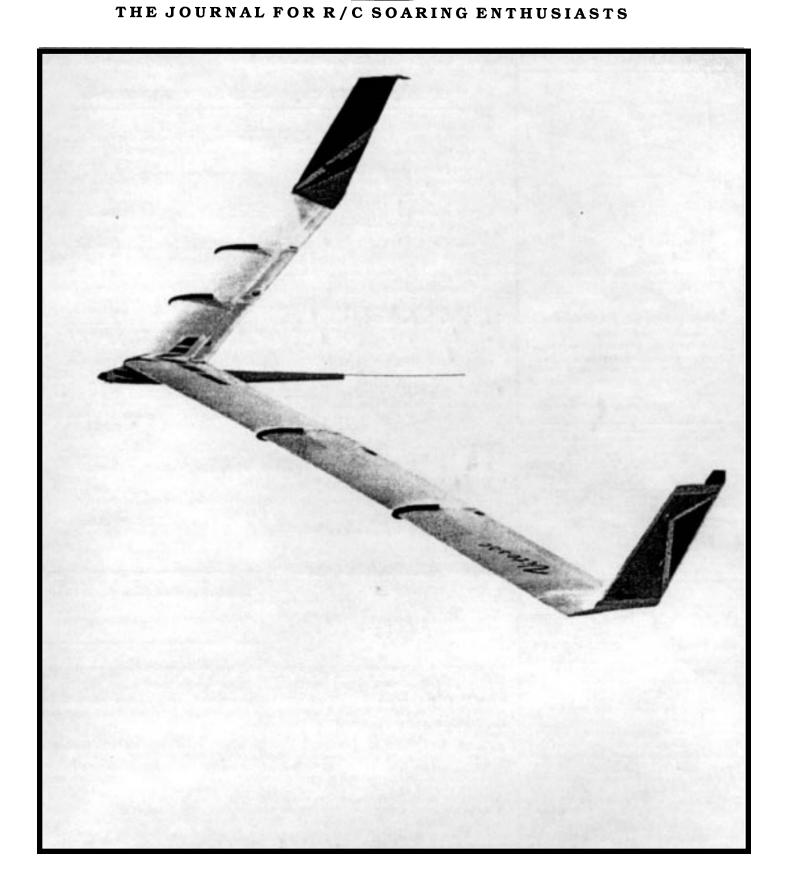
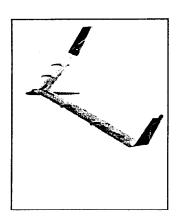
## R/C Radio controlled SOARING DIGEST



#### THE JOURNAL FOR R/C SOARING ENTHUSIASTS



#### DAVE CAMP'S VITESSE IN FLIGHT

his month, "On the 'Wing" columnists, Bill and Bunny Kuhlman, cover the Vitesse design and flight testing in-depth. Note the leading edge fences, two per wing, and the small winglets attached to the tip of the main winglets.

Photography courtesy of Dave Camp.

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 topyrights 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 wishest obtain additional information to contact the author. RCSD was founded by Jim Gray, lecturer and technical consultant.

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#### Artwork

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

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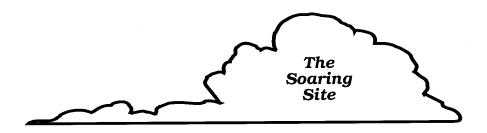
Please let us know, and we'll replace it. Something always slips by every month!

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Monthly Feature Photography & Web Version of the Printed Article (where appropriate) Highlights & Mailing Status of the Current Issue About RCSD .....(E-mail/web addresses, plus general information about their areas of interest) "Getting Started in RC Soaring"....... Getting started guide - Adobe Acrobat PDF format Links to Organizations, Special Interest Groups & Clubs On-Line Articles - Great articles originally written for the printed version of RCSD.

"Trimming Your Sailplane for Optimum Performance" by Brian Agnew "Flys Faster" by Dr. Michael Selig Bookshelf Listings - A listing of recently published books of interest to aeromodelers. Complete RCSD Index, 1984-1999



#### About the Cover

We've received some very positive comments about the cover of last month's issue which, as most of you know, was available for downloading this past month, in poster size, from the *RCSD* main web page. If you have not as yet downloaded it, you can still obtain it by sending an e-mail to B<sup>2</sup> at bsquared@halcyon.com, and they'll send you the poster as an e-mail attachment.

As promised, this month a second poster is available for those of you with computer access: the Vitesse shown on the cover of this issue of *RCSD*. Yes, it's in color, of course!

#### Looking for TULSOAR?

Dave Register, our "Tech Topics" columnist, says the TULSOAR club has made some changes, which he details as follows:

"We had a change of web address for our club web site a while back. Unfortunately we were not able to redirect from our old site and couldn't delete it once we stopped that service. If you've been looking for the TulSoar club, we're still alive and well in Oklahoma. But our web address has moved to:

http://www.sitemaster.com/tulsoar/ "If you've got a context-sensitive e-mail/ browser, the above address is also a link (at least in AOL).

"Come on out and visit us. The new site emphasizes club activities and also contains our newsletters. Information about our annual sanctioned contest (Last Fling of Summer) this September is posted in both HTML and pdf formats.

"If you've been looking for us and couldn't find us, the above link will get you there. If you haven't been to the site, stop by and get to know us a bit. And if you're passing through Oklahoma sometime, please come fly with us."

#### RC Soaring Resource Listings

Thanks go to all of you that sent in changes or updates this last month! For any of you that have noted discrepancies in the "RC Soaring Resource" listings, which have not been corrected this month, please let me know!

Happy Flying! Judy Slates

## Windows Plotting Programs

Airfoil Plot 8 \$35

Model Design 8 \$50

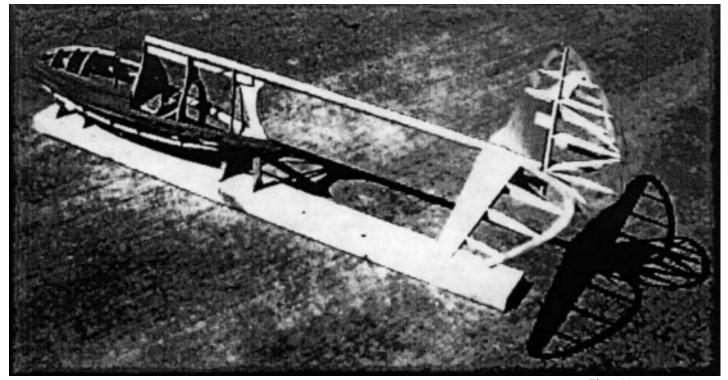
Airfoil Plot and Model Design are now available for Windows 95, Windows 98, and Windows NT. Features include the ability to use airfoils downloaded from Michael Selig's airfoil data base, export airfoils in DSF format for use with CAD programs, and plot airfoil templates for cutting foam cores upright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

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#### Jer's Workbench

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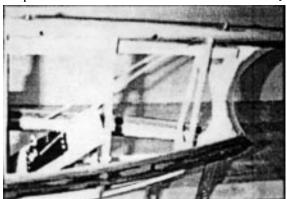
#### **Bowlus Baby Albatross - Part V**

It's been a long, hot summer, so far, down Wylie way. And with all the usual and unusual things that life sends our way, I haven't gotten as much done on my Baby as I had hoped.

Last month, I discussed the need to think about the construction of the finished model, before getting too far into the strip planking process. Having analyzed what could turn into a modeler's nightmare, without thinking through the process, I tackled the push rods, first.

#### Push-Rod Location

In order to locate the proper location for the push rods, the rudder and stabilizer



were built as shown in photo #1. (Push rod location for the rudder was not depicted on the drawings.) Having then identified the proper location, I marked it on the tail boom.

While drilling holes in the tail boom is relatively easy, there are still quite a few holes that need to be drilled; two holes are required to bolt the tail boom to the fuselage, two for the rudder post, two for the stabilizer, two for the wing rods, and four holes for the push rods! Some of the holes must be drilled precisely, in an exact location.

While the holes can be drilled with a hand held drill, I would suggest using a drill press with a jig that will hold the tail boom during the drilling process. (See photo #2.)

Once the hole drilling was complete, the push rods were installed into the tail boom, which was then installed into the fuselage. Photo #3 shows the tail boom mounted on the fuselage with the push rods and servos, while photo #4 shows easy access to the

rudder and elevator servos.

Before proceeding with the fuselage construction, two more items need to be completed. The first requires mounting the mono wheel. The second is more complex, as it requires developing some sort of anchor system in order to connect the fuselage wing strut to the fuselage. Wing strut design is not shown on the drawings - but should be something easily designed by next month.

Photo #1

So, until then, enjoy your summer and happy flying! ■

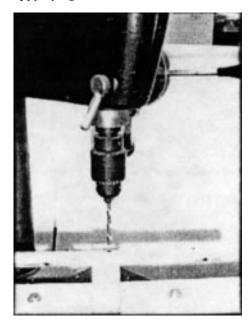


Photo #2



Photo #4

Photo #3

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#### IHLGF Fourpeat

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





## TULSA RC SOARING CLUB

AMA CLASS AA SANCTION 01651

## 19th ANNUAL LAST FLING OF SUMMER

BLUE SPRINGS SOD FARM, Broken Arrow, Oklahoma September 15, 16 and 17

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Class A: Handlaunch

6 Rounds

Saturday, Sept 16<sup>th</sup>, 9AM:

Class D: Unlimited

6 Rounds

Sunday, Sept 17th, 9AM:

Class B: 2 Meter

4 Rounds

(Expert and Sportsman Class for each Event)

#### Awards:

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Trophy For Combined 2m and Unl scores (Flyoff in case of tie)

Handlaunch

1<sup>st</sup> thru 3<sup>rd</sup>, 1<sup>st</sup> place for Sportsman (Certificates and cash awards)

2m and Unlimited

1<sup>st</sup> thru 5<sup>th</sup>, 1<sup>st</sup> place for Sportsman (Certificates and cash awards)

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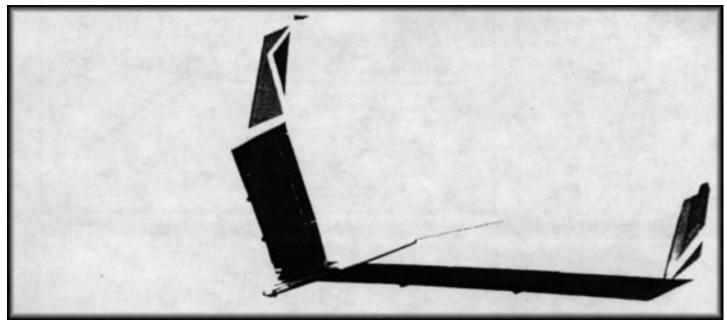
Tulsa, OK 74136

(918)-495-1028

e-mail: nxtdoor@swbell.net

For additional information, call or e-mail Dave or Jeff. An Adobe printable entry form and further details are available at the TulSoar web site:

http://www.sitemaster.com/tulsoar/





E-mail: bsquared@halcyon.com http://www.halcyon.com/bsquared/

Dave Camp and Glyn Fonteneau have been correspondents for quite a while, and we always look forward to hearing about their current project(s). Their last, a CO8-like 'ship with 2 meter span (RCSD October 1999), became the impetus for a larger version which is described in detail in this month's column. Take a close look at the included photos! You'll see that leading edge fences have already been installed, and Dave's model sports a C-wing configuration.

## Vitesse

Vitesse is a 3.4m flying wing of our own design, incorporating lessons we have learned with our previous CO8-2m which was a cut down version of CO8 by Hans-Jürgen Unverferth. (See RCSD October 1999.) The performance of the CO8-2m has exceeded our expectations, but of course restricting the span compromised performance. Our aim with the Vitesse was to have a flying wing with a performance as far as possible on a par with the F3J type of model being flown within our club, typically Starlites, Graphites and Storchs. At least those would be the designs we would judge our success against.

Dave Camp's Vitesse in flight. Seen from below, the beauty of a swept wing is readily apparent. That rigid tube extending from the rear of the fuselage houses the antenna.

(Below) Glyn Fonteneau's Vitesse coming in for a landing.



Glyn did most of the basic design work, using the Panknin twist calculation program, plus of course evaluation of typical design parameters used with other successful wings and our own experience.

#### **Design Targets**

Design targets we set were roughly as follows:

All up weight 4.5 lbs. Flying speed 20 m.p.h.

