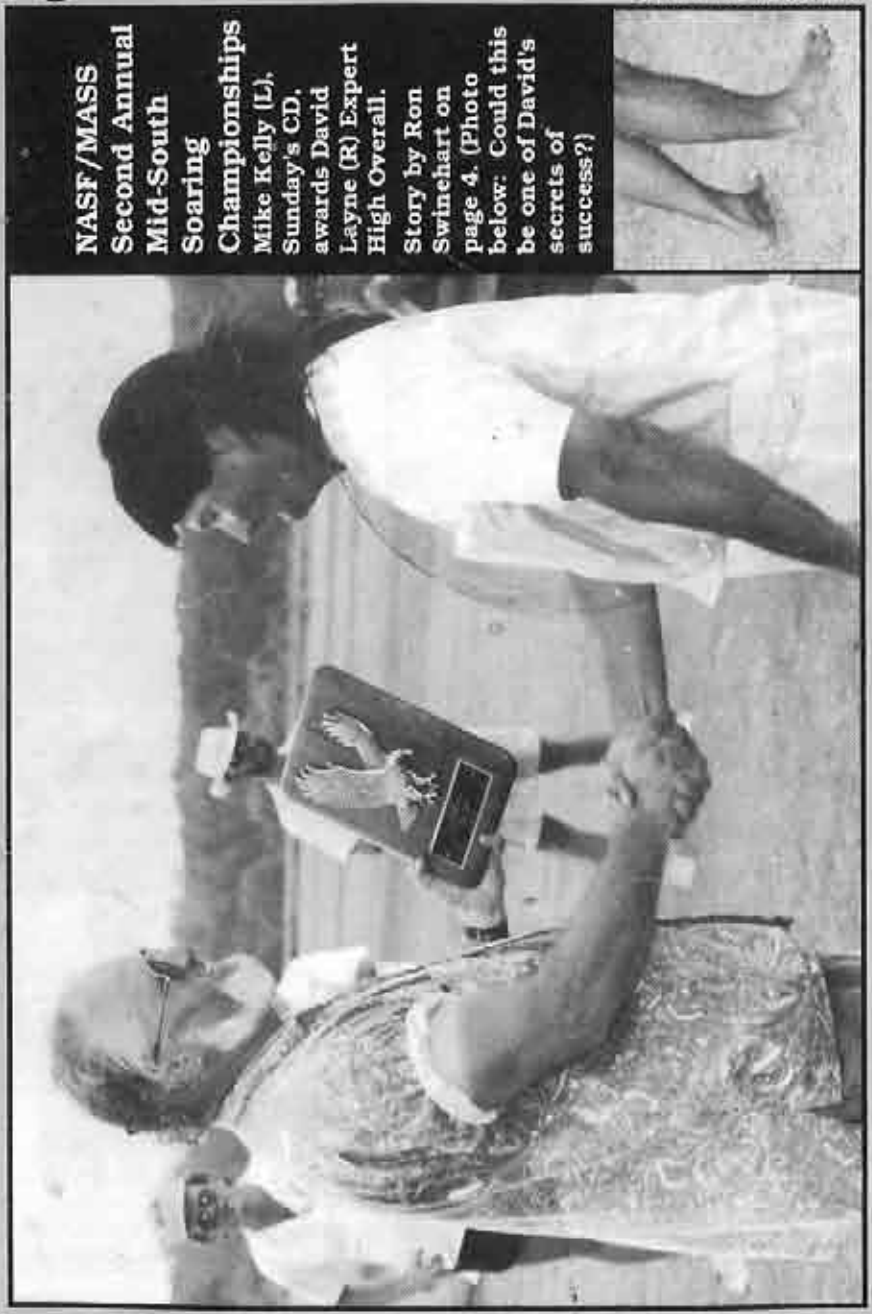
Suffering for Lift?
Slope soaring story by Phil Lontz on page 8.

R/C Soaring DIGEST

August, 1993
Vol. 10, No. 8

U.S.A. $2.00
Canada/Mexico $2.50

NASF/MASS Second Annual Mid-South Soaring Championships
Mike Kelly (L), Sunday's CD, awards David Layne (R) Expert High Overall. Story by Ron Swinehart on page 4. (Photo below: Could this be one of David's secrets of success?)



R/C Soaring Digest

A publication for the R/C sailplane enthusiast!

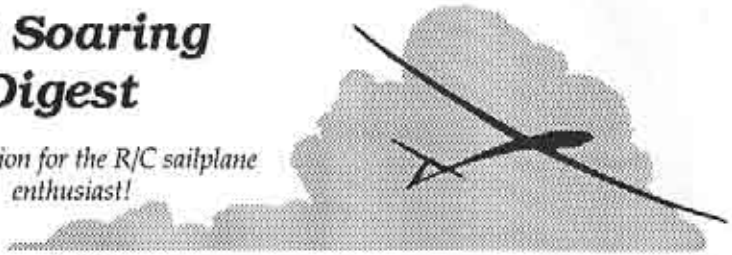


Table of Contents

Other Sections/Information

Advertising

Special Interest Groups & Contacts

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; (602) 474-5015.

RCSD should not be considered to endorse any advertised products or messages pertaining hereto. An advertising rate card is available for businesses, clubs and personal advertising.

R/C Soaring Digest is printed on recycled paper.

RCSD Staff

- Jerry Slates — Editor/Technical Editor/Jer's Workbench
- Judy Slates - Publisher/Submission of Mat'l Via Disk (MAC or 5.25" 360K MS-DOS or any 3.5" MS-DOS formated)

(Printing by J. Morgan Graphics & Design, (510) 674-9952)

Feature Columnists

Wil Byers, Mike Bamberg, Gordon Jones
Bill & Bunny Kuhlman (B²)
Martin Simons, Ed Slegers

Questions About Radios??

Contact David Woodhouse, 96 Division Street, Guelph, Ontario, Canada N1H 1R6; (519) 821-4346 between 19:00 - 21:00 EST.

R/C Soaring Digest
P.O. Box 2108
Wylie, TX 75098-2108 U.S.A.
(214) 442-3910, FAX (214) 442-5258

The Soaring Site

Last Fling of Summer

The 12th Annual Last Fling of Summer will be held on October 16 & 17 in Oklahoma at the Blue Springs Sod Farm southeast of Broken Arrow. Dale Nutter says, "It's a beautiful 160 acre site. October is an ideal time of year to hold this event. The temperature is moderate and there are fewer bugs. There will be a BBQ Saturday evening at a local park. The competition is man-on-man; there will be three Rahm winches with E-Z Mechanical Retrievers. The raffle items include a computer radio (Vision), kits, and many other items."

Oklahoma, Texas, Kansas and even California flyers are expected to be in attendance, so it promises to be a fun event, indeed a "last fling of summer". For further information or registration, contact Sandy Hay, the contest director, at (918) 665-8069 (home) or (918) 838-9961 (work). They would like to load the database by October 11 for the computer scoring and random group selection to avoid having a delay at the start of the contest. So, if you're planning on attending, help them out by getting in touch with Sandy, now.

SAGE

There is a new sailplane club in Arizona called the Southern Arizona Glider Enthusiasts (SAGE). We received a note from Burt Kline telling us about the new club. Burt says, "We welcome all levels of flyers." Burt is in Tucson and can be reached at (602) 882-4083. We have also added his name to the resource list.

CompuFoil Upgrades

Eric Sanders called to say that he is offering free upgrades to anyone who has purchased CompuFoil software from him. Just send him the original disk and a SASE including your address. The upgrades are: CompuFoil 2.14D,

CompuFoil Plus 1.4F, and CompuFoil Professional 1.44. Eric's address is 3904 Traine Dr., Kettering, OH 45429.

A NEST for *RCSD*

Every month we send *RCSD* to California red label (UPS - 1 day) for printing, and every month we worry about it, particularly the photos and ad copy. The small box we used lasted only one or two months even though it was only mailed one way and was boxed in another box on its way back to us. Although the box was made of heavy cardboard and lined with plywood, it was usually in bad shape after only a one-way trip. We wondered what we would do if *RCSD* got damaged or wet in transit. We had considered putting it in a metal box, if we could find one, as no amount of insurance can replace it!

Well, Dale Nutter of D&D Specialties knew that we were shipping *RCSD* to California each month for printing. So, he asked what size we needed, and a beautiful, rugged, waterproof, specially designed box arrived in the mail; it should easily survive most of the rigors of the postal service! We really appreciate Dale's thoughtfulness and wanted to let you know that Dale has helped us with one of the most important aspects of insuring that *RCSD* gets out the door on a monthly basis. Thanks, Dale!

Surface Mail

Over the last year, based on letters we have received, we have noticed that surface mail to other countries has been getting slower and slower and sometimes the copies of *RCSD* just don't arrive. As we understand the process, a boat is loaded daily with surface mail and will stay in port until it is full. Then, and only then, will it leave for foreign ports. Sometimes it takes a couple of months, sometimes it takes six. Perhaps, the economy today has something to do with the fact that it is taking the boats longer to leave. We don't really know the answer.

Anyway, we considered volunteering to "drive" the boat, but that obviously was out of the question as the Loch Ness is not normally part of a freight sea route. So, our only alternative is to stop offering surface mail to other countries. Of course, we know that some of you have been getting surface mail for a long time, so if you are not experiencing any problems in your country, please drop us a note. Since there are only 26 of you that receive mail by boat, each of you may have important input on our decision to discontinue this service.

RCSD Back Issues

There is a new ad for *RCSD* in this issue which includes the cost of back issues, what is available, and how to read your subscription label for expiration. We plan on including it in each issue.

Author Guidelines

We receive quite a few phone calls every month asking about the process for submitting articles. So, we wanted to touch on those areas where we get the most questions, and we plan to do a more detailed summary which will be included in a future issue of *RCSD*.

- All material/articles that are submitted must be original and not infringe upon the copyrights of others. Be sure to include a note telling us if more than one publication has or will be receiving the material or if the article has been printed elsewhere.

We do quite a bit of follow-up on some articles; we write letters and make telephone calls in some cases, dependent upon what is included in the cover letter and who sends in the article. (Those of you that write for major magazines pretty much know how to submit material and we thank you for making it easy for us.) Yes, we may refuse it, but do not send us an article that is being sent to a major magazine or other copyrighted publication, unless they refuse the article. Announcements and press releases, of course, are not considered articles. We can currently maintain an easy process for article submission and would like to continue to do so with your help.

Yes, we receive requests from others every month requesting permission to reprint something that appeared in *RCSD*. We usually grant permission, as long as the author gives their permission, as well. In some cases, we prefer that permission be in writing; in other cases it doesn't matter. One reason that we feel permission is necessary is that it lets the author know that their work is appreciated and may encourage them to write, again.

- A frequently asked question is, "When will my article be printed?" Well, this depends on several things: the length of the article, subject, whether it is on disk or hand written, if permission is required from someone else, if something requires technical analysis, etc. So, the answer varies, and until we have actually seen the article, we can't tell you that it will indeed be printed.

- Yes, we usually return photos and computer disks.

- *RCSD* is prepared on a Macintosh™ utilizing Microsoft Word® for word processing and Pagemaker® for page layout. We scan in and touch up graphics, or use OCR (optical character recognition) software where we can, to read documents. While we prefer a 3 1/2" disk, we can read a 5 1/4" MS DOS disk, as well. We prefer that articles are saved in your favorite word processing format and we will translate them from IBM™ compatible formats to Mac™ format via one of the software programs or through translation software. Graphics can be a bit of a problem. While they can be embedded within the word processing document, it is usually best not to included them on disk unless you're using a MAC™. Usually, we can read and place PICT, TIFF, and EPSF formats, but we know, from experience, that the odds are not in our favor. (Oh, and please, don't put in returns. Just allow the typing to word wrap.) Please be sure to include a hard copy of the article.

A special thanks go to each of you that have found the time to share your thoughts, ideas, construction techniques, flying experiences, and stories with others. Your efforts are most appreciated!

Happy Flying!
Jerry & Judy

Curt Nehring
Southern California

NASF/MASS Second Annual Mid-South Soaring Championships

...by Ron Swinehart, President, NASF
Huntsville, Alabama

Friday, June 25th in Huntsville, Alabama dawned as the day before the biggest contest the south has seen to date. By 12:00 PM, all field preparations were completed and most of the winch/retriever line (5) was in place. Twelve to fourteen of the North Alabama Silent Flyers (NASF) crew had arrived at the field at 7:30 to raise the two large (16x32 ft) military tents provided by the 832nd Army Ordinance Division of the Red Stone Arsenal. One was used as the scoring/impound area, and the other was turned into the vendor's display area manned by **Jerry Slates** of Viking Models U.S.A., **David Layne** of Layne/Urwyler, **Dale Nutter** of D&D Specialties, and **Barry Kennedy** of Kennedy Composites. By 3:00 PM, 35 to 40 flyers had arrived at the field for practice flying. These included Mike Stump and Troy Lawicki (LSF - League of Silent Flight) from Michigan, Frank Weston (WACO) from Maryland, Fred Rettig of Mobile, Brian Smith from Ohio, Bob Sowder of MASS (Memphis Area Soaring Society), Art Frost from Missouri, Buddy Roos and his gang from Atlanta, Georgia, Royce Salmon of Oak Ridge, Tennessee; not to mention at least 15 of the NASF gang. By this time we were using 3 winches and retrievers, and it looked like a full blown contest to me! Of special note, Bob Champine (LSF Level V twice around) from New Port News, Virginia flew with us. His son, who lives in Decatur, Alabama, took this opportunity to invite his dad to come to Alabama to visit.

By Thursday, I had 104 pre-registered entries from 20 states, and the donations to the planned raffle had grown to proportions that were hard to believe. This can be seen by the list, which describes in detail who donated what, and who the eventual winners were. I should note here that most of this was a direct result of the efforts of **Judy & Jerry Slates**, the owners and editors of *R/C Soaring Digest (RCSD)*. A **Special Thanks** must be given to

Saturday Expert Winners (R-L) Cliff Smith (NASF), Brian Smith (Ohio), and Frank Weston - "WACO" (Maryland)

Brian Smith (Ohio) - winner of the Airtronics donated Infinity 600

all the contributors, but especially to **Ed Slegers** of Slegers International Products, **Tim Renaud** of Airtronics, Inc., and **David Layne** of Layne/Urwyler. These folks went the extra mile to see that this contest will grow to what I anticipate will become one of the premier contests in the country.

