGE welcomes all level of flyers!

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

California - DUST, Buzz Waltz, 68-320 Concepcion, Cathedral City, CA 92234, (760) 327-1775.

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

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

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

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

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

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

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

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

Eastern Soaring League (VA, MD, DE, PA, NJ, NY, CT, RI, MA), Tom Keisling (Pres./Editor), (814) 255-7418, kiesling@ctc.com; Ben Lawless (Sec./Tres.), LawlessB@ang.af.mil; Anker Berg-Sonne (Scorekeeper), (508) 897-1750, anker@ultranet.com; Josh Glaab (Contest Coordinator), (757) 850-3971, ljglaab@pinn.net; <http://www.eclipse.net/~mikel/esl/esl.htm>.

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

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

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

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

Illinois (Chicago Area) - Silent Order of Aeromodeling by Radio, Jim McIntyre, 23546 W. Fern St., Plainfield, IL 60544-2324; (815) 436-2744. Bill Christian, 1604 N. Chestnut Ave., Arlington Heights, IL 60004; (847) 259-4617.

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

Iowa - Eastern Iowa Soaring Society (Iowa, Illinois, Wisconsin, Minnesota), Ed Harris (Editor), 2000 NW 84th Ave., Ankeny, IA 50021; (515) 965-5942, <harris.edwin@mcleodusa.net>.

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

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

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

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

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

Louisiana - Capitol of Louisiana Soaring Society (CLASS), Leonard Guthrie (contact), 12464 Fair Hope Way, Baton Rouge, LA 70816, (504) 275-2122.

Maine - DownEast Soaring Club (New England area), <Jim.Armstrong@juno.com>.

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

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

Michigan - Greater Detroit Soaring & Hiking Society, Greg Nilsen (Sec.), 260 Rosario Ln., White Lake, MI 48386-3464; (248) 698-9714, GNilsen624@aol.com.

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

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

Missouri - Independence Soaring Club (Kansas City area, Western Missouri), Edwin Ley (Contact), 12904 E 36 Terrace, Independence, MO 64055, (816) 833-1553, eve.

Missouri - Mississippi Valley Soaring Assoc. (St. Louis area), Peter George, 2127 Arsenal St., St. Louis, MO 63118; (314) 664-6613.

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

Nebraska - Lincoln Area Soaring Society (Wilson Slope Races), Jim Baker, 920 Eldon Dr., Lincoln, NE 68510-4014, (402) 483-7596, <http://www.geocities.com/CapeCanaveral/Hangar/1671/lass-2.html>.

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

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

Nevada - Las Vegas Soaring Club, Jim Allen (President), 7117 Caprock Cir., Las Vegas, NV 89129; ph (702) 658-2363, fax (702) 658-1996.

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

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

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

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

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

New York - Long Island Silent Flyers, Stillwell Nature Preserve, Syosset, NY, Ze'ev Alabaster (President), (718) 224-0585, or Peter DeStefano (VP), (516) 586-1731.

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

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

Northwest Soaring Society (Oregon, Washington, Idaho, Montana, Alaska, British Columbia, Alberta), Sandie Pugh (Editor - NWSS Eagle), 1119 SW 333rd St., Federal Way, WA 98023, e-mail: parrot2luv@aol.com, (253) 874-2429 (H), (206) 655-1167 (W).

Ohio - Cincinnati Soaring Society, Ed Franz, 7362 Ironwood Way, Burlington, KY 41005; (606) 586-0177, <ejfranz@fuse.net>.

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

Ohio - Mid Ohio Soaring Society (MOSS), Hugh Rogers, 888 Kennet Ct., Columbus, OH 43220; (614) 451-5189, e-mail <tomnagel@iwaynet.net>.

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

Oklahoma - Tulsa R/C Soaring Club (TULSOAR), http://www.mccserv.com/tulsoar

Oregon - Portland Area Soaring Society (PASS), Pat Chewning (Secretary), 16766 NW Yorktown Dr., Beaverton, OR 97006, (503) 645-0323, e-mail: patch@sequent.com, www.europa.com/~patch/

Oregon - Salem Soaring Society, Al Szymanski, CD, (503) 585-0461, http://home.att.net/~aszy/sss/> for club's home page.