On the basis of the above and looking at other examples, we set the following parameters:

Span 3.4m (134") Chord 9.25" Sweep 25 degrees

Section RS004a — the same as used on our CO8-2m

Twist - 4.5 degrees total, divided

across three sections Control surfaces: 3 per side, i.e., whole

trailing edge is effectively trimmable

Inboard sections are flaps and used as airbrakes

Mid sections are ailerons only Outboard sections are elevons 3 piece wing with plug in winglets Winglets RS004a section

#### Construction overview

Blue foam with carbon and glass skins, and a single carbon shear web used with carbon blade and rod joiners.

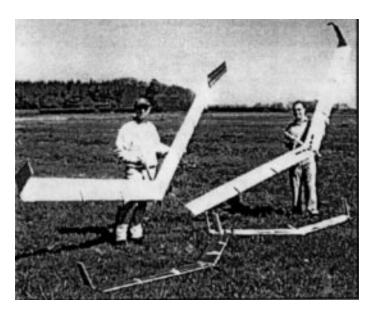
So, the basics decided, a plan of action was then required to get the materials and to start work. On the face of it, it should have been a fairly quick project we thought, after all there isn't much to a flying wing is there? Suffice it to say, the project has taken far longer to reach the flight test stage; starting work at the beginning of December 1999, we both reached completion around the third week in April 2000. Anyway, onto some of the key points and/or problems.

#### Details of construction and design

Wings are cut in 3 sections per side. This follows the middle third theory used by Hans-Jürgen Unverferth. This allows the wing twist to be stepped across the span, rather than linear.

Outer two sections are joined together prior to vacuuming. The cores are sliced to allow the shear web to be glued in. The shear web is de-swept. That is, the root of the center section is placed at approximately 25% root chord and at the extreme tip at about 15%. This is designed to reduce flutter. While the cores are split, a cable slot

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Glyn Fontenau (L) and Dave Camp (R) show off their CO8-2m models in the foreground while holding their new Vitesse 'wings.



Dave Camp with his 3.4 meter Vitesse, a 'ship designed to compete favorably with current F3J machines.

is hot-wired. Carbon fibre shear spars are fitted using epoxy resin; the cores are returned to the beds to ensure alignment is maintained. While fitting, the shear web joiner boxes are also bonded in. This makes life a little difficult because all three sections have to be butted together for alignment.

When the epoxy has hardened, the joiner boxes are sawn through to separate the center section from the outer panels. The joiner boxes are mounted to the front face of the shear web and the cable duct to the rear.

Ply ribs are mounted at the ends of each panel. In future we would make these much thicker to aid vacuuming and adding

strength. The wing skins are vacuumed in place using mylar in the normal way. Skins are 5.6 oz/yd<sup>2</sup> carbon (from Aerospace Composites) at 45 degree bias, with 100g glass cloth (from Nic Wright) on top aligned spanwise.

The center sections are joined together using new beds cut to incorporate the required anhedral. Vacuuming the center section is quite difficult because the bottom mylars, when taped together, cause

the top mylars to overlap. This causes laying up to be very interesting. We had the same problem with the CO8-2m and therefore were ready and practised for this.

Having trimmed up the finished bagged wings, holes were opened up to accept the electrical connectors. Servo pockets are also opened, having ensured we know were the spar is located. On Glyn's wings the servos protrude outside the surface a bit because he used JR 3341 servos. Dave used JR341's, which just sit flush.

The wiring is not easy because of the thinness of the wing. Therefore it is difficult to get much slack in the wiring so that you can pull the wire out far enough to solder and fit heat shrink and then pull it back and solder the joints for the servo. We used four wires for the servo's; this means you must make the +ve and -ve common and the signal wires MUST be kept separate.

The winglet is fitted to a short wing tip which is made from a specially cut section of wing. We didn't put enough time into the design of the tip — winglet joint; therefore there are some differences in our designs here. The winglets are blue foam with one layer 100g glass vacuumed as per wings. A carbon uni-web strip was used as a spar on both sides, plus a strip one side of the trailing edge.

Setting up the surfaces took some hours, making sure travel direction is correct. Programming took many hours to ensure we had what we felt looked right and in the desired mode.

The center of gravity was calculated using the Panknin twist program which is obtainable from the B<sup>2</sup> web site through <a href="http://www.halcyon.com/bsquared/Panknin.html">http://www.halcyon.com/bsquared/Panknin.html</a>.

Fuselages were our own design and we both had our own idea as to the shape that

they should be. We agreed on one part: that the wing should be pylon mounted. The fuselage was carved from blue foam with glass and Kevlar vacuumed on. The blue foam was melted out later with solvent. An access hatch with a carbon cover was made in the fuselage bottom. This is only required for charging, a switch was made accessible from the outside. The wing seat was 1/32 ply, an access hole being cut for the servo leads, and then the fuselage bonded to the center section using a mix of epoxy and glass microfibers. The aerial extends out the rear of the fuselage, a length of red Sullivan snake outer providing protection and support. Tow hooks are mounted 1/3rd of the span each side, so that towing is done using a bridle.

The finished models came out heavier than planned (don't they all) at around 5.25 lbs. Nose weight was required to achieve the required CG position, which is the opposite of our 2m designs. We made a mistake with the fuselage designs; the nose is too short. So if we had kept to the proportions of the 2m designs we could have used less lead. Most likely this is because of the considerable increase in span, with a lot of structure behind the CG. However we are finding it difficult to see where weight savings could have been made. Torsionally the wings are very rigid, but they do still bend span wise. We do not believe the layup can be reduced to save weight. The total weight of each complete winglet and stub was only 4 oz., but of course that amounts to 8 ounces total behind the CG. Perhaps these should be hollow molded in future, and this could still be done in retrospect. JR PCM10 receivers were mounted under the wings and 1.2ah ni-cad packs used. Glyn uses a Graupner/JR MC24 transmitter, Dave a JR PCM10S. Programming is an area being experimented with, as will be seen following initial flight trials.

#### Flight testing

#### Initial flights:

o start with, we set the CG 0.5" in front ■ of the position indicated by the Panknin spreadsheet. Glyn had carried out some rechecking of his sweep and it certainly looked like the sweep was near 26.5 degrees, the result of some awkward moments joining the center section and vacuuming. This makes a big difference to the CG; he therefore balanced his accordingly. Dave's had 25-degree sweep; this indicated a CG at 17" behind the LE at the root, so 16.5" was used as a starting point. Incidentally, it is worth mentioning that balancing something of this size and configuration is not that easy. We ended up using a thin chord looped around the body, but a 3.4m wing suspended indoors is a bit of a handful!

The very first flights were hand launches

into a moderate breeze. Yes this can be very risky, but we thought any serious problems would show themselves and it would be better than committing to a winch launch or slope flight. Anyway, launching each revealed no problems, so it was decided to go straight to winch launching as, after all, this is what they were designed for.

The first winch launches took place on a day with a moderate breeze, a bit gusty at times, so not ideal, but after all this time patience was wearing thin. A bridle to cope with the wing mounted hooks was made up, using stainless steel trace wire, with lengths of plastic snake to add protection. Dave took the first launch, Glyn throwing the model flat, which resulted in a low launch, the model overtaking the line, Dave not pitching the model up. Still, the handling seemed OK, with a good glide. The next launch was fine The model was pitched up soon after release and was very steady, releasing easily off the top. Handling was good, very sensitive in pitch, but roll control steady, not quick but positive. A check of the flaps showed that they produced a very strong pitch up effect. Full down elevator would not control the model with full flap used. So landings were without flap. This results in a LOT of ground being covered. These wings just keep going, despite the 10+ m.p.h. breeze. Subsequent launches were made with a slight nose up attitude as this gave better launches. Dave contacted lift on the fourth flight, circling away downwind, and tight circles could be maintained without problem. At the higher altitude the wind speed was obviously greater, however penetration was not so good coming back and some positive down elevator was

required to get it moving. This indicates a

need for a fast cruise setting on a 3-position switch, just a tiny amount of down would be required, 1mm or so.

Glyn unfortunately had a very rough time of things. The first launches over-ran the line, but a good launch was made and handling seemed OK, but there was a difference apparent. Worst was yet to come when a decent launch was made and then Glyn realized he had control difficulties, the model being unstable. On approach to land, a wing dropped suddenly, probably due to a gust, and hit the ground.

With a model of this size, one must expect damage, and we found in this case the carbon skin had cracked on the center section near the root, plus other slight damage was done at the panel joiners. The rear carbon tube joiners were shattered. In hindsight we concentrated too much on the early launch problems — the model either coming off early by over running the line or pinging off early when climbing. We should have spotted the signs of a too rearward CG.

Not to be deterred, Glyn has managed a repair. Considerable work was involved to maintain strength and an even spread of load, carbon webs being inserted and large thin carbon plates vacuum bonded onto the skins, fairing in when all was cured. The rear joiner in both models has been changed to steel as Dave had also found a fracture following a heavy landing.

#### Subsequent flights:

The next session with both models was in turbulent breezy conditions (15mph measured on the ground). Dave launched OK for a few flights. Control was fine in the turbulence and lift was contacted. The use of flaps has still not been sorted for landing. Despite further down elevator mix, the pitch up is too strong. However, the performance is encouraging. In the breeze a lot of tension was applied during

the launch with no problem, although the outer panels were bending quite a bit! Glyn had a few troubled launches. Things were better than before, but the hook position needed examining. As a comparison, Dave flew his CO8-2m and found it difficult to handle in the turbulence; a pair of conventional aileron equipped soarers flown at similar times did not manage the conditions any better.

The last session held was very brief, but was trouble free, launching in only a light breeze. Glyn had moved his hooks forward to match Dave's — one inch in front of CG. This appears a safe position, as slight nose up launching has started without problem. Launch height wasn't bad, even with no launch flap used so far. In light conditions the thermal flap setting seems OK, allowing tight circling if required and generally slowing the model slightly.

Our latest session to date (May 14, 2000) was held in virtually calm conditions and a restricted field that only allowed around 150 meters of line to the turn-around. Launching was trouble free, but release height was probably only around 100 meters or so. However, the Vitesse is exhibiting a very good glide angle and will work weak lift very well, particularly with thermal flap set. Dave had nearly 9 minutes using weak lift and Glyn had 18 minutes in slightly better air.

Glyn had a chance to explore the new "speed" setting — this made progress around the sky at a controlled fast cruise a delight. Once established in a thermal turn, the workload is light, as they lock in nicely. A short video was made of Dave's flight. Reviewing this later revealed no sign of adverse yaw or pitching in turns. As before, the shortcoming is in the landing. With such a flat glide it is hard to imagine ever landing short! Some more options are going to be explored to give the controlled

## STREAMLINES

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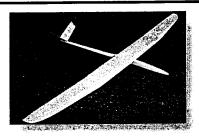
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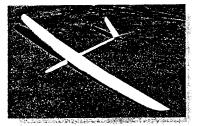
high rate of descent required for spot landings and small field work.

So, summarizing the flying so far, Glyn could certainly have done without the early breakage, but we are both now very pleased with the performance. It is too early to see if we have met the aim of matching the conventional F3J models, but it looks encouraging. Landing is the area needing most work, but this should come from some more radical program developments we have in mind. The center of gravity location is absolutely critical, as expected, and the flaps initially appear to be far more effective than seen on the 2m wings.

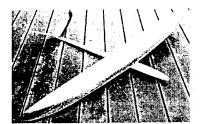
As further testing takes place we will provide updates on our progress. Hopefully we will be able to get some MPEG video footage for internet downloading.