The NASF/MASS crew launched five rounds of ninety eight (98) pilots (representing 19 states) on Saturday in hot (89° F) and humid weather

(R) Lars Ericsson (NASF) and the Falcon 550E, Jerry Slates (L)

Byron Rodgers (NASF) and the Thermal Eagle

Bill Jenkins (MASS) and the Airtronics donated Thermal Eagle

combined with light breezes, with all rounds being completed by 5:00 PM. These consisted of 3, 5, 7, 9, and 11 minute duration flights in any order at the pilot's discretion, with each round being worth 1000 points (900 points for flight & 100 points landing bonus). As noted by the winners scores in the tabulation, the thermals were plentiful, with a lot of the pilots present being able to get their times. Ninety four percent of the winning score would have gotten you 27th place in expert class. Cliff Smith, one of the NASF Gang, won first place expert, with a score of 98.7% of perfect (4934). He averaged 90 plus on five landings and less than 2 seconds off perfect time for the five rounds.

The number of flyers this year represented a 43% increase over last year's entry on Saturday. While the scoring was being tabulated, the donated raffle prizes were given out. Nine (9) names were drawn at random, by various persons from the crowd, with each named person having his/her choice of the prizes. Frank Weston of WACO, in appreciation of a well run contest and the high level of competition, gave the winner of Saturday's event (Cliff Smith) a WACO TWO in his choice of colors.

Eighty six (86) pilots flew four rounds of Triathlon on Sunday, again in clear, hot conditions (92° F), with the last round being completed by 2:00 PM. When the dust had finally cleared, there were a different set of winners on Sunday than on Saturday, with even another set taking the **HI-OVERALL AWARDS in all** but the Novice class. The grand winner was **David Layne** flying his own design, the **2.9T Saturn**. His score not only netted him the First Place Expert plaque on Sunday, but also the **Expert High-Overall Award.** I doubt if Jerry Slates or Tom Jones got any rest all the way back to Texas after that victory, since David had carpooled from Dallas to Huntsville with them. All awards were by Jennings Products of Hendersonville, Tennessee. The Over-All awards were especially nice, being 9x12 solid Walnut plaques with a large bronze Eagle in full landing flare.

I personally want to thank all of the NASF/

Chuck Thomas (MASS) - winner of the Layne/Urwyler Saturn 2.9T

Don St Germain (NASF) - winner of the JR X-388s radio

NASF/MASS MID - SOUTH SOARING CHAMPIONSHIPS

CONTEST RESULTS

SAT 26 JUNE (max 5000)		**SUN 27 JUNE (max 3400)**	
Junior			
1 - Travis Larson	4345	Michael Wilson	2287
2 - Michael Wilson	4189	Travis Larson	1675
3 - Chris Webb	3917	Chris Webb	1102
Novice			
1 - Steve Addison	4843	Chip Bullen	2724
2 - David Campbell	4802	David Godfrey	2571
3 - Chris Schoenbauer	4760	Jeff McComb	2015
4 - Chip Bullen	4553	Al Larson	1992
5 - Don StGermain	4535	Johnny Berlin	1797
High Overall - Chip Bullen 7277			
Sportsman			
1 - Eric Sanders	4702	Mark Thomas	2655
2 - Tom Ernst	4691	Don StGermain	2543
3 - Charles Baltzer	4673	Chuck Thomas	2530
4 - Tom Long	4651	Byron Rodgers	2482
5 - Ben Cleveland	4574	Mickey Collier	2417
High Overall - Charles Baltzer 7204			
Expert			
1 - Cliff Smith	4934	David Layne	3253
2 - Brian Smith	4906	Bob Champine	3145
3 - Frank Weston	4893	Ed White	3108
4 - Troy Lawicki	4889	Greg Norisworthy	3059
5 - Dale Nutter	4875	Robert Taylor	3034
High Overall - David Layne 8022			

MASS crew for their time and effort in making this contest possible. Rob Glover and his wife Valeta, along with Cindy Ericsson, Dana Kelly, Kay Thomas, Jean Harris, and Lynn Weston, made the scoring for these two events look easy. Scores were posted within minutes of the completion of a given flight group. One of the major keys to the flow of the contest and its resulting success has to go to John Cooper (NASF) for his organization of the impound area. Special thanks also go to Harry Goldsmith (MASS) for his tireless effort with John during both days of handling over 800 radios without a single shoot down caused by a transmitter being left on. (Good Job, John & Guys!) This is not to say that the guys out on the winch line operating four winches and retrievers also do not deserve special credit, but there are too many to name them all. Once again troops, it was **really great!** ■

Prize Raffle

Raffle Items	**Donors**	**Winners**
o Thermal Eagle	Airtronics, Inc.	Bill Jenkins
o Thermal Eagle	*RCSD* (Judy & Jerry Slates)	Byron Rodgers
o JR X388s Radio	MASS Club	Don St Germain
o Infinity 600 Radio	Airtronics, Inc	Brian Smith
o Falcon 550E	*RCSD* (Judy & Jerry Slates)	Lars Ericsson
o Banshee	Slegers International	Roger Yoakum
o Saturn 2.9 T	Layne/Urwyler	Chuck Thomas
o MAP Sailplane	*RCSD* (Judy & Jerry Slates)	Ed White
o Sailplane Fuselage	Viking Models, U.S.A.	Sam Fara

The Mid-South Championships

...by Jerry Slates

I want to thank all the folks at the Mid-South Championships. I had a great time! This was my second year in a row to attend, and I already knew what to expect. I did miss Struts, however!

For those of you that weren't able to attend, this contest was exceptionally well run. The coordination that it took to keep everything running smoothly speaks for itself when there was not a single shoot down as Ron points out in his summary. What he doesn't tell you is that the clubs did a lot of things behind the scenes to help make the contest a success. (Ron kept us well posted on their progress so that we could include information in *RCSD* and, in other cases, we were able to keep others up-to-date.) The database, for example, is amazing. It can quickly output data in several different sorts and formats. The special decals that the folks had made up for the event were beautifully done by David Friant of Washington. The folks also requested Tom Jones to make up the T-shirts, again this year. Tom does beautiful work! He sold out quickly.

Ron was right when he said that he suspected that Tom and I wouldn't get any rest on the way back to Texas. This was David's first major win. After the contest, when Ron sent us the FAX with all the information and scores, David sat right down with the calculator and began double checking to see if he would have to give the trophy back, after all. You see, David was 21st place on Saturday and really didn't think that he had a chance, but he was only 165 points from first place, because the scores were so close. The Saturday scores were much further apart. Of course, when the second FAX came in, David sat right down again to make sure they hadn't changed any numbers! ■

Suffering for Lift

...by Phil Lontz
San Anselmo, California

I was in a deep sleep with dreams of the endless rain that had all but stopped my flying for the last few weeks. Who but Aaron would call at such an hour in the A.M. and say, "Hey Phil, you want to fly Whites Hill today?" I replied, "I don't know. I'm too tired, too cold, too wet, too old for some hair brained trip to some untested fly spot. Sure, I'll go, pick me up in ten or fifteen." What I didn't know was that this was to be one of the BEST flying days I'd ever had. We'd all packed our slope ships, lunches, water bottles and mountain bikes. Did I have my new rubber duckie antenna from Tom Overton? What about extra batteries for my Ultra GP? I had seen White's Hill from a distance in the car and it looked like a true classic. The problem was you could only get to it by bike, with a full hour and a half of riding up, down, up, down through deep mud, over rocks, steep descents, pushing, shoving, pulling, sweaty, cuts, scratches, and scrapes. All this with a slope ship strapped to your back pack. Slope flying sure is gobs of fun...

Our fearless party, including JD*, arrived at

the trail head. We packed our gear on our bikes and started what seemed to be an endless climb to the top of the first of many hills. About half way up the first hill, we could begin to see our destination - a **huge** hill with the most outrageous horseshoe bowl I'd ever seen. The hill itself was 1400 ft high and about a mile across the face. Bruce said, "This just might be the best slope site

in the northern California area." My mind muttered to itself, " It damn well better be after this sadistic abuse of my aching body."

The brothers Remail (hereafter referred to as Bruce and Charlie), Aaron Crocker, and yours truly - the fearful scribe, fly together on a regular basis. I have found their flying skills to be rather advanced and they all have a rather aggressive attitude compared to the passive style of thermal duration flying. So, the search for new and thrilling places to fly is the norm for this group. If the flying is just half as good as getting to it we'll be in for some good sweaty palm stuff.

After an hour we arrived at the base of White's Hill. It loomed high above. We couldn't ride up this hill; we had to push our bikes the whole way. 30 minutes later, sweaty and beat, we were at the top.

White's Hill is located in Marin county on land that is owned by MMWD and The Boy Scouts of America. It is north of the town of Fairfax, California. I would strongly recommend a trail map so you won't get lost. The hill is shaped like a horseshoe, with the open end facing south more or less. The entire bowl is very flyable on a south or west wind. Plus, if the wind is northeast you can fly the slope over looking the town of Fairfax. The slope drops off rather sharply on all sides and is quite steep. The area is clear of "magnetic" trees and has only a few

rocky areas. There is tall grass and plenty of open places for dropping your sloper down for a landing. And, of course, there is mild rotor on the downwind sides. If the wind is light, then you can easily find hot booming thermals. As the day wears on, the wind will shift more to the west.

We got to the top at 12:00 noon and Aaron flew first. He tossed off his battle axe a fine ship called V-MAX PLUS. It by the way is a great ship for back country journeys as the wings and tail feathers are removable. The wind was from the northeast and was very light, but the V-Max was easily up to the challenge as was Mr. Crocker. He flew and we started our lunch. What a sight. Four mud splattered dudes, bikes, planes, and feasting in the hot winter sun of California. This is why I live here. We gobble chow and prepare for flight.

Bruce was busy freeing up the ailerons on his custom sloper; seems some CA had its way with the torque rods. Charlie was busy getting the wings of his new Ultra G.P. adjusted just right. Me, I'm waiting for the air and likewise adjusting the G.P. wings. Aaron sings out, "This is unreal!!!" The lift had specked him out in seconds. The wind did its shift thing, Now it's blowing southwest, the ideal direction. Bruce launches, Aaron launches, Chas and I watch... The whole bowl is up and running and I mean the whole bowl! They could do no wrong. Inside, outside, invert, no matter! Booming slope lift and wind blowing a gentle 9-12 mph. "This is rich," I thought as I gently pushed my G.P. into the lift band. I'm the nervous type, always thinking, "Where am I going to land and how?" (Full scale training?) Found a good spot did a few fly bys and dropped it in. No problem. Relaxed, I launched again. Charlie is ready, he launches his G.P, and it is a terrorist! He knocks off 3 or 4 high speed rolls just to wow the fans. This ship is the fastest rolling thing you have ever seen. Aaron once did 7 rolls in a row with enough speed left over for a full pull, outside loop with a roll thrown in for good measure. Maybe it's the hollow core wings, maybe the SD8000-7003 airfoil, maybe it's just one of those airplanes that comes along and all things conspire to work just right.

We flew all afternoon. The wind was getting stronger and stronger and it topped off at 22 mph out of the west. It's 4 o'clock. We strip down our ships and pack up our gear and prepare for the wildest downhill ride you could imagine.

This, without a doubt, was the steepest downhill ride of my life. Not that it was scary; it was just plain steep. I had visions of going head first over the handlebars landing on my G.P. Fortunately, it didn't happen. We forded 3 or 4 steams on the way down, some up to our waists. "Keep your servos dry boy." ... Crocker, "Stay right. Stay right!" Yeah, right into the deepest part of the river. Thanks, Aaron. I owe you one.

What a day. Home at last, and into the hot tub.... Ahhhh, yes. That's a good day's fly. Hey, Guys! How about tomorrow? (*JD? JESSIE'S DOG!) ■

My Visit to Slegers International

... by Keith Love
Milpitas, California

My business trips seldom take me to the garden spots of the world; as proof of that, my latest one took me to northern New Jersey. Having some extra time on my hands, I thought I might find what I could in the way of supplies for our hobby.

I remembered seeing Ed Slegers' ad, and decided to see how far I would be from Wharton, New Jersey; a quick look in Rand McNally showed that I wouldn't be more than 20 miles away!

When I called, I was lucky enough to have Ed himself answer the phone. We had corresponded at one time in the past, which he remembered; when I asked if he took any visitors, he said simply to call him when I arrived in the area.

I called upon arriving, at which time we discussed several options regarding times that might be best. Based on his recommendations about the local traffic situation, I agreed to visit him the next morning.

It turns out that R/C planes are not his livelihood; motorcycles are! He owns a Honda/Yamaha dealership, which brought back memories from my many years as a Honda mechanic; he had even spent a summer working five miles from where I grew up in Illinois!

After several minutes reminiscing as I watched his service department in action, I introduced myself. As Ed stopped to answer a phone call, he handed me a fiberglass fuselage, saying, "See what they just sent me? This happens all the time..." I was holding the new Avion fuselage from Wright Manufacturing (featured in the June, 1993 issue), and it was every bit as beautiful as claimed.

We then headed upstairs to check out his inventory. Amid the racks of motorcycle parts were other racks holding wings, fuselages, radios, boxes, etc. As he opened box after box, I saw many fine examples from his ever-changing inventory, including planes from Müller, Flite Lite, RnR (their only distributor), and Allen Development, to name but a few. He had a beautiful Ellipse from Czechoslovakia with super machined hardware, X-Altations from Belgium, Freudenthaler planes and actual props (not the Aero-naut copies) from Austria, and the planes I personally fell in love with from M.A.P. of France. He had an Aura 2 with hollow tips and carbon tow showing through the clear finish, set up to be as light weight as possible for competition; Father's Day will be here soon!

He prefers flying to building, which should give you some idea how much flying time he gets in; in fact, he lives next to a 300-acre field, so he doesn't have to travel far. (There aren't any slopes in the area to speak of.)