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

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

Tennessee - Tullahoma (Southern Middle Area), Coffee Airfoilers, Herb Rindfleisch, 106 Inglewood Circle, Tullahoma, TN 37388, (931) 455-1836, <herb@cafes.net>.

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

Texas - aerotowing, Dallas area, Andrew Jamieson, 9426 Hillview, Dallas, TX 75231, (214) 349-9346, e-mail ajsleep@aol.com. Larry Sengbush, (972) 291-4840.

Utah - Intermountain Silent Flyers, Tom Hoopes, (801) 571-3702 (eve). "Come Fly With Us!"

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

Virginia - Blue Ridge Area Soaring Society (Central Virginia - Waynesboro), Tom Broeski, (540) 943-3356, <tjb@rica.net>.

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

Virginia - Appalachian Soaring Association, Virginia's Southwest (Bristol area), Greg Finney, 106 Oakcrest Circle #5, Bristol, VA 24201, (540) 645-5772, e-mail <gfinney@naxs.com>.

West Virginia & Pennsylvania - Tri-State Soaring, Chip Vignolini, 2784 Mill St., Aliquippa, PA 15001; (724) 857-0186, Voice mail (412) 560-8922, <ydne30a@prodigy.com>.

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

Wisconsin - Valley Aero Modelers, Lee Murray, 1300 Bay Ridge Rd., Appleton, WI 54915; (920) 731-4848, <lmurray@athenet.net>.

Outside U.S.A.

Australia - Southern Soaring League, Inc., Mike O'Reilly, Model Flight, 42 Maple Ave., Keswick SA 5035, Australia. Phones: ISD+(08) 8 293-3674, ISD+(08) 8 297-7349, ISD+(018) 8 082-156 (Mobile). FAX: ISD+(08) 8 371-0659.

Canada - Montreal Area - C2VM Glider Club, Jacques Blain (President), days (514) 443-5335, eve. (514) 652-6167.

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

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

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

England (CIAM Flyer), Jack Sile (Editor), 21 Bures Close, Stowmarket, Suffolk, IP14 2PL, England; Tele. # 0449-675190.

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

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

Japan - Dr. Paul "Sky Pilot" Clark, 2 - 35 Suikoen Cho, Hirakata Shi 573, Osaka Fu, Japan; IAC+(81) 720-41-2934, <pclark@osk3.3web.ne.jp> http://www3.osk.3web.ne.jp/~pclark/skypilot/

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

RCSD Index/Database

Available from: <http://www.athenet.net/~atkron95/pcsoar.htm>. Or, send 3.5" high density disks & SASE with stamps for 2 oz. Lee Murray, 1300 Bay Ridge Rd., Appleton, WI 54915; (920) 731-4848 after 5:30 pm weekdays or on weekends, <lmurray@athenet.net>.

Reference Material

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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International Scale Soaring Association

There is a growing interest in scale soaring in the U.S. We are dedicated to all aspects of scale soaring. Scale soaring festivals and competitions all year. Source for information on plans, kits, accessories and other people interested in scale. For more information, write to:

International Scale Soaring Association
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Sailplane Homebuilders Association
Dan Armstrong, Sec./Treas.
21100 Angel Street
Tehachapi, CA 93561 U.S.A.

The Eastern Soaring League (ESL) is a confederation of Soaring Clubs, spread across the Mid-Atlantic and New England areas, committed to high-quality R/C Soaring competition.

AMA Sanctioned soaring competitions provide the basis for ESL contests. Further guidelines are continuously developed and applied in a drive to achieve the highest quality competitions possible.

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ESL Web Site: http://www.eclipse.net/~mikel/esl/esl.htm

ESL President (99-00): Tom Kiesling (814) 255-7418 or kiesling@ctc.com

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THE CONDOR

SPECS:	
WING SPAN	112.5"
WING AREA	918 SQ. IN.
AIRFOIL	SD7035
WEIGHT	62-66 OZ.
WING LOADING	9.7 - 10.3 OZ./SQ. FT.

CONDOR

Tomorrow's Sailplane, Technology Today

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

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

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

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

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

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