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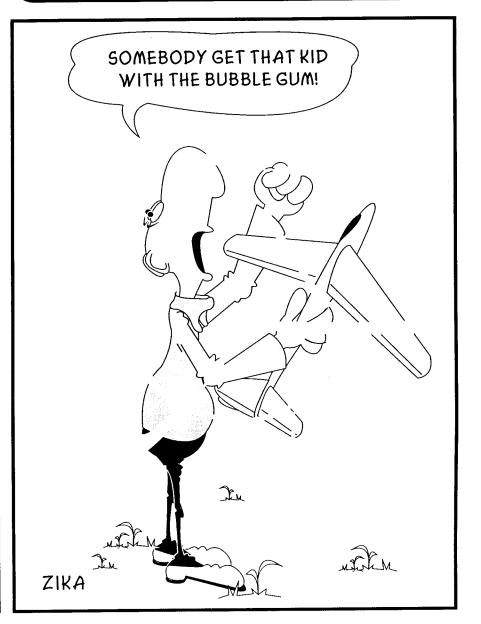
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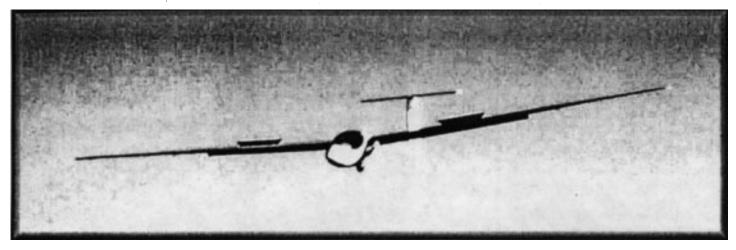


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#### TECH TOPICS



Dave Register Bartlesville, Oklahoma regdave@aol.com

It's been some time since I've had a chance to catch up with writing the "Tech Topics" column. During the last several months, we've had a number of business and personal trips that made it difficult to stay in touch.

One of those trips involved graduation ceremonies at the Naval Academy. Number 1 son, Michael, was commissioned with a degree in aeronautical engineering and is now off to Pensacola, Florida for flight training. So, the Register family is now the proud owner of a bright, shiny new Ensign. In addition, I'll call on him from time to time as an 'expert' when needed to resolve questions on aeronautical design.

#### Corrections

There have been several comments on recent columns that require clarification of a few items.

John Agnew recently pointed out a correction to the write-up on battery management systems (BMS). I had commented that the Sirius units went into trickle mode after fully charging the batteries. In fact, these systems revert to maintenance mode when they sense a full charge. In this state the unit provides a periodic pulse of current to maintain the batteries at full charge. This is different from a conventional trickle mode in which a low-level but continuous current is applied to the battery. Maintenance mode is clearly described in the literature which comes with the Sirius chargers. My thanks to John for pointing out this correction.

Also, on the topic of battery cycling, Al Scidmore noted that putting a resistor across your Rx battery is a tried and true method for discharging, BUT a 1/4 watt resistor won't take the heat. Al is absolutely correct and use of a small wattage resistor (as mentioned in the column) in such an application is quite dangerous due to the

heat generated. My old discharge system used a 10 ohm, 20 watt resistor and worked fine. Major brain cramp when the smaller wattage was mentioned. Please use the higher rating if you try this method.

As a final note on the battery management topic, Allan deLaubenfels recently sent some information about a charger used by power and 1/4 scale flyers. It's designed and made by Dr. Robert Suding in Colorado and has a number of very interesting features. If you're looking for a high performance battery management system, take a look at Dr. Suding's web site at <a href="http://www.ultimatecharger.com/">http://www.ultimatecharger.com/</a>.

In addition to discussing the design concept used for his electronics, there are also several excellent articles on color patterns and flying techniques. These are designed for power flyers, but a lot of the ideas apply to us silent types, as well. Thanks, Allan, for this very interesting lead.

In an earlier column I had discussed some opinions regarding moment coefficients and center of pressure travel. The technique discussed at that time was suggested as a means to determine a starting point for the center of gravity (balance point) for your sailplane. Tom Finch corresponded several times with an interesting discussion on the value of determining the neutral point of the planform as a more relevant stability parameter. Using the neutral point takes into account both the areas of the wing and stabilizer as well as the stabilizer moment (distance from quarter chord of the wing to quarter chord of the horizontal stabilizer). Martin Simons has discussed in

Dave Miller's ASW 27 on final, with flaps and spoilers deployed.



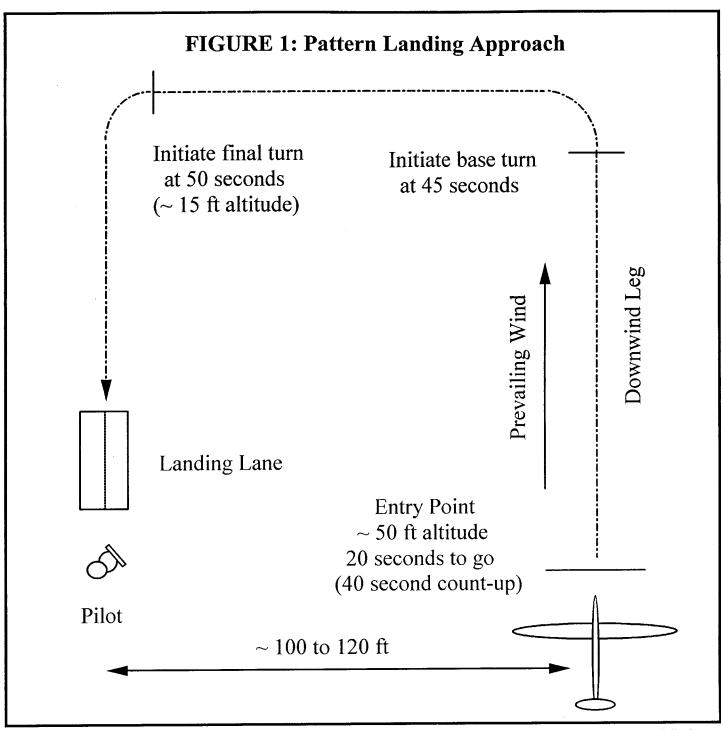
Laser 3MC on time at the end of a pattern approach.

his text a graphical means of determining the neutral point. It can also be determined by solving a few simple algebraic equations.

Martin also discusses a parameter called the static margin. This is the distance (measured in units of wing average chord) ahead of the neutral point at which one sets the desired center of gravity. As Tom notes, a major determinant for a good static margin is the comfort level of the individual pilot with the pitch stability for the chosen center of gravity.

Several years ago, I published a summary of rudder and horizontal stabilizer volume coefficients used in a number of sailplane designs popular at that time. That article also compared neutral points and static margins for those same designs. The conclusion drawn from that review was that there was a range of volume coefficients which seemed to be more predictive for design purposes than the static margin. However, Tom has raised some good points which merit further discussion. If

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anyone out there would care to provide a clarification on the use of the neutral point and static margin, I would be very happy to provide this space to a guest columnist for purposes of that review.

#### **SPOT LANDINGS**

In spite of all the recent travel, mergers, etc., I've had the good fortune to attend a few local contests. A couple of things that I've learned:

You can fly hand launch in 25 mile an hour winds if you're really crazy enough to try.

You can slope a tree line, or even a single tree, if you're stupid enough to try that as well.

You can feel even stupider when the wind stops for a moment and your plane settles comfortably into the top of the tallest tree on the field. (Paul Naton I ain't!)

But you also learn you have some great friends when they scamper up the tree and poke around for 30 minutes or so until they get it out for you. (Thanks Randy, Ted and Rex. You guys in Kansas Soaring Society are really OK.)

Another thing that I've noticed at several local contests, and even at the Nationals two years ago, is that fewer pilots are using pattern approach these days when trying to make a spot landing. Although a pattern

approach has been used successfully for years by competition flyers, it seems to have fallen out of favor at today's events.

Very experienced flyers, such as Dale Nutter and Jim Frickey in our area, are so familiar with their planes, glide ratios and crow setups that a straight-in approach works very well for them. However, for less experienced pilots, and plain old klutzes like me, a pattern approach can be a great way to make competitive landings while still becoming familiar with the general handling characteristics of the sailplane. So for the rest of today's column, let's discuss how to set up and execute a pattern approach for accuracy in both time and landing position.

Figure 1 shows a schematic diagram of what we're talking about when we refer to a pattern approach. This type of approach is the same as used for most full-size aircraft. It consists of a downwind, base and final leg. The critical components are choosing the altitude, time and position for entry into the pattern. After that, the correct selection of timing points assures completion of the landing within about a second of the target time.

Let's assume we are entering the pattern at the entry point indicated in the figure. The height is approximately tree top (or a bit higher than the old geezer's hand launch, if you don't have trees). In Oklahoma, that's a standard black oak. For Texas, a big Mesquite. In the East Coast or Upper Midwest a decent Maple will do. For the West Coast, a Redwood... Naah, you guys are just bragging. An old Juniper is about right.

However the height is judged, a 40 - 50 ft. estimate is about right. Lower if you are carrying a lot of speed, higher if you're not. If you hit the entry point at 40 seconds into the final minute countdown (20 seconds to go), then completion of your pattern will require an average sink rate of 2 - 3 feet per second. At minimum sink, an efficient 3 meter ship well have a sink rate of ~1 foot per second. So you've got some excess to burn off.

On most approaches you're carrying a modest speed at the start of the landing pattern. 30 feet per second is a reasonable estimate for this initial speed. So initiating the base leg turn at 45 seconds will carry you about 150 feet to 175 feet down the field.

By the time you hit your base leg, you've probably burned off a little speed so the roughly 4 seconds across the base will carry you around 100 to 120 feet across the field. This accounts for the estimated 100 ft. horizontal separation between you and your sailplane at the entry point.

Initiating your turn onto final will leave you at about 15 - 20 feet off the deck with about 150 feet to come back to the spot. You'll also have about eight or nine seconds left in the pattern. That gives you a targeted sink rate of a little less than two feet per second and an average velocity of a bit under 20 feet per second.

Using a reasonably efficient 3 meter sailplane as a guide again, under normal conditions that type of plane will have a sink rate a tad greater than 1 foot per second for a horizontal velocity somewhat in excess of 20 feet per second. So you only really need about 7 of those seconds to get back to the landing zone with a very reasonable glide slope.

On a dead calm day, you now have both crow and camber to burn off the extra altitude and the extra second or so. Consequently, with this type of pattern you are almost guaranteed to be within a

second either way of getting your time. Since the time target will now be met to a high degree of accuracy, you can forget about the stop watch for the last few seconds and concentrate strictly on the positioning of the landing.

Now let's consider a major factor in all landings - wind speed. For the record, I have NEVER flown on a dead calm day. Not on the East Coast, not on the West Coast, and nowhere in between. There is ALWAYS a breeze blowing. Most of us don't really notice a breeze of 5 mph or less. So let's see what that type of wind does to our timing marks.

If we originally entered the pattern at 30 feet per second air speed, for a 3 - 5 mph tail wind, our velocity over the ground will be in excess of 35 feet per second. Initiating the base turn at 45 seconds will carry us down the field by ~180 feet.

Base leg remains the same, so the turn on final has us about 180 feet out, but now with the speed over the ground of ~20 feet per second (~25 feet per second air speed minus ~5 feet per second air velocity). That gives us nine seconds on final, which is just about exactly what we've got left in the flight time. So the timing marks we have discussed are really calibrated for a pretty typical light wind day.

Now let's take the wind speed up to values more usual in the Kansas - Oklahoma - Texas region. A pretty normal wind speed might be ~10 mph. Based on those conditions, our down wind speed relative to the ground will be ~40 feet per second while final will be ~15 feet per second. No way a 45 second base turn timing mark will do the job. You're halfway to the next county by then.

Suppose instead you initiate your base turn at 43 seconds and your final turn at 48 seconds. Your down wind distance at base turn will be ~120 feet and your final approach velocity (relative to the ground) of ~15 feet per second will get you back in about eight seconds. That leaves you about 1 second excess which is probably about right to correct for the down wind drift while you're on the base leg. So we're right back on track again!

If the wind gets much above 10 mph you may have to use more significant modifications to the whole approach style. In our area of the country we often fly in winds up to 20 mph. But that usually requires ballast and a lot of experience with wind gusts and ground turbulence to really use a pattern type approach effectively. Under most normal wind conditions the techniques described above should work very well.

The key to effectively using a pattern approach is to go out and practice it. Learn how many seconds to correct for the base turn timing mark for the wind conditions in which you normally fly. When you're out fun flying, take your hat and toss it on

the ground 30 or 40 feet away before you decide to land. Then practice the pattern approach we've discussed using your hat as the targeted landing spot. If you don't have a timer, simply practice counting off the time to yourself. (You know, the old one-thousand-one, one-thousand-two routine.) After a few attempts, the position of the entry point will be pretty apparent. Then it's a matter of correcting the timing points for your specific wind conditions and landing style.

