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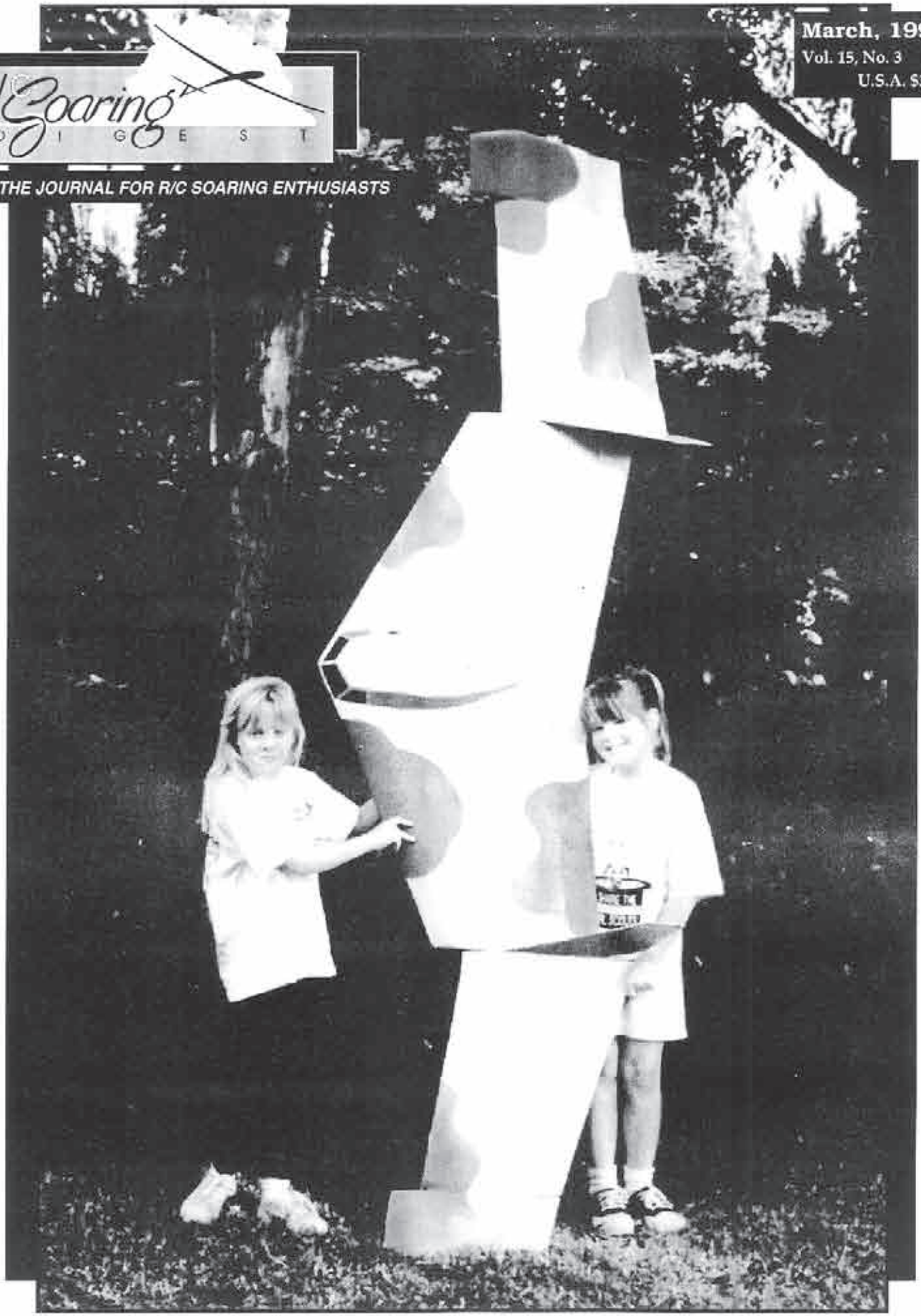
R/C Soaring DIGEST

THE JOURNAL FOR R/C SOARING ENTHUSIASTS



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Krause

1/4.75	Discus	HQ2.5/12	158" (4m)
1/3	Salto	HQ3/14	179" (4.53m)

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1/4.5	ASK 21	E393	165" (4.2m)
1/3.8	Ka6E	E392	165" (4.2m)
1/3.75	Fox	RG12	149" (3.77m)
1/3.4	DG 800	E207	163" (4.15m)

Roebers

1/4	Pilatus	B-4 Ritz3	147" (3.75m)

Buechele

1/3.75	Fox	HQ1.5/10-12	149" (3.77m)
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1/4.2	Nimbus 4	E68-66	246" (6.28m)

PriBeck

1/3	ASW27	HQ2.5/12	196" (5m)
1/2.7	ASK18	E203-201-193	209" (5.53m)
1/3	Ka6E	E207-205-205	196" (5m)
1/2.7	ASW19	Ritz3 mod.	212" (5.4m)
1/3	ASK13	E68-67-66	209" (5.33m)

Mueller

1/3	Discus	HQ2/12	196" (5m)

Bruckmann

1/3	Salto	Ritz 2	176" (4m)
1/3.8	ASK 18	E 203	165" (4.2m)
1/3	Fox	E 374 SD 6060-6062	183" (4.66m)

TOWPLANES

Frisch: 1/4 Wilga 109" (2,78m)
Brauer: all glass 1/4.5 Pilatus Porter Turbo 139" (3.52m
Roedelmodell: 1/4 Jodel Robin 86" (2.18m)
Roedelmodell: 1/4 Piper Super Cub 105" (2.18m)

SPECIAL ORDER

PriBek

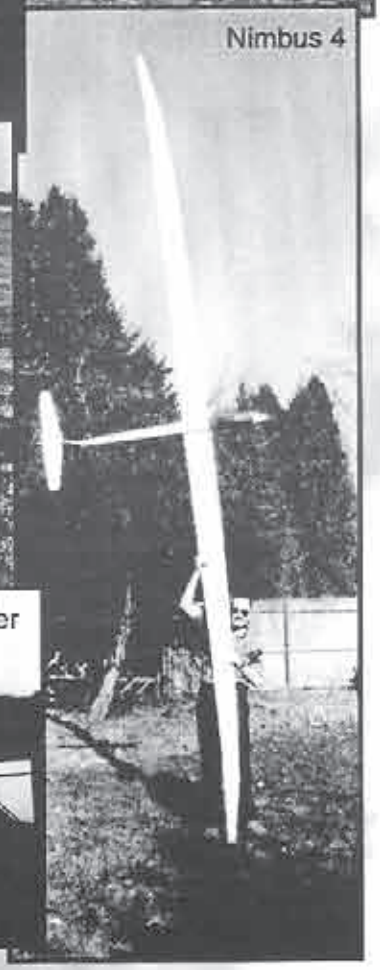
1/3	ASW24	E203-201-193	196" (5m)
1/2	ASW27	HQ2.5/15	294" (7.5m)
1/3	Fox	E374	183" (4.66m)

Bruckmann

1/2.5	Fox	222" (5.65m)

Schueler & Fleckstein

1/3 all glass Fox	RG12	183" (4.66m)
1/3 all glass ASW24	E203	196" (5m)
1/3 all glass ASH 26	HQ3/14-10	235" (6m)
1/2.5 all glass ASW15B	HQ3/14	235" (6m)



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OTHER GOOD STUFF

R/C Soaring Digest (RCSD) is a reader-written monthly publication for the R/C sailplane enthusiast and has been published since January, 1984. It is dedicated to sharing technical and educational information. All material contributed must be exclusive and original and not infringe upon the copyrights of others. It is the policy of *RCSD* to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of all articles, model designs, press & news releases, etc. are the opinion of the author and may not necessarily reflect those of *RCSD*. We encourage anyone who wishes to obtain additional information to contact the author. *RCSD* was founded by Jim Gray, lecturer and technical consultant. He can be reached at: 210 East Chateau Circle, Payson, AZ 85541; (520) 474-5015; <jimpeg@netzone.com>.

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

TARANTULA

By Michael St. John, Long Beach, California. The 105" model weighs just 61 oz. Held by Michael's daughters, Andrea (L), and Christina (R).

The Soaring Site

This has been a very busy month. We've experienced software problems for the computer, and hardware related problems for the reproduction machine. The computer is now back on line, after more days then we care to count and, as usual, everything seems to be working itself out.

MSSC

For those of you planning on attending the Mid-South Soaring Championships (MSSC) in June, the program will be available late this month. If you don't automatically receive one, say by mid-April, you may not be on the initial mailing list, so contact Edwin Wilson at ewilson1@bellsouth.net, or call (502) 239-3150, evenings before 10:00 p.m.

Ed tells us that the rooms reserved at the special rate are already filling up fast, and a significant number of entries have already been received. So, if you want to be assured of flying on the channel of your choice, we suggest you don't wait until the last minute. And, channel 23 will not be available at the MSSC this year for safety reasons.

For those of you with web access, registration information can be obtained any time from the Louisville Area Soaring Society (LASS) web site at <http://www.kynet.org/lass>. Sam Woodard, the Web Page Editor, constructed and maintains the site, which contains all the detailed and up to date information on MSSC activities, as well as LASS club activities, newsletter, and other pertinent information.

Nothings Changed

We've received some inquiries this last month regarding the process for submission of photos or articles to *RCSD*. While e-mail certainly has a way of making things easier for many folks, if you want to send something in, but don't have e-mail access, that's OK. The postal process still works just fine! And, don't worry if your photos are in color, instead of B&W, as we can easily convert them here.

Happy Flying!
Judy & Jerry Slates

T.W.I.T.T.

(The Wing Is The Thing)

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 $18.00 (US) or $22.00 (Foreign) per year for 12 issues.

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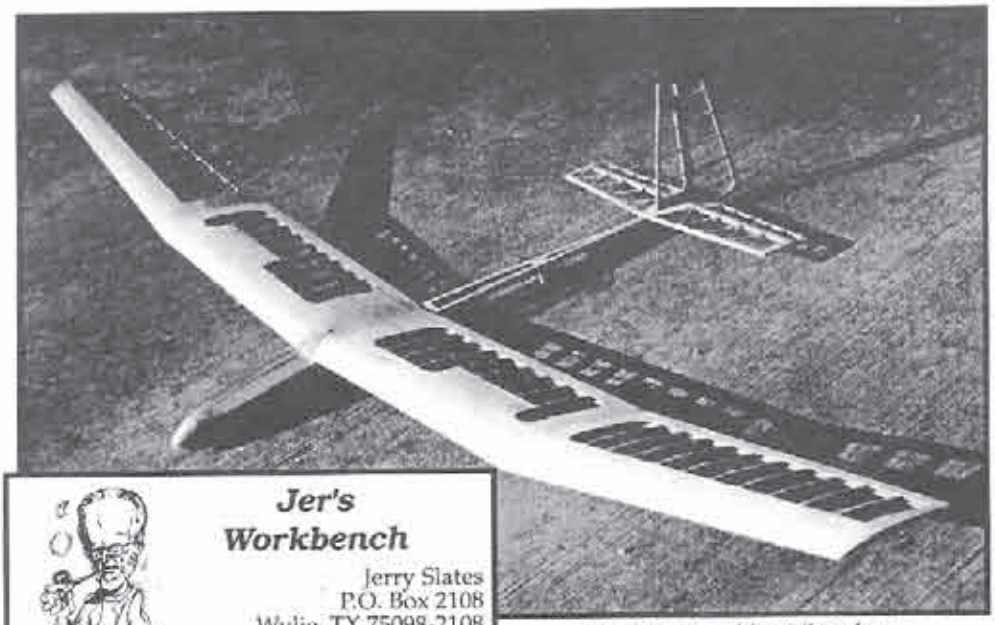

Jer's Workbench

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RCSDigest@aol.com

#1 - Paragon with spoilers down.

#2 - Paragon with spoilers up.

#3 - Aquila Grande, equipped with spoilers.

Building from Plans, Part III

Since last month, all of the construction has been completed on the Paragon, as shown in photos #1 and #2. Once covered and balanced, it will be ready to fly.

Most of the building time required involved wing construction. Once complete, the fuselage, rudder, and stabilizers went together quite fast. While I didn't keep track of the time, it seemed like only a few minutes had passed when these items were complete. I did a bit of work on the fuselage, also constructing the rudder and stabilizers, one day, and completed the fuselage the next day.

Why did it take so long to build the wings? Well, I designed and constructed a set of spoilers with a "very positive action". And, you may say, "Just what does that mean?" I'll try to explain as I go along.

Photos #3, #4, and #5 are of an Aquila Grande. I believe the model design dates back to around 1975 or 1976. Note that the model is equipped with spoilers. They are activated by a pull string on a third servo, as shown in photo #4. Photo #5 shows the other end of the string, pulling the spoiler into the up position. Note the lead weights, which are glued onto the bottom of the spoiler. These weights hold the spoiler down while the pull string is slack. While this system works, it's not quite what I would refer to as a "very positive action".

With today's technology, it stood to reason that there should be an easy way to build and install a set of spoilers that had a "very positive action". Well, it was time to recall all the ideas filed away in the back of my mind, which had been gathering dust over the years, to see if any might be applicable for the task at hand. Idea #1 required far too many parts, and I really wanted to keep things simple. Idea #2 seemed too simple to be true. But, it worked, as shown in photos #6 - #8!

First, I glued a sub-micro servo to the bottom of the spoiler. Next, the servo arm was extended, in order to obtain the correct amount of movement. Then, a pin was used to hold the end of the servo arm in place.

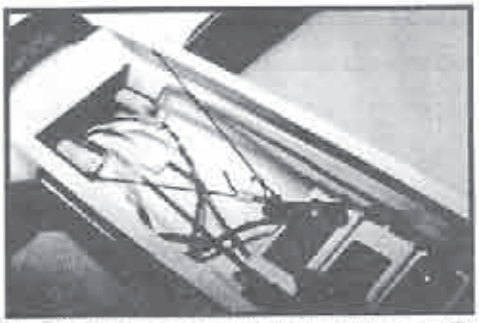
When activated, the servo arm is held firmly in place; the servo moves. Because the servo is glued to the spoiler, the spoiler is activated, which makes for a very positive action. The system holds the spoiler in a very positive up or down position, as well as all points in between. The only moving part is the holding pin, which is attached to the servo arm and the hinge on the spoiler. Quite simple and easy to do.

Conclusion

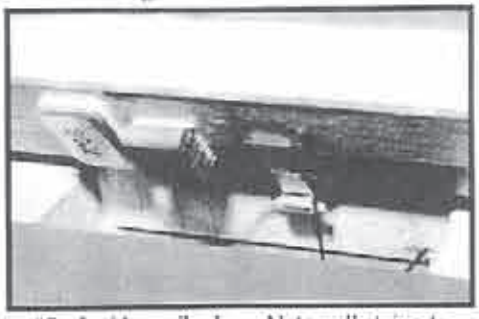
Well, this concludes "Building from Plans". A summary of the changes I made on this project are as follows:

1) Added carbon fiber to the bottom of the wing spars.
2) Sheeted leading edge of wing in order to add strength to the wing.
3) Added hard points into wing, so that wing could be bolted onto fuselage.
4) Replaced 1/8" plywood wing joiners with carbon fiber wing joiners.
5) Original fuselage was constructed using 1/8" plywood and 1/8" balsa wood. I used 1/8" light ply to construct the entire fuselage.

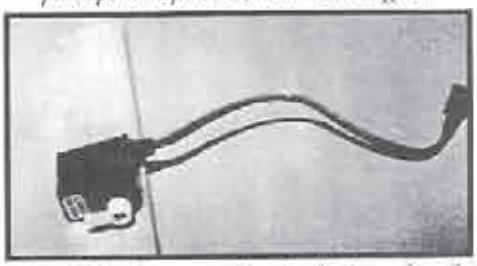
The rudder and stabilizer were built exactly as shown in the plans. ■



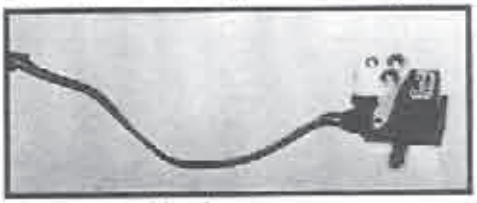
#4 - Pull strings & third servo to activate spoilers.



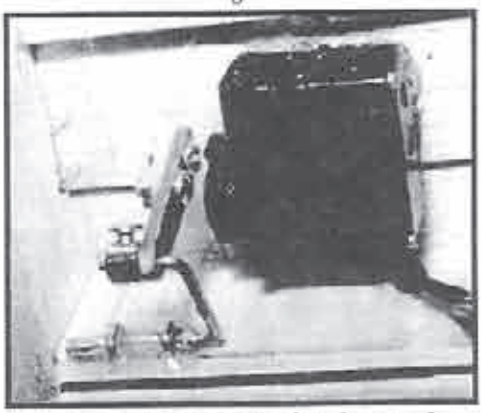
#5 - Inside spoiler bay. Note pull string to pull spoiler up. Also, note lead weights.



#6 - Sub-micro servo glued to bottom of spoiler.



#7 - Note longer servo arm.



#8 - Looking at spoiler from bottom of wing; spoiler in down position.

Spar Redesign for the Nostalgia Event

By Oliver Wilson
Punta Gorda, Florida

The NOSTALGIA rules wisely allow redesign of the spar to cope safely with the power of 12 volt winches. Spar caps of uniform cross section are almost universal in the original design of model sailplanes for economy and ease of construction. This results in spars which are too weak near the root and too heavy everywhere else. By tapering the spar caps, the spar structure can be made three times stronger for the same weight. At the same time, the center of gravity of the spar caps moves closer to the center of the model, improving both roll and yaw response.

The beauty of tapered spar caps is that they almost exactly match the bending-strength requirement of the wing as it changes from root to tip. For example, the Windfree has a 1/8 by 1/4 spruce spar cap, top and bottom, from the root to the tip. If that spar is over stressed during launch, it always breaks near the root where the bending load is greatest and it never breaks anywhere else, because the spar is stronger than necessary everywhere else. If the 1/8 by 1/4 spruce spar caps are replaced with 3/16 by 1/2 spar caps, which taper to zero by zero at the tip, several things happen:

1. The wing is harder to build.
2. The wing will take nearly three times the bending load before it breaks.
3. When over stressed, the wing is likely to break anywhere along the span, because the strength distribution along the span matches the load distribution along the span.
4. The new spar caps weigh the same as the old spar caps.
5. The center of gravity of the spar caps shifts from half way out (root to tip), to one third of the way out (root to tip).