He subscribes to the theory that "BEC's are actually PEC's Plane Eliminator Circuits!" He is now working on an on-off controller that should sell for $60-$70; rest assured that it will not be available until he is 100% satisfied that it is first-rate.

He has a good price on Airtronics Vision radios; by the time you read this, you will have already seen his sale on all handlaunch kits.

If you plan on visiting, be certain to call first; they don't work on Sundays or Mondays, and those days are reserved for flying. What you'll find is a sailplane enthusiast who sincerely loves our hobby and goes out of his way to help in any way he can. ■

Marc Dufresne - Photo courtesy of Jack Sile (England)

European Chronicles

...by Marc Dufresne

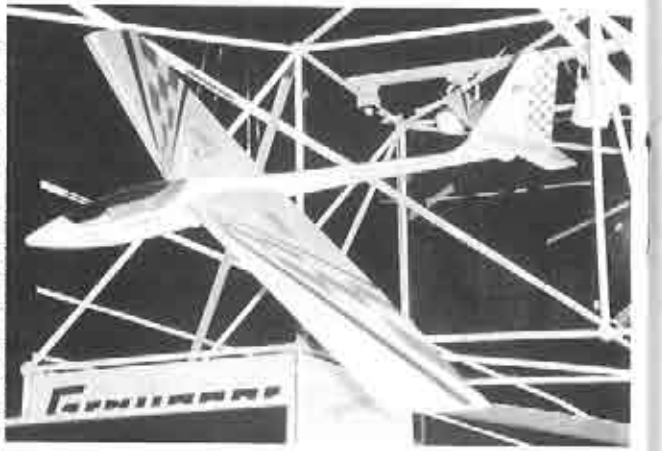
Domaine de Belle Croix
17, rue Albert Camus
77330 OZOIR-La-Ferriere, FRANCE
Tel/FAX: +33 1.64.40.12.24

Sh..SH..SHOWTIME!

I went to my first model trade show: the Paris International Modeling, Scale and Games trade show. Held around Easter every year, it runs for ten days, from 10 am til 7 pm every day, and completely fills one of the seven halls at the Paris Exposition Park. The shows claims to be the largest of its kind in the world and the one with the second highest public attendance in France.

The hall covers 30000 square metres! When I first read that, I thought it was a typo. Nope, the number is right. The photos speak for themselves. So, I got there early on Saturday, having taken the train and metro to avoid the Easter weekend traffic jams out of town. So, I walk out of the metro and it's there: It's huge! It's the size of a stadium and that's just the one hall. Some 250 participants had booths there this year. Besides the obvious ones such as manufacturers, federations and clubs, you also have individual vendors and hobby shops. Also, and suprising for me, I discovered that four museums, the national railway and the national electrical utility were also at the show.

At the entrance, you have 20 turnstiles. Also, at the back of the hall, INSIDE THE SHOW AREA, a fully equipped cafeteria and to one side, two cafes and a bar. This place is built for volume. No wonder, as last year's attendance ran over 190,000 people. Tickets are 55FF. The price of entry includes a 100 page booklet that covers all aspects of the show and of the disciplines on display. In the booklet, you get a quick overview of the show itself, a short description of the various modeling activities with their current orientations as perceived by their respective federations and a series of articles from all the editors of modeling publications in France.



So I walk through and survey the scene. The roof is 25 metres off the ground. The general layout has the demo areas (plane flight ring, train track, car track, boat basin, games area, etc.) around the periphery and the vendors in the center. A walk about, to get the general feeling of the place, left me with the overwhelming impression that scale modeling, in all its forms, was THE favored activity. This impression was later confirmed during an interview with Mr. Philippe David, Editor of *MODELE MAGAZINE*, a leading model airplane publication here in France.

The planes get the prime (and most) turf: right at the entrance. The attention grabbers are the quarter scale models and the flight ring. Also on display are the winners of various national static scale contests. All are well laid out on landscaped platforms 60 cm high.

The flight ring is something else; some 40-50 metres in diameter, it is surrounded by a four metre wire fence topped all the way to the ceiling with netting. In one corner, a simulated control tower, from where the announcer describes the ongoing action. While I was there, I saw demos for U-control, helicopters, peanut scale and lighter than air. Electric and gas. Noise? Yup. Smoke? Yup. Didn't seem to bother anyone. They'd announce the demo and pack 'em 4-5 deep along the fence. The noise served as a wonderful attractant, especially when the U-control speed bombs were doing their thing!

The FFAM booth was right next to the flight ring and a little further on, EOLE. The FFAM had a special area manned by clubs so they can answer specific questions on

the spot. My club, Les Cigognes, went as far as to have an open day at the field the weekend following the show and was issuing invitations to those who came by the booth. Some 80 people followed up on the invitation and a few eventually joined the club. The day that I was there, that section of the booth was manned by a local club that had brought in its youth section to show off their talents. The kids, 10-12 years old were building away and displaying the results as they went along.

EOLE had a very elaborate display on all aspects of glider modeling, from building techniques, scale and competition. All the models on display were on loan from individual members from all over the country. My personal favorite was an all wood 3,75 m KIRBY KITE, built from original plans.

From there, I wandered into the commercial area, drawn by GRAUPNER's neons. Everything was neatly laid out in separate display cases: power packs, radios, motors. Very impressive. Very German. The attention grabber here was a 4m VENTUS equipped with their latest: a retractable power pod. Punch the throttle and the pod pops out and does its thing. Shut down and it hides itself away. From the general layout and products on display, I got a sense that GRAUPNER put its technological prowess forward as its main selling point.

Then onwards to the ROBBE/FUTABA booth. In France, this vendor operates through a distributor. The booth layout, therefore, takes on a more French flavor, i.e. some flair, some clutter. Here the focus is more on scale and scale-like

models. My favorite was a huge 4-5m ASW-22.

In both places, I spent quite a bit of time looking and talking about radios. Since MULTIPLEX was absent, I wandered over to a hobby shop booth. On functionality, they are all equivalent. On looks, I prefer the MULTIPLEX line. For programming ease, the FUTABA seemed to be a bit easier. GRAUPNER comes out as the price/performance leader. I really need to get some hands-on experience for a while to get a better sense of which I would really rather have.

All this wandering had brought me into the core of the show floor. The atmosphere was very much akin to that found in a medieval town market: tightly packed stands, alleys full of people, a buzz of activity. Looking for something particular? a specialized tool? A hard to find part or this rare piece of documentation for your model? No problem, just hunt about. You are likely to find it. Toolmakers, parts makers, model makers, raw materials, suppliers and retailers of all ilk. I had to watch my pocket book. Even by focusing on my most critical needs, I ended up leaving a rather princely sum in various hands along the way.

I went back to the demo areas, to look at other themes. The boat basin was equipped with wind-making machines for the sail boats. There were stands to watch the show. As I came by, a fire boat was ending its demo. Later, I had a look at the innards: pumps, cables, batteries... Mind blowing.

Trains... For the ultimate in scratch building and if you like mechanical complexity, find a guy that's into train modeling, especially steam ones. These guys go after plans of the original device, get their hands on the appropriate raw metal parts (bars, sheets, tubes), head for the machine shop, emerge some (usually long) time later with a miniature replica with all parts working! And that's just for starters, 'cause after that, you got to build the railway, complete with scenery and infrastructure. One display had a computer controlled switching program that allowed three trains to share the same set of tracks.

"Now.. These are a real big seller this year," said he, pointing at a page of his catalog, while a couple of guys let some whistles fly. I had just come to the figurine area of the show and "these" were some very good looking, well rounded

ture and I was thirsty. So, I wandered over to the bar for a beer and a bit of rest. From there, I surveyed the scene and reflected on what I had experienced. Modeling here really means building something to scale. People involved in it take pride in their work and they get rewarded for it. The results are of very high quality and in most cases a complete miniaturized replica of the prototype.

Given that, it helps me understand a bit better some comments and attitudes I run into here. Modeling takes time. Modeling means high skills, and that you have to be ready to build your parts. It also means in-depth background knowledge (science, art, history...). Scratch building is common. It even gets taken a step further by designing your own equipment. Our club VP designed and then about 10 clubs members built a dual frequency Tx/Rx set. Microprocessor based with all the bells and whistles, these sets are as well designed as their commercial equivalent. "It's all part of modeling," was the answer, when I inquired why it was done.

Oh yes, this year's attendance was over 198,000 people! ■

bare breasted female figurines. I did a double take on that one. Being a history freak, I was admiring the handiwork in a neighboring booth showing off war figurines and I had not noticed the activity next door. "Ah well, France, again," I thought to myself. All casual. All relaxed. Anyway - Figurines. Static display and very fine detail work at its best. More closer to sculpting and with results that, in some displays, reproduce well known historical situations.

By now it was late afternoon, my feet were sore, my handbag filled with litera-

Ferdi Galè's Ubara

On the Wing

B²
P.O. Box 975
Olalla, Washington
98359-0975

The pitch stability of tailless planforms is always of concern to the designer. In the case of "plank" planforms, stability is achieved by reflexing the camber line of the airfoil from approximately c = 0.75 to the trailing edge. This change in airfoil contour affects the moment coefficient of the section, and the airfoil is self stabilizing when the coefficient is positive.

Swept 'wings, on the other hand, rely on washout - geometric, aerodynamic, or both - to achieve pitch stability. Four methods of determining the washout angle and twist distribution have been previously explored in this column. It is generally accepted, when speaking of swept tailless planforms, that a combination of more twist and a more forward CG create a more stable aircraft.

Our good friend Dr. Ing. Ferdinando Galè, author of "Tailless Tale," "Structural Dimensioning of Radioguided Aeromodels," and other books, described his experiences with a new tailless design in a recent letter.

"I am enclosing a picture of an experimental tailless I built recently. It is a free flight HLG which was intended to be a 'proof of concept' 'craft... to realize a larger radioguided version later on.

"The lifting area between the two vertical plates has a flat bottom airfoil set at four degrees, while the outboard stabilizing tips are just flat plates set at minus four degrees. The cuspidate tail, a la Horten, has a reflexed trailing edge. The initial idea was to alleviate the burden on the two stabilizing tips. The adjustable elevons, of thin aluminum, had to be set at neutral because Ubara turned out to be ultra stable. The measured glide ratio is about 9:1, which is not bad for such a rough arrangement.

"Now the funny part of the story. After many hand launches, the tips were so damaged that I decided to tear them off before scrapping the model (that is, handing it to a young admirer, son of a neighbor). Then, big surprise! Without the stabilizing tips the model is as stable as with them. The glide path seems to be better, too.

"Perhaps if you mention this experiment in your 'On the 'Wing...' column, some keen readers may offer useful comments and suggestions."

Why did the removal of the wing tips not adversely affect Ubara's flight performance? Was flight performance actually improved, and if so, why? How can this information be productively used in future designs?

Ferdi's experiences with Ubara certainly raise some interesting questions, and we would very much like to hear readers' thoughts. In an effort to gather as much input as possible, we'll send a copy of "On the 'Wing... the book" to the reader submitting the best explanation for Ubara's behavior and a discussion of possible implications for future designs. In addition, the contribution will be printed in this column in a future issue of *RCSD*. All entries must be received by September 30. Mail them to: OT'W Contest, c/o B²Kuhlman, P.O. Box 975, Olalla WA 98359-0975. ■

Understanding Sailplanes

...By Martin Simons

13 Loch Street, Stepney,
South Australia 5069

Flying in Wind & Weather

Slope soaring

So long as the wind blows, on the windward side of any hill, ridge or even building, there will be an upcurrent. The air cannot pass through the obstruction and although it may try to spread out sideways to get round it, this is only partly successful. Extended hill faces or ridges aligned across the wind, or even long rows of houses closely packed, produce large areas of upward moving air. Even if the wind is not directly at right angles to the slope, it nevertheless moves up and over slantwise, so some upward motion is present, but if the angle at which the wind approaches the slope is too fine, even though there will be some lift, it may be too weak for soaring. An oblique approach to a slope is gentler as anyone knows who has found it easier to climb a hill by taking a slanting path rather than trying to go straight up. Even with a hill of conical shape, some air will flow up and over the top. The area of upcurrent produced will be small in such a case.

So long as the upward component of the airflow is greater than the sinking speed, it will take a glider up and the pilot's concern is then to keep the sailplane flying in the 'lift'. The disturbance of the flow normally dies out with altitude. For a particular slope, wind strength and sailplane, there will therefore be some level at which no further gain of height is possible. Also, flight too far ahead of the slope or too far on the downwind side of it will enter areas of weaker upcurrent and reduce the altitude attainable.

The area of best 'lift' for slope soaring is upwind of the slope (Figure 37). Low down the strongest upcurrent is often found close to the hill, but not too close. The wind gradient effect, discussed in previous articles, operates on sloping ground just as much as on the flat. Flying too near the slope low down may find a sailplane in relatively 'dead' air. As height is gained the model may be flown further forward and still climb. It is surprising sometimes how far out in front of a hill the lift extends.

Suitable slopes

The size of the hill required to soar a model glider is not great. It is not necessary to have a very steep slope or a very strong wind. Seagulls and other soaring birds are good indicators of soaring conditions and where they can soar over slopes, models can do the same. In full-sized gliding, hills and sand dunes no more than 100 feet high have been used. (The famous ridge at Dunstable in England is about 200 feet high and gives lift up to about 600 feet above the top in a moderate breeze.) Scaling these dimensions down it is evident that a slope of only 30 ft, if facing the wind, may be very satisfactory for models. Few measurements are available but slopes of 20 degrees can provide ample lift if they are facing the wind and are relatively smooth and free from obstructions. The smoothness of the slope and its relationship to the wind are factors more critical than either the steepness or the total vertical height. Since humans are rather small and hills are large, we tend always to exaggerate angles in the vertical plane. Diagrams like Figure 37, which look about right, are invariably greatly expanded in the vertical scale. As a guide to the realities, a gradient of two in three (two up for three along), so steep that many people would find it hard to climb without using their hands to keep balance, is a slope of under 34 degrees which is much flatter than most people guess when asked. Anything steeper than this becomes a regular scramble to climb.