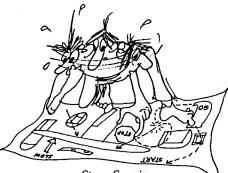
At smaller club contests, if the landing zone is a reasonably clear, I'll position my plane a bit up wind of the entry point with about a minute to go. Then I'll go around in a circular pattern waiting for the entry point timing mark. The radius of the circle and the rate of altitude loss are adjusted so that the 40 second timing mark and ~50 ft. altitude can be met pretty accurately while exiting the last circling turn. At a large contest, with a lot of planes in the air at the same time, please don't use that technique as you are almost guaranteed to get in the way of everyone else in the landing pattern!

Whether you use a pattern approach for contests, or just for fun flying, it's a good idea to use a method like this for consistency in your landings. Some fields, like the PSS site at the Rose Bowl will be tight enough on final that some form of pattern like this will be required. But whether it's a tight park, or a wide-open sod farm, consistently using a pattern approach will really help you with your landing techniques.



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#### "SHORT CUTS"



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

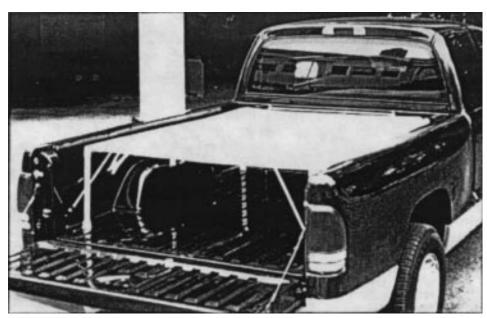
#### Getting From Here to There

recently was fortunate enough to purchase a new glider transport system (Dodge Dakota Pick Up). The old trusty Ranger had 166K on it and was getting a bit rusty, though still in excellent mechanical condition with a nice Leer cap that allowed ease of transport for my many planes. The problem I'm now facing is that until the Fall I will not have a cap on the Dakota. For those interested, the Dakota bed is 78" long and much wider than the Ranger, so those 2 meter wings fit in nicely. I now have more storage capacity but no protection from wind and the elements. What I needed was a low cost solution and quick.

I decided that rain was not a issue because I don't often fly in the rain anymore. My only concern was for wind and sun. What I needed was a cheap cover. My solution was to built a low cost, light weight frame out of 1" PVC piping and hinge a thin sheet of ply wood over that. The PVC was readily available and cheap (<\$15.00). The frame was designed to support itself on 6 legs with one at each corner and two over the recesses on the wheel wells. I made it just slightly wider than the plywood and about 8" shorter than the bed length. This allows overhanging hooks (2 each end) to be used in conjunction with 40" bungee tie downs to hold everything in position.

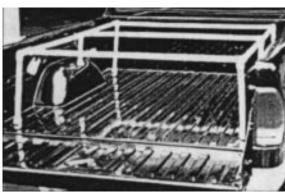
Half way through this project I decided to make the cover small enough so that when I do get a cap I can use the cover as a secondary shelf to double stack planes. It was not uncommon for OFB Jim Armstrong and myself to bring up to 17 planes to Elmira when local slope flying was available during the aerotow.

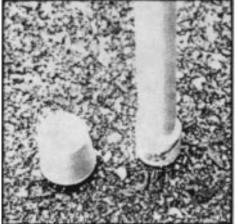
I did not know how I was going to hinge the top onto the frame, so I just went browsing through the hardware store and found that 3/4" plastic conduit clamps would work just fine. These same clamps would allow for a



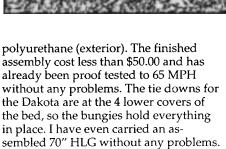
seventh leg to be added, which would serve as a hold open for the cover. The plywood I used for the cover was a bit overkill (3/8" fir AC), whereas 1/4" would have been adequate enough and lighter.

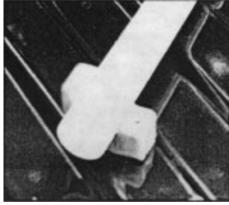
The tie downs and conduit clamps were secured with 1/2" sheet metal screws which had a strong bite into the plywood. When all was said and done, the plywood was sealed with two coats of water based











THE NATURAL SIDE OF THERMAL

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By Lee Murray
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1300 Bay Ridge Rd.

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Appleton, Rf Appleton, A

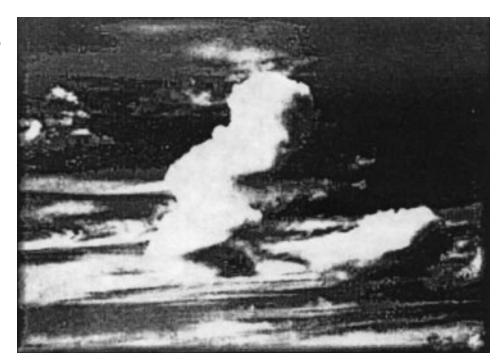
nce the model leaves the tow hook, your model is sinking in air with the exception of those times you are trading kinetic energy (velocity % mass) for potential energy (above ground height % model weight). What we all hope to find is air moving upward faster than your model is sinking. I'm going to borrow a mental image from Martin Simons' book, "Gliding With Radio Control". Picture yourself in the middle of an up-escalator but walking down. If you walk slowly you gain height. If you walk quickly you descend. If your model is traveling in air that is rising faster than your model is sinking in that air, you are soaring. Soaring is possible in a number of situations. I'll exclude discussions of slope and wave lift which are semi-stable forms of lift and focus on the more illusive forms of lift having to do with solar heating and convective cooling (thermals). The local atmospheric conditions relating to the latter have been the subject of previous articles. The factors discussed include:

#### ENERGY BUDGET ITEMS:2

- Amount of solar energy hitting the earth's surfaces within the range of your model. This is related to the time of year, time of day, cloud cover, latitude and the slope of the land, whether facing the sun or facing away from the sun.
- The Absorption: Reflectivity ratio of the surfaces being illuminated by the sun, e.g., black asphalt vs. light colored ground.
- The amount of evaporative cooling reducing the temperature rise of the surface. This is related to how much moisture is on the surface and how much plant moisture loss is cooling the
- Cooling of the surface by wind... Like a wind chill factor.
- Loss of surface heat to the ground beneath the surface.

#### TOPOGRAPHICAL ITEMS:3

 The presence of objects or terrain features causing parcels of warm air to break free of the horizontally moving air mass and to rise. This includes things such as fences, roads, tree lines,



ridges, etc.

#### ATMOSPHERIC ITEMS:

- The air temperature vs. altitude profile above the heated parcels of air, i.e., lapse rate.<sup>4</sup>
- Presence of thin stratus clouds or haze that reduce the sun's energy at the earth's surface.<sup>5</sup>
- Cloud Streets caused by circulation patterns just off the predominant wind direction.<sup>6</sup>

A question recently asked by an *RCSD* reader was, "How often does a thermal come by where you are flying." The question deserves some thought. I should also concede that birds and RC sailplanes don't require thermals so large that they rise to the top of the mixed boundary layer where clouds form. These bigger thermals are certainly useful for full size sailplanes, but what do we know about thermals in general?

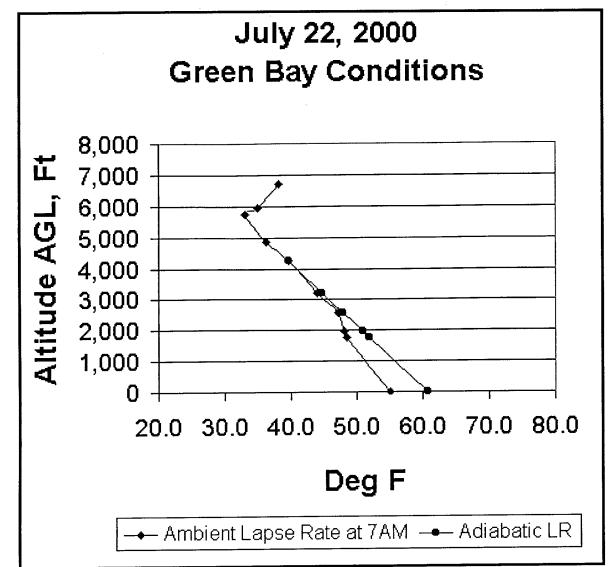
One might assume that the factors related to the energy budget that give rise to convective cooling or thermals also relate to the frequency of the convective cooling cycle. In many cases, the thermals themselves create cumulus clouds that interfere with the solar heating of the surface. The cycle of cloud development and dissipating would also regulate the frequency of the convective cooling cycle. The frequency of thermals could vary widely. In cases where the humidity is too low to form clouds at the top of the convective layer, or in case's where only strong thermal generators are creating thermals that show up as cloud streets in a largely blue sky, the cycle would be predictable. On a fair weather day, you can see the pattern of pulsing

thermals visible at a string of puffy clouds in the sky. The distance between the pulses is a function of wind speed and the frequency of thermals being released. I talked to some friends (Fran LeClercq, Ted Elliott and Jack Ritchie) who had been flying "free flight" for decades, and have a good feel for the frequency of thermals. What I heard was that on a cloudless day, or nearly so, a thermal commonly occurs each two minutes. They had a number of tools like streamers on poles to observe wind changes.

The only direct information I could find that relates to frequency of thermal development comes from a book found at Milwaukee's Mitchell Field Used Book Store. Ann Welch, in her book "Pilots' Weather, a Flying Manual"<sup>7</sup>, indicates that when the thermals are small they are more frequent than when they are large. In the mid to late afternoon they are likely to be stronger and last longer but less frequent. Have you noticed that, at a soaring contest, contestants want to "sand bag" later in the day? Is it just competitive pressure, or do they know that if you launch at the wrong time later in the day, you probably can't find lift over the area you can cover from a single launch?

In her book, Ann Welch also has some pictures of cumulus clouds and interprets what they show. One cloud is a solitary cumulus cloud with a background of cirrus clouds (reproduced in this article). Her comment is, "Typical summer cumulus cloud on a breezy day. The sparseness is due to the wind preventing sufficient warming of weaker thermal sources, and because the cirrus is reducing heating of the surface. This cirrus in the photo is

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indicative of stronger winds at height, ahead of a depression. July 4, 995 mb, Wind NW, 10 knots."

I have started to collect some real data starting with temperature and relative humidity. I see clear cycles in the data, but I need some consultation with an expert before putting it in print. I hope to expand the data collection to include sunshine intensity and wind speed. I would hope to show from actual data, the answer to the reader's question, "How often do thermal occur?"

Before ending this article I'm listing a few Internet resources.<sup>8</sup>

- Clouds: http://vortex.plymouth.edu/ clouds.html
  - Be sure to see the cumulus clouds from above.
- Kevin Fords Soaring Forecasts based on US weather bureau ROAB soundings and information about the soaring forecasts: http://csrp.tamu.edu/soar/ for.html

- Be sure to see the FAQ section. (This page was not working on 7-22.)
- University of Wyoming Program for getting and displaying sounding data: http://www-das.uwyo.edu/ upperair/sounding.html
- A program for analyzing downloads of ROAB soundings is available from SSA web page. The program is described at the SES Soaring Forecast Page: http://www.mindspring.com/ ~gmlawler/ses/storms.htm

#### Another Example of Using Soundings Data

This example occurred while writing this article. We had four students at the field, two with an electric trainer. The first flights were at noon. Several of the flights were spectacular. Rege Geen, a student on his first time out, was flying his electric 3-channel sailplane with his instructor. The model specked out after a motor run to about 400 feet. Keeping the model in sight required some careful action. The wings on this popular ARF (Easy Up by Dymond

Modelsport) are light and can fold or blow up if the model is flown too fast in a dive. We used the prop as a brake by running the motor at the lowest possible power in an open spiral. The motor sounded like it was running at full power. The energy to turn the motor that fast was from the model's energy in that diving spiral. I hope that this is not an unsafe act with regards to the speed controller and the BEC. Your feedback would be appreciated. Afterwards, I went to the Univ. of Wyoming Aviation web page and downloaded the 12 Noon ROAB sounding for Green Bay. The local time when the sounding was taken was 5 hours earlier or 7 AM. The chart shows that if the ground temperature got above 62 deg F, the models could rise to 4,000 feet. The actual high for the day was 75 deg. This thermal intensity was rather unexpected

without knowing the lapse rate because we had about 70% cloud cover — for most of the time we were flying with north winds at 5-10 mph. The next day, under the same weather system, I flew with a Casio altimeter watch in my Cumic+. The model reached 2,980 feet on one flight and 3,020 feet one hour later.