Now for some practical considerations. Instead of tapering the spar caps to zero at the tip, just taper them to 1/16 inch square at the tips. That will give you a little gluing surface near the tip and a less fragile and dangerous tip end.

The shear forces at the root can be three times greater than before, so the shear webs need to be beefed up three times at the root. The shear decreases in an almost linear way from root to tip, so the shear webs can be reduced uniformly from three times the original design at the root to zero at the tip.

One way to make tapered spar caps is to gang cut the taper with a good, sharp, well adjusted plane. I do mine on a piece of plate glass, because it is so nice and flat, and easy to clean. First, spray the plate glass with 3M 75, which is a low tack contact adhesive. After the contact adhesive has dried, it will be slightly tacky, just enough to hold the wood in place while it is being planed. Next, examine each spar cap for grain runout and switch the ones with opposite grain runout end for end, so that none will tear out under the plane blade when planed in the preferred direction. Then, the spar caps are placed side by side on the tacky glass and the taper planed into all spar caps at once. When the first taper is finished, turn each spar cap 90 degrees and, again, check for grain runout. Flip any spar caps which do not match the grain runout of the others. Plane the second taper. It can be done in less time than it takes to write about it (not counting the 20 minutes it takes the 3M 75 to dry).

Of course, the spar cap notches in the ribs need to be adjusted to fit the taper of the spar. If the ribs are already cut, as in a kit, just make them wider where required and fill them in where they are too big. If you are making the ribs from scratch, just leave the notches 'til last, and cut them one by one as each rib is glued in place. It's tedious, but you will have the satisfaction of having a spar with the best strength to weight ratio in its class, and a performance edge on your lazier competitors. ■

on the Wing

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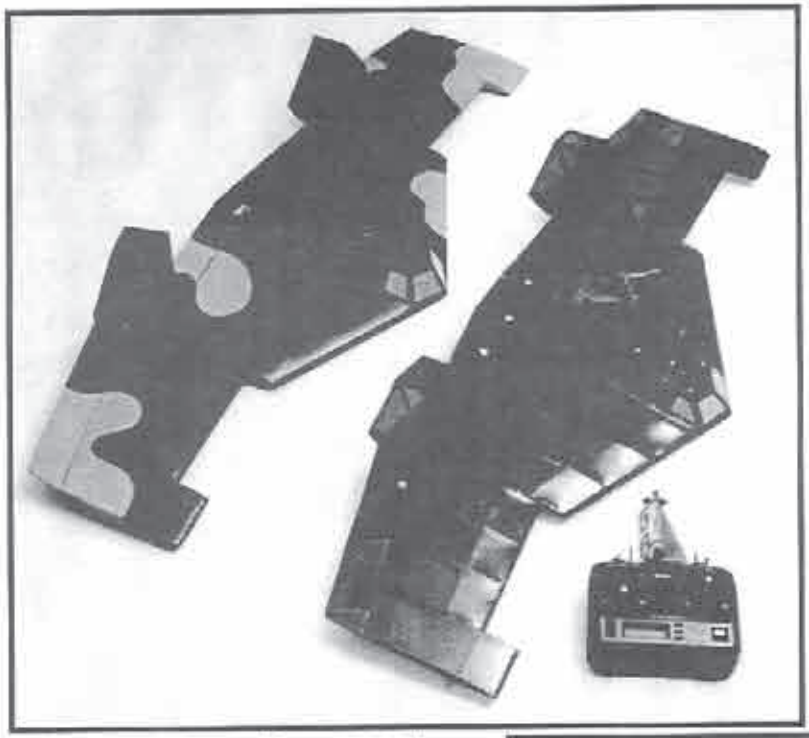
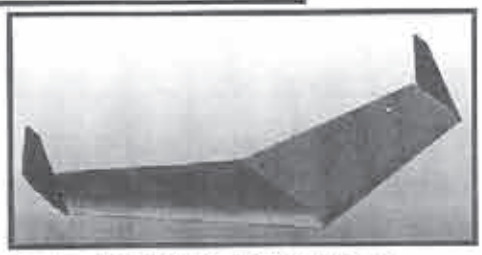


The two 50" span preliminary Tarantula models - foam core (L), and open bay (R) construction.

Below: A computer generated model of the 60" foamy Michael mentions in the article.



Tarantula

Design Intent: Highly maneuverable 100 inch slope soarer with an emphasis on slow speed close-in flying, while making a unique styling statement.

A few weeks ago we received an e-mail message from Michael St. John, Long Beach, California, stating simply, "Well, it is the biggest thing I have ever made. Second test flight this weekend." As an attachment, he included a picture of his latest and largest creation. Not satisfied with this simple declaration, we asked Michael to provide more information about Tarantula, and he provided the following report:

"Over the last six months I have made four flying wings: a 60 inch foamy utilizing a conventional swept back wing, and three others having this wing platform. Two of the latter wings have a wingspan of 50 inches, 500 in^2 wing area, a fully symmetrical airfoil, and weights of 14 and 23 ounces. Due to the successful flight characteristics of these first two, I decided to make something big.

"This wing, named Tarantula, has six foam core wing sections to hot-wire cut out. I use my own airfoil. It is a positive camber design, 6 percent thickness at the swept-back center section, and 8 percent at the swept-forward outer wing panels.

"Once the sections are cut out, they are epoxied together. Two carbon fiber rods are glued as spars to the center wing section. The outer wing panels are positioned 2.5 inches back. This is to reduce the need for additional nose weight to achieve the correct center of gravity, and it looks good too.

"One carbon fiber rod is then inserted into both of the outboard wing sections and the center section. The four push rods (Sullivan Gold-N-Cable) are installed. The wing is planked with 1/16" balsa sheet using 3M 77 spray. The outer tips are then attached.

TARANTULA 105 inch Version	
Wing span	105 inches
Wing area	1800 in^2
Airfoil	Semisymmetrical, reflexed
Weight	61 ounces
Wing Loading	4.9 ounces/ft^2
Chord, root	24 inches
Wing planform	Swept back - swept forward
Dihedral	Main panels - 1.5 degrees Tips - 20 degrees from horizontal
Wing construction	White foam with balsa sheeting
Control surfaces	Ailerons, elevator, split airbrake
Mixing options	Flaperon, elevons, and ailerons coupled to elevator
Servos	Five
Radio	Airtronics *Radiant*
Designer/builder	Michael St. John 4143 Gaviota Ave Long Beach CA 90807 e-mail: msj239@aol.com

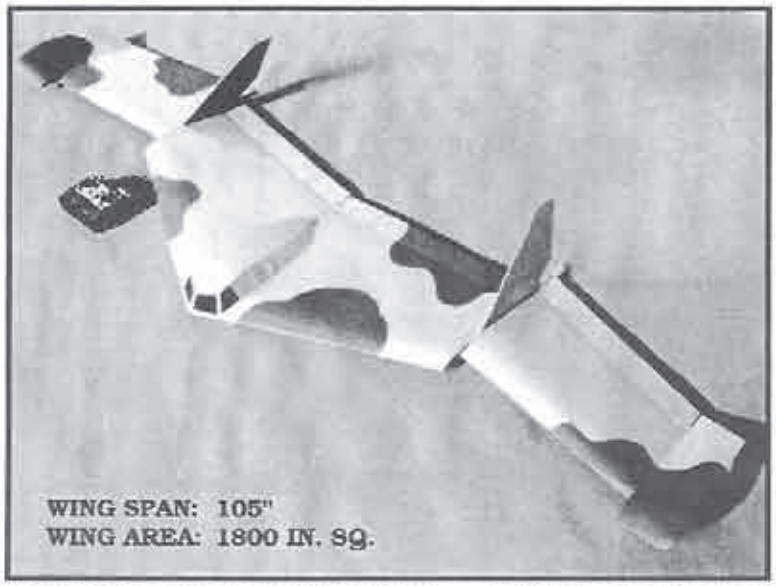
To secure all the wing sections, three inch width fiberglass is epoxied to each joint. Ailerons and elevators are 3 inches wide and are built-up balsa structures. Two vertical stabilizers are used. These are also a built-up balsa structure.

"For covering, I used Hobby Shack FlightKote, then painted the camouflage markings with the cheapest paint I could find at Home Depot. The canopy is constructed out of 1/16" balsa sheet, fiberglassed on the inside for strength. To achieve the correct center of gravity, four ounces of lead was added to the nose.

"The split airbrake is located at the center portion of the airframe, on the trailing edge, next to the elevators. Each side is 6 inches long by 3 inches wide. The left side goes up 50 degrees and the right side goes down 50 degrees. Due to close location to the centerline, the split airbrake has no effect on rolling the airframe. I use the retract switch to operate it (off/on). This was developed from the 50 inch version. That wing carried more speed on landing approaches than I wanted — it just kept flying over the landing site without scrubbing off air speed.

"Flying this wing is a real pleasure, mainly due to its tight turning radius and anti-stall characteristics created by the forward-swept outer wing panels. In all of my slope soaring designs, I try to achieve a wing loading of under seven ounces/ft^2. This gives the additional slow speed handling I am looking for.

"But the biggest secret in the flight performance is the larger chord wing tips on all three versions. I have used this wing planform for many years now. A full size aircraft cannot have a wing built strong enough, but we can. Modelers, do not look to the next US military fighter aircraft for your next model improvement idea, do it yourself — experiment.



This gives me the pleasure of flying the only one like it in the world.

"**P.S.** About that simple swept 'wing... It's my kick-around, let everyone fly it, 60 inch foamy. Yes, it is very conventional, but it was my first all foam wing. I made it for the beginner pilot. I felt a 48 inch combat wing is too small for most beginners, and they need the extra wing length/area for lift and to improve visual reference. This 'wing is modeled with SolidWorks Engineering software."

"Bigger in this case means different, not better. Yes it is smoother, and more dramatic visually, but it does take more area to fly compared to the two, 50 inch cousins. Low rolls next to the cliff's edge... I think not.

"At all angles viewed, the design of this wing makes a unique styling statement.

Designer/Builder: Michael St. John
4143 Gaviota Ave.
Long Beach, CA 90807
e-mail: msj239@aol.com

■

Chip Vignolini Ariel

Reviewed by Dave Garwood
Scotia, New York

I've seen Chip Vignolini's new Ariel HLG perform in the hands of ace pilots, and now that I've flown my own copy, I can answer your three most important questions about the design and the kit:

1. Yes. A bargain.

2. No. Exceptionally quick and easy.

3. Yes. Exceeded expectations.

First, a little back ground, then amplification on the Three Basic Questions of model airplane kit reviews.

I first saw the Ariel at the HL Golf event at the 1996 Nationals in Muncie. After the golf match, well-lubricated pilots play an informal "skins" game. The task is to knock a bottle cap off an inverted plastic cup with your HLG, without disturbing the cup. Quite a precision task it is, and in this venue the flyers play for cash. You might call it the "put your money where your mouth is" part of soaring.

Former Nats overall champion Jim Thomas borrowed Chip's personal Ariel to compete in the "skins" game. Jim made one familiarization flight, and on his second launch with the borrowed plane he clipped the bottle cap, left the plastic cup undisturbed, and won the game.

Since it wasn't dark enough to quit, the pilots called for another round, and this time Joe Wurts also borrowed Chip's personal plane, and Joe won the second round "skins" game with the Ariel.

Kit Contents

Q1. Do you get you money's worth in this kit?
A1. Yes, it's a bargain.

The Ariel kit has an amazingly low parts count: four wing panels, two V-tail panels, a molded fiberglass fuselage, music wire push rods in Sullivan cable sheaths, a bag of small parts and a bag of pre-cut fiberglass cloth.

The wings are pink foam with carbon cloth spars, vacuum bagged with light glass cloth and fully finished, save a little light sanding of the leading edges. The fuselage is dyed in the epoxy and also requires no surface finishing except a little seam sanding.

Given my love of simple HLGs, I asked Chip if he would mind if I built mine with separate vertical and horizontal stabilizers, so I could use a non-mixing radio set. He said he was thinking of developing that variation himself, and he sent me the first set of cruciform tail parts off the production line.

Construction

Q2. Is it hard to build?
A2. No, exceptionally quick and easy.

This plane can be completely constructed

The ChipVignolini Ariel HLG. This, the first one built with cruciform tail.

Ariel HLG
V-tail kit cost: $159,
plus $10 shipping available from:

Custom Wings by Chip Vignolini
2784 Mill Street
Alquippa, PA 15001
phone: (412) 857-0186
voice mail: (304) 284-2715
e-mail: ydne30a@prodigy.com

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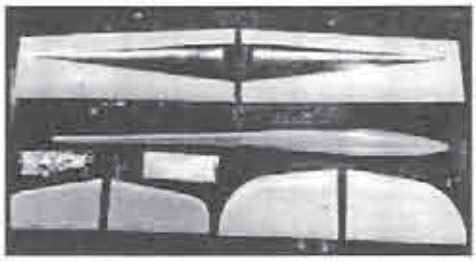


Low parts count in the Ariel kit: finished foam wing halves, wing tip halves, v-tail halves, molded foberglass fuselage, control rods, bag of small parts and bag of fiberglass tape, plus instruction sheet (not shown).

up to radio installation in three evenings. To complete the wing, join the four panels with foam-friendly CA, wrapping them with fiberglass tape, and lightly sanding when cured. This took me two hours. The final step in the first building session is to install the front mounting dowel and rear hold-down plate and let the epoxy set up overnight.

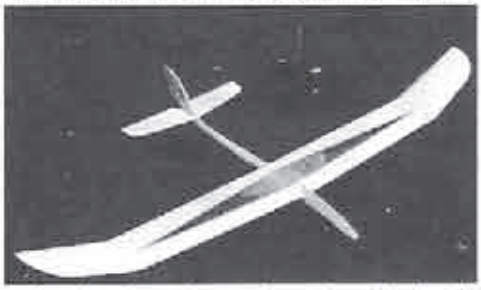
Total time at the bench was 2.5 hours.

My second building session was spend designing the cruciform tail assembly and its removable mount. My fin mounts to the fuselage with 10-24 nylon bolts and blind nuts holding a mounting block the fuse. The fin mounts to this block with epoxy. The horizontal stabs slide into a close-fitting slot in the fin, and are secured with epoxy. This took about three hours.

The fuselage is completed in the third building session by fitting a single bulkhead, the servo mounts, and the rear wing bolt receiver plate. I shortened the fuselage tail boom by 1.5 inches, worried about final weight and balance, since I was adding a third tail panel. Finally, squirt some RTV silicone on the wing area to make a close-fitting wing saddle, and let this set up overnight with the wing bolted in place. Another short night, about 2.5 hours.

The next morning, I installed the control cables and set up the radio. After another three hours, my Ariel was ready to fly. If you built the V-tail version (as designed) you could probably reduce the construc-

Cruciform tail alignment on Dave's workbench. The horizontal stabs were held in place with masking tape while the epoxy cured overnight.



Completed cruciform tail version of the Ariel HLG, with compact transmitter from Hitec Focus-II SS (single stick) 2-channel AM radio set.

tion time by one evening, and likely reduce the flying weight by an ounce.

A radio note: I'm pleased with the Hitec Focus II SS two channel, single-stick radio set. It can be ordered with a pair of HS-80 micro servos for under a hundred bucks (or for slope planes, with standard servos for under eighty bucks). It's intended for alkaline battery installation, but rechargeable nickel-cadmium batteries cost little more. A wall charger is available from J&C Hobbies for ten bucks. The light Hitec transmitter helps me balance myself when throwing a hand launch sailplane.

Flight Report

Q3. Does the plane fly well?
A3. Yes, it exceeded expectations.

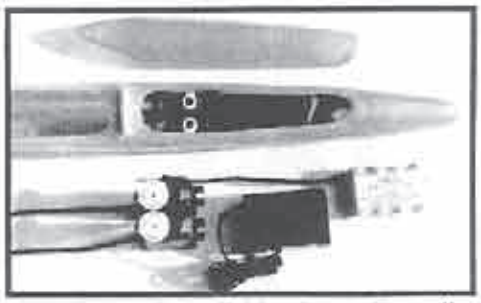
I'm outrageously pleased with the Ariel's flight performance. While I was happy with its structural strength and empty airframe weight, I was unhappy to be installing nose weight to get it to balance. It flew fine when balanced at the factory recommendation, but as I gained stick time, I removed more and more nose weight and became even more pleased with its behavior in the air.

DAY 1: Twenty degrees F, overcast, NW wind 15 MPH gusting to 20 on the day I finished the plane, and I had to fly it. Nose weight: 1.5 ounces, balanced 2.75 inches back from the wing leading edge (factory spec).

Notes from the logbook:

Powerful high launches in the wind, exceeding my expectations for the undercambered airfoil. The air was gusty in this small field surrounded by tall trees, but the Ariel went up as well as down. Flat glide, as expected, and smooth on the controls, which I was relieved to discover, given my tail modification. In about 20 launches I got four flights exceeding 30 seconds, and caught the plane in the air three times.

DAY 2: Thirty degrees F, partly sunny,



Small Hitec Focus-II SS radio set allows all components to be installed in front of the wing leading edge. Shown here are Hitec HS-80 servos, Hitec HAS-2MB receiver, and Sanyo 150 mAh battery pack.

wind 10-12 MPH, this time in a larger field. Nose weight: 1.0 ounce. 2.875 inches back from the wing leading edge.

Again, satisfyingly high launches. Found light air, even over the snow pack and got a two minute flight. Flat glide. Elevator control is perfect at one half inch each way. Loops easily. Rudder control is adequate at 1.25 inch each way, but didn't feel powerful enough to horse it around. It didn't feel like it will do a rudder roll like a CR Aircraft Climmax, with that plane's full flying stab. I'm thinking if I had it to do over I might increase the rudder chord half an inch, or increase the center panel dihedral over the original spec of 1.25 inches (total). We'll see how it handles in calm air.

DAY 3: Forty degrees F, bright sun, light wind. Nose weight: 0.5 ounce. Balanced 3.0 inches back from the wing leading edge.

The Ariel achieved a surprisingly high launch, considering its strongly undercamberd airfoil. Oh well, I guess I don't know as much about airfoils as I thought I did. High launch, slow flight, and amazingly flat glide. Many oohs and ahhs from the small crowd. "Check that hang time. Sure flies great," and, "Wow, I think I've been flying the wrong airplane," were some of the remarks made.