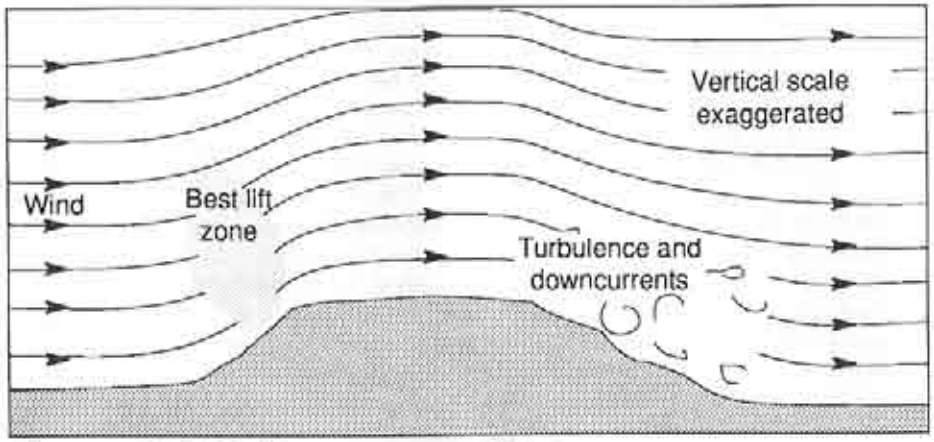


Figure 37 Airflow over a ridge

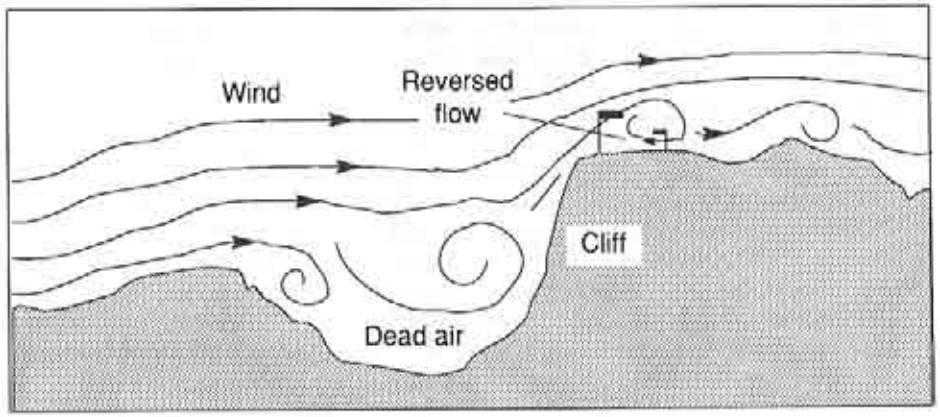


Figure 38 Airflow over rough country

Slopes more than 45 degrees require ropes and belaying for safety.

Imagine standing upright facing a slope and extending both hands horizontally forward. If the finger tips touch the slope, the angle is about 60 degrees. Truly vertical cliffs are quite rare away from the sea coasts and their height is usually much less than imagined by people looking at them. There may, of course, be cliff-like rocky outcrops on otherwise gentler hillsides, but when measured it is surprising how often these turn out to be less steep than first estimates suggest.

Isolated trees and crags do not seem to make much difference to the lift generally, despite their disturbing effects in their immediate neighbourhood. If the face of a slope is severely broken up it will produce turbulence low down, although the general airflow high up remains smooth. Soaring over densely wooded hillsides is perfectly possible although there are obvious hazards in getting too low in such situations. The built up sea wall at a holiday resort, or a sand dune, can produce enough 'lift' for

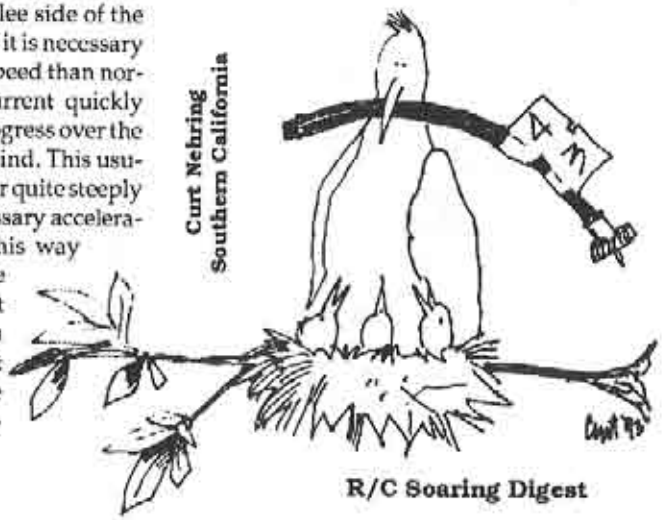
a small glider. Even a row of terraced houses or a long shed may be sufficient if conditions are right. Public safety must, of course, be considered. (If a building is as large as an airship hangar, slope soaring even a full sized sailplane becomes feasible over such an obstruction. This has been done.) With a light model it is occasionally even possible to soar on the windward side of a dense row of trees or the edge of a forest, although the lift in such a location is never very strong. Much of the air escapes through the branches but there may be just enough 'lift' sometimes.

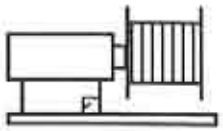
Leeside

On the leeward slopes of a hill, the air inclines downward and, if the slope is steep, there may also be flow separation with resulting turbulence, equivalent to 'white water' in a river. Flight in these areas is to be avoided if possible and if the dangerous area is entered accidentally the model should be trimmed for higher speed to ensure adequate control. The additional airspeed will also allow the model to penetrate quickly through the bad regions and enter smoother air. The most common cause of trouble of this kind is when a model which has been soaring upwind of a slope is allowed to drift back too far. If it is permitted to wallow about slowly in the sinking air, it will probably flop out of control somewhere out of sight on the lee side of the hill. To regain the slope lift it is necessary to trim for much greater speed than normal to leave the downcurrent quickly and also to make rapid progress over the ground despite the head wind. This usually means diving the glider quite steeply at first to achieve the necessary acceleration. The height lost in this way will be regained once the model has reached the front of the slope again. When landing on top of the hill, it is better to abbreviate the circuit rather than allowing the model to fly a long way downwind before turning to make the final approach. An overshoot is preferable to an undershoot since if the landing is missed the model may be flown forward again into the upcurrent and a second attempt made.

Where the country is generally rough, a slope which otherwise looks promising may prove disappointing for soaring (Figure 38). Instead of following the contours of the ground smoothly, the flow tends to be broken up and separated. In valleys between hills the air often lies stagnant or 'dead', so a good slope may be partly or wholly 'blanketed' by the lee sides of other hills upwind. This is especially likely if the air in the valley is cool, since the upper wind may blow across it, rather than going down into the hollow and rising up the other side. The effective height of the soaring slope is much reduced when this happens even though the model fliers standing on the top feel quite a good breeze.

With unusually steep slopes and cliffs, as suggested in the diagram, rotating vortices are common both below the top on the windward side, and behind the crest. A famous photograph was once published showing two windsocks a few metres apart, as sketched, blowing in opposite directions. Between the two was a small area of dead calm. To land a model glider in such a place is hazardous. ■





Winch Line ...by Gordon Jones

Gordon Jones, 214 Sunflower Drive, Garland, Texas 75041; (214) 840-8116 After 5:00 P.M. CST

Servo Trays

Servo trays serve a couple of functions in addition to holding the servos; they strengthen the front of the fuselage, and hold accessories such as the ON/OFF switch and canopy attaching devices. The design of the plywood tray has been given little thought in most instances, other than a place to hold the servos. The servo tray when properly designed or strengthened can provide a great deal of strength to the nose of the fuselage. In fact, some designs use the servo tray to strengthen the fuselage.

When constructing a servo tray, if none is provided in the kit or you are scratch building your own design, a template can be made using the top view on the plans. This template can be made from paper, cut out and custom fit to your fuselage. This gives the builder a closer fit and alleviates using several pieces of plywood to accomplish the same goal. Another advantage in making a template is having one for building another of the same plane.

If you use the "standard" 1/8" plywood tray that comes with most kits, it is a good idea to strengthen the tray where the servos are mounted. Other than using a thicker material, the easiest way to add some beef to the tray is to cut some hardwood rails and fit them to the bottom of the tray at the screw locations. Cut enough pieces of say 1/8"x3/8" hardwood (spruce or bass work well) to fit across the tray from one side to the other. This will not only provide more meat for the servo screws but it will also add some lateral rigidity to the whole tray.

Another method of strengthening the servo tray, and the front of the fuselage is to fiberglass the tray to the fuselage. This really adds a great deal of strength and will help hold the servo tray in place during a "lawn dart" landing. Glassing the tray in is not difficult and for those who have not worked with fiberglass it will provide an easy way to learn to use fiberglass cloth.

To glass in the servo tray, install the tray in the fuselage with microballoons and epoxy. Before the adhesive dries, scrape gently along the edges next to the fuselage removing the excess. When the tray is dry, measure a piece of fiberglass (3 oz. cloth works real well) so that it fits the servo tray and extends up the sides of the fuselage approximately 1/2 inch. Mix about one ounce of epoxy resin (you can use regular epoxy for this as well, but it is a lot thicker), then brush a light coat of resin on the servo tray and fuselage sides up a little further than the cloth will reach.

Lay the fiberglass cloth down on the wet resin trying to get it fit on the tray first. When the cloth is on the tray about right, use the brush to brush the cloth along the fuselage sides and brush the sides in place. Move the cloth carefully until you are satisfied with the fit on the tray and fuse sides. Next, brush a little more resin on the cloth to make sure you have really "wet" out the cloth. You may need to use the brush to tamp the corners where the tray and sides meet to get a good fit.

When the resin has dried (usually 24 hours) cut out the cloth over the servo holes, switch hole and any other slots in the servo tray with a razor blade or X-acto knife. Lightly sand the edges of the holes/slots with 220 grit paper to smooth off the edges and you are done.

You have just strengthened the front of the fuselage and provided a solid mount for your servos. If you have any other ways or ideas, let me know. ■

5 year old Matt Stump with HL Blitz & X-388s Tx at his feet.

Hand Launch BLITZ

Designed by Tom Siler
...Reviewed by Mike Stump
Cadillac, Michigan

I first saw the HL Blitz at the 1991 AMA NATS in Vincennes, Indiana. The version flown then, I believe, was Tom's first or second prototype and was impressive by its high launches, and ability to cover lots of air quickly. The physical resemblance of the wing planform to the popular Falcons, along with the T-tail, drew lots of interest.

In seeing a newer version Tom had built in the static display at the Toledo show in 1992, I convinced myself I had to try one. The kit version I got from Tom is called "Blitz HL4" meaning it is version 4 because, like most active modeler / tinkerers, he has been tweaking the design with each new prototype.

Wing span is HL maximum 59" with a wing area of 390 sq. inches. Projected weight is 14 - 16 ounces using two micro servos. The airfoil is the SD-7032. This airfoil is not often used on HL sailplanes, but in this case seems to work well. I also got a set of S-3021 cores from Tom and have since cut a set of E-387 cores.

The wing cores supplied with the kit were of pink foam and were very well done although not in full size beds. It will be interesting to see if the E-387 cores which were done in virgin white foam will be any lighter. Stab construction is a 1/8" x 1/4" balsa frame and the stabs are full flying (instead of stab/elev.) driven by a 1/32 sullivan cable. The weight of the SD-7032 version built by me was 17.6 ounces, slightly higher than projected weight but still yielding a 6.5 oz. per sq. ft. wing loading.

Wing Construction

The wings were built first and they go together quickly. Mine were sheeted with 1/32 balsa vacuum bagged with my EZ-Vac system and EZ-Lam epoxy. The only things necessary other than basic core preparation is to bury the housings for 1/32 sullivan cable which drives the full span ailerons in the foam, and to cut a slot for the 1/16 ply joiner at the root end of the main panels. (The joiner in the kit extends almost 5" into each panel. I cut mine down to 1.5" to save weight and pose less margin for error in aligning the panels after sheeting, as the joiner is installed when the panels are joined.) The tip panels are butt glued to the main panels for sheeting, then cut away and sanded to the proper angle and re-glued.

The rest of the wing construction is fairly straightforward for foam wings. Cut the ailerons away and face both the wing panel and the control surface. After joining the main panels and tip panels, I reinforced all joints with a 1" wide strip of 1 oz. glass cloth and thinned epoxy. Install the wing to fuse mounting system and that's it. Cover the wings with your favorite covering and hinge the controls and the wings are done.

Fuselage & Stab

The kit is supplied with fuselage sides of 1/8" balsa with a unique, built up, hollow canopy. The stab and rudder are built from 3/16" x 1/4" stock. The fin uses 1/8" x 1/4" for an internal framework and is sheeted with 1/32" balsa for additional strength to support the T-tail. Aluminum tubing is supplied for the receiver tubes in the stab and the pivot

The reason some of my hobby hours are changing. 8 year old Michael Stump is working on his first sailplane - a Carl Goldberg Sophisticated Lady!

tube in the fin. This seems to be fine for the receiver tubes, but I had trouble with the epoxy bond in the fin for the pivot tube not holding. I have since replaced this with the same size brass tube with no difficulties.

Construction of an all wood fuselage such as this should be no problem for most anyone that has a kit or two under their belt. I kept the 1/8" sides for patterns and built my fuselage with 1/16" balsa using a 1/64th ply doubler from the leading edge forward. This probably ends up at about the same weight as the thicker side, but with cores for several I wanted to experiment with a couple different methods of construction.

Both the rudder and stab are driven from the servo by 1/32" sullivan cable. The rudder is run from the same servo which controls the ailerons which brings the servo count down to two. Both servos are placed in the front fuselage section for easy access in hooking up the aileron linkage. The control linkage arrangement for aileron and rudder works similar to those used in the 3-channel set up common to Dodgson Designs sailplanes (Pixy and Camano). Also, in the front compartment is the battery pack.

The receiver goes in the compartment under the wing which also has room for a small ballast box if you wish. Before moving on with radio installation, the fuse, stab, wing, and rudder were covered with monokote. Tape hinges can be used if you wish. I opted for the classic Monokote hinge.