- Simons, Martin, "Gliding With Radio Control Soaring", B<sup>2</sup> Streamlines, Olalla, WA 98359-0976, 1994
- Murray, Lee, RCSD, V16 #3, Mar 1999,p. 10
- 3 Murray, Lee, *RCSD*, V16 #5, May 1999, p. 24
- Murray, Lee, RCSD, V16 #9, Sept 1999,
   p. 22
- 5 Murray, Lee, *RCSD*, V17, #4, Apr 2000, p. 22
- 6 Murray, Lee, *RCSD*, V16 #11, Nov 1999, p. 8
- 7 Welch, Ann, "Pilots' Weather, a Flying Manual", Frederick Fell Publishers, Inc., New York, NY 10016, 1977
  - Ciurpita, Greg, personal e-mails

## THE ELECTRIC CONNECTION



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Bill & Bunny would be proud of meanother flying wing review! Last month, we took a look at the excellent HobbyFlite EFW and, this time around, we'll look at yet another readily available flying wing, the Multiplex Pico Jet.

The Pico Jet is an all foam flying wing made out of molded, dark silver gray, EPS foam. When the shipping box arrives at the door, you'll find this large, rather thin box (36"x24"x6") and, when you open it up, you'll find one large molding that makes up the whole wing and the bottom half of the nose section, smaller moldings that make up the upper nose/canopy and

vertical fin, a vacuformed plastic fuselage liner, prewired Speed 400 6 volt motor, Gunther prop, two bags of miscellaneous bits and piece, wire pushrods and housings, plastic hinge tape, a large sheet of self adhesive decals and an instruction book with two smaller sheets of addendums. The thickness and heft of the instruction book is a bit deceiving as there are sections for German, English, French, Italian and Spanish translations.

#### **Multiplex Pico Jet Specifications:**

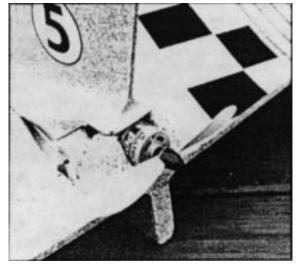
Wingspan: 35-1/4 inches
Wing Area: 303 square inches
Weight: 19 ounces (as tested)
Wing Loading: 9.5 ounce/sq.ft.
Motor: Speed 400 6V

Prop: 4.9"x4.3" Gunther prop (pusher configuration)
Battery: 7 or 8 cell Sanyo™ 500AR pack

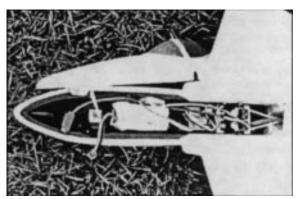
Battery: 7 or 8 cell Sanyo<sup>TM</sup> 500AR pack (Sanyo<sup>TM</sup> 600AE cells also will work)

The English instructions and photo page only take up 6 of the 28 pages! All in all though, this is a complete kit and all you need to add is a radio, speed controller with BEC, and battery pack. I chose to use a Hitec III AM radio as I did in the HobbyFlite EFW, A Castle Creations Pixie 14 electronic speed controller with BEC and a 7 cell, Sanyo 500AR battery pack to complete the Pico Jet.

There really isn't much to build here - or should I say assemble. There is a vacuformed plastic liner that needs to be trimmed and then epoxied into the nose of the large foam molding. This adds strength and rigidity to the portion of the fuselage extending from the leading edge of the wing. I would suggest sanding the outer (glue side) of the liner with coarse sandpaper to improve the epoxy bonding to the plastic. I used 30 minute epoxy to glue the liner into place. Be sure that the liner is in solid contact with the foam and press/ pull/tape as necessary to achieve this. The next step is to prepare the elevons and cut them free. Read the instructions carefully



Motivating end of the Pico Jet - Speed 400 6 volt motor with Gunther prop. This may look like a "toy" prop, but it works quite well and is inexpensive to replace. Note too how the elevon control horns are set up.

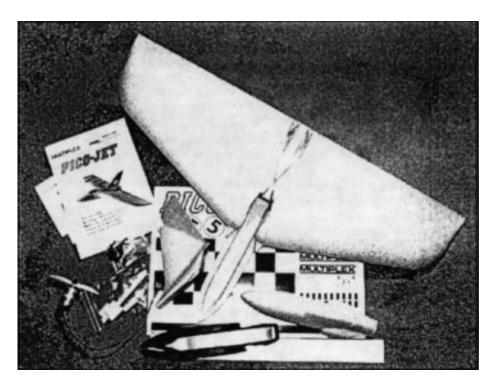


Internal layout of Pico Jet - 7 cell Sanyo™ 500AR pack up front followed by Hitec™ receiver and two HS-60 size servos.

here - you don't actually remove the elevons from the wing. The elevons are driven by a rather unique set up. There is a square section of hardwood (looks like obechi) to which you screw and glue a servo arm onto one end. One of the small addendum sheets clarifies the instruction book by telling you to cut off the short arm, leaving the longer servo arm as the control horn. When attaching the servo arm to the end of the wood elevon actuator, be sure to build both as "mirror images" of each other. I choose to glue these into the preformed slots on the underside of the elevons using alphatic resin glue instead of epoxy but either adhesive will work. Check to be sure that the control horns are poking through to the upper surface of the wing equally and in the same relative position. When the glue had cured, I lightly sanded the foam to remove the small molding nubs, then applied the hinge tape to the upper surface of the wing. Then I cut away the ends of the elevons from the rest of the wing molding using a fine tooth razor saw. I found that I needed to use a bit of sandpaper in the cut to open up the clearance of the slot so there was no rubbing. I then lightly scored the hinge line with a new single edge razor, taking care NOT to cut through the hinge tape. I then worked the elevons until I had an easy to move elevon surface. All of this was surprisingly easy and the elevons work well.

After mounting the servos at the back of the fuselage opening, you cross mount the pushrod wires back to the elevon control horns. There is a small plastic piece that is used to make up the difference between the pushrod wire diameter and the molded hole in the control horn. The instruction book photos shows the pushrod wire coming into the outside face of the control horn but I decided to have the wire come into the inside face of the elevon control horn. That way, the natural bend of the wire coming out of the fuselage acts as a spring to keep the wire in the control horn. From there, I attached the prop to the motor shaft and glued the motor at the back of the fuselage with epoxy. It helps to have the prop mounted so that you achieve the proper clearance off the back of the tail. Be sure that the prop is mounted correctly and that the raised lettering on the prop face is to the rear. I then glued the vertical fin into place with alphatic resin and set the fuselage aside to cure.

The Speed 400 6 volt motor comes prewired with long lead wires and a Multiplex connector. I planned on using Sermos<sup>TM</sup> connectors for the battery to speed controller, and hard wired the speed controller directly to the motor leads. In my



Pico Jet kit fresh out of the box.

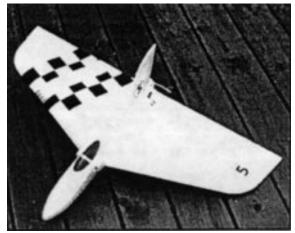
set up, I had to trim the motor leads back (they are rather long) prior to soldering the speed controller into place. I could have removed another couple of inches of wire, but wasn't sure what the final set up would be, so I erred on the safe side.

With all the fixed pieces in place, I now could figure out how best to mount the receiver and battery pack to achieve the correct CG. Multiplex smartly has molded two small dots into the under side of the wing that are right on the required CG. Place the Pico Jet on your finger tips, move the battery to balance and you're set! I chose to place the battery in front, followed by the receiver and then the servos. Your set up may vary depending on your battery pack configuration and whether you choose a 7 or 8 cell pack.

The only design feature I was not happy with is the use of rubber bands and eyelets to hold the front of the upper canopy hatch molding to the fuselage. The kit design is to use two screw eyelets - one on the hatch and one on the fuselage bottom and rubber bands between the two screw eyelets to pull the hatch down and to the rear. There's not



Underside of Pico Jet - bright band forward of elevons is reflective tape added for ID purposes.



Pico Jet at rest.

much vertical space to work with and when completed, there wasn't much tension. I switched out the kit supplied rubber bands for smaller ones but I still

thought that it could open up in flight. Looking around the house for a substitute, I realized that the wide, blue rubber bands that are used to hold broccoli stems together might be a good substitute. Sure enough, it works fine. The rubber band is wide enough to fit around the outside of the nose without digging into the foam and isn't noticeable when in the air. Eat healthy and keep your Pico Jet's nose on!

#### On to flying!

took the Pico Jet with me to a club glider I took the Pico Jet with the contest and flew it before and after the contest. After radio range checks and double checking elevon surface throws and CG, there was nothing left to do but fire it up and fly. The Pico Jet is easy to hold and a firm throw had the Pico Jet off and flying. Initial flights were with a 7 cell Sanyo 500AR pack and the Pico Jet got in step quickly. Control was neutral in roll and stable in pitch. I found that the breeze and a bit of bumpy air was easy to read with the wings rocking a bit. The Pico Jet rolls well with a bit of barrel to it but I had a little difficulty trying to loop it. My loops were rolling out at the top but a little practice and the loops started to look good. The Pico Jet is not particularly fast but on the other hand, it's not terribly slow either. Having flown my Vortex SP and Switchblade S400 Race recently, it probably isn't fair to use them as a reference. Landing the Pico Jet is easy too - just set up, throttle back, and glide in. A little back pressure on the stick and the Pico Jet slides in nice and easy onto the grass. If you're thinking of flying and landing on a hard surface, I would recommend some sort of solid protection on the belly so that you're not leaving a bit of model behind every time you land. The Pico Jet looks cool flying by and the prop sound is unique too. Fellow club member Brad Young flew the Pico Jet for me so that I could get some flight photos and gave the Pico Jet a

jump in speed and vertical performance but be sure to maintain the correct CG location. I am more than satisfied with the Pico Jet's performance at the recommended CG location and see no reason to push my luck finding the point of no return with an aft CG.

And yes, you can repair molded EPS foam models! I had a radio glitch at low altitude on about the 30th flight and the Pico Jet took a nose dive into a cornfield adjacent to the sod farm we fly from. I dejectedly walked over to the crash site expecting to find nothing more than foam bits and pieces suitable for packaging material and was surprised to find the remains easily repairable. The right wing had broken off at the root, taking a portion of the fuselage with it and there were a few odd pieces broken off as well. After carefully combing the area for all the pieces, I took the model home and pieced it back together. Other than missing a foam bead here and there, I had all the pieces of the jigsaw puzzle to work with. I started gluing it back together using Pica Gluit 2<sup>TM</sup>, a copolymer type glue, taping the pieces into place as I went along. You can also use an alphatic resin glue like Titebond or even epoxy. Epoxy will add more weight and is hard to clean off the surfaces, whereas Gluit 2™ and Titebond™ can be wiped down with a damp cloth or paper towel. After the glue had cured, I peeled the tape off and by using my fingertip, worked a bit more glue along the break line. In two short sessions, the Pico Jet was back in one piece and ready to fly again and the apparent weight gain was under 1/4 ounce. I sure wish some of my wood built up models went back together as easily!

The Pico Jet is a fun model that is easy to put together and go out and fly. You'll need elevon/V-tail mixing capability on your transmitter to set your Pico Jet up correctly. Keep your weight down and you'll not be disappointed with your Pico Jet! Go fly and have fun!!

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#### GORDY'S TRAVELS

# 'ASPIRE'-ING TO SOAR REVIEWING THE HANGER 9 ASPIRE 2M A.R.F (AND HOW TO INSTALL SPOILERS)

(AND HOW TO INSTALL SPOILERS)

by Gordy Stahl Louisville, Kentucky Gordy Soar@aol.com

My travels take me to different states; sometimes those are 'states' of mind and, in this case, the state of mind was to take a look at the growing craze toward Rudder, Elevator, Spoilers class (R.E.S.).

Okay, I admit it; I was attracted to the Aspire's advertisement. It showed attractive transparent blue, ribbed, wing panels, and tail feathers. It had the right foil for a R.E.S. 2m ship and, frankly, the fact that it was mostly built and already covered made a big impact on me. After all, it's pretty tough to find a flat surface to use as a pinning board for laying up a balsa structure wing in a motel room!

Heck, with all that going for it, how could I resist?