Other HLGs flown that day were the Larry Jolly Flinger, DJ Aerotech Wizard, Joe Galletti Bob, and Fred Mallet Epsilon. The Ariel was the darling of the field. Most Ariel flying was done with 1/8 inch stick movements or less, after the launch "bunt", including flying to hand-catches. My worries about insufficient rudder control were rapidly evaporating.

DAY 4: A week later, same weather as Day 3 except cooler. All nose weight removed. Balanced 3.25 inches back from wing leading edge.

The first toss for trim checking indicated light air was present. On the second launch I found lift and spiraled up for three minutes until the plane became hard to see. On the way back down, more loops, inverted flight and a rudder roll. I put aside my earlier thoughts of increasing the rudder area.

I found more lift during that flight and completed a ten minute round. In an hour and a half of flying over the snow pack, I got three more flights over five minutes, and continued to be impressed with the Ariel's ability to telegraph lift conditions,

and to hang in light air. It's damn close to being an anti-gravity machine. I can hardly wait for summer now that I have this plane.

DAY 5: Weather was the same as Day 4, and the flying was about the same, with one little exception: I launched once with the receiver off.

The night before, I had installed a receiver on/off switch, and located it on the side of the nose, just under the front of the canopy. It's the tiny switch that comes with the Hitec Focus II SS radio set, and I've not seen one smaller. Well, catching the plane with gloves on, I slid the switch off and didn't notice until I'd given the plane a mighty heave toward the Mohawk River. My heart jumped into my throat.

The Ariel did not stall at the apex of the launch; it leveled itself out and went cruising. Lucky for me, a gust tipped up a wing tip, inducing a thermal-turn type flight pattern, and the plane circled downward and landed shiny-side-up, about halfway down the hill.

Unlucky for me, it began sliding downhill on the 8-inch snowpack, which was covered with a crust of ice. It turned into the wind, accelerated down the hill and took off again. *Be still, oh heart of mine!*

Again, a gust directed the plane into a circular flight pattern, and it landed on top of a snow bank at the bottom of the hill, missing a fence and signposts. The plane was undamaged after two auto-landings. You can easily guess the jabs my flying buddies were hollering at me.

Conclusions from this launch:

The Ariel is a stable flyer. I've got it trimmed pretty good. Sometimes it's better to be lucky than to be good.

Summary

I love this plane. It builds fast and it's inexpensive considering the work already done for you at the factory.

The Ariel launches high, circles tightly in a thermal turn, almost turning around a fixed wing tip. It jumps and bounces, vibrates and wiggles with the smallest air current, making it easy to read the air.

I'm happy with my current setup of cruciform tail, fuselage shortened 1.5 inches, CG at 3.25 inches back from wing leading edge, 150 mAh battery pack, and zero nose weight for an RTF weight of 11.75 ounces.

It could use more dark coloring on the underside to increase its visibility, and Chip is working on this. It flies slowly, which is to my personal liking, and it signals lift better than any sailplane I've flown or seen flown. With its incredible hang time, even the landing approach is a search for signs of lift. I have not flown another hand launch glider so low, for so long, with so much confidence as the Ariel.

Dave Thornburg taught us, "There's a lot more to be learned - about yourself, about your model, about the air - below fifty feet of altitude than above it." The Ariel is a terrific plane to learn all this with. ■

VIDEO REVIEW

"Airborne to be Wild! The Video!"

Reviewed by Donn Schifano
Hayward, California

Almost nine years ago, I saw a video on how to vacuum bag wings. It was a Saturday night about 12:30 p.m., when I finally got to fire up the VCR to see this video. Half way into the video, at about 1 a.m., at the point where my eyes were half open, the narrator said, "Let's take a break while the wing cures and see some flying." Music came on and, for the next 20 minutes, I sat BOLT UPRIGHT, while scale and PSS ships zipped across the screen at mind boggling speeds at Eagle Butte, Washington and the Kona Coast, Hawaii. I have watched that 20 minute sequence about 100 times since then.

Aching to be Airborne

Finally, along comes a new video that reverses the format. Studio 'B' Design & Production, LLC's "Airborne to be Wild!" *showcases the flying* and explains some building techniques and tips during the "break". *(I watched this video as my house creaked and groaned from an early February rain storm that was bearing down on Northern California. This video sure cured my GPS (Grumpy Pilot Syndrome), a condition that afflicts many of us deep in the building season.)*

I knew "Airborne to be Wild!" had just been released, but I did not really know what to expect. *(I won't try to relate to you the entire video, like my son details his dreams to me.)* What follows should give you an idea of what is in this video and why you might want to purchase "Airborne to be Wild!".

"Airborne to be Wild!" is nearly a full hour long, with about 55 minutes of run time. Lex Liberato, the force behind Studio 'B', has done a superb job, with professional editing, clear narration *(Lex Liberato narrates the video and sound so professionally, I thought he paid to have it done.)*, music and captivating flying footage. The video sequences are simply the best I have seen. The camera work is smooth, artistic, and in focus. I know how difficult it is to try to stand in a strong wind, following a 60 inch, 100 mile per hour object in a viewfinder. You pray the plane does not fly past the sun and blind you for 30 seconds, while it continues on to perform the best aerobatics of the day! In one segment, Lex lets the video "say it all" with what looks to be one continuous shot over 3 minutes long. That is very difficult to capture on video or film. This segment made me feel I was there, seeing the plane as I would if I were the pilot. While there is a large chunk of great flying footage in this video, there is more than just flying.

I wish I could hand this video out to visitors at my home slope, as it answers many of the questions that they ask. In the video, Lex briefly and clearly explains what a slope glider is, how it works, a bit about slopes, and different types of planes. He even has a sequence with a Peregrine Falcon flying formation and doing "combat" with a 60" ship. He shows the technology progression leading up to EPP kits and shows some of his designs made from EPP. By the way, although Lex features his designs, this was NOT a "paid commercial" for Studio 'B' airplanes.

What is on the video?

I have never seen an SR7 do stall turns like those shown on the video! The "SCREAM Has Landed" sequence was one heck of "dork". *(Lex, I wanna see more of the flying Dino and the F4 Phantom!)* Have you ever seen "This Old House" field mod on a TRI-WING? And, there are crash sequences a plenty, history of foamies made easy, building tips and tricks for EPP, how to do aerobatics, slow motion sequences, landing sequences, combat, combat kills (How to yell "action" and make them hit each other.), and flying sites with spectacular slopes and breathtaking views. There is even a suggestion for what radio to use with combat planes.

The "break in the action" leads us to the shop, where Lex displays the tools of the trade. He then gives the highlights of building an EPP ship. Lex touches on prepping the wing, covering, installing ailerons, coroplast tail feather hinges, prep of the fuse, balancing, layout of radio gear, cutting the foam for radio gear, and the first flight. Watching the techniques and tools he uses even helped me with a project I have on the bench.

I love to teach slope flying. The presentation of this video is ideal for teaching youngsters, or oldsters for that matter, about slope flying. The video can also educate parents on what is involved, as the viewer is shown a wide spectrum of the slope hobby and some of the effort required to build a plane.

Safety

There is something very subtle in this video that makes it outstanding: safety. Lex wove this theme into the video in several places, incorporating the topic of safety into the flying and building sequences as an *integral* part of the hobby. In my opinion, safety should be as inseparable to the hobby as glue, and not as a parenthetical concept. You can tell "safety" is a way of life for Lex, as it should be. *(Bravo, Lex!)* That puts this video on my list for everyone interested in sailplanes.

I took the video to work and watched it (for the second time) during lunch in a conference room. Three people poked their heads in to see what was going on; none of them left until the video was done. I took it to work a second time to show it to two coworkers interested in R/C. The video taught them a lot about this sloping thing in an easy to follow, fun format. They both found it enjoyable and educational.

I do not have any dislikes with this video. I suppose I could say it is too short, needs more flying footage, more building, more crashes, more landings, more sites, more planes, more falcons, more aerobatics, more combat, more flying Dinos, more of everything, period. I guess that defines "Airborne to be Wild! The Sequel". *(How about a Miniseries, Lex? Say... Six hours? I'll be waiting. Meanwhile, I will be aching to be airborne!)*

You can get your copy of "Airborne to be Wild!" from Lex at Studio 'B' Design & Production, LLC, P.O. Box 514, Kurtistown, HI 96760-0514; Tel/Fax (808) 968-8721, http://Planet-Hawaii.com/studiob; available in VHS and PAL for $24.95 + $3.75 S&H in the US, credit card, check or COD. ■

(Editor's note: Lex Liberato is in the process of moving to the mainland. His new telephone # are not available as yet. If you get a recording that does not supply you with a new number, please be patient, and try again at a later date. E-mail and web address have not changed. ■

Robin Lehman
63 East 82nd St.
NYC, NY 10028
(212) 879-1634

Aerobatics

It's getting just a bit warmer now. The sun is much higher in the sky these days, and soon we will be saying good bye to old man winter. None too soon, if you ask me, but it all depends where you live. Soon, us Northerners will be able to get out there and do some FLYING. The rest of you have had some of the best flying weather of the year. A few of you may even have been out there practicing and, by now, you have learned enough maneuvers to begin to put on a very nice aerobatic display.

How many of you have been to airshows or, better yet, been to a full-sized aerobatic contest? Quite a few, I would imagine. Have you noticed that after the first few minutes of an aerobatic routine you get a little bored? Why do you think the announcer at all airshows is so very important? Well, amongst other things, he keeps your attention by dramatizing each and every maneuver.

The truth is, most (powered) aerobatic routines are repetitive by nature.As spectacular as they are, the (powered) aerobatic showplane is flying back and forth, back and forth, doing pretty much the same thing most of the time. Some pilots at air shows spice things up by doing their stunts VERY near to the ground, but the fact remains, the flight path is still mostly back and forth many times over. What's all this got to do with you, the sailplane pilot?

As I've mentioned before, almost all maneuvers are made up of combinations or parts of the same things - loops and rolls. This gives you two huge assets; it means that once you've mastered the basics, it's easier and easier to learn most new maneuvers; it also means that all you need are a few maneuvers to string together and you'll have a spectacular show piece! This is especially true of sailplanes; because they have no motors their stunt routines are sometimes even more impressive especially low to the ground! Take a simple thing like a low pass...

I remember the first time I visited the IGG airtow fly-in in Switzerland some ten years ago. There was this pilot who flew the same stunt routine at the end of his flight every time he went up. (He flew a 1/3 Grob twin Akro.) I can still remember it after all these years! He would come

Aerobatic Flight Plan

October 1997
- Uncouple your rudder & ailerons.
- Practice flying Straight & Level.
- Master airspeed.
- Practice the Inside Loop.
- Determine what rudder & aileron adjustments are required to fly a perfect loop.
- Tackle Inverted Flight.

November 1997
- Practice the Split-S or Wing-over.
- Practice gaining sufficient airspeed to be able to complete a 360° Roll.
- Practice The Roll.
- Combine maneuvers to develop your personal, custom, aerobatic sequence.

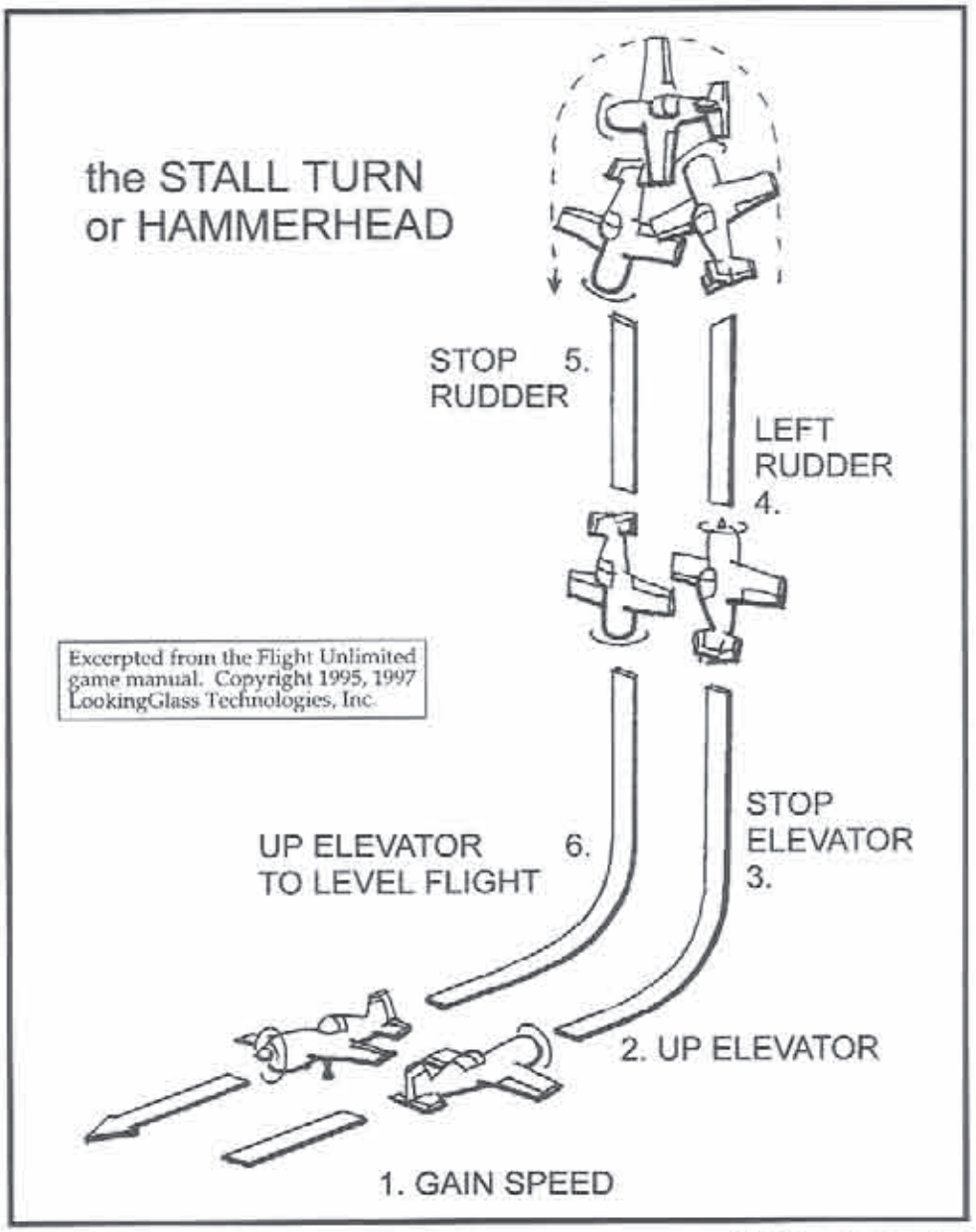
December 1997
- Practice 1/2 Cuban 8.
- Practice the Cuban 8.

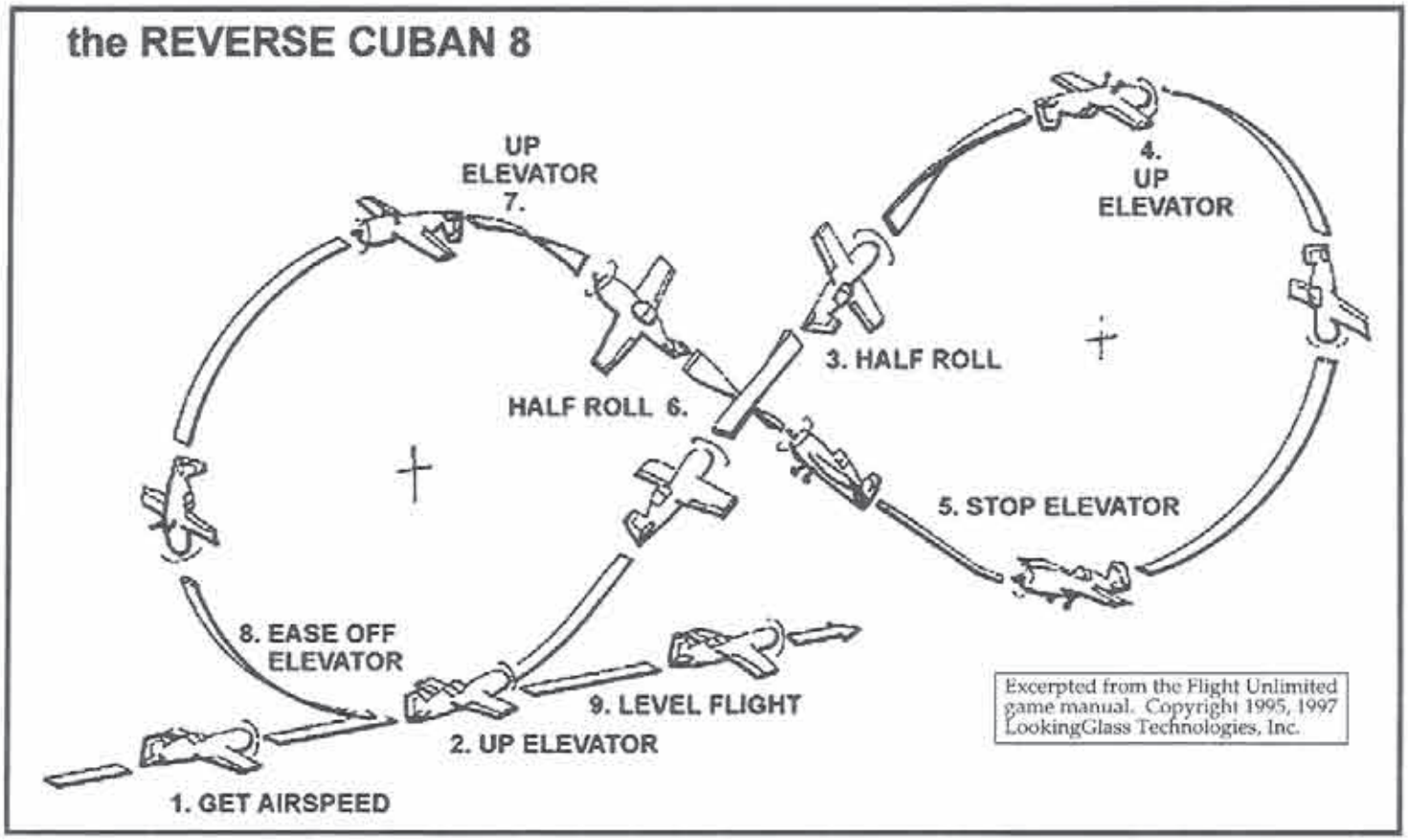
January 1998
- Practice the Outside Loop.