Rather than using a tube for the Rx antenna, I pulled it through the fuselage from the rear saving the weight of a tube in the tail boom. To do this I drilled a very small hole in the bottom of the fin post. I then insert a .015" music wire up into the compartment under the wing. There are two ways I have found to attach the antenna to this wire to pull it back. If you pull the insulation toward the end of the antenna like you would when trying to straighten a new antenna, you will notice that the insulation will often stretch past the end of the wire. Simply insert the music wire in the end wire cover and gently pull antenna back through the fuse. If all else fails, a very small drop of CA hardened with accelerator will hold the antenna to the music wire. I've found this very effective in getting that uncooperative antenna to go down a tube in a fuselage, as well.

The radio system used for the Blitz was my new X-388S from JR although this plane can be flown using the 2-servo arrangement with virtually any radio using mini or micro gear. I use the 341 servos from JR for both functions. They're very tight around center and light at just over .6 ounces. The battery is a 125 mah portable phone 4-cell pack purchased at Radio Shack for about $12.00. I used the new 649S receiver from JR which is very compact for a 9 channel PCM Receiver and weighs just 1 ounce. It fit neatly under the wing packed in foam, still

leaving room for ballast if I should ever need it.

The X-388S and X-347 transmitters are great for hand launch if you're like me and try to run all over the field chasing thermals. The transmitter is light weight and durable, as well. (Mine have passed the oops test more than once.)

Flying

After waiting several days for the spring winds of Northern Michigan to quit blowing, it calmed down to a reasonable 15-20 mph and it was time for test flights. The first thing I learned was that with a hand launch sailplane using a flying stab, it's important to use a conservative CG setting for initial flights. With the acceleration of a hard through plane with a rearward CG may have a tendency to tuck. A couple pieces of lead later I found the Blitz much more manageable on launch and a lot easier to keep in the groove while turning.

Several days later with much better conditions of light and variable winds I got a chance to really check the Blitz out. For the 17.6 oz. weight the launches were excellent with a very steep climb and plenty of stab control to round over at the top. While still not totally in touch with the way this plane flies due to lack of stick time, I was able to find a couple batches of lift at pretty low altitudes and work some 2-3 minute flights. I have yet to work the real tight circles as I've been able to do with the Vertigo and Orbiter, but given time I'm sure the Blitz will be capable of the same.

I still have a lot of adjusting to do as far as fine tuning the CG and control throws. Another thing I haven't tried yet is to turbulate the airfoil as is often common with the SD-7032 and E-214. This may make quite a difference considering the low Reynolds numbers and light wing loading.

In summary, this HL airplane appears to have great potential. As I finish up the versions using the other airfoils (S-3021 & E-387), I'll be sure to pass along information on how they fare. From the few times it's been flown, with the launches and versatility in handling combined with the clean lines that allow it to move out or penetrate, I'm looking forward to a lot of fun from this design. I've caught the hand launch sailplane bug for sure now (I have 6 different HL models.), and have found virtually every flying session to be a learning experience.

You can contact Tom Siler for information on the HL Blitz. His address is: 5717 Shannon Place Lane, Dublin, OH 43017. Tom's phone is (614) 766-4283. ■

Blitz & X-388s ready for test flights.

Notes from a First Time Glider CD

...by Jim Reith
Southbridge, Massachusetts

Since I started flying in the early 70s, I've always tried to set a goal for what I hoped to accomplish each trip to the field. In the early years it started with returning home with a repairable plane, then an undamaged plane and finally I got into specific tasks like landing on the runway. I took a few years off while starting my family and got back into it in 1988. Suddenly, there were clubs around and people who knew how to fly well and new things to master. Soon, I was hooked again and spending much of my time involved in airplanes. Some of the people from work started flying at lunch and we found a local field where we could fly 2 meter and handlaunch gliders. My first proportional plane had been a Graupner Amigo II with an .049 power pod and I really enjoyed flying it around. I got back into gliders with this lunchtime group and we started working with each other to help ourselves improve. It was a great way to relax in the middle of the work day. Soon, we were "competing" amongst ourselves and during 1991 we decided to go to some of the local glider contests to see how good we really were. We had a ball but many of the contests were 2-3 hours drive away. The 1992 Nats came out to our section of the country and we decided to try our hand at it. One of the local power clubs had a small group that flew gliders in the morning before the club fun-flys. This club also sanctioned an open contest once a year. This past winter I was asked if I'd be willing to take it over and I said, "Sure!" This article is a recount of my experiences and things that I would recommend people put time into if they want to have a successful contest.

Since I had been competing for a few years and had been to several contests that I liked (and a few I thought had problems), I had some specific goals that I wanted to reach. The first thing that I want people to remember is that regardless of what you do, Murphy will be your co-CD. The most successful way to get a contest going is to plan ahead for eventualities and not let Murphy surprise you. My first brush with Murphy was when the sanctioning forms were submitted. The AMA was moving so the forms came back later than expected. We had a "committee" to write the letters to places for prize donations and they wanted to include a copy of the sanctioning form with the letters. The committee decided that this was the year to update the letters. This further delayed the letters going out so by the time the early season glider contest came around, few glider relevant prizes were available. This caused me to go out and buy some prizes to fill in the gaps. I found all this out when I checked on the prizes with two weeks to the contest date, I managed to get a few manufacturers to send me gift certificates so we had some prizes. *Point 1: make sure your prizes are in order while you still have enough time to do something about it. Better yet, handle the donation requests yourself. After all, Murphy will be sure to be on the committee.*

Another consideration was the award plaques. I had incorrectly assumed that the prize committee had also taken care of that so I had to put in a rush order and was pleased to receive the plaques Friday before the contest weekend. When you fill out your sanctioning forms, you need to decide what type of contest you want to hold. Since our field is a small power field, we have problems and can only run two winches at a time. In past years we have used sport winches and the launches have been anemic. I managed to line up several winches for the contest and luckily we had enough for what we needed. I also set out to find retrievers to use. There was one in the

club and another was promised by one of the non-local people that called for directions. (Murphy heard the call.) With only two winches to run and two retrievers available, I declined an offer of a dirt bike to pull chutes. We have a less than perfect winch area so we had several line snags and breaks. This was helped by having several winches lined up. Point 2: *Never refuse equipment that can help out at the contest. Duplicate equipment isn't extra, it's backup.*

Since this is mostly a power club and doesn't have standard winch paths laid out, the winch area is mown the week before the contest. Murphy handled this task for me as well and I got a call late Friday night that I needed to be at the field with the payment for the mower to have the field done. *Point 3: If you need custom cutting done at the field, get it done early in the week. In the future I'll have it done the weekend before and then go out the day before the contest and personally touch it up as needed.*

In previous years, our winchmaster has been down at the winch area for most of the day and gotten pretty sunburned. Remember that these people are volunteers and make sure they have everything that they need. This year we set up a canopy at the winch area so they could get out of the sun. I thought of having a small cooler for sodas after the contest and will provide that next year since our launch area is away from the main CD/impound area due to our field setup. We also had a pair of canopies at the impound/CD area. The impound was covered to shade the equipment. This worked out well but for the wrong reason. See, it seems Murphy knew the weather gods and while we had little wind, we had a pretty consistent drizzle during sections of the contest. The canopies provided refuge and kept the equipment dry. Another thing to consider is staff. Running just about any size contest is something that can't be done alone. I was fortunate to get some power fliers to come out and help run the contest. I also had help from my family and the more hands you have, the smoother things go. The best thing to do is to delegate everything and then you can handle the little emergencies that WILL come up during the day. Minimum staff I'd recommend is a winchmaster, score tabulator and impound person. Doubling up on these positions allows people to take a break. Your job as CD is to make sure that things keep moving and help out in the bottle necks. Even though it is tempting to take one of these jobs yourself, resist the impulse. You'll be busy enough filling in the gaps when the unexpected things happen. Nothing is more boring for your contestants than waiting. *Point 4: Get a commitment from people to work the contest and verify that they can as the date approaches. Have extra people scheduled and assign tasks the morning of the contest. Even people that can only stop by for a few hours can help out and give people a break. The more people you get to help out, the smoother things will run.*

When the contest day arrives, get to the field early to set up. I made signs to post on the access roads so contestants not familiar with the field could find it. This worked out well and we actually had spectators for the first time. Try to have some of your helpers there to help set out the winches and set up registration. When people start to arrive, start processing registrations so it doesn't backlog. Figure out how you're going to do the scoring for the rounds and have the forms made up ahead of time. Have twice as many forms as you'll need and leave plenty of room on any you make so you can read the scratchings you will find on them later. Have plenty of pens or pencils so people can fill out the forms and do the individual flight scoring. Keep all the score sheets that get turned in in case you need to go back and settle a dispute in scoring. Have the timer for the flight put his/her initials on the scoring chit. Most people that come to thermal duration contests have a stopwatch with them but it never hurts to have a few extra available in case someone needs a timer. *Point 5: Figure out what you need for signs, fliers, scoring sheets and get them made up and copied well in advance.*

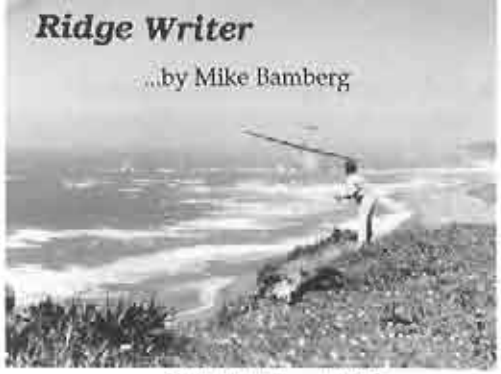
The most important time of the contest for the CD is the pilot's meeting. At the beginning of the contest you should determine the tasks (sometimes you need to change this based on the day's weather) and let the pilots know. You also need to tell any visiting pilots any special rules for the field you are using. Make sure that they know the scoring system you are using and what needs to be entered on the scoring chits. Make it clear that it is the pilot's responsibility to verify the timer entered the proper information on the chit BEFORE it is turned in to the scorekeeper. Make sure your scorekeeper understands how you want the scores tabulated. Too many times I have seen times entered as 5:23 only to have the scorekeeper enter it as 523 points. Remember the minutes are only 60 points (if you use the point per second system). *Point 6: Have a set of notes to read at the pilot's meeting so you don't forget any points. It is difficult to clarify rules once the contest has started. Always ask if there are any questions once you're done.*

At the end of the day when you are done with your flying and need to get things in order for the awards ceremony, try to have something to occupy the contestants while you do the necessary preparation. What we have found is that several contestants bring HLGs to fly at this time so we've actually organized a HLG event to fly during final standings calculations. This has worked out well and with a format of 5 tosses in a 10 minute window with a group of 4-8 pilots (Depending on frequency conflicts, you should try to keep the groups uniform in size.), we've had a good time both flying and spectating these events. Make sure to thank all the helpers as often as possible and get out there and have a ball. *Final point: Double check the scoring sheets to make sure that the awards are given to the proper people. Once you hand them out it's difficult to correct mistakes.*

Don't be afraid to volunteer to run a contest. Small club events are the easiest and most forgiving to run but the bigger contests aren't much different. Once you get a list of things to get done (as this article outlines) you can expand your helpers to cover any size contest. The best way to improve local contests is to hold one and get yourself involved. If you have any additional suggestions to pass along, please drop me a line as I'm still hoping to CD the ultimate contest for the fliers in my area. You can contact me, Jim Reith, at P.O. Box 863, Southbridge, MA 01550. ■

Ridge Writer

...by Mike Bamberg



1059 NW Darnielle St.
Hillsboro, Oregon 97124, (503) 640-5926

Slope Scene

It's been an interesting two months since my last column. My job at the flight school has really taken off (pun intended). I've instructed over 100 flight hours in less than 6 weeks. Needless to say I've been busy and the model flying has suffered. This month I was able to get some pictures in the column. The first is yours truly launching my RnR Genesis. Yah, I know this is a slope column, but boy I love that plane.

The next picture is of Rolf Zurcher's light air slope racer. It only weighs about 10 lbs, has a 12 foot wing span, all glass flying surfaces and all flying rudder. Rolf is into glass bagging in a big way. He has developed a few interesting techniques for building and coloring glass wings that I'll get more info about and share next column.

The first week-end I've had off lately was the first slope race of the summer season. We had great winds about 25 MPH but very gusty. The racing was fun but I want to talk about the planes that didn't finish, or in some cases didn't start.

We had our share of folded wings and blown stabs. All of the planes being flown were foam sheeted with balsa, obechi, or 1/64 ply (and Rolf's glass wonder # 120-something). Two of the planes that failed were rotating wing designs, one a full pitcheron, the other a wingeron (roll control only). Both failed during steep descents, one while diving to start a race the other while descending to a better position for landing. Both planes were recovered with minor damage to the fuselage and other parts so that some post-mortem could be attempted. I don't think it all that important to particularly identify the model or manufacturer, but I think we ought to look at the potential problems associated with the rotating wing concept. By the way, we had other failures that day due to radio problems and one fly-away due to vision problems and inattention, but no other problems that can be attributed to flight loads alone as I believe these are. We also had other wingeron planes flying that experienced no problems. In fact, one posted the fastest time for the day.

Both planes that failed had compression fractures on the bottom and top of the wing in the area near the end of the pivot/wing joiner rod. One aspect unique to the rotating wing designs is that by nature there is only one wing support rod. This really concentrates the loads to the area of the wing at the root where the rod first enters the wing and the rod end which must be supported in the wing structure out about 4 to 8 inches depending on wing and rod size. I don't know for sure, but I think some manufacturers limit the rod length to reduce the area of friction and allow the wing to pivot easier. There are other arguments for differences in length, but I digress. In any case the two planes that folded their wings at the race had relatively short rods. The structure in the wing to support the out-board ends of the rods was non-existent in one case and very minimal in the other. No spar structure extended past the rods except wing sheeting in either case and in one case the rod supports did not even extend under the sheeting. (The rod support system was not capped by the wing sheeting.) Now, I'll admit that one of the ships was mine. I've flown it for a little over a year and

Winch Launch

Slope launch of Polyhedral plane

Model line-up

don't normally fly it in wind this strong or gusts like we had that day. I built it strictly according to plan and had great fun flying it. I'm sure that the wing was not damaged in any way at the start of flying. (I do a pre-flight inspection, after all I am a flight instructor and have to do it right.) The wings flapped a few times in gusts before the failure occurred, and it didn't look like anything unusual for the conditions.