I contacted Horizon and the kit (and their new G-Force Hi-Start for 2m's) arrived. Inside the Aspire box were all the components, individually packaged so that assembly could be done in component steps.

It looked as nice in the 'balsa' as it did in the advertisement! Like most covered balsa structures it would need some re-shrinking to clean up some wrinkles. Everything seemed fairly light and straight.

The stab and rudder hinge slots were already in place as were the rubber band wing-post holes. The fuselage radio compartment has slotted walls to receive the rails for mounting the servos... even standard size servos!

The towhook location is pre-drilled and actually in a great location for big controllable launches.

The vertical stab slips into a slot in the

fuselage and the horizontal stabilizer is slotted to slide onto the vertical, making perfect alignment automatic; just add a little epoxy.

The wing-panels have spare boxes in them to receive the joiner. While I flew the Aspire as a two piece wing (I travel.) and found it to be plenty strong, the instructions tell you to glue the joiner and panels to make it a permanent and stronger one-piece wing.

I actually launched on a winch with no problem; launching on high-starts should be no problem.

The canopy is vac-u-formed with clearly defined edges. You have to cut away the flashing with scissors, but it's easy to end up with a nice looking canopy that fits well. The kit includes pre-cut pieces for the canopy formers that also act as a retainer for a rubber band that holds the canopy in place, yet also allows access to the radio compartment. Some 'tune-up' shaping is needed to the canopy formers to make them fit just right.

I used 'Goop' shoe-goo type glue to glue the canopy formers in place. I figured that since the canopy would be handled quite a bit that the more flexible 'Goop' would be the more secure choice for glue.

If there was a shortcoming to the kit, it was the rudder and elevator pushrods. They need to be built. You get two hard wood pushrod pieces and four threaded-end 2/56 wires. It takes about as much time to make these rods up as it did the other components. They obviously do the job, when completed, but clearly could be

improved.

The kit needed very little lead to get it to the balance point and, as usual, the CG setting was far too conservative for competitive flying, but great for social flying or beginners.

My radio choice was for JR components. There was no need to use smaller than standard size servos, as the weight was needed up front anyway.

#### Flving

Flying the Aspire was as good as it looked. Nice, big, docile launches, gentle enough for a beginner. It turned really flat and thermaled out on handlaunch type thermals. In fact, I hand launched to specked out altitude a bunch of times. (We have good air some days in Kentucky!)

The Aspire instructions give recommended throws and they worked just fine, too. Its ability to react smoothly to input made every landing straight and smooth. In general, the instructions take you step by step through each component of construction, except for adding spoilers. So for that I contacted an excellent builder friend of mine who I knew had modified his Aspire with spoilers.

While the spoilers aren't needed to dethermalize from the clouds (The Aspire spins down pretty well.), spoilers are needed for competitive R.E.S. landing control.

Take a look at the photos and you will see how simple this modification can be.

A note about Hanger 9's G-Force Hi-Start

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launching system. First, it comes completely assembled with spike, excellent black rubber tubing, and a very efficient parachute all rolled up on a handy reel. There are even set up and launching instructions included in the box!

G-Force Hi-Start launching systems come in four configurations. Two tension strengths, one for two-meter ships and a stronger one for bigger ships. Two lengths for those of you who have short fields or fields that will handle the standard 800' stretch.

All in all, the Aspire and the G-Force are excellent products that work as well as they look and are worth the money! The Aspire would be a great 'club-trainer' or a sweetheart for those days you just want to sit in the clouds.

The covering is Ultra-Coat transparent and it literally glows in the sky when the sun shines into the wings.

Thanks to Horizon and Hanger 9 for two nice A.R.F. products.

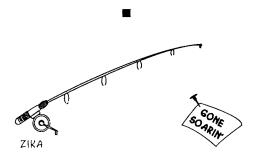
The spoiler modification is worth doing... IF you have the need. Don't bother with it if you don't intend to compete. The system shown uses two micro servos to actuate the spoilers; they are coupled via a "Y" connector and plugged into the 'throttle' channel. In this configuration, the Aspire can be flown on the most basic three-channel transmitter.

R.E.S isn't my 'cup of tea', as I prefer unlimited ships for my limited amount of time to soar, but I wanted to see what the attraction was to R.E.S. What I found was relaxation and simplicity, especially when you start with a nice sailplane that is mostly complete, right out of the box!

Its weight is comparable to any 2m kit you might assemble out of parts; it uses the 7037 airfoil, superb for easy thermaling and not bad in the wind. In fact, I flew the Aspire in a 25 mph wind just to see how it handles; it handles just fine!

If you want to find out more about the Aspire or G-Force launching systems contact Horizon Hobbies @ 8077-504-0233 or visit their web site at www.Horizonhobby.com.

What a lucky guy I am. All my travels are fun! See you with my Aspire on your field some day!



#### **Spoiler Modifications**

Hi Gordy,

This is how I put spoilers in my Aspire. It took about 1 & 1/2 hours start to finish. I used 1/8" X 1/4" balsa to make up the frames and 1" trailing edge stock for the spoilers. The horns were made of G-10 printed circuit board, but 1/16" ply would work fine, They are set forward of hinge-line. JR's new super micro servos are the perfect choice since they are light weight and plenty strong to keep the spoilers up in a dive

Just get some Ultra-Cote to cover over your mods, then cut out around the spoiler with a razor knife. Tape the hinge-line and you are done!

You only need about 15% up elevator to keep the plane from pitching.

I used a JR 'Y' harness to couple the two spoiler servos into one channel of the receiver. You'll find the spoilers are VERY effective.

Since I intend to compete with my Aspire, I also cut the covering off 1-1/2" wide in the center, joined the wings, and glassed them. Probably overkill, since my friend Denny did his as the plans stated, and we both launched all day into a 15 mph winds with a 12 volt winch... CAREFULLY. Just have to watch the flex. Mine weighs 31 ounces with the spoilers and the glass.

Bill Grenoble Shermans Dale, PA



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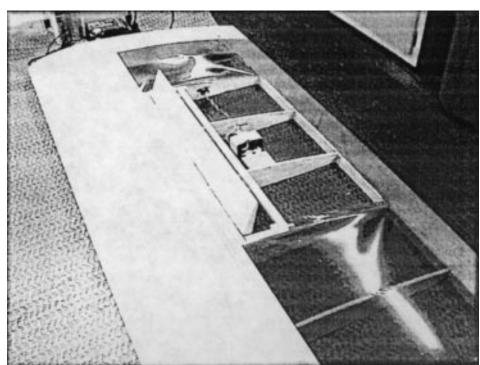
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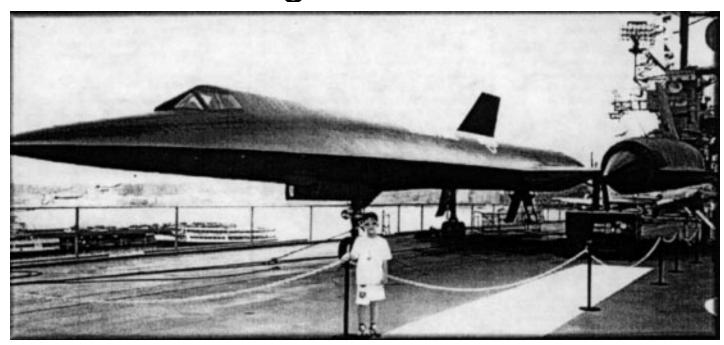
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## Searching For A Tow Partner



by Joe En-Huei West Windsor, New Jersey

#### Introduction

I had a lot of fun aerotowing scale gliders at the Elmira meet over the past 4 years. Since then, I would like to aerotow locally and introduce this sport to my friends. I started searching for a tow partner from my fellow club members, but none had seen R/C aerotowing and were not sure if aerotowing is a good way of launching large gliders.

About 5 months ago, I lent a "R/C Aerotow" videotape (produced by Robin Lehman) to my buddy Zby Hubacek to see if Zby would be interested in becoming a tow pilot. Zby is an excellent pilot, flying various kind of planes from Park Flyers to large scale motor planes. I explained to Zby that aerotowing is a team sport requiring coordination between tow pilot and sailplane pilot.

After viewing the tape, Zby was duly motivated in trying something different. So, we ordered an Ultra Stick with a Saito 180 engine as the tow plane. The Ultra Stick has a wide speed range and is a good candidate. The motor generates about 15 lb. of static thrust when spinning a 16x8 prop and the tow plane is only 12 lb. We plan to tow a popular 4.2 meter Rodel ASK-21 and a 6.25 meter EMS Nimbus-4 at 12 lb. and 16 lb., respectively.

#### Aerotowing the ASK-21

We brought out our test planes during early July to our relocated club field at Mt. Holly, New Jersey. Our flying field is sandwiched between a capped landfill and



a 4-lane highway about 300 feet away. We can not fly over the highway. However, the airspace over the landfill is all ours. So, we decided to make a gentle turn away from the 4-lane highway after takeoff followed by a series of crosswind runs (long-legged zigzag) to altitude. (We learned from other

Full-size SR-71 photo taken on the deck of aircraft carrier Intrepid (NYC) with Joe's son, Daniel.

Photography includes ASK-21, Nimbus 4, and Ultra Stick.

pilots' experiences that the sailplane might overtake the tow plane if we go downwind.)

The towline was about 100 feet long. We started with the ASK-21 under a light breeze, parallel to the runway. The Ultra Stick was quite powerful and the ASK-21 needed only about 20 feet of ground roll before becoming airborne. I kept the ASK-21 at about 5 to 10 feet above GL and waited patiently for the tow plane to pick up speed and lift off. After both planes had gained sufficient altitude, we initiated a gentle turn away from the highway. I set the elevator trim such that the ASK-21 would fly slightly higher than the tow plane.

The ASK-21 was released at about 700 feet when Zby started having trouble seeing his tow plane while the planes were flying away from us. We were very happy to have a very successful tow, especially for Zby who never did any towing before. Zby suggested trying a downwind tow so he could keep the tow plane in sight - and so we did. The ASK-21 tended to overtake the tow plane. (I attempted to slow down the ASK-21 by deploying the spoilers, but the spoilers became very sensitive in high speed.) So, we released it at about 300 feet. Perhaps the wind speed is substantially higher at 300 feet than the breeze near ground, causing the ASK-21 to pick up

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speed quicker than the tow plane can handle.

#### Aerotowing the Nimbus-4

We also aerotowed the heavier Nimbus-4 after we built up our confidence. We noticed that the tow plane needed a little bit longer time and distance to accelerate upon ground roll after the Nimbus-4 had become airborne. We adjusted a mild climb angle for both planes to gain altitude along a zigzag flight path. The Nimbus-4 was released at about 1,000 feet without any problems and we were more than happy to achieve this.

Upon the next flight, we attempted a downwind tow with the help of Nimbus-4's flaps and midflaps (cambered about 10 and 5 degrees, respectively), in order to slow down the plane; the tendency to overtaking the tow plane was greatly minimized. The Nimbus-4 was released at a very high altitude where I kept the plane in thermals with a gaggle of soaring birds; I had a very long flight. We were all very excited with the results of high tow. The spectators said the EMS Nimbus-4 is the highest performance thermal sailplane that they have seen. The ASK-21 is always a very pleasant and easy plane to fly.

#### Conclusion

This is the first aerotowing at our club field with over 50 years of history. This is a very special event for Zby and myself to remember. We also plan to tow a 4 meter Rodel Discus-2a (my latest project) and perhaps an ASW-28 in the future. The Ultra Stick will also be handy to serve other club members desiring to try aerotowing big

gliders, which turns out to be quite easy to do with some planning.

Meanwhile, we have ordered a Pegasus from John Derstine so that my bigger sailplanes can be towed locally. I saw several Pegasus at the recent Elmira meet and was impressed by its ability in heavy duty towing. Most importantly, the Pegasus is quite big such that the tow pilot can "see" his tow plane at altitude.

R/C aerotowing is a very enjoyable team sport and we have learned a lot from this exercise.









#### **GORDY'S TRAVELS**

#### GETTING FLEXIBLE WITH A NEW GLUE!

by Gordy Stahl Louisville, Kentucky GordySoar@aol.com

Igot tired - actually had been tired for sometime. But all that changed when I visited this year's Toledo Model Hobby Show. It was there when I found an end to my 'tiredness'.