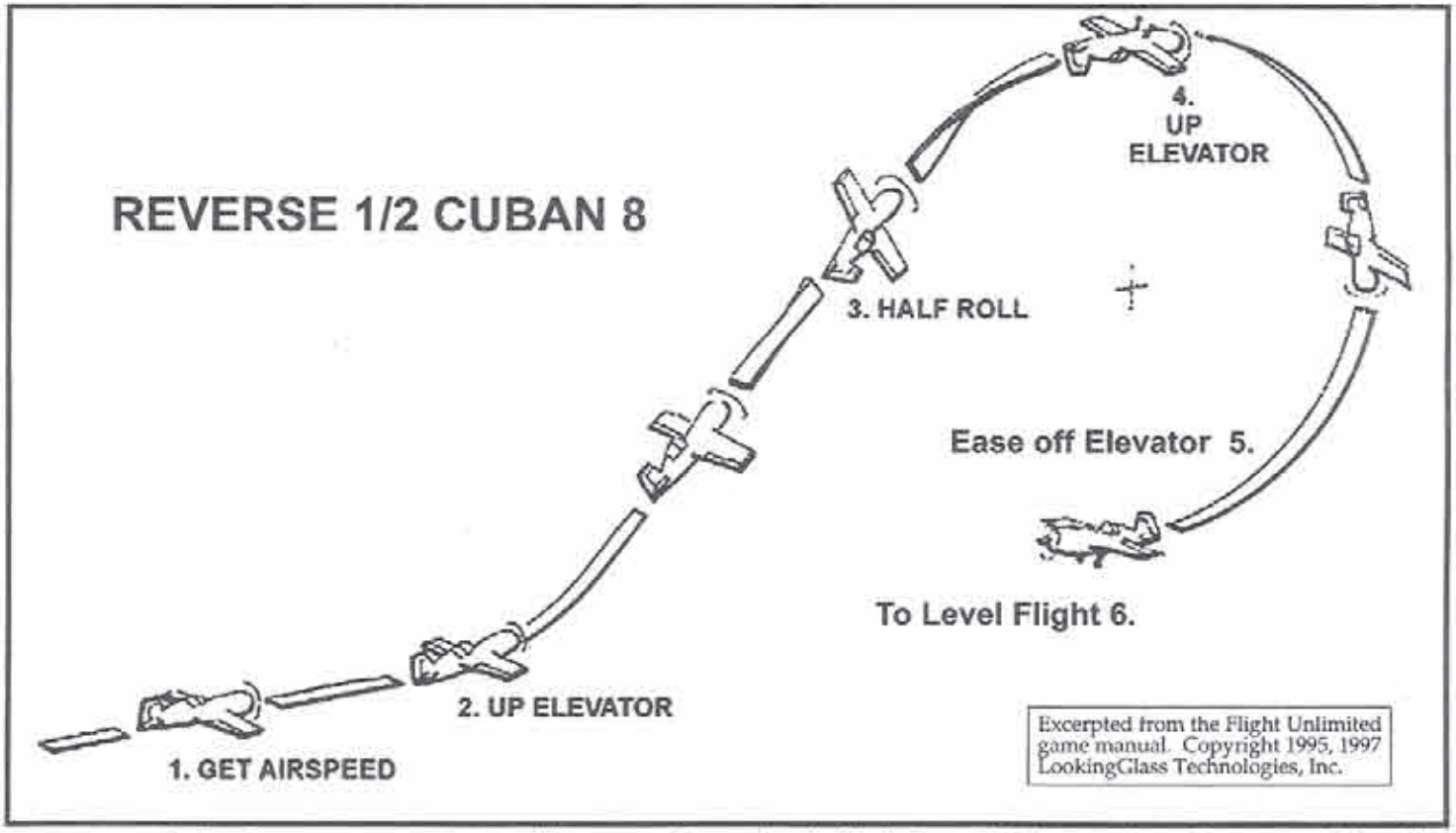
February 1998
- Practice the Immelmann and Reverse Immelmann.

March 1998
- Practice the Hammerhead, Reverse Cuban 8, and Reverse Half Cuban 8.

Notes:
- Establish and maintain a "Sailplane Diary" for each plane.
- Review monthly progress.
- Practice flying with a knowledgeable friend or expert, and remember that safety comes first.
- Practice with a flight simulator program such as Flight Unlimited (April, 1997 *RCSD*).
- Definition of "One Mistake High": Be darn sure you're high enough to complete the maneuver and make one mistake, before hitting the ground.







screaming into the landing strip (up wind) and do a roll very low, then a stall turn - that got everyone's attention! It certainly got my attention! Then he would fly downwind, do a couple of circles (by then his wingtip was almost touching the ground), and just when you thought he would run out of airspeed and altitude, he would level his wings, glide for some time more, and land right at his feet. We all applauded! The first time I saw this, I was sure he was going to crash. What a spectacular show he put on for us. (This same series of stunts would not be particularly impressive with a powered aircraft!) He did this three times in a row.

This guy knew his sailplane's performance inside out and certainly practiced this show-stopper many times before! He knew exactly what he was doing and did he ever entertain the rest of us! The

maneuvers he flew were not difficult, but his manner of presentation was just spectacular! When and if you take the time to get to know your bird, there's absolutely no reason you can't do something just as interesting for the rest of us to see!

All said and done, master just a few of the maneuvers we are exploring together and you will be able to put on quite a show yourself! Let me introduce you to another old friend. Perhaps it will become part of your permanent showstopper!

The Stall Turn or Hammerhead

(easy for R. + E., easy for A. + R. + E.)
a turnaround maneuver

The stall turn is very pretty, quite easy to do and serves nicely as a turn-around maneuver. You start going in one direction (to the right, for instance), and you end up heading in the opposite direction (to the left, for example).

Properly done, the stall turn is very gentle and puts little or no strain on the airframe. All types gliders should be able to do this maneuver - everything from the gentlest of Gentle Ladies to the hottest aerobatic sailplanes.

According to the AMA rule book, "Stall turns consist of lines and partial loops... The following criteria apply to all maneuvers containing stall turns:

1. Lines must have exactly vertical and horizontal flight paths.
2. Entry and exit must consist of partial loops with equal radii.
3. The length of the vertical line is not a criteria.
4. The maximum pivot radius is the wing span. A pivot radius of more than 1 wing span should be considered a major defect.
5. If the model shows a pendulum movement after the pivot, the maneuver is also defective."

(All of the above used by permission of the AMA.)

Here's how to do it. Pick up airspeed, fly straight and level with your wings level, pull up elevator until the glider is going exactly vertical. Once vertical, neutralize the elevator and turn full rudder one way or the other. The glider should start to turn and, as it slows down, rotate 180 and then come back down, with its nose pointed straight at the ground. The wing tip should rotate around itself as the glider points its nose back down to the ground. Once pointed straight down, give up elevator in approximately the same position you entered the stall turn, and fly straight and level.

The stall turn is a very dandy maneuver! It's a great turnaround maneuver and it's a heck of a lot of fun to watch and perform. Best of all, it shouldn't take you very long to master and it will come in handy no matter where you fly.

The Reverse Half Cuban 8

(difficult for R. & E., easy for A. R. & E.)
a turnaround maneuver

Remember my mentioning that many maneuvers are similar? Well, here is a perfect example. If you already know the Cuban 8, then this is certainly variations on the same theme.

The glider gains speed then "pulls up and executes one eighth (1/8) of an inside loop to 45 degrees, hesitates, does a one-half (1/2) roll, hesitates, then performs a five-eighth (5/8) of an inside loop back to level flight in the opposite direction." (Printed by permission from the AMA rule book.)

As you've heard many times now, the whole secret is airspeed, *airspeed*, AIRSPEED!!!!!!! Be sure to start this maneuver with enough *AIRSPEED* to carry the glider up and over the top. Once you start down, you're home free. When you start your 45 degrees climb, hesitate and do the half roll to inverted; be sure to keep your hesitations very brief, or you'll find yourself quickly running out of airspeed and won't be able to complete the Half Reverse Cuban, gracefully. ■

A Letter on Glider Aerobatics

We're always pleased to hear from readers that are trying out the aerobatic stunts. Recently, we received the following letter from Ian Roach, Australia. ED.

"Although I have had the October issue of *RCSD* for nearly a month, I only yesterday got around to reading Robin Lehman's article on aerobatics. This article contains an error that should be corrected.

"Robin states that, for a rudder only model (I assume he means rudder and elevator), flying inverted, application of rudder produces a turn in the opposite direction. This is not true.

"When flying upright, application of right rudder produces a yaw to the right, closely followed by roll to the right, caused by the dihedral. A reasonably smooth turn to the right results.

"When inverted, right rudder produces a yaw to the left, followed by a roll to the right, caused by the anhedral. The resulting turn is unbalanced and ugly, but it is to the right, not the left.

"It is not easy, at least for me, to accurately guide the glider around the sky this way, because frequent and coarse rudder inputs are needed just to keep the wings reasonably level, and prevent the model rolling back upright. But you can, at least, keep the model in the right part of the sky reasonably easily, and I have managed to slope soar for several minutes this way, before running out of height and being forced to resume the normal position."

Thanks for the input, Ian. Readers, for Ian and others who have encountered this situation, this just goes to point out the fact that almost every airplane flies a little differently. What Ian says may hold true for his particular glider, but the fact still remains, if one is trying to fly inverted, the rudder is reversed.

Many rudder-elevator only gliders will be difficult to fly inverted (if they will at all), and many will be UGLY when inverted. It is probably safe to say that the more dihedral, or polyhedral a sailplane has, the more difficult and ugly it is to fly inverted.

Readers, as we explained last year, each model will perform differently. We would really like to hear from more of you that have tried the aerobatic maneuvers in this series. Perhaps you've had some experiences that can be shared with other modelers who fly similar planes. Robin ■

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Photography by Robin Lehman.

What's Your Plan?

By William G. Swingle II
Pleasanton, California
bill_swingle@electro-test.com

Combat has entered the sloping scene with a vengeance here in California. At local slopes you can find pilots combating every weekend, with contests becoming a regular occurrence. The end result of all this flogging is inevitable: damaged airplanes. True, the durability of today's combat plane is astounding (thanks Pat, Dave, et. al.), but a sad fact remains. Anytime you fly your plane into another object you're risking damage. Go figure.

The combat pilot must have a longevity plan for his model. Though it's often not consciously considered, in fact, all combat pilots do. Specifically, I'm referring to the pilot's course of action when his model's damaged. The most common plan is the "fix what's broken" approach. This approach addresses the present, but misses the big picture.

When you repair a plane, the model typically ends up worse than before the initial damage occurred. Whether it's increased weight, additional aerodynamic drag, or a poorer airfoil, your model is most likely closer to the end of its useful life. So, what are we pilots to do? Do we blame it on fate, some guy named Murphy, thermodynamics? Partially, yes. A gradual decline in performance is almost inevitable, but how much depends on us. With some forethought and consideration, the life of our models can be optimized.

How much time do you allow for repairs? Do you agonize over every detail, or just slap together some foam and tape and call it done? This is usually determined by how much you enjoy building. If you're spending countless hours repairing and you're enjoying yourself, congratulations! Enjoyment is the whole point. That's why it's called a hobby. But, for those who don't want to fly poorly performing airplanes, would rather spend more time flying and less time repairing, a plan will prove useful.

What deserves repair? This is the fundamental question. If a repair will require many hours of effort, perhaps your time will be better spent assembling a replacement. How many times have we asked ourselves, "Should I fix it or start over?" A decision must be made. The thing to consider is the end result. Will the repaired model be grossly over weight? Will the airfoil's shape be distorted? If the model won't fly acceptably when you're done, your time will be better spent constructing a new model.

The choice of materials plays a big role in determining what deserves repair. Yesterday's combat models were made from conventional foams such as styrofoam. All impacts would dent the foam and distort the airframe, which made combat flying a rapidly changing pastime. As damage accumulated on your model, its performance would deteriorate. Though quite challenging, it quickly became tiresome and frustrating. For conventional foam models, the best plan for maximizing enjoyment relied heavily on replacement. Minor repairs would be done, but soon a major repair would be needed and replacement would be chosen.

Combat pilots were often looked down upon because of their hangers' high rates of attrition. The conventional pilot viewed the high turnover rate as blasphemous. Now a new kind of foam, expanded polypropylene or EPP, has entered the scene, which doesn't dent! EPP absorbs impact and springs back into position just like a light rubber.

Now, with EPP, the answer to the question of what deserves repair has changed dramatically! A dent in conventional foam degrades the very foam itself. To fix any dent requires some effort and usually isn't worth it. Because EPP doesn't dent, minor impacts are not cumulative. Further, breakage occurs in definable spots instead of regions as in conventional foam. Thus, repairs are easier and have a high chance of not degrading the shape of the surface/airfoil.

With EPP, the option of repair is much more feasible! It's no coincidence that the question of repair or replacement is also more difficult. Now damage tends to remain localized such as a broken spar or a tear in the foam. The repair is thus fairly straight forward and typically consists of gluing pieces back together. Generally, these fixes don't suffer the major downfalls of conventional foam models. They can be repaired without distorting the airfoil or warping the airframe. Ideally, the only problem that prevents an infinite life for our models is weight gain. This is a huge improvement!

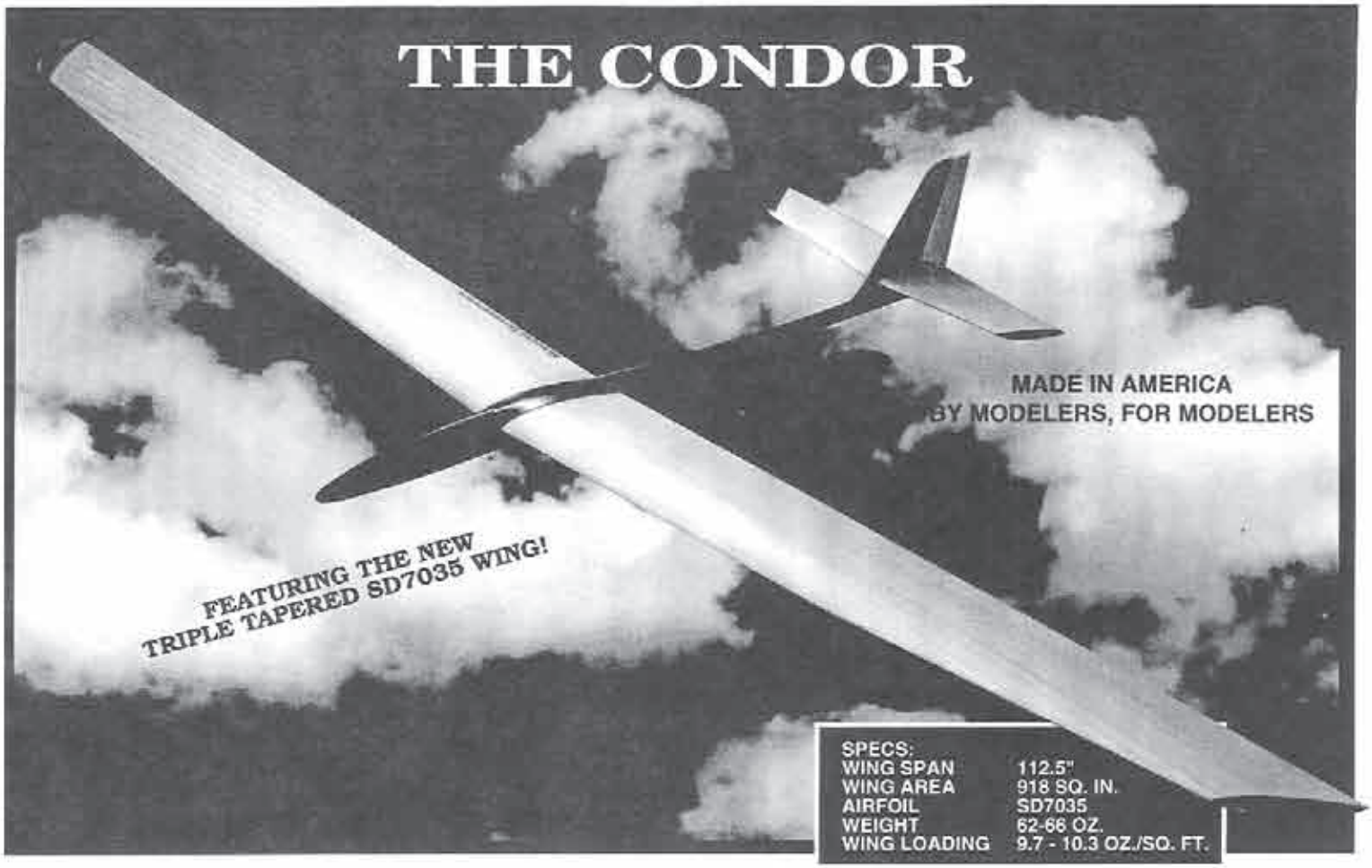
Now that we've conquered two of the three major obstacles to the repair of our combat planes, repair becomes just as viable as replacement. With both options now viable alternatives, the decision of repair/replace has now become a matter of personal choice. Neither option being wrong or ill advised.

So, which option do we choose. I've seen competent pilots on both sides of this decision. The paths to follow for either option are clear. Either build durable and strong, or cheap and fast. Deciding which is determined by how you value your time and money.

A local pilot, Charlie, subscribes entirely to the replace option. He's designed a flying wing which he cuts from pink foam with an EPP leading edge. From start to finish he can have a new wing ready to fly in about an hour. His total, finished cost is around ten dollars! When he arrives at the slope, he's typically got two planes, or more, ready to fly. With two complete airplanes and a roll of tape, he's ready for a full day of fun. It's cheap, simple, easy and works for him.

On the other side of the coin is myself. I've chosen the repair option. I fly an all EPP combat plane that I built to be strong and durable. I've repaired all damage, and consequently have had the pleasure of flying the same combat plane for just over one full year with no end in sight!