One other non-rotating wing design which did not fail in flight was withdrawn from the race when the owner found compression cracks on the bottom surface after one of the flights. That particular plane was a 2 meter one piece wing design, also balsa over foam with glass reinforcement in the center out about 1/3 of the span and 3/4 oz. glass over all. It had an all up weight, at the time, of about 5 Lbs.

The real issues here I believe is the structures required to support this type of wing/control system and the flight loads that are present in very gusty conditions regardless of the wing and control system. I don't know that we appreciate the stresses involved. In the thermal duration environment there are also extreme loads such as during winch launch and in turbulent thermals even

with lightly loaded ships. Perhaps one of you engineer types could write an article for the magazine explain the loads I'm talking about in quantitative terms. If I get another rotating wing ship any time soon you can be sure that I will study the wing rod system carefully and make some serious modifications if I think the structure requires it. I'll also think twice about throwing my favorite ship off the hill in real gusty conditions.

To finish up the column this month I have a picture of some of the models being prepared for our last winter race. I'm proud to say that there were 4 ODR1 variants present including the factory demo ship and a highly modified swept-wing version you can see in the foreground. Also, you will find, on close inspection, a VS V-Max and a SIG Samuri tip-to-tip just left of center. The Anabat combat didn't race (in fact, no one did that day), but we had fun flying it. And on the far left my favorite light air sloper, an RnR Genesis. Boy, I love that plane.

Have fun,
just watch out for the gusts. ■

Finishing Obechi Wings

This month I am going to get away from electrics and talk about finishing obechi wings. In the last few years, it seems that almost all the manufacturers of high performance electric and non-electric gliders have gone to covering either white, blue, or gray foam with obechi. Other woods have been used, but they were either too heavy or too expensive, or too hard to get in quantities that kit manufacturers needed. Obechi, on the other hand, is light, relatively inexpensive, and easy to obtain. Two good sources for obechi are Dave's Wood Products and Kennedy Composites. A unique product that Kennedy Composites offers is black obechi. The disadvantage of obechi as a covering material is that obechi is very open grained making it difficult to get a good finish.

Over the years, one of the questions I am most asked is how to finish obechi wings. There are two types of finishes when doing obechi. One is to "get the plane in the air quickly finish" and the other is the "show finish".

Let's assume you have a set of obechi covered wing cores that you either bagged or were already covered by the kit manufacturer. The next step is usually to install the leading edge tip blocks and cap off the flaps and ailerons. When doing this, use only white wood glue and do not use a CA glue. I do not know the reason, but in time the obechi will turn very yellow wherever CA was used, making for a discolored wing. Also, try to keep your hands clean because the oil from your skin will also leave very bright yellow spots. Once the wing has been sanded, remove ALL the dust. I use a compressor to blow off the dust. If you do not have access to a compressor, use a vacuum. Either way, try to remove all the dust remembering that obechi is very porous, so that there will be lots of dust in the grain of the wood. If you do not take time doing this, your finished wing will look like sandpaper.

Back to sanding for a second. I have found that the small palm sanders with 400 grit paper does a very good job.

The next step is to apply a finish to your wing. If you want to just seal the wood against moisture, two or three coats will do. There are two types of clear finish. One is a solvent base and the other is a water base. The solvent base is not generally used. It is best applied with a compressor and spray gun, takes a longer time to dry than the water base, and if applied too wet, can soak through the obechi and dissolve the foam underneath. For these reasons, I avoid the solvent base and use the water base, instead. The two products that I've had the best results with, and I believe are available nationally in paint and hardware stores, are MinWax Polycrylic Clear Gloss and Flecto Varathane Diamond Finish.

Apply the clear with a paper towel. (I use Scott's which is very lint free.) Some people have told me that they use a foam brush and I'm sure that would work well, but I have found that a paper towel, dipped in clear and wiped over the entire panel works well. Apply one coat over the entire panel and let dry for about an hour. When dry, sand lightly with 400 grit paper and wipe off the excess dust. Do this for three or four coats, and you are finished. Remember, this is the "get it in the air quickly finish". You will still see the grain and there will not be much of a gloss, but the wing will be sealed adequately from the elements.

To get a really super high gloss finish that would be similar to that of a piano or guitar does not come easy. The process takes many hours and adds a little weight to the plane, but the end result will be stunning.

The first and most time consuming process is to fill the grain of the obechi. The best way to do this is to use the West Systems Epoxy. With the West System, I also use the slow hardener to give me more working time. Mix up the epoxy per the instructions and, with an old credit card or something similar, spread the epoxy over the entire panel, making sure to scrape off all the excess epoxy. When you are finished, you should not see any trace of epoxy. What you are trying to accomplish is to fill the grain and not put a layer on top of the wood. Also, this will make your job of sanding the panel much easier. Do only the top of the wing panel, the top of the ailerons and the top of the flaps at this time. Let everything dry for at least 24 hours. Then, lightly sand the panels using 400 grit paper. Next, epoxy and remove all the excess from the bottoms of the wing panels, flaps and ailerons. Let this dry for 24 hours and sand. Then, repeat the entire process. What you will wind up with is two coats of epoxy to seal the grain of the wood. In very rare occasions, and you can tell by holding the wing panel up to a light, you will still see some grain. If this is the case, you will need a third coat.

As I said, a good finish takes a lot of time. When you are satisfied that all the parts are sealed and sanded, put on a coat of clear gloss with a paper towel. Let this dry over night. Then, lightly sand this coat with 400 grit paper. Repeat this step at least two or three times. After the fourth or fifth coat has dried, sand with 400 grit WET. I usually do this for two coats. The last coat should be applied very thin. When this has dried, I rub the coat out with steel wool grade 000. After this, apply a coat of wood wax and buff out. All of this takes a lot of time, many hours, or days of which is letting your parts dry. But, I know of no better way. If any of you know of a more efficient procedure, please let us know.

Good Flying! ■

Programming the JR X-347 Computer Radio

...by Sherman L. Knight
Bellevue, Washington

Computer Radios: If you like gadgets, you've got to have one of these. Their flexibility shortens construction time (simplifies control mechanisms) and the flight trimming that used to take all summer can now be done in a couple of days.

I spent an extensive amount of time reviewing the Ace Micropro 8000, the Airtronics Vision 8SP, the JR x-347 and the Futuba Super7. The Ace and the JR provide the most flexible programming. The template method of programming reduces the flexibility of the Airtronics Vision. However, there is a template available for every type of sailplane imaginable. The Futuba is restricted by limited programming and lack of dedicated mixing functions. I finally purchased the JR X-347 because it fit my small hands better and no one else in the local club owned one.

Almost immediately after I purchased the radio, I began to hear rumors that the JR would not allow you to place the flaps on the throttle stick. However, I quickly discovered these rumors were not only false, but the JR radio allowed an incredible amount of programming freedom. The JR radio easily provides all of the programming necessary for a full function competition sailplane.

Programming the JR is complicated by the fact that there may often be more than one way in which to accomplish the same result. Although more than one means may be available, it is important to select and use only one method to accomplish your objective. Otherwise, programming functions may be in conflict. The purpose of this article is to provide help in programming the JR for use in a six servo full function sailplane. It is important to realize that this is only one of many methods to accomplish the objectives below. If you disagree with my methods or you have found one that is better, please let me know what they are for use in a future article.

This article also assumes you own a JR x-347, have the manual handy and are familiar with the six programming functions across the face of the radio. The page numbers referenced in the article are the page numbers found in the manual.

The transmitter has two separate programming modes. These are the system setting mode and the function setting mode. Although the system setting mode comes at the end of the instruction manual, you must first set the system settings prior to the function settings. If you program the function settings first and then install the system settings second, it may result in wiping out your programming and returning to the system defaults.

System Setting Mode:

You enter the system setting mode by pressing and holding down the up and down buttons on the face of the transmitter and then turning the transmitter on. Once in the system setting mode, you need to name the aircraft (page 107), Select Aircraft Type, glider, (page 109), Inhibit V-Tail Mixing, (page 110) and Activate Dual Flap Mixing, (page 110). Then touch the up and down buttons simultaneously to exit the system settings.

Function Setting Mode:

After turning the radio on, touch the up and down buttons simultaneously to enter the function setting mode. You have now entered the section of the program that allows you to program and mix each servo in the airplane.

First, place the servos in the wing so that arm-side of the servo faces the wing tip. If you plan to use the dedicated aileron differential mixing (which I strongly recommend), you need to reverse the aileron and flap servo connections. For some reason, the left and right aileron and left and right flap are labeled backwards in the instruction manual. Don't worry, it is easy to fix. Simply plug the left aileron into the right aileron socket on the receiver. Plug the left aileron into the right socket. Perform the same reversing for the flap servos. Now, check and make sure that all of the servos are working in the right direction relative to the stick movement. (At this stage of programming, you should have control over your aileron's, elevator and rudder.) Flaps will come later. To reverse a servo, push the up or down button until you enter the function mode identified on the screen as "Reverse SW" (page 87). Then press the CH key until you find the servo you need to reverse. Once there, touch the plus or minus keys to reverse the servo. If you have to reverse the ailerons (make sure you do both of them), go ahead and reverse the flap servos while you are here.

Set End Point Adjustments:

Next, enter the end point adjustments. Touch the up or down key until T.ADJ appears on the lower part of the screen (page 89). Touch the CH key to identify the servo whose end point you wish to adjust. Then, hold the appropriate stick all the way to the stop and touch the plus or minus key until the control surface goes in the proper direction and the desired distance. Each control surface has two separate end points. Left and right or up and down. Simply repeat the above, but push the stick in the opposite direction and then set the end point. The transmitter defaults are set at 100 percent. These can be adjusted from zero to 150 percent. I recommend setting more down elevator than up to help control pitch up when flaps are lowered. Leave flaps at 100 percent for now.

Aileron Differential:

There are two different ways to set aileron differential. One is to use the end point adjustments described above and the second is to use the differential aileron mixing function (page 92). I prefer to use the differential aileron mixing function. That way, if I want to modify the differential mixing, changing one setting not only changes both aileron servos, but makes the same differential adjustment to both flap servos if the flaps are mixed to the ailerons. Otherwise, you would have to change the end point adjustments on four separate servos.

By reversing the left and right servo and left and right flap you can now take advantage of differential mixing. If you plug the aileron's and flaps in per the manual, you still have differential mixing; however, it is backwards.

Enter differential mixing by pressing the up or down key until MIX DIFF appears on the screen. Initially set the differential to 100 percent by pressing and holding the plus or minus key. Moving the aileron stick will now force one aileron up, but the other one will not go down. Now hold the aileron stick all the way to one side. If you want more or less up aileron, return to the end pointed adjustment section above and make the appropriate adjustment. If the amount of up aileron is in the ballpark, hold the aileron stick all the way to one side and push and hold the plus or minus key until the opposing aileron comes down the desired amount. Differential mixing works for both ailerons. Push the stick the other way and you will see that the mixing effect is the same on both ailerons. If the ailerons go up different amounts, re-enter the end point adjustment described above and modify the end point adjustments until both ailerons go up the same amount.

Trailing Edge Camber and Reflex:

On the upper left hand side of the transmitter is a knob identified in the manual as the flap knob (page 101). However, because you are going to place the flaps on the throttle stick (explained in greater detail below), you can re-program this knob to adjust trailing edge camber. Press the up or down key until FLAPP TADJ appears on the left side of the screen. Press the plus or minus key until the right side of the screen reads approximately 10 percent. This knob now acts as a trim knob for the two-flap servos. On my current aircraft, this gives me approximately three percent up and three percent down at the trailing edge. To get the entire trailing edge to reflex or camber, press the plus or minus button until MIX FL-A appears on the left side of the screen (page 93). Set the mixing value to 100 percent. Now, reflex or camber of the entire trailing edge can be adjusted at any time by simply turning this

knob.

Rudder to Aileron Mixing:

There are four programmable mixing functions allowing you to mix any stick movement to any other servo on the model. These are labeled MIX A through D. Mix - Ds primary setting is master two to slave four (aileron to rudder). Mix D differs from the others in that the mixing values for left and right are the same and no offset point can be set. Press the up or down key until MIX D appears on the screen (page 97). Press the CH button until MIX D CH appears on the screen. Press the plus key until 2 appears on the master channel setting and press the minus key until 4 appears on the slave channel setting (page 99).

Press the CH key until MIX D SW appears on the screen. Press the plus or minus key until MX SW appears on the screen (page 99). This allows you to turn the aileron to rudder mix on and off with the long switch in the upper right and rear of the radio.

Press the CH button until MIX D 2 4 appears on the screen. To the far right of the screen, there should be a zero with a percentage symbol. Standing behind the airplane, press the aileron stick all the way to the stop. Press the plus key until the rudder goes the appropriate distance. If the rudder goes in the wrong direction, re-set the mixing value to zero by pressing the clear key and then pressing the minus key until the rudder goes in the appropriate direction and the appropriate distance. Simply modify the percentage of the mixing value to increase or decrease the amount of rudder to aileron mixing.

Operating the Flaps from the Throttle Stick:

This section places the flaps and elevator compensation on the throttle stick. Although it appears from the instructions that there are other dedicated mixing functions for this, I strongly recommend using programming MIX B and C. The other dedicated flap mixing functions assume that flaps will be controlled by the knob on the upper left hand side of the radio. To control flaps from the throttle stick, you must use the programmable mix functions.

Enter MIX B by pressing the up or down key. Press the CH key until MIX B CH 1-1 appears on the screen. Press the plus key to set the master channel to one. Press the minus key to set the slave channel to three. (This channel will be used to mix an elevator compensation.)

To set the operational switch setting, press the CH key until MIX B SW appears on the screen. Press and hold the plus or minus keys until ON appears to the right. This sets the operational switch setting so that elevator compensation is on all of the time.

Press the CH key until MIX B 1-3 OFFSET appears on the left side of the screen. I like to set my flap stick so that the stick is at the top for neutral flap and the stick is at the bottom for full 90 degree flaps. To accomplish this, push the throttle stick all the way to the top and press the clear key. This stores the offset position. The right hand side of the screen should read approximately 170.