Okay, I wasn't actually 'tired' tired; I was tired of brittle Cynoglues. Sure they 'stuck' things together immediately and that made me feel good ...for awhile.

For instance, I would come off the winch line hoping for a tremendous zoom launch, and go deep into the 'bucket', sometimes too deep! That's when I would begin to feel bad. Those quick-togrip glue joints would shatter apart just as my plane's nose would hit the ground.

Sure, my glue joints would have been the least of my problems at that point... but what about when I would find that my crash was caused by my elevator pushrod housings, which had cracked lose from the fuselage sides? And this allowed the rods to flex instead of powering my elevator to get the nose out of that terminal dive?

Well, what I found at Toledo was a new and innovative 'super-glue' supplier to our hobby. Cyberbond had been around for a while but their products hadn't been available to our hobby; and its Cyberbond's trademark adhesive, 'Cyberbond Flex' is one of the most exciting Cyno-glues to our hobby, since 'Odor-less'.

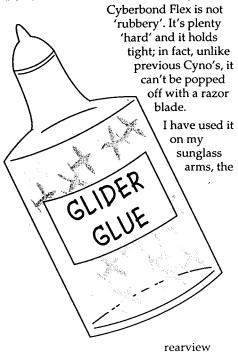
What is the secret inside of Flex? Well if we knew that, we'd have thought of it ourselves. However, Cyberbond's competitors have thought of it and most of the brands we are familiar with offer a 'Flex' version of their own. You may have seen them on the shelves of your local hobby shop; they are fairly easy to spot, because they are black in color, and Cyberbond Flex is clear.

Flex has the consistency of a thick or medium viscosity Cyno. Any brand 'kicker' works great to accelerate the cure, but Cyberbond makes Cyberbond "Blast" accelerator specifically to work with their products. Flex is advertised as perfect for glue jobs where you would have used a "gap-filling" Cyno or where epoxy had been the choice.

Yes I have used it... for lots of jobs. I use it for tailposts in a glass fuselage, built up rudder joints, servo tray mounting, tow hook plate mountings; even elevator

bellcrank pivot tube glue jobs, but one place where it really shines is on pushrod to fuselage-side adhesions.

Don't mis-understand. Once cured,



mirror mount in the car and lots of other tough, somewhat flexing joints; it has worked as hoped.

Cyberbond has other great products such as:

- **CB Balsa:** Specifically designed not to run away from a balsa joint, but still will penetrate for a strong joint.
- CB Super Glue Remover: The first ever, industrial strength Cyno glue remover that is NOT Acetone based and it works! Seems like water, but turns Cyno glue into wipe-off-able goo. It works fast and has no smell or affect on skin. Really neat for getting that spill off of your new molded fuselage!
- **CB No-Odor:** Works safe on Styrofoams and no fumes too!
- **CB Universal:** Perfect for our uses not so thin that it runs all over, yet not so thick that it takes forever to cure during a field fix.
- **CB Plastic:** Stick ABS, or Delryn, and even Nylon! Approved by Ford as a plastic bonder!
- **CB Epoxies:** They offer a 4 minute and a 30 minute, with both version providing huge levels of strength, in my opinion, beyond the competition.
- CB Steel Repair Putty and Wood Repair Putties: Steel Putty is tough stuff that can be taped with threads, and sets up in 3-5 minutes; Wood Putty comes in a "knead together' form for easy use in patching applications.



I think you will find that Flex will become your glue of choice. I use it where I was using 'Goop' type glues since they take so long to cure and are sloppy to apply.

One ounce bottles of Flex lists for about \$6 per ounce, but check out their web site for a dealer near you or call them.

Their web site address is www.cyberbond1.com and their phone number is 630-761-8900.

I'm not tired anymore. Put some energy into your glue joints and get some Flex in your plane's step.

I really got a lot from this trip; in fact, I bought a case of bottles! No, I am not

worried about the glue 'gelling' up in the bottles. I have had two bottles open in high humidity and hot temperatures for about 5 months with no thickening. CB says that humidity will cause all Cyno's to gel. The best way to keep un-opened bottles fresh is to refrigerate them, but not to do that with open bottles; dry and cool is the ticket for opened bottles but, frankly, if your glue is getting old, you just aren't building enough!

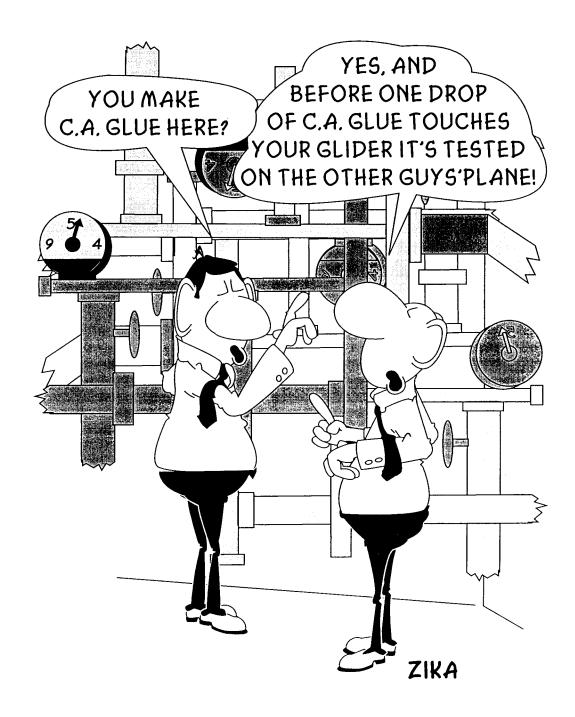
The web site shows strength comparisons with other 'name' brands, so if you are the type who tests his batteries and weighs his planes, you will enjoy the numbers and graphs on Flex comparisons.

If you know about a Hobby Trade Show coming to your area, contact Cyberbond and suggest they attend, as they offer 'show special' pricing and provide expert answers for your gluing needs. They are really nice people and know their products and our hobby needs.

Cyberbond isn't 'discount' glue, but rather glues made up to a quality for high demand, critical applications.

Give them a call or an e-mail, and tell them you heard about them in *R/C Soaring Digest* magazine!

Hope you enjoyed this trip as much as I! See you on my next 'travel'! ■



#### CROSS COUNTRY SOARING



Scott Gradwell Medford, Oregon rcpilot@cdsnet.net

E arlier, when I wrote the article about what it took to get into R/C Cross Country soaring, I just gave a general overview. I am going to spend a few columns explaining in more detail some of the things I was talking about. In the earlier column I mentioned that a vario was an extremely helpful item to have for R/C Cross Country Soaring, so I would like to explain what a vario is and what it does, and why I think it is essential.

If you are a full size pilot, I am sure you are familiar with a VSI or vertical speed indicator. It is an instrument that tells you not only if you are going up or down, but the rate at which you are going up or down. It does this by measuring the rate of flow through a calibrated hole in the instrument. But we don't care how it works, as long as it tells us what we want to know

In a sailplane, a variometer does the same job as a VSI, but the instrument is much

faster and more sensitive.

Many full size sailplanes are equipped with electrical varios that have a speaker built into them. The speaker sends out a tone that corresponds to what the vario is reading. This allows the pilot to keep his head out of the cockpit looking for other sailplanes, yet still know what kind of lift he is in.

Almost all full size sailplanes utilize a total energy compensation system which I will describe next month.

Using a variometer would be great, if we could sit there and watch the face of the instrument, but that is kind of hard to do when the sailplane is 2000' in the air and we are on the ground. So luckily, some people that are much smarter than I, have made a variometer and hooked it up to a transmitter. This signal is received on the ground by the receiver, which kind of makes sense.

The Ace Sniffler, Multiplex Helios, and Telario Talk are all examples of R/C variometers. I only have personal experience with the Multiplex Helios. The main reason I use the Helios, is because it was the only one that was available when I was looking for one. I have used it for many hours of R/C Cross Country flying and am very happy with it. The receiver outputs an audio tone that duplicates the tones full size sailplane variometers put out, so you can look up and fly while knowing what kind of lift you are in. There are a few shortcomings with it though.

The signal is sent on the CB band so, sometimes, truckers will come in over your receiver. It comes with only one set of crystals, so if the truckers are driving you

crazy, or you show up to a contest and another person is on your frequency, you are stuck. Also, when the sailplane is at certain angles or distances from the receiver, the signal can get scratchy. It isn't set up to utilize a total energy probe, so if you want a total energy system you have to make up your own. Or ask Tom Hoopes how to do it, or maybe beg him to do it. I don't know if he still can.

There are just a few things I know about the Ace Sniffler; it does have a port to accept a total energy probe. They aren't made anymore, so you have to pick up a used one somewhere. The tone put out by the receiver is horrible sounding.

The Telario Talk is the newest one to come out, and probably the best. The signals aren't sent out on the CB band, and you can set dip switches on the transmitter and receiver to change frequencies easily. Besides the vario information, it gives you an altitude reading. I have been told that the newer versions are set up to accept a total energy probe, also. Now if they could incorporate an airspeed indicator into it, you would have an unbeatable package.

If you want to know where to get the Multiplex Helios or Telario Talk, e-mail me and I will get you the information. Next month, I will tell you what I know about total energy systems and how they are helpful to us Cross Country pilots. ■



ZIKA



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#### SCHEDULE OF SPECIAL EVENTS

August 12-13

CRRC Soar-In Contest Sudbury, MA Anker Berg-Sonne, (978) 897-1750 anker@ultranet.com John Nilsson, (978) 368-7136 nilssonj@rd.simplexnet.com Info. & map: http://www.charlesriverrc.org/ August 19-20

Cape Blanco, OR Safari 2000 Mike Shaw, (541) 269-2423 http://clubsos.homestead.com/indexweb3.html August 26-27

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

September 2-4

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

September 2-4 OVSS Fall Roundup Marc Gellart, (419) 229-3384 Isoar2@wcoil.com Muncie, IN Paul Siegel, (513) 561-6872 psiegel@fuse,net September 15-17

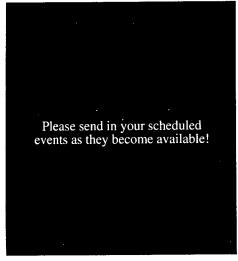
Last Fling of Summer Broken Arrow, OK Dave Register, (918) 335-2918 regdave@aol.com Jeff Naber, (918) 495-1028 nxtdoor@swbell.net http://www.sitemaster.com/tulsoar September 29 - October 1

St. Louis, MO Oc-Tow-Berfest 2000 Peter George, (314) 664-6613 twometer@worldnet.att.net October 21

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

Tucson, AZ

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



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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 Expensive Christian Programmes of Sailplanes and Airfoil Polars plus a new Expensive Christian Programmes and Airfoil Polars plus a new Expensive Christian Programmes P rel 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) 731-8484 after 5:30 p.m. weekdays or on weekends. E-mail: <a href="mailto:lmurray@athenet.net">lmurray@athenet.net</a>. PC-Soar Web Page: <a href="http://www.athenet.net/~atkron95/pcsoar.htm">http://www.athenet.net/~atkron95/pcsoar.htm</a>.

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

DesignAire: EASY TO USE AIRCRAFT DESIGN SOFTWARE (PC). 3-D sketch, performance, Wt/Bal, inertias, color graphs, panel analysis, static stability, airfoils, envelope, FAR 23A loads and envelope. Runs "airfoil ii". \$119. JammAero POBox 236, Horntown VA 23395. www.jammaero.com.

SAILPLANE PLANS: Copies of ORIGINAL, SAILPLANE PLANS: Copies of Oxiginal, SOAR BIRDY & BIG BIRDY plans as originally kitted by Bridi Hobby. \$12.00 per set, shipping included. BUZZ WALTZ, 68-320 Concepcion Rd., Cathedral City, CA 92234, 760-327-1775 or email, <buzzwaltzrc@excelonline.com>.

#### For Sale - Personal

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

1/4 Scale Mosquito, nice airplane, good shape... flown about 10 times, 135" span, very gentle to fly, has air brakes... \$650 w/all servos. Eclipse V, all molded, very nice, good thermal ship... \$500 or \$735 w/all servos. Add S&H. Dale King, (972) 475-8093, Wylie, Texas.