Which plan is the best? Sadly, I'm not sure. Charlie and I have each had good results with our chosen plans. Curiously though, we are each giving thought to the other's approach. He's considering an EPP plane and I have one of his wings on the bench right now. Obviously, neither choice is right or wrong. Maybe the grass just looks greener on the other side of the fence! ■



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

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

CONDOR

Tomorrow's Sailplane, Technology Today

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

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

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

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

★ VISA ★ MASTERCARD ★ DISCOVER ★

SLEGERS INTERNATIONAL

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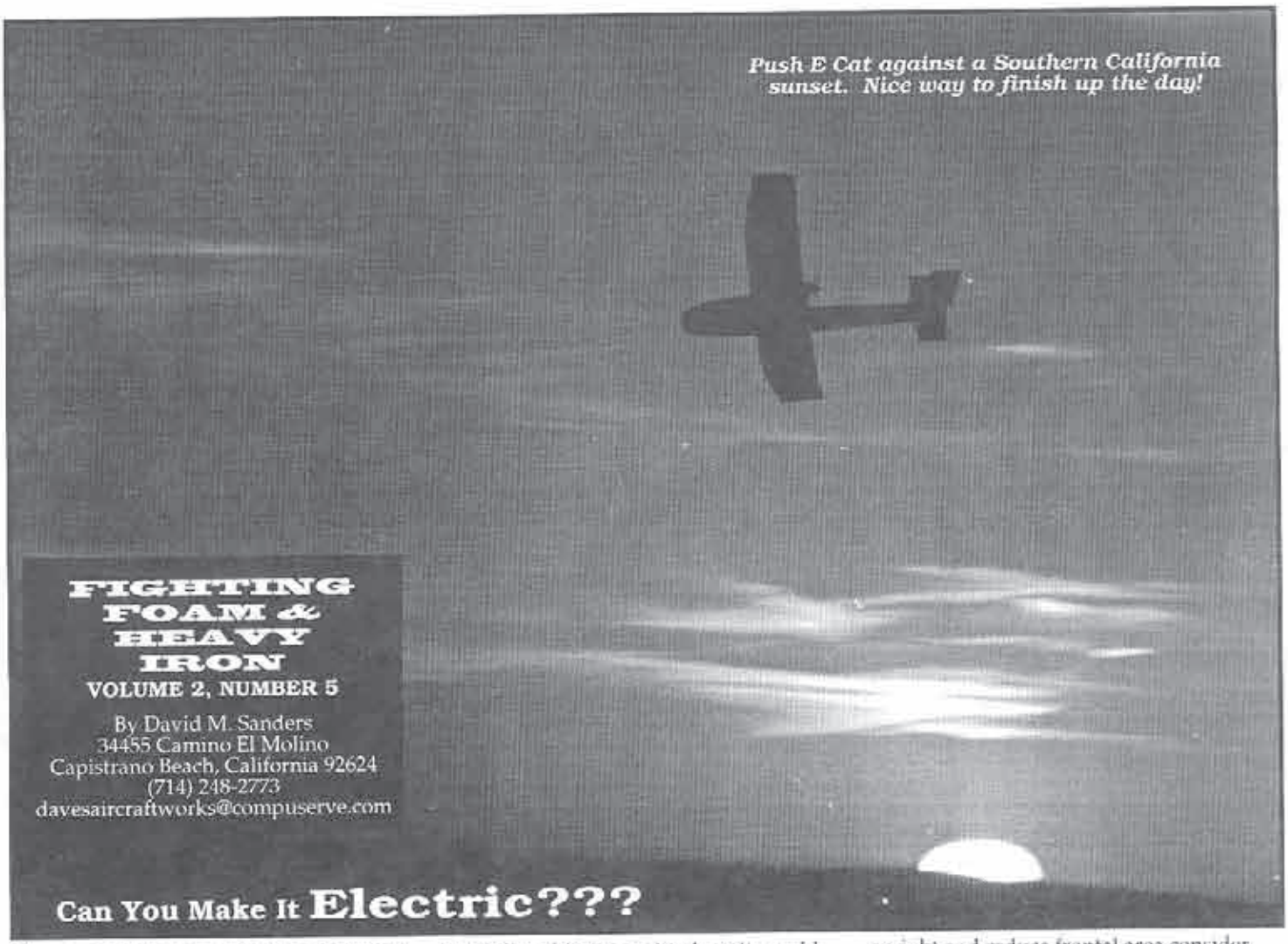

Push E Cat against a Southern California sunset. Nice way to finish up the day!

FIGHTING FOAM & HEAVY IRON

VOLUME 2, NUMBER 5

By David M. Sanders
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Can You Make It Electric???

I've probably been asked this a thousand times in my career as an EPP kit maker. My answer has always been a qualified one, noting that an intuitive guy could do it, and a few have with my own and other maker's models.

Now someone has done it definitively! Pat Mattes and Darwin Garrison, of Mattes Models and Garrison Aerodrome respectively, have brought the first electric powered EPP foam model to market designed, from the ground up, specifically for electric power.

Personally, I've always been little less than enthusiastic about electric powered aircraft. I admit, a friend and I had tried some low-cost kits to see how it worked and the results were less than stellar. Immediately, the conclusion was drawn that electric power only seemed practical with airframes built so lightly that they would likewise be very delicate and probably not up to rather, uh... spirited use. Couple with the above reasons, an abundance of slopes in our area, and it was easy to turn our backs on electric power.

By now, the word about EPP foam has gotten around in the modeling community via the magazines and internet, and many facets of the hobby have now set their sights on utilizing EPP in a number of capacities. The electric power fliers in particular, after years of flying almost gossamer ships, saw a shining beacon of durability. It's not as simple as it would seem, because there's a lot of problems to solve. EPP itself is quite light, but by the time you take the measures required to insure structural stiffness and a serviceable finish, you've added considerable weight. And, what use is an indestructible airframe with a quite destructible (and sometimes pricey) motor and prop assembly at the business end?

Here's how Pat and Darwin did it. The result is the Speed 400 powered 'Push-E Cat'. The concept is pure and simple: a two-channel, 58" span ship with a high, polyhedral wing and the motor in a protected location, behind and above the wing. The wing has simple upper and lower surface wood spars. The inboard spars are hardwood, and the outboards balsa. The E205 foiled wing's straight center section and slightly tapered tips allow the EPP to be cut in full chord width without the trailing edge deteriorating (this is very challenging). This alone saves considerable weight. The polyhedral tips are held to the inboard panel with tape alone; light and perfectly strong enough. The tail group is made of 3/32" sheet balsa for light weight, low drag and stiffness. The fuselage is 100% EPP, and though the example I was sent for evaluation was left with square corners, it could easily be shaped down with existing EPP carving techniques, which would shed some weight and reduce frontal area considerably. Finishing can be done with either tape or iron films like Ultracote. The foam parts are cut with enough sectional area to not require use of strapping tape, again saving weight.

Darwin was kind enough to send out one of their prototypes for me to take for a spin, knowing that I was skeptical, too! I took it out and flew it... Did it work? Yeah! It actually works really well! Surprisingly well. After a few flights, I could see the real innovation of the design. The high motor position allows use of inexpensive propellers and protects the whole motor assembly from damage in the event of a poor landing. The wing is detachable, and the poly tips can be removed for transport; it breaks down small enough to travel with The battery is accessed through the canopy-styled hatch on the nose and can be changed in seconds. The model I was flying utilized seven 600KR cells and gave about five minutes of powered flight. With judicious use of throttle, I was able to achieve eight minute flights with ease. The battery area is plenty large enough to accommodate just about any choice of battery, and many of the beta testers on this project have gone with 1000 to 1250mah packs for longer flights. Although it's obviously not a 'jet job', it gives a satisfying, useful climb rate and can be specked easily. At an overall weight of 24 to 25

Push-E Cat in flight with some other aerial objects. The little ship scoots right along and is pleasantly responsive on the sticks.

ounces, wing area of 384 sq. in., and around 9 ounce per sq. ft. loading, it will soar if you're careful and patient; not too shabby! For you electric guys, they quote 47 watts per pound on this airframe/motor combination, which falls quite close to the '50 watts per pound flies like it should' standard. Power-off performance was also smooth and predictable; hand catching for landing was simple, though obviously not necessary... Heh, heh, heh.

At one of our sessions at the local beach, I actually flew the plane into a palm tree while trying to give Mrs. Sanders a good camera position! Only damage was fracture of the motor pylon, which was easily repaired with some CA (Pat and Darwin are switching to tougher material for this component; the example I evaluated used balsa.), and the plane was ready to fly again in minutes. This collision occurred at full power, too! Whap! No prob... It's a foamie.

Along with the aircraft, Darwin sent me a kit manual for evaluation, which was complete and concise, including numerous photo illustrations and figures. Construction is logical and thoughtful and would present no troubles to a builder with even modest experience. This aircraft could also serve effectively as a trainer. Sure, it's a little fast, but it's rubber and self launches! Yahoo!!

This kit is offered in various levels of completeness to start you off at square one, or to get you going from square three or four, if you're already an electric flier and have your own power system on hand.

For more information and kit prices on the Push-E Cat, contact Darwin Garrison at Garrison Aerodrome R/C Model Enterprises, 5717 Woodlea Avenue, Fort Wayne, IN 46835; (219) 486-2889, fax (219) 486-9761, e-mail: <garrison@rc-aero.com>. Pat's is <mattes@rc-aero.com>, <http://www.rc-aero.com/kits/push/>.

Wild Video

I just got through watching "Airborne to be Wild!" produced by Lex and Roberta Liberato at Studio 'B' Design and Production, LLC in Hawaii. This well produced, approximately one hour tape, documents the toys and experiences of a group of local fliers on the Big Island, as well as some footage from Lex and Roberta's recent Australia trip. Along with that, there's some excellent aerobatic sequences with composite ships, some awesome crash shots and lots of EPP combat action, including some delicious kills. (I know, I'm bloodthirsty... Deal with it.) The most intriguing part of all is the construction sequence; it shows Lex constructing an all EPP Foaminator at his bench from start to finish. Many, many excellent tips are demonstrated and could be of great aid to those having trouble with or unsure about modern foamie construction. A good tape to have in your R/C video library! See Studio 'B's ad in this issue for complete ordering details, please.

Sensei John Roe's Dynamic Soaring F3J Benefit Show

Heard about Dynamic Soaring? It's been the topic of controversy for a while on the internet, because a lot of folks think it's a myth. Well, it's not, and since John Roe had seen it done himself by no less than Joe Wurts at Parker Mountain, he decided to go and get some video footage. You'll see Joe himself demonstrate and describe the technique, as his molded Diamond howls around him at near sonic speeds the entire time. Also included are footage of top HLG fliers doing contest launches at the '97 IHLGF in Poway, California. A valuable study for your own competitive HLG flying. There's much more; too much to list! This video is NOT professionally produced, but contains useful information for any serious R/C sailplane flier, AND, all the cash collected beyond reproduction cost is going directly to the US F3J Team. The team works on a tight budget, and every little bit helps. C'mon guys... Let's see to it that our team goes to England in style! A donation of $20.00 will get you a copy of the video. Send check or money order to John Roe, Dynamic Soaring Video, 25331 Pike Road, Laguna Hills, CA 92653; e-mail: <sensei_john_roe@compuserve.com>.

Wood Can Be Good

So, what about it? Wood for tails on foamies? Depends on what you're using 'em for. As we all know, Coroplast has its limits and deficiencies, so many fliers, and even manufacturers, have been casting a longing gaze over their shoulders at the materials of yore.

Wood can be a practical tail material if you're not engaged in primary training or combat. For these two operations, Coroplast's inherent toughness still makes it reign supreme over any other challengers. But if you are just doing normal sport flying with infrequent contact with other aircraft, or just concerned about ground obstacles and dorks, a wood tail makes a lot of sense. It's light, stiff, finishes well, stays in trim and is readily available. Pat Bowman is already using it on his Javelin HLG foamie and we here at DAW are using it on the 1-26 2M kits. So far, Pat, myself and many of our customers have had good results, even with pretty rough handling and flying. For planes being launched off winches, it can give a lot more solid feel on launch and also offers more trim stability, which is important when flying at great distances from yourself. If you're tired of wrestling with keeping Coroplast parts straight, then you may want to take a second look at balsa.

Right: Static shot of the Push-E Cat. Clean, simple layout that incorporates excellent protection of radio gear and power system, taking full advantage of EPP's durability without leaving the motor and prop as a sacrificial lamb on the nose of the plane.

If you still want to stick with the Coroplast, then you may want to try a trick that Wade Kloos at Durable Aircraft Models uses: brass tubing. He shoves a piece of brass tubing into the Coroplast cell directly ahead of the hinge line and holds it in place with a dab of Goop at each end. This gives you a stiff and re-bendable spar inside the Coroplast tail parts that can be tuned and maintained. Granted, it adds a little tail weight, but the benefits of a tail section that stays in trim more reliably is a definite plus.

Goof

I goofed on Durable Aircraft Model's web page address last edition. Mixed up my 'net's and 'com's! Sorry 'bout that, Wade! Here's the correct one: <www.globalpac.com/damkits>.

That's All for Now

I'll hope to see some of you guys at Russell, Kansas for the LASS Slope Challenge in May! 'Til then, watch yer' six! ■

BOOK REVIEW

"Summary of Low-Speed Airfoil Data - Volume 3"

(Christopher Lyon, Andy Broeren, Philippe Giguere, Ashok Gopalarathnam, and Dr. Michael Selig)

Reviewed by Dave Register
Bartlesville, Oklahoma

Recommendation

I've had such a good time developing this review that it's gone on longer than intended. For those who would like the up-front result: BUY THIS BOOK! There's a wealth of new information on performance, flaps, leading edge control, trips, moment coefficients, several new airfoils, etc., etc. You won't regret it no matter what your level of technical interest. Your support will encourage the continuation of this work. Contact Herk Stokely. (see side panel for details).

Background

Those who set to the sky in sailplanes demand more of design efficiency than other pilots. Lift is our friend, drag is our enemy. While harvesting resources from thermal or slope lift, drag constantly depletes our efforts and inevitably wins the battle. Skill, luck and energy conservation are our best allies in this struggle.

Until recently, successful soaring designs have been largely determined at the flying field. Since the mid 1980's, new insight has been gained by a small group of scientists who have chosen to study the problem at scales of interest to modelers. This article reviews the latest contribution from that group, headed by Prof. Michael Selig at the University of Illinois, Urbana-Champaign.

For decades, design of sailplanes and gliders, especially at small scales, has been an empirical science. In the late 1970's and early 1980's, this picture began to change as wind tunnel data at Reynolds numbers (Re) below ~300,000 became available (Stuttgart, Delft and the earlier work at Goettingen and NACA). At about this same time, Prof. Richard Eppler (Stuttgart) and Dan Somers (NASA, Langley) developed a low Re analysis code (NASA TM 80210 and TM 81862, later enhanced in Eppler's book - "Airfoil Design and Data" (1990)) to predict the performance of low speed airfoils.

Perhaps the most dramatic application of these principles was the development of human powered flight by Paul McCready's AeroVironment group. Paying careful attention to low Re design theory, both the Kremer prize (Gossamer Condor) and the crossing of the English channel (Gossamer Albatross) were accomplished solely under the power of pilot and propulsion system Brian Allen. This provided both an emotional and financial reward for careful analysis of low Re airfoil design and performance.

Although such accomplishments clearly demonstrated the advantage of this approach, very little laboratory corroboration of these results was available to the R/C soaring community. Several airfoils were proposed from Eppler's work for use in R/C soaring. Among these are the well known E193, E205, E374 and E387. Although they have been popular sections over the years, in typical use they are almost always modified in one way or another. This suggests that actual experience in the field has found some minor deficiency within the overall performance envelope of the airfoils.

In August of 1986, Michael Selig and John Donovan at Princeton University teamed with David Fraser (Fraser-Volpe Corporation) in a series of experimental analyses of low Re airfoils specifically targeted at the regime of interest to model sailplanes. That pioneering work was captured in the now well known 'Soartech 8 - Airfoils at Low Speeds', published by Herk Stokely. The quality of this research has been proven many times over in the performance of the S3021, SD7037 and SD7080 to name just a few of the airfoils that emerged from those studies.

Sadly, David Fraser was lost in an untimely accident shortly after this project was completed. Activities at the Princeton site wound down with the graduation of its leading protagonists. Of the original project partners, Michael Selig remained as the champion for continuing this effort. After completing his doctorate at Pennsylvania State University, he settled at the University of Illinois at Urbana-Champaign. Garnering funds from start-up resources, modelers and other agencies, he began the work that has now produced 3 excellent volumes of airfoil data and design. With this latest effort, his group is both leading the way in low Re airfoils and extending this excellent work to other groups within the modeling community.

Organization of the Book

As with previous volumes in this series, the chapters have been organized so that each area of interest can be conveniently served. After a brief introduction of the authors (Hey, somebody out there in the aerospace business should hire these guys - they're good!), the book is ordered in 6 sections. The first three chapters deal with a review of the experimental techniques used in this series, as well as a very useful description of the airfoils tested and the objectives of the test. For those looking to understand the methodology and quality of the resulting data, these chapters are very important reading. Comparison with results from the NASA Low Turbulence Pressure Tunnel (Langley) provides excellent corroboration of the present data. The authors' candor in discussing these comparisons is both refreshing and a vote of confidence for the UIUC program.

Chapter 4 will perhaps be the most useful for the majority of readers. It provides a careful summary of the objectives for each of the groups of airfoils tested and a thoughtful interpretation of the results. To those not specifically trained in the language of this technology, this section is well written and an essential prerequisite for applying the data summarized in the tables and charts. Don't skip over this chapter. Read it up front so you can understand the results reported later.

The main body of the volume is in chapter 5. As with previous editions, each airfoil is plotted along with its velocity distributions and dimensional deviations from the intended section. This last piece of information is an important part of the evaluation, since it gives some idea of the sensitivity of the results to the imperfections inherent in building a wing section. Following this summary are plots of lift and drag coefficient at each Reynolds number tested. A new piece of information not previously available is the measured moment coefficient for the section. This data has a few surprises, which may take some time to sort out (more on that later).

Throughout the previous 3 volumes (including "Soartech 8"), the question of boundary layer control through the use of trips has often cropped up. Chapter 6 of the present volume provides the most comprehensive discussion (and evaluation) to date of trip strips for boundary layer control. The purpose of a trip is to control the transition from laminar to turbulent flow over the airfoil surface. In some cases this may produce a better behaved section at low Re, but higher drag at high Re. The effects of trip location, width, thickness and design are carefully reviewed in this chapter. This includes a surface oil flow visualization technique, which provides compelling evidence for the experimental results, as well as a truly dramatic illustration for the cover art!

Finally, the appendices provide all of the airfoil coordinate and performance data in tabular form, as well as a section on inviscid velocity distributions for airfoils in Volume 2, for which viscous velocity distributions were originally provided (XFOIL calculations). Although the tabular data is all one needs to create an airfoil and simulate its polar performance, obtaining this data on a floppy disk is much more convenient.