Finally, enter the mixing value. Press the CH key until MIX B 1 3 appears on the left side of the screen. The right side of the screen should read zero percent. Pull the throttle stick (now the flap stick) all the way to the bottom. Press and hold the plus or minus key until you achieve the proper amount of elevator deflection and in the proper direction.

Next, we need to mix the throttle stick to the flaps. Press the up or down button until MIX C appears on the left side of the screen. Press the CH key until MIX C CH appears. Then press the plus key until one appears for the master channel and press the minus key until six appears for the slave channel. As you did before, set the operational switch setting to ON. Now this is where it gets interesting. Typically, even when mixing extensive elevator compensation, many models still balloon when the flaps are initially lowered. By setting a different offset for the flap than you have for the elevator, you can program the radio so that as you begin to bring down the flap stick, a slight amount of down elevator occurs before the flaps begin to move. To achieve this, press

the CH key until MIX C 1 6 OFFSET appears on the left side of the screen. Move the flap stick all the way to the top, then bring it down three or four clicks and press the clear button to set the offset. The offset function should be approximately 136. By having different offsets, elevator compensation begins slightly ahead of the lowering of the flaps. This has completely eliminated any tendency of my current aircraft to balloon on approach. You may need to experiment with your own values.

Finally, set the mixing value by pressing the CH key until MIX C 1 6 appears on the left side of the screen. Pull the flap stick all the way to the bottom and touch the plus or minus button until you achieve the desired amount of flap. If for some reason flap movement is insufficient, you may need to change the end point adjustment for flap and auxiliary two. If this is still not enough, you may need to vary the length of the servo arm or of the flap horn until you achieve full 90 degree flaps.

To adjust the flap in the up position, use the sub trim adjustment (page 88).

Dual Flap Trim:

Pots 5 and 7 are the trim knobs on the right hand side of the transmitter. I strongly recommend inhibiting the action of both of these knobs. They are too easy to bump in the impound area and these adjustments can easily be made on the ground using electronic sub trim. Also, if you are flying Mode 2, you don't want to take your hand off the stick to adjust either of these knobs.

Elevator to Flap Mix:

My larger sailplanes are flying with either an SD7037 air foil or a combination of an SD7032 that tapers to an SD 7037 at the tip. I find that with both of these air foils, thermal capability is enhanced by mixing trailing edge camber with up elevator. This can easily be accomplished by using the dedicated elevator to flap mixing function (page 90).

The long slender mixing stick immediately above the throttle stick should be moved to the upper position. This mixing function can be turned on and off in flight with this switch. This switch must be in the ON (upper) position for the mixing values to be set. Press the up or down key until MIX E-FL appears on the left-hand side of the screen. Pull up elevator all the way to the stop. Press the plus or minus key until you have achieved the proper amount of trailing edge camber with full up elevator. (This is usually around ten percent on my models.)

Launch Flaps:

In the upper left front corner of the transmitter is a switch labeled CROW. This switch is discussed in detail under the butterfly/crow mixing function in the manual (page 94). I like to place my preset launch flaps on this switch so that at the top of the launch and immediately prior to zoom, I simply flip a switch to return the flaps to the normal flight position. I do not use the flap stick for launch flaps.

Press the up or down key until MIX SP appears on the left side of the screen. Press the CH key until MIX SPOI OFFSET appears. Hold the flap stick at the exact center and press the clear button. The offset should be as close to zero as possible. This may take several tries. Press the CH button again until MIX SP:F appears on the left side of the screen. If you flip the CROW switch back and forth, you will see that the switch position varies between zero and one on the display. Push the switch to the back (launch flap position). With the flap stick in the "up" position, press the plus or minus key until you have the proper amount of launch flap in the right direction. At the top of the launch curve and immediately prior to zoom, pull the switch forward which re-sets the flaps to normal flight mode.

Crow:

Adding crow is probably the most difficult function. There must be an easier way, but I have not found one yet. With

the crow switch in the normal flight position, press the CH key until MIX SP:A appears on the left side of the screen. Pull the flap stick all the way to the bottom, press the plus or minus key until you have the desired amount of crow. (Both ailerons will go up.) Then, flip the crow switch to the launch flap position and enter the exact same mixing value. You should now be able to switch back and forth between crow position zero and one and the ailerons will not change. However, the aileron will appear to be stuck in the up position. You now have to enter the sub trim adjustments for aileron one and aileron two and change the sub trim until the ailerons are in their proper position when the flap stick is all the way up. Now, when you pull the flap stick down, the flaps will go down, the ailerons will go up and elevator will compensate.

Flap Adjustments:

The flaps in the up position can now be adjusted using sub trims (page 88 to adjust the flaps). To adjust the flaps in the down position, pull the flap stick all the way down and change the end point adjustments (page 89). If flaps still do not come down far enough, you may need to make further changes to the end point adjustments or increase the mixing percentages in program MIX C or change the length of the servo or flap arms.

Dual Rate/Exponential Rate:

Who needs dual rates when you have exponential mixing? Exponential mixing takes the twitchiness out of stick center. I use it in all functions, especially the elevator to smooth the flight of the aircraft. Although the flight of the aircraft is smoothed out, similar to what dual rates would do, you still have full throw on all of your control surfaces at full stick movement. This is something that I would fully encourage you to experiment with.

The first time you program this radio, it is going to take you some time. However, the functions are very easy to get used to, especially if you consistently program all of your aircraft the same way. As stated in the beginning of this article, this is only one of many possible methods for programming this radio. JR is offering a $30 upgrade, which I believe turns the three position switch immediately above the flap stick into a three position trailing edge camber switch. I believe there are some other functions involved, but I do not know what they are.

Although the above may sound complicated, believe me, it is a lot simpler than trying to mix all of these various functions mechanically. The ease with which you can make adjustments in the field to any of the mixing parameters, makes the trimming and balancing of an aircraft simple. It also encourages you to experiment with different trim settings, because they are so easy to do.

Instead of taking the whole summer of bending, twisting, lengthening and shortening cables, and servo control horns, all of the adjustments can be made with the radio. If you can afford one, the time saved and the ease with which an aircraft can be trimmed and balanced with the computer radio was well worth the money spent.

If any of you have any different means of programming a six servo setup using a JR X-347, please let me know. Over time, I would like to assemble different ideas on programming this radio. Please give me a call at (206) 455-2345 PST or send me a copy of your data sheet to 1000 Plaza Center, 10900 Northeast Eighth, Bellevue, Washington 98004. This is a great radio. The radio performed all of the functions that I needed at a relatively inexpensive price. I hope you found the information useful. Good luck and good flying. ■

What Mother Never Told Us About Foam Wings

...by Ed Jentsch
2887 Glenora Lane
Rockville, Maryland 20850
(301) 279-7611

Finally!! You've scrimped, you've saved, you've even conducted well planned midnight forays to the kitchen to filch from the cookie jar. And now, the payback for your sacrifice and surreptitious financial maneuvering - heralded not by trumpets, but by the soft chime of the doorbell and the paradiddle beat of footsteps rushing to the next beat-the-clock delivery - rests on your doorstep. God bless UPS!

It's here! At last! Cosmic Cloud Cruiser 120ZX, your very first, your very own, balsa sheeted, foam winged wonder of the contest circuit. Wow!

And are you ready? You bet! You've read every how-to-build-foam-wings article you could lay your hands on, and committed every single one to memory. You're more than ready; you're hot; you're in the groove, 5-by-5. T-i-m-e t-o b-o-o-g-i-e!!

Whoa hoss! Slow down... Put the epoxy back... There are some things mother never told us about doing it with foam wings ... I know, it's hard to believe, but true nonethe-less. Mothers are like that; they know that some things are best left to experience.

So what's missing? What didn't she tell us? What did she leave for life's ultimate instructor to let us in on? Only one small thing: how to build PRECISION foam wings, ones that match the intended airfoil shape and are planform accurate and planform symmetrical.

What? You'd heard that foam wings inherently superior... Isn't that what everyone says? Ah, yes, that is what we've been told, and it's right, as far as it goes. The airfoil of a sheeted foam wing should be truer than that of a built-up wing, all things being equal. Built up wings have ribs with open bays between, into which the wing covering invariably sags like a well worn mattress. Only at the ribs will the airfoil be close to its nominal shape. But elsewhere, it's anybody's guess.

In that respect, sheeted foam wings have the advantage, hands down, no question about it. Then why am I making this fuss, implying the unthinkable, that maybe foam wings aren't all they're cracked up to be? Well... because they have to be built, and usually by modelers like you and me who lack the financial backing required to do it more than once in a blue moon. In other words, foam wing amateurs.

Here, the best way to illustrate is to take a look at a typical set of foam wing instructions:

- Install spar and lightly sand the core.
- Prepare the sheeting (tape & edge glue; cut to planform shape; bevel the trailing edges; etc..)
- Add layers of fiberglass reinforcement, and maybe a layer of carbon fiber mat for good measure, between the sheeting and the foam at the trailing edge.
- Add carbon-fiber tow between the sheeting and the foam to reinforce the spar.
- Add fiberglass patches, maybe, for servo cavity reinforcement.
- Spread epoxy on the top and bottom sheets.
- Lay the foam core in place, aligning its trailing edge parallel to the sheeting trailing edge.
- Fold the top sheeting over; tape things together.
- Place in oven and bake at 350 'til...

Whoops! Wrong instructions... here we go...

- Place in vacuum bag, hit the switch and go kill 24 hours.
- Remove from bag, sand lightly, add leading edges, etc..

Now, what's wrong with that, you're wondering? Sounds fairly straightforward.

First, take a look at your foam cores. If they have perfectly straight, well-defined trailing edges, count yourself among the fortunate. More than likely, the trailing

edge of one or both will be feathered, just enough so you can't tell where it really is. Think about that - how does one align virtual edges?

Don't get all in a huff now, mumbling unkind things about the kit manufacturer. Minor feathering isn't really a problem, as we'll see, provided you're aware of a simple little trick for dealing with it.

Second, did you tally the thickness of all that reinforcement? About .015" if you triple-layer the trailing edge. I know what you're thinking; anything measured in thousandths of an inch isn't worth losing sleep over, right? Then dig out your dog-eared copy of Soar Tech 8 and re-read the last paragraph on page 90. See, .015" is almost four times the acceptable deviation from the theoretical plot.

Or, if you can afford to experiment, build a wing, then run your finger over the reinforced areas. Your finger will not lie to you, it will tell you the ridges at the reinforced areas are at least an inch high.

Wait! Don't send that hard-earned kit back. Retreating to built-up wings isn't the answer. Nothing you can do will improve those. But with a touch of patience, you can make a pretty good foam wing. You just need to know what Mother's recipe omitted.

Getting the Planform Right

First things first. Put the cores back in their saddles, and tape them in place so they look exactly like the block of virgin foam from which they emerged.

Then, if there's dihedral, or polyhedral, or wing tiplets, or whatever to deal with, take care of those next. A radial-arm or table saw is ideal for trimming the angles neatly and precisely. If your shop isn't mechanized, do yourself a favor and build a sanding jig. Even a simple one consisting two straight-edges clamped to the wing saddle is superior to eye-balling this operation.

Take your time, and do this right. It's not terribly critical that, for example, the dihedral angle trimmed on each wing half is exactly 3 degrees, for example,, as long as the angles are the same on each. That's important.

Also important is that you maintain the sweep angle relative to the trailing edge at the root and tip (typically 90 degrees). Use a good square to verify them. If they're off, fix them before going any further. Correcting these later isn't easy.

Now, find your softest (#2 or softer) pencil and sharpen it carefully. Then, with a good ruler (not tailor's tape or a yard-stick), measure, say, 3" in from the trailing edge at each end of each core/saddle and make a mark. Next, with a combination square, draw a vertical line at each mark.

After preparing the bottom sheeting, draw a short line at each end of the sheet, parallel to the trailing edge, on the side that will contact the core, exactly the same distance from the TE of the sheet PLUS the amount of balsa TE overhang. E.g., if the lines on the cores are 3" from the TE, and you're using 3/4" overhang, the lines should be drawn 3-3/4" from the TE of the sheeting.

You now have reference lines on both the wing cores and the balsa sheeting that will make alignment a snap. Exactly where the lines are drawn isn't critical, just make sure they're far enough in from the TE so they won't later be covered up by any of the TE reinforcement.

Needless to say, the TE's of the sheeting should be perfectly straight. And, when you fold the top sheeting over onto the core, make sure the TE's of the top and bottom sheets line up exactly.

Not much to it - that's all it takes to get the planform within +/- 1/64" which is about as precise as the human eye and a pencil can achieve. And, by using this simple-minded technique, you will find it's much, much easier to confirm that the core hasn't shifted after you sandwich it between the top and bottom sheets.

Maintaining Your (Airfoil) Shape Philosophical Part

What to do? What to do? How do we prevent those nasty little ridges that can mutate a perfect SD7037 wing core into something only my friend Bunky would fly?

The easy way out is to do nothing; let the ridges form where they may. Then you can claim they are intentionally designed-in "trips" of your own invention to improve the locally minimized reynolds number performance of the sub-laminar flow region at the 80% chord point. (Some, the author among them, will nod sagely at this display of engineering acumen and elevate you immediately to the status of an aerodynamic guru).

But that approach puts you at risk. Everyone will be waiting and watching for you to launch the darn thing and demonstrate its superior flying characteristics, so have an adequate selection of technical repartee on hand to deflect doubts about your newly acquired eminence should your plane fly like a brick.

You don't like the stick-your-head-in-the-sand-and-ignore- the-ridges approach? There has to be a way around the problem? Maybe there is. But it'll mean attacking a Cherished Notion (CN), which is a sure way of attracting whispered, and occasionally even shouted, comments about your mental stability. OK, if you're willing, here goes...

Why reinforce anything? Did you reinforce any of your built up wings? Not likely. Did they fall apart on you? Hmmm... must've been pilot error. Are foam core wings that inferior that they need all that high-tech fabric to shore up their strength? Maybe, maybe not.