#### Hobby Shops that Carry RCSD

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Gunnings Hobbies

Hobby Town U.S.A. 8060 S. 84th St. La Vista, NE 68128 (402) 597-1888 Hobby Warehouse 4105 South Street Lakewood, CA 90712 (562) 531-8383 King R/C Five Forks Village King, NC 27021 Tim's Bike & Hobby 2507 Broadway Everett, WA 98201 (206) 259-0912

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(972) 442-3910 RCSDigest@aol.com 9:00 A.M. - 5:00 P.M. CST

#### Dear Scratch Builder.

Many of you have asked for fuselages that we have not been in a position to provide, as most of you know, until now. But, we're back, at least for a limited time.

The thermal/slope, epoxy fiberglass fuselages shown below, are the first of our Viking line, and include suggested specifications (wing span/airfoil/radio channels). We will not carry an inventory, but rather custom make each fuselage as the orders are received. We want to do things right, so delivery time varies, and can take up to a month or longer, depending on what you want.



#### **Design Suggestions**

Fuselage designed to take a heat shrink battery pack in the nose, with a standard size receiver, on/off switch, and 3 standard size servos in tandem. Fuselage designed by Bernard Henwood. Recommended for thermal or slope, intermediate to expert.

S&H via U.P.S. - Continental U.S.A. (Texas residents add 7.25% state sales tax.)

Check or money order only, U.S. funds, please. C.O.D. \$10.00 additional. Prices subject to change without notice.

#### Thermal or Slope

		_	
	Epoxy Fiberglass Fuselages	Price	S&H
	Aeolus III (60"/NACA 63A010/3)		
	43" fuse, plans	\$75.00	\$15.00
	Condor 3m (bolt-on wing mount/up to 1		•
	52 1/4" fuse, nose cone	\$90.00	\$15.00
	Contestant (148"/E205/3-4/10.5" chord)	•	·
	60" fuse, canopy, tray	\$90.00	\$15.00
	Elf 2m (bolt-on wing mount/up to 10" ch	ord)	
	44 3/8" fuse, nose cone	\$80.00	\$15.00
	Oden (100-130"/S3021/As Req./10.25" ch	ord)	
	51" fuse, canopy	\$85.00	\$15.00
	Raven 3m (119"/Mod. E193/As Req./10.	75" chord)	
	51" fuse, plans	\$90.00	\$15.00
	Stiletto II (100-136"/Any/As Req./10" max. c	hord/bolt-c	n wing)
	49" fuse	\$85.00	\$15.00
	Stiletto RG-15 (100-136"/RG-15/As Req.	/plug-in w	ring)
	49" fuse	\$85.00	\$15.00
	Stiletto S-3021 (100-136"/S-3021/As Req./9.5"	Chord/plu	g-in wing)
	40" fuco	\$85 OO	\$15.00
	Stiletto S-7037 (100-136"/S-7037/As Req./9.5" 49" fuse	Chord/plug	g-inwing)
	Stiletto HQ 2.5/9 (100 - 114"/HQ2.5/9/As Req./10" rox	ot cord/plug-ir	wing)
)	49" fuse	\$85.00	\$15.00
	Zen (100"+/None/Var.)		
,	51" fuse, hatch	\$85.00	\$15.00
;	•		

All fuselages are Kevlar™ reinforced.

#### 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://shl.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, (480) 345-9232, <a href="mailto:azdw@uswest.net">azdw@uswest.net</a>, or visit CASL at <http://www.public.asu.edu/~vansanfo/casl>

Arizona - Southern Arizona Glider & Electric (Tucson area), Philip Brister (contact), philipbrister@netscape.net, (520) 394-2121. SAGE welcomes all level of flyers!

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

California - DUST, Buzz Waltz, 68-320 Concepcion, Cathedral City, CA 92234, (760) 327-1775, <br/>
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com>.

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

California - Inland Soaring Society, Robert Cavazos, 12901 Forman Ave., Moreno Valley, CA 92553, RCAV@aol.com. California - Northern California Soaring League, Mike Clancy, 2018 El Dorado Ct, Novato, CA 94947; (415) 897-2917.

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

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

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

California - Southern Calif. Electric Flyers, John Raley (President), 1375 Logan Ave., Costa Mesa, CA 92626; (714) 641-1776 (D), (714) 962-4961 (E), email: 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.), Lawless B@ang af mil; Anker Berg. Sonne (Scorekeeper), (508) 897-1750, anker@ultranet.com; Josh Glaab (Contest Coordinator), (757) 850-3971, ljglaab@pinn.net; <a href="http://www.eclipse.net/~mikel/esl/esl.htm">http://www.eclipse.net/~mikel/esl/esl.htm</a>

Florida - Florida Soaring Society, a league of Florida soaring clubs. Newsletters available on website <a href="http://">http:// /www.asterix.specs.com/fss>.

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

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

Hawaii - Maui Island Slope Soaring Operation (MISO), Duane A.K. Asami, 262 Kamila St., Kula, HI 96790, pgr. (888) 932-6247, <dasami@mauigateway.com>. Illinois (Chicago Area) - Silent Order of Aeromodeling by Radio, Jim McIntyre, 23546 W. Fern St., Plainfield, IL 60544-2324; (815) 436-2744. Bill Christian, 1604 N. Chestnut Ave., Arlington Heights, IL 60004; (847) 259-4617.

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

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

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

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

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

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

Kentucky - Bluegrass Soaring Society, Frank Foster (President), 4939 Hartland Pkwy., Lexington, KY 40515; (606)`273-1817 Kentucky - Louisville Area Soaring Society, Ed Wilson (Contact), 5308 Sprucewood Dr., Louisville, KY 40291; (502) 239-3150 (eve), e-mail <ewilson1@bellsouth.net>. Louisiana - Capitol of Louisiana Soaring Society (CLASS), Leonard Guthrie (contact), 12464 Fair Hope Way, Baton Rouge, LA 70816, (225) 275-2122, flynguts@aol.com.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

www.scrollsander.com/SierraSilentSoarers.htm>

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

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

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 SailplaneSociety: http://www.bufflink.com/css/or Lyn Perry, President, (716) 655-0775, perryl@ecc.edu; Jim Roller, Competition Coordinator, 716-937-6427, Rolj98@aol.com.

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)

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,email <tomnagel@iwaynet.net>.

Ohio, Kentucky & Indiana - Ohio Valley Soaring Series, Marc Gellart, (419) 229-3384, <isoar2@wcoil.com>, <www.dma.org/DARTS/ovss/ovss.html>.

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

Oklahoma - Tulsa R/C Soaring Club (TULSOAR), <a href="http://www.sitemaster.com/tulsoar">http://www.sitemaster.com/tulsoar</a>.

Oregon - Bay Area R/C Fliers, Mike Shaw, <grizzy2@gte.net, (541) 269-2423.

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 Szymański, CD, (503) 585-0461, http://home.att.net/~aszy/sss/>.

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 (South Central), Coffee Airfoilers, Brian Smith, 317 Crestwood Dr., Tullahoma, TN 37388, (931) 393-4876, <bismith@midtnn.net>

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

Texas - aerotowing, Dallas area, Andrew Jamieson, 6931 Desco Dr., Dallas, TX75225, (214) 369-6118, AJamieson@Sleepmed.com. Larry Sengbush, (972) 291-4840.

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

Vermont - Steve Savoie, 926 Gage 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, Bristol VA & TN area, Daniel E. Didgeon, Apt A, 721 Meadowview Rd., Bristol, TN 37620; (423) 844-0518: voice mail (423) 914-4290, <ddijun2@aol.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>.

#### T.W.I.T.T. (<u>T</u>he <u>W</u>ing <u>I</u>s <u>T</u>he <u>T</u>hing)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation which is dedicated to furthering education and research in a variety of disciplines. Full information package including one back issue of newsletter is \$2.50 US (\$3.00 foreign). Subscription rates are \$20.00 (US) or \$25.00 (Foreign) per year for 12 issues.

> T.W.I.T.T., P.O. Box 20430 El Cajon, CA 92021

#### 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 - Calgary R/C Soaring Society (Alberta), thermal duration & slope soaring, Chris Gregg (Pres.), (403) 226-1019, cgregg@cadvision.com; Eric Weder (Sec.), (403) 289-8844, eaweder@telusplanet.net.

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: <a href="http://www.athenet.net/">http://www.athenet.net/</a> ~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, <a href="https://www.athenet.net/">https://www.athenet.net/</a>.

#### 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 <hr/>
\*\*Cilitimate Scale Soaring\*\* video taken at the 1998

"Ultimate Scale Soaring" video taken at the 1998 Northeast Aerotowing Fly-in, New York, U.S.A. - international flyers & interviews. From Germany: The Akro Cup and The Scale Seglerschlepp. Check or money order, \$24.95 plus \$3.20 S&H (U.S.), payable to John Derstine, RD 3# Box 336, Gillett, PA 16925; (570) 596-4392, cjohnders@postoffice.ptd.net>. S&H foreign: \$6 Canada/Mexico, \$7 Europe, \$8 Asia/Africa, \$8.50 Pacific Rim. VHS format, NTSC standard. PAL format \$40 + applicable shipping.

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, <raulb@earthlink.net>. To view summary of book info.: http://home.earthlink.net/~raulb

#### Seminars & Workshops

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

#### BBS/Internet

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



Sailplane Homebuilders Association (SHA)

A Division of the Soaring Society of America

The purpose of the Sailplane Homebuilders

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

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

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



The League of Silent Flight (LSF) is an international fraternity of RC Soaring pilots who have earned the right to become members by achieving specific goals in soaring flight. There are no dues. Once you qualify for membership you are in for life.

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

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Vintage Sailplane
Association
13312 Scotsmore Way
Herndon, VA 22071 USA



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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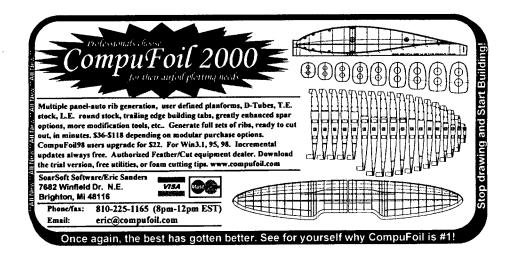


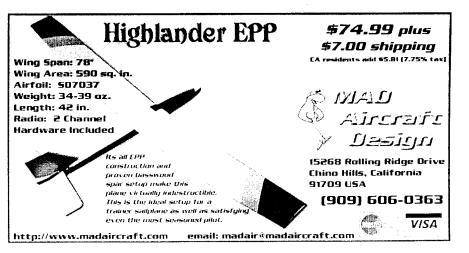
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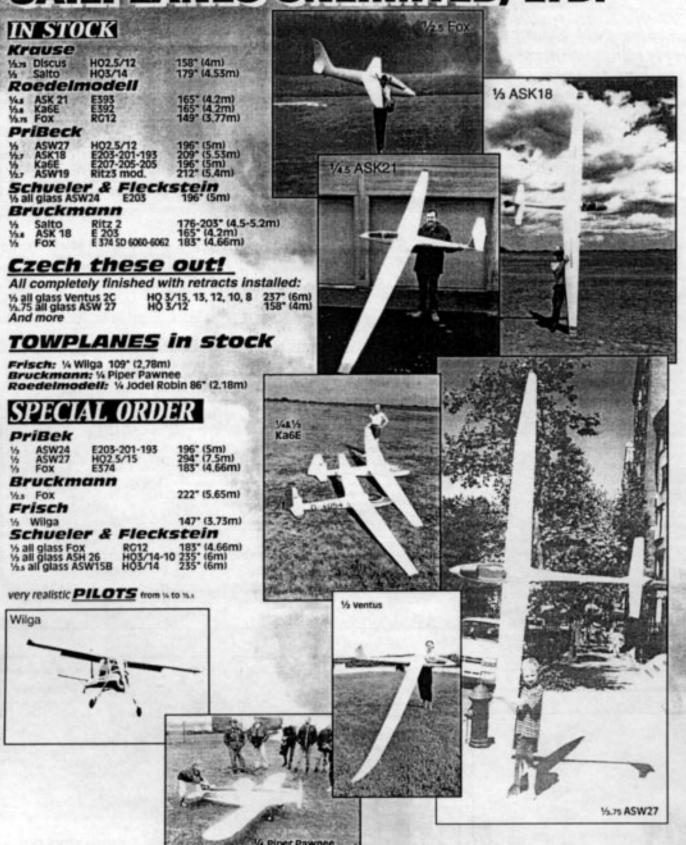
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