A Few Additional Comments

As you can tell, I've been rather impressed with this entire body of work. The latest volume further enhances the credibility of Prof. Selig's group. It also provides us with a number of new pieces of information. I want to highlight some of those and speculate a bit on their consequences.

Although much of this volume is devoted to R/C soaring airfoils, several new studies are highlighted. Among these is a review of airfoils used for R/C sport and aerobatic planes. This should be of interest to the much larger R/C power community. Any manufacturer that kits power planes would be well advised to evaluate the results of these studies. For those sailplaners who have buddies in the power side of the sport, you could do them a favor by passing on the section data and comments. (Or encourage them to buy Volume 3!)

FIGURE 1

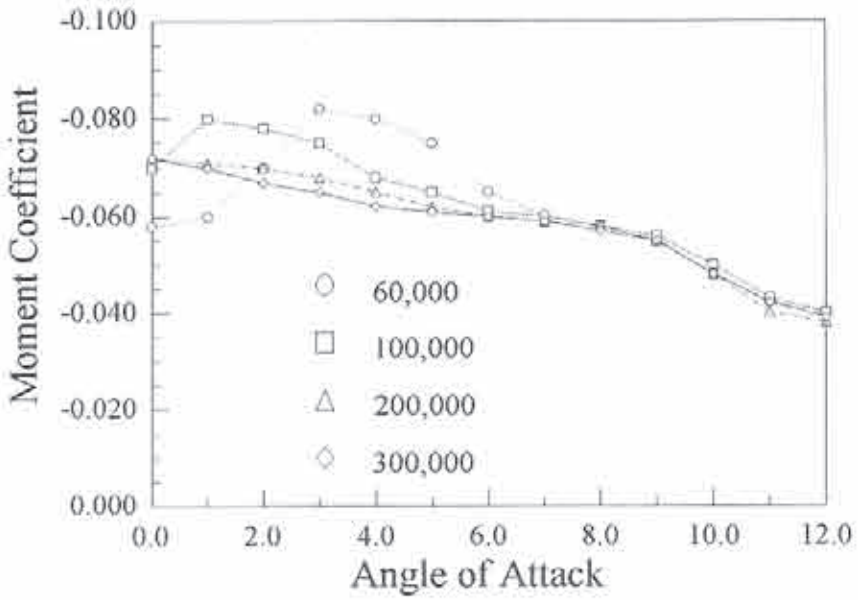
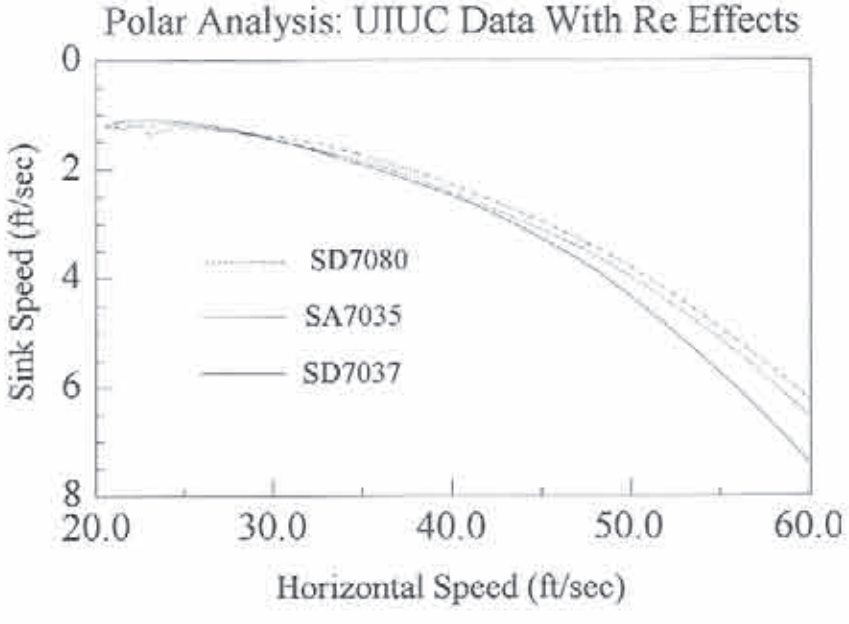


FIGURE 2



For soaring applications, three new airfoils have been developed. These are the SA7035, SA7036 and SA7038 sections, which are based on the successful SD7037 but with changes in lift capability for each section. Several of these airfoils have appeared in limited production kits. As an owner of one of these ships, I can personally attest to the performance potential of these new sections. Their evaluation (and coordinates) is worth the price of the book alone.

Several new measurements for the SD7037 have also been made. These include flap settings and a new configuration using both leading and trailing edge flaps. The performance advantage of this geometry merits further testing at the field. In case you feel this is an impractical and complicated geometry, you might recall that Daryl Perkins flew a plane of similar specifications in preparation for his successful world championship defense in 1997. Is the additional cost of this approach worth the performance advantage? Time will tell. We are seeing a glimpse of the future and only field trials will prove the practicality of such leading-edge technology.

The current volume provides another significant step forward by reporting some of the first data available on moment coefficients for low Re airfoils. This parameter reflects the measured torque (or twisting force) about a particular location on the chord. This is usually chosen as the quarter chord (for good theoretical reasons) and that location is the reference point in these measurements. The moment coefficient is often used as a measure of pitch sensitivity for an airfoil and has implications for the design of the horizontal stabilizer (size, moment arm, etc.). The surprise in the reported data is that this coefficient is not constant across the range of angle of attack used in the study (Figure 1). For high Re (>500,000) this has generally been found to be flat across the flight envelope of the airfoil.

What's the implication? Well, insofar as the moment coefficient can represent the travel of the lifting center of the airfoil, this data suggests that the lifting center has a relatively small amount of travel near stall conditions - probably appropriate for the minimum sink setting and maybe as far out as max L/D. However, at low angles of

Herk Stokely has been responsible for printing and distributing Prof. Selig's studies for the soaring community. Starting with SoarTech 8 "Airfoils at Low Speeds", Herk has been publishing the results of the low speed airfoil trials for 9 years. The research at the University of Illinois at Urbana-Champaign (UIUC) has been reported under the title "Summary of Low-Speed Airfoil Data" and now comprises 3 volumes. Information about Volume 3 and other reports can be obtained from:

SoarTech Publications
c/o Herk Stokely
1504 N. Horseshoe Circle
Virginia Beach, VA 23451
e-mail: herkstok@aol.com

Priced at $35 (plus shipping), "Summary of Low-Speed Airfoil Data, Volume 3" is the largest and most comprehensive report to date and contains 440 pages of text, data and charts. Mailing charges for various destinations are:

$6 US surface mail ($41 total)
$8 surface mail outside the US ($43 total)
$20 air mail to Europe ($55 total)
$25 air mail to Asia/Africa ($60 total)
$27 air mail to Pacific Rim ($62 total)

The UIUC group appreciates the ongoing encouragement of the modeling community. In addition to your support through book sales, your direct contribution to the program helps to continue this excellent work. Contributions to UIUC should be made payable to "University of Illinois, AAE Dept" and should have a note in the memo field "Selig - Wind Tunnel/AAE Unrestricted Funds". They should be sent to:

Prof. Michael Selig
Dept. of Aeronautical and Astronautical Engineering
University of Illinois at Urbana-Champaign
306 Talbot Laboratory
Urbana, IL 61801-2935
e-mail: m-selig@uiuc.edu
http://www.uiuc.edu/ph/www/m-selig

attack, the travel is increased over what might be expected for a more well-behaved value. If your stabilizer and moment arm are designed for good control at thermalling conditions, you may find a tendency to 'tuck' at high speeds. Perhaps this has been the reason for the relatively large stabilizer sizes required for model use as compared to full size. Hmmmmm!

Finally, in my opinion, all four of the volumes in this series have presented an unanswered challenge to sailplane pilots throughout the world. Namely, can we achieve the performance at the field that these airfoils suggest is attainable? It's not good enough to go win some contests and think the job is done. The data from UIUC demands verification in the sky, which can only come from careful observations of sailplane performance via polar measurements. If Blaine Beron-Rowdon could do that 20 years ago, we ought to be able to do it even better today. Video techniques and more sophisticated analysis codes should make this a practical experiment.

As an example, Figure 2 shows a polar calculation using the present data (including Reynolds number effects) comparing the SD7037, SD7080 and the new SA7035 in a typical open class TD ship. Although the SD7080 appears to provide a broader speed range with lower drag, the differences at thermal conditions favor the SD7037. The SA7035 pretty much splits the difference. Is this what happens in the real world? We need to do the experiment. In the meantime, get Volume 3 (to go along with the previous editions in your library) and dream a little about the possibilities! ■

Composite Fuselages The Easy Way

By Oliver Wilson
Punta Gorda, Florida

The easiest way to acquire a composite fuselage is to order one from Viking models. (It doesn't hurt to give your publisher a plug.) However, if you want something that is not available commercially, try the lost foam method of making a strong, light fuselage of almost any shape. For one-of-a-kind fuselages it is the easiest method I know of. The shape is not limited by rigid mold removal considerations like drift angles. Best of all, the finished fuselage is seamless (lighter and stronger).

Begin by getting a blank of blue, pink or gray closed-cell polystyrene foam. Square it up and draw the profile view on the side and the plan view on the bottom (or top). This profile and plan should be undersized by the thickness of the layup (somewhere in the range of 3/64 to 3/32 of an inch). Cut out the blank to the plan view and tape the cut-off pieces back on. Then cut out the profile view. A band saw or hot wire may be used. If you are using a hot wire, use four small drops of foam compatible CA to tack the side pieces back on instead of tape. Put the CA in the corners where it will not interfere with the cut.

Lightly sand the core to the cross section of the inside of the finished fuselage. Use cross section templates if eye balling isn't good enough. Various grades of sandpaper from 100 down to 220 are practical. If chunks of foam are pulled out by sanding, use less pressure. The surface of the foam is vulnerable to dents from finger pressure so hold it lightly. As you approach the final shape, go carefully so as not to take off too much and ruin the core.

A temporary support is needed to hold the work in a vise while it is being fiberglassed. If the wings are to be bolted to the fuselage, let a stub of 1/4 inch plywood into the foam in the wing saddle area. If the wings are to plug into the fuselage sides, run a pair of dowels through the foam in the wing root area. The temporary holding stubs can be secured with foam compatible CA.

The layup is done with multiple layers of light cloth. This is much stronger than a single layer of heavy cloth. I use 1.4 ounce cloth and from 12 to 24 layers depending on the strength and stiffness desired. Cloth up to about 3 ounces is suitable depending on how easily it contours over the core. Open weave and harness weaves drape much better than tight and plain weaves. A low viscosity laminating epoxy with at least a 15 minute working time is best.

When working with epoxy it is very important to keep it off your skin. The tolerance for epoxy exposure eventually wears off and allergic reaction sets in. In extreme cases this can even be life threatening. So, wear latex rubber gloves or other skin protection when working with uncured epoxy.

Cut several pieces of cloth on the bias to cover a little more than half the circumference and the full length of the core. Where the curvature is too sharp for the cloth to lay down around the nose cut the cloth back a little.

Put the holding stub in a vise. Cover the entire core with a light coat of laminating epoxy and lay down a piece of cloth. Brush it out so that there are no bubbles, the cloth is thoroughly wet and the edges stuck down. The cloth will stay in place where the curvature is not too great. Cut away any areas which will not lay down. Add the second piece of cloth to cover the other side of the core and overlap the first piece. Smooth it down and saturate it as you did the first piece. Continue adding alternate pieces until you run out or the epoxy starts to thicken. I can usually get three or four layers (six to eight pieces of cloth) to one batch of epoxy. After the layup has set and reached the green cure stage, sand away any high spots and feather the edges of the last layer.

Cut at least 12 squares of 1.4 ounce cloth, on the bias, for the nose. These can be sized to cover the nose and overlap the first layup. Mix up a small batch of laminating epoxy and coat the nose and the nearby layup. Put a patch of glass cloth over the nose and smooth out any wrinkles. The bias cut allows the patch to drape over the compound curve quite easily. Continue adding layers of cloth until you run out or until the epoxy starts to thicken. Cut the thumb out of a rubber glove or the neck off of a small balloon. Pull the rubber over the nose layup so that the rubber extends a couple of inches over the dry part. Work out any air bubbles. If the rubber won't stay in place, tape it to hold it from sliding toward the wet layup. When the epoxy cures the rubber can be rolled off for a perfectly molded nose.

Where the nose layup meets the first layup the thickness changes. On the next layup position the layers of cloth to compensate for any thickness variations. For instance, if the first series if layups overlapped on the sides of the fuselage, do the second series of layups so they overlap on the top and bottom. Continue the series of layups until you reach the desired thickness, strength and stiffness. Stagger the edges of each layer a little so that you maintain smoothness and sand out any uneveness between layup sessions. At the end of each layup session blot off any excess epoxy with paper towels to keep the weight down and the strength up

Prepare the fuselage for a nose cone layup by sanding it smooth. Wax and buff the area of the nose cone and a little beyond. Do at least four waxing and buffing layers. After the last buffing, coat the area with a layer of poly vinyl alcohol (PVA) and let it dry. Don't leave any bare spots where you will be laying up the nose sheath. After the PVA is dry, the nose sheath is laid up exactly like the fuselage, first the sides and then the nose. After six to eight layers, remove the nose cone. Slit the nose cone with a razor saw along the centerline on the top or bottom from the aft edge of the layup to within about an inch of the nose. Take care not to saw into the fuselage. Work a razor blade under the layup and begin to separate it. After you get the separation started switch to popsicle sticks to pry under the nose cone. As the separation progresses, the slit will widen and more popsicle sticks can be worked in. As you near the nose work in a piece of 1/8x1/4 spruce opposite to the slit. There will be a satisfying pop as the nose cone comes free. Wash and dry the fuselage and nose cone. Close the slit with thick CA, careful not to get any inside where it will interfere with a close fit to the fuselage.

When the CA has hardened continue laying up additional layers on the nose cone until it is at least 1/32 thick. It is better to put strength into this area than lead in the nose. When the layup is complete cut off the excess from the rear of the layup and sand it smooth on a flat surface. Try reinstalling the nose cone on the fuselage. If the shape doesn't permit, the slit may have to be reopened for a short distance.

Coat the inside and outside of the nose cone with PVA around the aft edge of the nose cone. While the PVA is drying, carefully clean any remaining wax from the fuselage aft of the nose cone with alcohol. When the PVA is dry, install the nose cone and mix a small batch of epoxy. Add microballoons until the mixture reaches a peanut butter like consistency. Coat the area from the nose-cone-rear-edge a distance of one or two inches farther back on the fuselage all around. The coating should be a little thicker than the nose cone and taper to nothing at the rear. When the epoxy is thoroughly cured sand off the excess to expose the seam and to fair the nose cone into the contour of the fuselage. When the fairing is complete the nose cone can be removed. Put the seam over the edge of the workbench and press down on the nose and tail until the seam pops. Turn the fuselage over and repeat for the other side. Now the nose cone can be easily slid off or on. Carefully clean off any wax and PVA before painting. Also, sand off the aft edge of the nose cone to allow for paint thickness otherwise a dork landing will put all the force on the fairing which may crack.

Cut the equipment access hatch in the fuselage. Put a one foot long piece of music wire in your drill motor and bend 1/4 inch of the end to a 90 degree angle. Put the spinning end of the music wire into the foam core and pulverize the foam. Run the end in and out and press it against the inside of the fiberglass. Don't worry, the music wire will not hurt the fiberglass. It will just rebound into the foam. The last vestiges of foam can be removed by shuttling a coarse, rat tailed file back and forth inside the fuselage.

From beginning to end it takes about a dozen twenty-minute working sessions, spaced a day apart, to do a fuselage. Four hours of working time is not long compared to the other alternatives.

A word about strength and stiffness. Fiberglass structures usually fail by buckling. Thick structures of multiple layers resist buckling better than a thin single layer. Go with the thickest layup that your weight budget permits. Use light enough cloth to permit multiple layers. Given two fuselages of equal weight, the one that has a large diameter and thin walls will usually fail before a smaller diameter fuselage with thicker walls. The smaller diameter fuselage also has lower drag. If you are designing for performance and strength, minimize the fuselage cross section. Small diameter structures tend to absorb shock by flexing rather than breaking. The fuselage need only be stiff enough to prevent excessive deflection and flutter in flight.

■

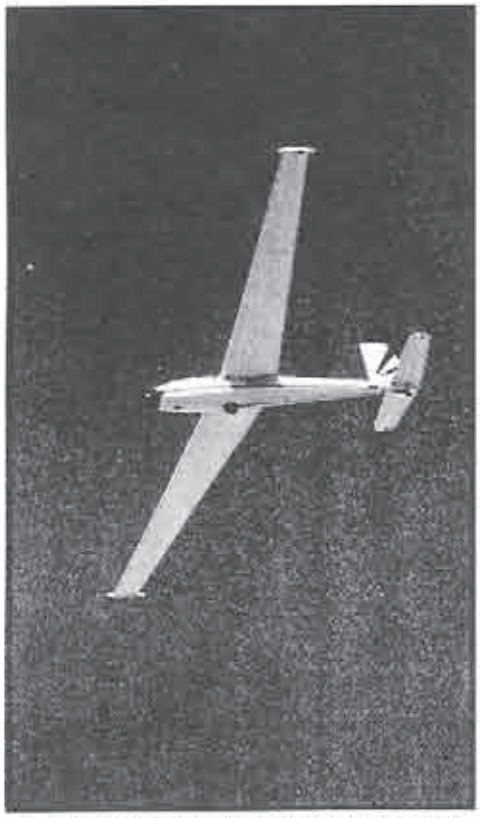
Tony prepares the Fox for its maiden flight. Big, huh!

Pensacola '97

By Asher Carmichael
Spanish Fort, Alabama
Photography by Robin Lehman

Based on our experience over the last two years, it would seem that the initial scheduled dates we pick for a Pensacola Aerotow event are jinxed. The first event in 1996 was rescheduled because of a tropical disturbance, as was 1997's. The second time is a charmer, as they say, and our decision to reschedule the event for February's 1998 was definitely validated.

When we get good days in winter along the gulf coast, they are <u>really good days</u>.



A full-size Blanik flew overhead, from a local gliderport, sharing some of the wonderful thermals at the event.

Tony Fiorentino flew his giant 1/2.5 Bruckmann Fox for the first time. It is very majestic in the sky, and flies just like the real thing. With a very light wing loading, this aerobatic sailplane will surely thermal - the best of both worlds!

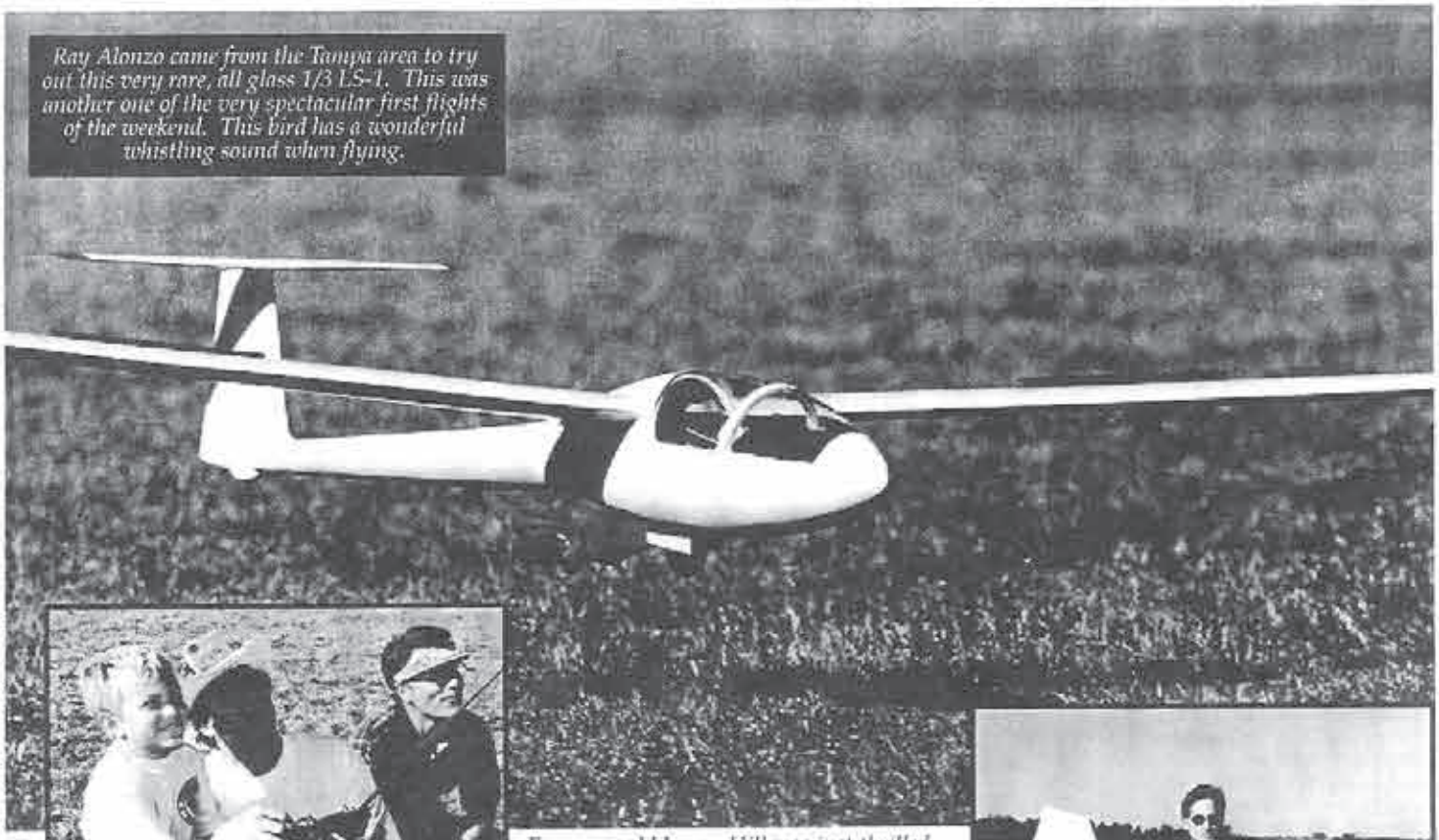
Wayne Parrish, master pilot, is also a full-sized aerobatic pilot who used to fly the airshow circuit. Now, he shows the rest of the folks how it's done!

(Right) Wayne Parrish gets a hug from his wife, Dee, after the maiden flight of the Duo Discus. It flew well, and was easy to tow and land.

The flight line was kept moving all day long, with lots of loops in hand for hooking up the gliders to the towline. A very easy way to do things, as there was no waiting around.

Pete George drove 10 hours to get to Pensacola, and probably had the longest thermal flights with his 1/4 ASK 18. He also checked out the Sportsman (easier) aerobatic routine, which will be used at the Fayetteville aerobatic contest in October. Here, Pete's on approach after a 75 minute flight.

Ray Alonzo came from the Tampa area to try out this very rare, all glass 1/3 LS-1. This was another one of the very spectacular first flights of the weekend. This bird has a wonderful whistling sound when flying.



Four year old Logan Hill was just thrilled to be able to fly Ray Alonzo's glider! Ray and Logan got along famously, as dad looks on. This is part of the spirit of the Pensacola Fly-In, having fun in a very relaxed atmosphere.

Bob Hodges brought several sailplanes, as well as his G-63 powered, giant Stinger, which he used as a towplane on both days.

February 21-22 was absolutely wonderful for the twenty aerotow and scale sailplane pilots (double the number for interested observers) who met at a local sod farm on Friday, and mile-square Site 8 on Saturday. Bright blue skies, light winds and thermals that would carry you to oblivion in a heartbeat were typical of both days. Sunday's flying was canceled, again because of poor conditions, but those who had traveled from afar were just as happy to be able to begin their journey home or to take in some of the local sights and flavor such as the Naval Aviation Museum and the beaches. It seems everyone had flown to their hearts content on Friday and Saturday.

Rusty Rood was the CD and he did everything he could to make everyone miserable and uptight. (Heh. Heh.) Several thermal duration pilots were overheard to say how nice it was to get together and fly without the strain of competition. Rusty overheard this and tried to humorously introduce some competitive tension by announcing at the top of his lungs that "so and so" only had 2 minutes to get his flight in or they would receive a zero for the round. Not.

Our aerotow events are about flying, conversing and just generally having a good time. If anyone feels stress, it would be tow pilots, and maybe those who are trying out a new plane. Wayne Parrish and Robin Lehman flew their EMS 3.75 scale Duo Discus and 35% Extra tow-plane for the first time. Ray Alonzo had saved his "old-but-new" Rich-Air LS-1 for the event, and Tony Fiorentino (Mr. Big) put up his new Bruckner 1:2.5 scale Fox after a morning's respite. I also managed to try out my new 1/4 scale Wilga. I'm happy to report that all went well for everyone and that the "new airplane stress" was minimized as the event progressed.

The stress of aerotow duties was reduced, because of the presence of 5 towplanes and pilots. Wayne Parrish had his trusty Robin 99 and Rusty Rood was always in line with his beefed-up Senior Telemaster. A relative newcomer but excellent towpilot, Bob Hodges, worked his Lanier Stinger; Robin Lehman had his 35% Extra and I managed quite a few tows with my 1/4 scale Wilga.

This was my first time towing in an aerotow event and I must say that pulling up scale gliders is an absolute blast. It definitely brings a new sense of purpose and function to power flying and seems to be the perfect basis for cooperation between "power" clubs and soaring groups.

Another interesting characteristic of the Pensacola aerotow meet is the number of spectators and non-participants drawn by the event. We had as many interested observers as pilots during Saturday's activities and the "Ooh's" and "Ahh's" indicated they were having almost as much fun as the pilots.

When was the last time you flew in an event where there were as many spectators as there were participants? It's good to know that some aspects of soaring can be fascinating to the casual observer. Flying in circles and punching holes in terra firma, or racing and looping along a slope is definitely fun for those of us who are participants, but doesn't seem to be conducive to observation from the general public for any length of time. Aerotow, however, seems to have enough components and visual stimulation to hold attention for longer periods. Several die-hard thermal duration pilots who were at their first event in Pensacola agreed, and said that it was the most fun they had encountered in their modeling careers.

We also introduced a very young member of the crowd, four year old Logan Hill, to the magic of flying large scale sailplanes. Ray Alonzo of the Florida Soaring Society offered his LS-1, along with his helping

Asher worked long and hard to have the Wilga ready to fly. He both learned to fly the Wilga, and airtow in the same weekend, which is quite an accomplishment!

Asher Carmichael is preparing to tow Bob Hodges' 1/3 G-103.

hands, to the elated youngster. Perhaps another modeler was "born" that day, or perhaps two, because John's dad seemed to be equally impressed.

There were several memorable flights during the event. The EMS Duo Discus is truly an amazing sailplane. Wayne Parrish and Robin Lehman put it through the paces and it seems to work lift extremely well. That, along with great restitution in aerobatics and a wide speed range, makes for a "killer" combination.

Tony Fiorentino's near 1/2 scale Fox is also impressive. A magnificent, large-scale aerobatic sailplane is always going to turn heads.

Ray Alonzo's Rich-Air 1/4 scale LS-1 had to sit in a box in Florida for 15 years before making its debut at Pensacola. It's built just like the full-size with vertical honeycomb, hollow-core molded surfaces, and it makes the neatest whistling sound in flight.

Pete George and Wayne Parrish worked on sportsman and expert aerobatic flight routines for a planned sailplane aerobatic contest this fall in Fayetteville, North Carolina; Robin Lehman also impressed everyone with his aerobatic flights. His 35% Extra 300 was a fitting counterpoint to the sailplane aerobatics. It really is inspiring to see what our models are capable of in the hands of accomplished pilots.

There were also many other beautiful planes. Vic Manget's and Bernie Coleman's Roke DG-202's were gorgeous. Lauren Taylor's scratch-built vintage planes are a joy to see up close, as well as in the air. Old "Cornfed" himself, Fred Rettig, came out with his yellow CNC ASW-27; Sam Smith kept everyone looking for longer airtimes, while they chased his Robbe ASW-24.

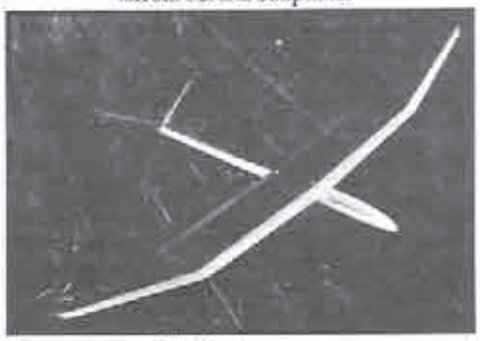
There was truly something for everyone at every turn. Great food, a wonderful aerotow event, the Naval Aviation Museum, and the world's whitest beaches. It is no wonder that this year's event drew people from all over the eastern half of the country. The distance traveled by some of the participants was impressive and indicate the extent to which we will go to be with like-minded individuals. Those of us left behind in Pensacola certainly are thankful for those who came to fly with us; we look forward to seeing them, as well as some new faces, next year. ■

ZIKA

NEW PRODUCTS

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

Carbon D-Light
...from ICARE Sailplanes



Wingspan:	60" (1.5 m)
Wing area:	365 sq. in.
Weight:	9 - 11 oz.
Wing loading:	3.9 oz./sq. ft.
Airfoil:	S4083
Order:	Carbon D-light RTF kit # CAR-001 Retail price: U$199.00 + 10.00 S&H Intro offer: U$185.00

Carbon D-Light is a high performance handlaunch, putting together the best knowledge in composite, free flight construction. It features a light and strong white fiberglass fuselage, almost 2 oz., with pushrod tubes and wing hold down installed, plus trimmed canopy.

The wing construction features a molded carbon D-box; a pre-shaped foam (D-form) is pressed with a layer of carbon into a female CNC machined mold. This gives a very stiff and accurate leading edge with perfect airfoil respect. The rear of this D-box is faced with light balsa shear webbing. The rear of the wing is traditional selected balsa build-up. Root and transition ribs are made of balsa/carbon sandwich. The wing tip is made from a four ply carbon/balsa sandwich, also pressed in a form to give the elliptic wing tip shape. This very stiff, yet light wing is covered with Oralight covering. The leading edge is silver painted for better visibility. It features a slightly modified S4083 airfoil.

Radio requirements are two sub-micro servos and a micro receiver. You can use a 110mAh or a 270mAh receiver battery.

ICARE Sailplanes, 381 Joseph-Huet, Boucherville, Qc, J4B 2C5, Canada; (514) 449-3497, ICARE@telts.com, <http://www.jonction.net/~icare/icare.htm>. ■

Closet Scale Stuff
At Sailplanes Unlimited. Ltd.

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

1/3 Müller Discus - 5 meter span (196"), wing profile HQ 2/12, ca. 20 lbs.

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

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

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

1/4 Roebers Pilatus B-4 - 3.75 meter span (147"), wing profile Ritz 3, approx. 8 lbs.

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

1/3 ASK 13 - 5.33 meter span (209"), wing profile E 68-67-66, ca. 32 lbs. Completely built & ready to fly with all servos installed, brand new, unflown.

1/3.5 Roke DG 202 - 4.86 m span (168"). Completely built including all servos.

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

International Hand Launch Glider Festival - 1998

The Torrey Pines Gulls and ***Slegers International***, the official sponsor of the 1998 International Hand Launch Glider Festival, invite you to participate in the fifth annual IHLGF on June 6 and 7 at the TPG Poway Flight Center, located in Poway, California (25 miles NNE of San Diego).

We have made a few changes in the '98 IHLGF format. This year there will be three classes of pilots: Open, Junior (15 and under), and "Bald Eagle" (55 and better). Each class will have their own set of awards. Open class will have plaques through 10th place and the Junior and Eagle classes will have plaques through 3rd place. The Junior and Eagle classes will both fly in the same flight group and will compete against their peers. Also, while we encourage each pilot in these two classes to throw his/her own plane, we have modified the rules to allow for an alternate thrower. There will be some restrictions on who may be an alternate thrower. The idea is to allow those Juniors and Eagles, whose arms would otherwise prevent them from being competitive, to be "in the hunt". If you qualify and wish to fly in one of theses two classes, you must register as such on the entry form. All others will be classified as Open.

Another change involves the implementation of a "throw-out" round. Your best nine out of ten rounds will be used to calculate your score. The top ten Open class pilots will be in the Championship Fly-Off and will carry their adjusted scores into the Fly-Off.

One of the things that makes the IHLGF so special is the social aspect. We begin Friday evening with a "Post Practice Social" at the local Mexican restaurant. Good food, cold beer, and a bunch of great guys telling war stories. Saturday evening we have an old fashioned "all you can eat" Pizza Party planned at Round Table Pizza in Poway.

TPG has a "Visiting Pilot" program for those IHLGF contestants who would prefer to stay with one of our members during the contest. Contact Mike Ziaskas (619) 484-7596 or e-mail him at Mzsoar@aol.com if you are interested. Space is limited so make your arrangements early.

The field will be available beginning Thursday, June 4, for practice. Toilet facilities will be available beginning Friday. RV parking and camping allowed at field, however, there are no hook ups.

For complete information on the IHLGF, local hotels, car rentals, maps, and a wealth of other information, please visit the TPG web site at: **www.TorreyPinesGulls.org**. If you have any questions please give me a call at (619) 454-4900 or e-mail me at Scharck@aol.com.

Ron Scharck, IHLGF Registrar

The Torrey Pines Gulls
in cooperation with
SLEGERS INTERNATIONAL

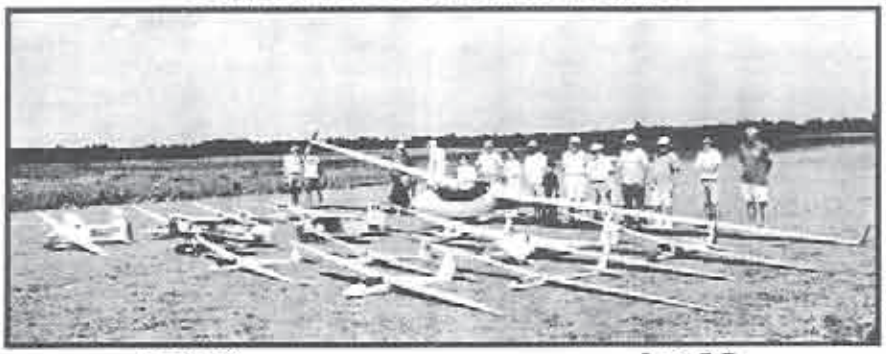
Invite you to attend the
1998 International HLG Festival
June 6 and 7
TPG Poway Flight Center - West Garden Road, Poway, California
(15 miles north-northeast of San Diego)

Ten Rounds of Competition - Three Fly-Off Rounds for Open Championship
Plaques through 10th place - Open Classs, 3rd place - Junior & Bald Eagle Classes
Vendor donated prizes awarded to 'Those Who Also Flew' and Raffle
Pilot Check-in: 8:00 a.m. Pilots Meeting: 8:45 a.m. First Round: 9:00 a.m.
Entry Fee: $30 (Includes lunch on Saturday and Sunday)
Pizza Party Saturday evening at Round Table Pizza - Poway $10 per person
Lodging: La Quinta Inn - 619-484-8800 / Poway Country Inn - 619-748-6320
RV Parking and Camping at field - no hook ups
CD: Dave Condon - (714) 454-8725) or e-mail - dcondon@parker.com
Entry limited to 70 Pilots - Entries must be postmarked no earlier than APRIL 1
For more information, see our web site: www.TorreyPinesGulls.org

Please complete the following information, together with your check made payable to TPG, and return to:
Ron Scharck, 7319 Olivetas Ave., La Jolla, CA 92037
(619) 454-4900

Entries must be postmarked APRIL 1 or later.
Name: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone: (____)_____
AMA #: _____
Class: Junior ( ) Bald Eagle: ( ) Age: ___
Frequency 1st ____ 2nd ____ 3rd ____
Tee-Shirts: M___L___XL___XXL___
Entry Fee $30.00
T-Shirts ($15 x ____) _____
Pizza Party ($10 x ____) _____
Total Enclosed _____

SCHEDULE OF SPECIAL EVENTS



Fayetteville '96, Lehman photo.

March 28
Torrey Pines Scale Soaring Classic — Poway & La Jolla, CA
Ron Scharck, (619) 454-4900, scharck@aol.com
Gary Fogel, (310) 838-6068, gfogel@ucla.edu

April 18-19
ISSA April Fun Fly '98 — Apple Valley, CA
Stan Sadorf, (760) 245-6630, Soareyes@aol.com
David Hall, (909) 790-5875
DLHall@compuserve.com

April 25
HL Series Event — Lafayette, IN
Ryan Woebkenberg, woebkenb@expert.cc.purdue.edu

May 1-3
Fayetteville Airtow Fly-In — Fayetteville, NC
Wayne Parrish, (919) 362-7150

May 2-3
17th Annual 2-day Soaring Contest — Pasadena, CA
Information: (626) 812-0491
http://www.rcsoaring.com

May 16-17
Los Banos Slope Scale Soar-In — Los Banos, CA
Lynsel Miller, (408) 275-6403

May 16-17
CSS Memorial Contest — Cincinnati, OH
Ed Franz, (606) 586-0177, ejfranz@fuse.net

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

May 23-24
442-444 — Tullahoma, TN
Herb Rindfleisch, (931) 455-1836

May 30-31
CSS Spring Intergalactic — Cincinnati, OH
HL Series Event
Paul Siegel, (513) 561-6872, psiegel@fuse.net

May 30-31
Sailplane Weekend — Addison Oaks Park, MI
Ray Hayes, (810) 781-7018, skybench@tcleweb.net

June 5-7
SBSS Golden State XCountry Race — California Valley, CA
Mike Gervais, (408) 683-4140

June 6-7
IHLGF — Poway, CA
Ron Scharck, (619) 454-4900, scharck@aol.com

June 11-14
Elmira Aerotow '98 — Elmira, NY
John Derstine, (717) 596-2392
johnders@postoffice.ptd.net

June 13-14
Land of Lincoln E-Fly — Springfield, IL
Tim McDonough, (217) 523-8625, tpm@inw.net
http://www.inw.net/~tpm

June 26-28
MSSC '98 — Louisville, KY
Ed Wilson, (502) 239-3150
ewilson1@bellsouth.net

July 19
HL Series Event — Dayton, Ohio
David Rice, David_Rice@reyrey.com

July 25 - August 1
LSF/AMA NATS — Muncie, IN
Cal Posthuma, CALPLSF@aol.com
Aldin Shipp, alden@bcl.net

August 29
HL Series Event — Columbus, OH
Paul Wiese, pwiese@avcomsmt.com

August 29-30
Cape Blanco Inagual Slope Fly-In — Port Orford, OR
Larry Broman, (541) 751-8847

September 12-13
Sailaire One Design Contest — Cincinnati, OH
Ed Franz, (606) 586-0177, ejfranz@fuse.net

September 19-20
442-444 — Tullahoma, TN
Herb Rindfleisch, (931) 455-1836

October 3-4
25th CVRC Fall Soaring Festival — Visalia, CA
Phil Hill, (209) 686-8867

October 3-4
CSS Fall Intergalactic — Cincinnati, OH
HL Series Event
Paul Siegel, (513) 561-6872, psiegel@fuse.net

October 16-18
(Rain date October 23-25)
Airtow Aerobatic Sailplane Contest — Fayetteville, NC
Wayne Parrish, (919) 362-7150

October 17-18
Pumpkin Fly — Cincinnati, OH
Ed Franz, (606) 586-0177, ejfranz@fuse.net

November 7
Turkey Fly (Winch & HL) — Cincinnati, OH
Ed Franz, (606) 586-0177, ejfranz@fuse.net

Outside U.S.A.

May 1-3 or May 16-18
Coupe du Quebec Slope Race — Leclercville, Qc, Canada
Jacques Blain, (514) 652-6167

July 11-19
Canadian Soaring Nationals — St. Jean, Qc, Canada
Jacques Blain, (514) 652-6167 eve.
http://www.riq.qc.ca/users/pthiou/c2ym/index.htm

Aug. 1998
F3J World Championships, organized by BARCS

August 14-16
GNATS Scale Fun Fly — Niagara Peninsula, Canada
Gerry Knight, (905) 934-7451
Don Smith, (905) 934-3815
mistral@niagara.com, linden@niagara.com

Los Banos, Lehman photo.

Pensacola, Lehman photo.

Elmira '96, Lehman photo.

Classified Advertising Policy

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

For Sale - Business

PC-Soar Version 3.5 Sailplane Performance Evaluation Program Optional Sailplane Library now expanded to 54 models including: Alcyone, Anthem, Genesis, Mako, Probe, Thermal Eagle, and Synergy-91. Free Library Upgrades. PC-Soar Upgrade to Ver. 3.5 $10, PC-Soar New Purchase $40. New Libraries of Sailplanes and Airfoil Polars $30. Please include $3 P&H for all purchases & upgrades. Also available: Laser cut airfoil templates. LJM Associates, 1300 Bay Ridge Rd., Appleton, WI 54915; ph: (920) 731-4848 after 5:30 pm weekdays or on weekends; <http://www.athenet.net/~atkron95/pcsoar.htm>.

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

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

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

SOARING SIMULATOR - for PC's. Ka-8, LS-1f, SB-10, ASW-27. Realistic aircraft and weather model. Lift from thermals and slopes. Winch launch or aerotow. Target, target-return, and triangle courses. Dynamic scenery. MUCH MORE! Free Demo Available. geewiz@wwnet.com. (248) 932-0825.

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

IMPROVE YOUR LANDING SCORES with unbreakable injection molded polyethylene landing SKIDS, SKECS and TEETH. Free catalog w/other unique soaring accessories. Tim McCann, P.O. Box 2091, Harrison, AR 72602, (870) 365-0023, <tmccann@alltel.net>, <http://www.alltel.net/tmccann>.

For Sale - Personal

Lasoar 1200, fiberglass fuselage, obechi wings, 139" wingspan, SD7037 airfoil, 100 oz. RTF weight, 25 - 40 size electric motor, NIB... $350.00. Herb, (931) 455-1836, herb@cafes.net.

DJ Aerotech Monarch, 2m, completely built, all composite construction... $275.00 + shipping; DJ Aerotech Monarch "C" handlaunch, NIB... $85.00 + shipping; Electric Hawk electric sailplane, all Kevlar™ gelcoated fuse, set up for geared Astro 05 FAI, includes elevator servo mounted in the tail, perfect condition... $250.00 + shipping. Keith, (408) 982-5244, Kglass@rusa.canon.com, California.

Two Synergy 91's, white tops & black bottoms, Airtronics 141 servos in wings, RTF, have 4 between my brother and I but can't fly all... $500.00 ea. Are as new. Art, (805) 526-6292, California.

Twin Astir (WIK), 4m, all glass... $400.00; 1/3 scale German Reiher glider, great shape... $600.00; Skyhawk glider, new, never flown.. $500.00; new, never flown, Lasoar 650 electric glider... $400.00. All above gliders have Futaba servos. NIB Airtronics Sagitta XC... $225.00. Gene Woolley, (941) 294-1793, eve., Florida.

California Condor, 114" span, beautiful composite wings (RG-15) by Ron Vann, white fuse, wings w/fluorescent red tips & black bottoms, solid airplane flown roughly a dozen times, never crashed, includes JR341 servos in wings (metal gears for flaps)... $550.00 + shipping. Chuck Robinett, (973) 584-3117, New Jersey.

1/4 Roebers Pilatus B4, 3.75 meter span (147"), wing profile Ritz 3, NIB... $495.00; 1/4 Roedel Super Cub (towplane), 2.687 meter span, wing profile Clark Y mod. (suitable motors are 160 T, 300 T, OS BGX-1, Brison 3.2 or similar), NIB... $385.00; 1/4 Rosenthal Ralley Morane (towplane), 2.78 meter span (109"), NIB... $295.00; 1/5 Wik Twin Astir, all glass, NIB... $595.00. Contact Robin Lehman, 63 E. 82nd St., New York, NY 10028; (212) 879-1634.

RTF, completely finished scale models w/metal gear servos. 1/3 scale Discus... $1595.00; 4.9 meter DG-202 w/retract. $1295.00; 4 meter all glass LS-4... $895.00; 1/4 scale Grunau IV, must see... $995.00 with carrying container; 1/6 scale Grunau IIb, Krick, completely finished... $595.00; kit, NIB, 1/3.5 scale all molded ASW-27, unbelievable quality, with molded removable winglets, hardware, German bags, etc... $1595. Dan Troxell, (714) 831-8013, California.

Wanted

Legionaire 140 kit, plans, parts. Chuck Hathaway, 10759 O'Brien Rd., Atascosa, TX 78002; (210) 622-3658.

Sailplane Homebuilders Association (SHA)

A Division of the Soaring Society of America

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

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

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

MARKET PLACE LISTINGS

ELMIRA AEROTOW "98" AT HARRIS HILL

COME FLY WITH US AND SOAR TO NEW HEIGHTS!

June 12-13-14 1998
HELD IN ELMIRA, NY
SOARING CAPITAL OF THE U.S.
HOSTED BY: HARRIS HILL L/D R/C
co-sponsored by:
The National Soaring Museum
The Harris Hill Soaring Corp.

Our event this year will again be at Harris Hill. There are some new developments to report. This year we will be given exclusive use of the Harris Hill Soaring Corporation's airfield on Thursday and Friday the 11-12. Thursday will be open flying (aerotow or slope) for early arrivals. Friday will be the start of the official event with radio impound. The field will be shared with full scale sailplanes, including ASK-21's, and Schweizer Trainers on Saturday and Sunday 13-14. Rides will be available during these days. Factory demos are scheduled for Saturday afternoon. National and international vendors will be showing their wares. The emphasis will be on fun and aerotowing, as well as some fantastic slope soaring, if conditions dictate. Tow planes and experienced pilots will be there to tow you to altitude. Bring your 3 meter (118") or larger aileron sailplane with nose release and join the growing aerotow movement. Scale gliders are recommended, but not required. We will have a few scale sailplanes available on site for those who can't bring their own. This year we are going to have pilots choice awards and a special award for the best Schweizer scale sailplane. Other prizes to be announced. On Friday evening there will be a picnic at the Harris Hill Youth Camp adjacent to the flying field. We will have an evening banquet Saturday night at the National Soaring Museum. Guest speakers to be announced.

More exciting plans are in the works, so keep an eye out for further developments as they become available. Current AMA membership is required. There will be a $25.00 pilot registration fee. For details & info. (including shipping your sailplane to Elmira), contact:

John Derstine
717-596-2392
johnders@postoffice.ptd.net
http://www.Geocities.com/CapeCanaveral/Lab/5739

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, (205) 722-4311, <ron.swinehart@svl.lmco.com>, or Rob Glover at AMA3655@aol.com, http://sh1.ro.com/~samfara/

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

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

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

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

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

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

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, Lee Cooper, 4856 Rockland Way, Fair Oaks, CA 95628, (916) 966-2672.

California - South Bay Soaring Society, A.J. Angelo, P.O. Box 2012, Sunnyvale, CA 94087; (415) 321-8583, fax (415) 853-6064.

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

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

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

Eastern Soaring League (VA, MD, DE, PA, NJ, NY, CT, RI, MA), Jack Cash (Pres.), (301) 898-3297, e-mail BadIdeas@aol.com; Bill Miller (Sec./Tres.), (609) 989-7991, e-mail JerseyBill@aol.com; Michael Lachowski (Editor), 448 County Rt 579, Milford, NJ 08848, e-mail mikel@airage.com, <http://www.eclipse.net/~mikel/esl/officers.htm>.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

New York - Elmira - Harris Hill L/D R/C, aerotowing & slope, John Derstine, (717) 596-2392, e-mail 2076182@mcimail.com.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

West Virginia - Chip Vignolini, 1305 Perry Ave., Morgantown, WV 26505; (304) 598-9506, <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, <74724.65@compuserve.com>.

Outside U.S.A.

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

Canada - 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.

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.

RCSD Index/Database

Available from: <<http://www.athenet.net/~atkron95/pcsoar.htm>>. Or: <<http://www.halcyon.com/bsquared/RCSD html<<. Or, send 3.5" high density disks and 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, 74724.65@compuserve.com.

Reference Material

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

"Elmira Aerotow 96 Video" taken at the First Annual Northeast Aerotowing Fly-in, New York. Over 40 minutes of flying, interviews, and a special preview of the National Soaring Museum with Paul Schweizer. Check or money order, $19.95 plus $3.00 S&H (U.S.), payable to Harris Hill L/D R/C, c/o John Derstine, RD 3# Box 336, Gillett, PA 16925; (717) 596-2392. S&H foreign: $6 Canada/Mexico, $7 Europe, $8 Asia/Africa, $8.50 Pacific Rim. VHS format, NTSC standard.

BBS/Internet

Internet - Email list/resource of RC soaring related folks, including US and international club contacts, vendors, kit manufacturers/distributors, software, equipment and supplies. Check out the web site: www.ocpapsych.com/yellow.htm, or contact Manny Tau at taucom@kaiwan.com.

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.

Clubs, events, major contest scores, pilot chat board, classifieds, picture gallery: <http://www.rcsoaring.com>.

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

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Fountain Valley, CA 92708
(714) 378-8924

Hobbies"N Stuff
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(505) 293-1217

Hobby Hangar
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Hebron, KY 41048
(606) 334-4331

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

Hobby Warehouse
4118 South St.
Lakewood, CA 90712
(310) 531-8383

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Five Forks Village
King, NC 27021

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(206) 259-0912

Advertiser Index

Advertising Note

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

The Vintage Sailplane Association

Soaring from the past and into the future!

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

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

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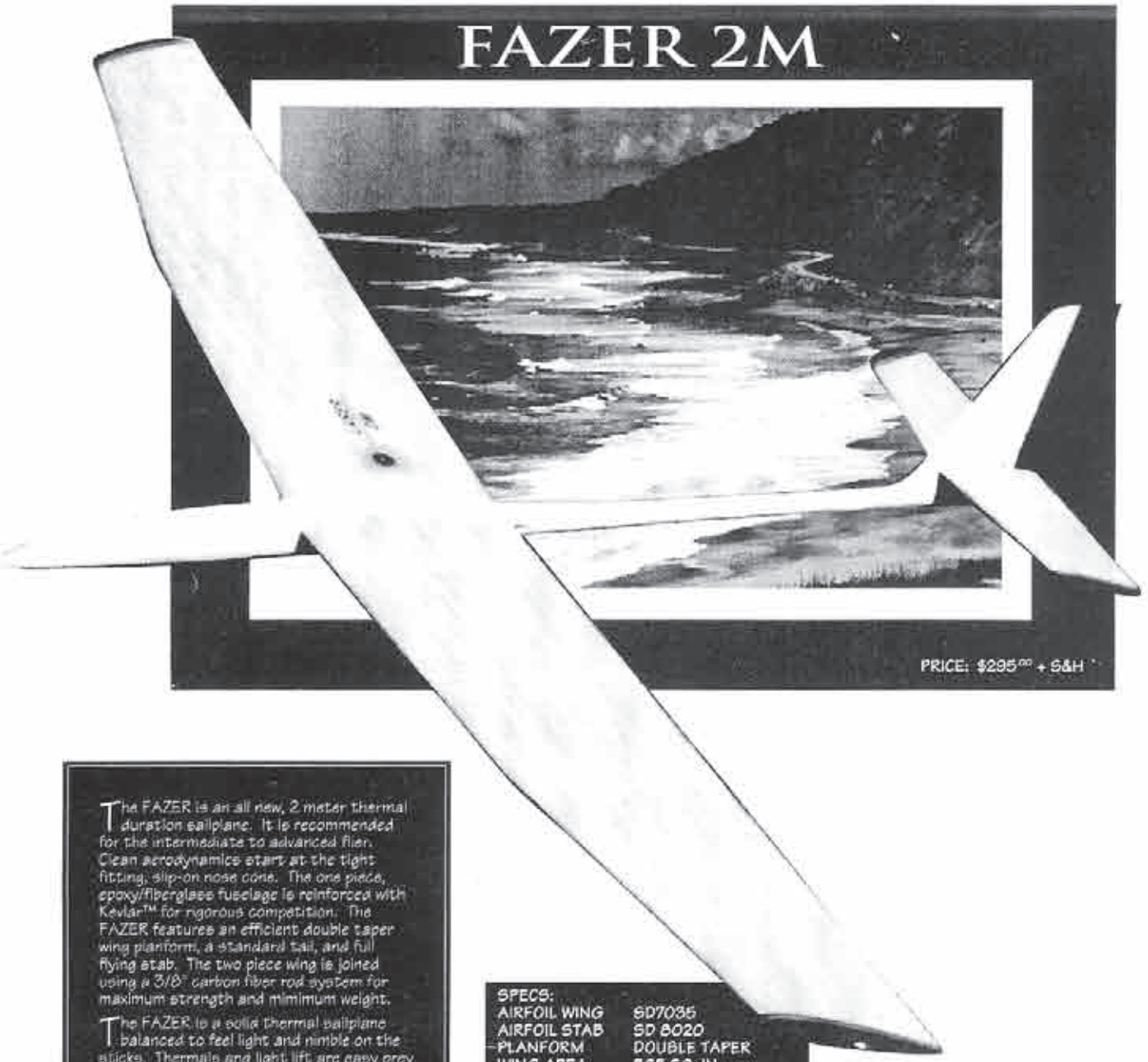

PRICE: $295.00 + S&H

The FAZER is an all new, 2 meter thermal duration sailplane. It is recommended for the intermediate to advanced flier. Clean aerodynamics start at the tight fitting, slip-on nose cone. The one piece, epoxy/fiberglass fuselage is reinforced with Kevlar™ for rigorous competition. The FAZER features an efficient double taper wing planform, a standard tail, and full flying stab. The two piece wing is joined using a 3/8" carbon fiber rod system for maximum strength and minimum weight.

The FAZER is a solid thermal sailplane balanced to feel light and nimble on the sticks. Thermals and light lift are easy prey for the SD7035 airfoil/planform combination, which delivers especially high zoom launches and slower than usual landing speeds. Large 2.125" chord flaps, coupled with generous aileron and rudder area, make landings a dream. The full flying stabilizer is used to extract a super positive pitch response at all flying speeds.

SPECS:	
AIRFOIL WING	SD7035
AIRFOIL STAB	SD 8020
PLANFORM	DOUBLE TAPER
WING AREA	565 SQ. IN.
STAB AREA	70.6 SQ. IN.
WING LOADING	8.8 - 9.8 OZ./SQ. FT.

The kit features include:
- Sleek new design with plug-on wings, standard tail, and full flying stab.
- Pre-sheeted and finish sanded wings & stab. Construction is obeche over foam.
- Routed servo pockets and aileron & flap hinge lines; 3/8" carbon fiber wing rod.
- Epoxy fiberglass fuselage, Kevlar™ reinforced nose to tail. Slip-on nose cone.
- Easy instructions by Bob Duke Graphics, and all hardware.

SLEGERS INTERNATIONAL

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