Then the obvious way of preventing ridges in the wing is to put nothing in the wing that would create them. Save time, save money, save sandpaper, save the shape of your airfoil, don't reinforce.

Are you convinced? Did the CN expire under scrutiny? Yeah, I thought not. You're unwilling to bet the cookie jar on that solution, and I sympathize. Maybe someone, someone with a deeper cookie jar, will take that risk, but it won't be thee and me.

But, by spreading doubts about this particular CN, we may have laid the groundwork for some prudent risk taking.

Servo cavities are a prime candidate. There's no structural advantage to reinforcing these. The only reason for adding fiberglass here is to make it more difficult to accidentally cut through the sheeting while hollowing out the cavity. Unless you're a fumble-fingers, that's not a good enough reason. And, if you plan to use a router to do the cavities, it'll take more than fiberglass to stop you from poking holes in the sheeting. Recommendation: don't reinforce the servo cavities.

The next candidate is the TE. The rationale for adding carbon-fiber mat here is that it provides a visible reference line for sanding a sharp TE. Not necessary. If you fiberglass the TE, the difference in hardness between the fiberglass and balsa will easily be "felt" during sanding. You don't need to see it; you could sand the TE in the dark and get it right.

So, forget carbon-fibering (verb invention) the TE or, if you do it, don't do it in addition to fiberglass, do it instead of.

Next, do you really need 2 layers of reinforcement on the TE? Wouldn't a single layer be adequate to stiffen the control surface (guards against flutter) and harden the TE. Take a chance? Use one layer, not two. Also take the time to pick out the stiffest pieces of balsa for use on the TE.

Having bought the argument for one layer, you're now going to have another decision to make - put it on the top surface or the bottom?

Argument for the top: when you sand down the ridge, you've a better chance of maintaining the airfoil shape if you're sanding a convex surface, than a concave one.

Argument for the bottom: it's usually recommended that if you have to disturb the airfoil at all, and have a choice, disturb the bottom, not the top.

Recommendation: put it on the bottom, and do NOT try to sand down the resulting ridge - you will do more harm than good trying to shave a few thousandths of an inch from a concave surface by hand.

That's it for the prudent risks. The spar can be reinforced without creating a ridge (see below), so there's nothing lost by doing it.

Maintaining Your (Airfoil) Shape Practical Part

Foam Cores - Preparing the Way

Foam cores have to be sanded. Why isn't relevant, so we'll skip over that. What is relevant is that you use very fine (400 grit) sandpaper and do only enough sanding,

with a very light touch, to remove the surface roughness. (Of course, if there are any large dents/gouges in the cores these should be filled with light-weight spackle and sanded to the core's contour.)

Then, install the spars according to your kit's instructions. Trial fit and adjust their height and length before gluing them in place. Reason: if you make them so they fit perfectly, you won't have any trimming to do AFTER they're in place. The foam cores are extremely soft, and the less they're exposed to sandpaper, the better.

Balsa Sheeting - Joining the Pieces

Check that all of the balsa sheets supplied for the wings are the same thickness. If not, replace the oddballs. Don't ignore this advice. REPLACE any sheet that is not up to spec.

Check that the edges of each piece (use a sufficiently long straight-edge, don't eyeball it) are perfectly straight. If not, trim them straight and check again.

Tape the sheets together to form the bigger ones that will cover the cores.

If you plan to vacuum bag the wings, taping the sheets together is sufficient. If you're using any other method, you should edge-glue the sheets together. Use carpenter's glue (aka aliphatic resin; aka PVA; aka "yellow"), and use VERY little. Carefully scrape off any excess glue when it dries to a rubbery consistency, BEFORE it completely hardens.

OK, OK, I'll explain it (can't get away with anything around here). The reason you don't need to edge glue the sheets when vacuum bagging is that they will do it themselves - some epoxy will be forced into the joints under pressure, unless you're a Scrooge with the epoxy or have a wimpy vacuum pump.

If, on the other hand, you don't vacuum bag, but weight the cores instead, there won't be enough pressure applied, unless you either swab epoxy on by the quart, or you weight the cores by parking your car on them overnight (which could have more of an adverse effect on their shape than what we're worried about in this article).

With the sheets glued or taped together, LIGHTLY sand the glue-side surface of the sheets with 400 grit sandpaper. The only reason for sanding them is to remove any dirt or oily residue (e.g. from handling) from the surface, so do it gently and sparingly and without your power sander.

Balsa Sheeting - Beveling the Edge

Why bevel the TE of the balsa sheeting, you ask? Good question. Suppose we didn't. Suppose we just applied the sheeting, sans bevel, and then sanded the excess balsa off the TE. What would happen?

If the sheeting isn't beveled at the TE, then the balsa will have to bend where the two sheets meet at the core's TE. And, we know what that means - the balsa will be stressed at the bend. This creates two potential problems:

1. The stress will be permanent, and it will try to separate the sheets. If the glue joint at this intersection is a good one, the sheets will probably remain joined. If not, strange things may happen to the wing.

2. It is very unlikely that the balsa will be of uniform stiffness, either along the length of the TE or between the top and bottom sheets. And, stiffness is essentially "resistance to bending stress". Variations in stiffness will show up as waves in the TE.

Conclusion: beveling the balsa is a good investment. It doesn't take long, and it avoids unpredictable results at the wing's TE.

If you decide not to invest time in beveling the TE, then make sure the TE is well supported while the epoxy sets, and let the epoxy set for its full cure cycle, usually a week, before removing the clamp.

One exception. When doing small symmetrical airfoils, like stabilizers, using thin sheeting (say 1/32"), don't waste time beveling the balsa sheeting beforehand. You can achieve good results, in this instance, by sanding the TE to a sharp edge after the sheeting is glued on.

Assuming you decide to bevel the balsa...

Draw a line 3/4" (or whatever the correct overhang is for your kit) in from the TE of the balsa sheet on the glue-side surface. Next, use one of the following techniques to form a guide that will protect the TE from feathering during sanding:

1. Apply a strip of masking tape to the side of the balsa sheet opposite the side to be beveled, so it extends say 1/16" past the TE of the sheet. Place thin music wire against the TE and press it onto the masking tape.

2. Find a nice hard straight-edge at least as long as the sheeting, e.g. an aluminum ruler, the edge of your building board, etc.. Line up the sheeting about 1/32" in from the edge and tape it in place.

Now, with a sanding block, and taking your time, sand the TE bevel, using the line and the guide (music wire or straight edge) as references.

Balsa Sheeting - Grooving the Spar Cap

One has to admire the forethought of abrasive manufacturers. The thickness of a piece of fine sandpaper is almost exactly .007", which is the same as the thickness of the carbon-fiber often used to reinforce spars. Thank you 3M.

Keeping the spar reinforcement from creating a ridge is simple. Just sand a .007" deep groove in the balsa sheeting and lay the carbon-fiber in the groove.

How? Also simple. Find a scrap piece of wood, say 3/4" x 2" x 4". Cut a 4" long by X" wide (X = the width of the carbon-fiber) strip from a piece of 150 grit sandpaper. Glue it, with rubber cement, at one of the 4" edges of the wood scrap on its 2" x 4" side (not on the 3/4" side). Presto, a sanding block for grooving. Put the sheeting on a flat surface and tape a straight-edge to it, positioned such that when the sanding block is run along its side, the groove will be where the carbon-fiber is to be laid.

Sand the groove. This takes patience. After each swipe of the block, you have to remove the sawdust or it will cause the block to lift off the balsa on the next swipe. Go to it. Swipe, blow off the dust; swipe, blow off the dust; etc.; etc.. Keep at it until you've produced a groove of uniform depth. (Note: smokers may have trouble with this technique).

Trailing Edge Rid(d)ing the Waves

Whether bagging or weighting, unless a full-width saddle is supplied with the wings, the TE will require some support to minimize its tendency to develop waves along its length. Two 1/8" thick strips of spruce, clamped on either side of the TE using plenty of spring-loaded clothes pins will suffice. If bagging, place the wing in the bag with its TE close enough to the bag's edge so it can be clamped after vacuum is applied.

Wing - Completing Mother's Recipe

After bagging, or its weighty equivalent:

Remove the excess balsa from the wing's leading edge, root and tip. One way of doing this without placing the wing in danger, is to put the wing in back in its saddle, aligned with the saddle top and bottom pieces. Weight the assembly so nothing can shift. Then put masking tape on the top and bottom edges of the saddle just above and below the protruding balsa. Sand off the sheeting, using the masking tape as a "stop" to keep from sanding into the foam.

Sand the TE to a sharp edge, but restrict the sanding to the balsa overhang area. This can be done by running a strip of masking tape, say, 3/4" (typical overhang dimension) in from the TE. The tape and fiberglass reinforcement act as sanding "stops" for this operation. Glue the leading edge on and plane/sand it to shape. Finally, VERY LIGHTLY, sand the wing's surface with 400 grit sandpaper.

General('s) Warning

Now you can get your epoxy, and all the other paraphernalia, you'll need, off the shelf. Time to do it with foam wings!

Beware though: this has not been a complete expose of the subject. All we've done is supplement previous articles. Make sure you've read those and have committed the basic procedure to memory; once the epoxy is mixed, you won't have time to graze your *RCSD* collection in search of step 23.

Right. Almost exited too soon. The warning: WEAR RUBBER GLOVES. Continued exposure to epoxy can result in an allergic reaction. And, once you develop the allergy, your days of working with this ubiquitous modeling adhesive are over, finished, done, terminated... you'll be reduced to using chewing gum and cellophane tape to hold your plane together. ■

NASSA News

NASSA members, attached is the tasks guideline for your perusal.

As active members of the association your input is extremely important to the health of scale soaring in North America. This guideline is meant only to function as tool for organization and not as a rigid standard. NASSA's general membership wants to recognize all flavors and varieties of scale soaring and to hopefully enhance the hobby for those already involved as well as those coming into the movement. So, the guideline is quite generic and only proposes to act as a jumping off platform for further growth in the movement. This guideline does, however, provide a number of tasks that are quite challenging. And, NASSA will provide recognition of completion of any tasks members are able to achieve, within the format of this guideline, of course. Additionally, as the membership grows and the guideline goes through a metamorphosis, other tasks and challenges will be offered forward for pilot and aircraft achievement.

NASSA's hope is that the tasks within the guideline will provide flying objectives which will be attractive to R/C enthusiasts such that they will transition into scale soaring. Please read the following and decide for yourself whether you find the tasks within challenging enough for your level of skill. You are encouraged to offer ideas for NASSA's guideline. Ideas should be submitted to NASSA, P.O. Box 4267, W. Richland, WA 99352.

1993
NASSA TASKS GUIDELINE

This NASSA guideline is a **LIVING** document. As such, this guideline or any part of it is subject to change as the Board of Directors and the members deem necessary for the continued health of the Club and the scale soaring movement!

CERTIFICATES OF ACHIEVEMENT:

NASSA membership provides pilots with a means and/or mechanism to have their scale achievements recognized. Any pilot meeting the minimum requirements for any task is eligible for a certificate of achievement. These awards do not denote any particular level of achievement, but rather provide an ongoing process of recognition for pilots fulfilling the necessary requirements to accomplish a specified task within the NASSA guideline.

MODEL CLASSIFICATIONS:

R/C Scale soaring tasks and maneuvers are classified by model type. The classifications are Vintage, Modern (any model copied after a sailplane built after November 27, 1957), and Power Slope Scale.

The classification affords the scale enthusiast the opportunity to measure any or all achievements by comparison to other models of similar Vintage or type, i.e., a 1/4 scale *Weihe* does not have similar L/D performance or penetration to a 1/3 scale ASH-26. Classification will reward and standardize, on a very limited basis, task achievement.

MODEL REQUIREMENTS:

A scale model shall be a replica (copy) of a heavier-than-air, man-carrying aircraft. Only prototype aircraft that actually made flights can be selected as subjects.

Models which only simulate scale appearance by component shapes resembling a prototype aircraft, but whose **basic design bears no relationship to it**, are not considered a scale model aircraft.

PROOF OF SCALE:

A Three-View (line, tone or color), drawing with 3 views or more is considered acceptable. Or, a selection of photos of the aircraft modeled, sufficiently showing the outlines of the aircraft in side view, front view and plan view. The photographs need not be taken from oblique angles which allow the judge to interpret the outlines.

TASK DOCUMENTATION:

Documentation for task verification will require a photo of the model and a three view, if available. The member requesting task recognition must provide a brief description of the model, and its classification, flown for the task (the more information provided the better). Accomplishments will be a published part NASSA news. As such documentation is required for verification.

The board of directors reserves any and all rights to request additional scale documentation and information to verify scale authenticity of the model accomplishing the stated task.

BUILDING TASKS:

The building tasks are intended to recognize the level of effort extended by builder/pilot to obtain a fly able R/C scale soaring aircraft. The tasks are broken into "Level of Effort" and are as follows:

1. Scratch Built: Modeler draws plans entirely from a 3-view or documentation. Model is built from scratch utilizing only pre-built parts when absolutely necessary, i.e., servos, covering material, canopy, etc. Model must successfully fly.

2. Plan Built: Model is scratch built from pre-drawn plans. Model may include some pre-built parts, however, the major components of the model must be built by the modeler. Model must successfully fly.

3. Partial Kit: Model must be completely built by the modeler, however, components of the model are pre-built, i.e., fuselage, canopy, wing cores, bellcranks, wing joiners, etc. Plans may be provided or the modeler my generate his/her own drawings. Model must successfully fly.

4. Kit Model: The modeler builds the model from a pre-manufactured kit. Model must successfully fly.

5. ARF Model: Model is an "Almost Ready to Fly" aircraft, however, the model requires a certain amount of assembly and/or pre-fabrication. Model must successfully fly.

Building achievement awards require verification. Verification is considered supporting documentation such as 3-view photos, a signed letter of the model's specifications, explanation of how the model was built, where purchased, construction start date and construction finish date. Successful flight verification is required by the signature of a independent party witnessing the flight.

DISTANCE TASKS:

Distance tasks are designed to test the pilot's ability to fly an R/C Scale soaring model over measured distance. This is a goal oriented task. As such, the pilot must guide the model over a distance equal to or greater than the task (i.e., the goal is two (2) miles), then the model must cover a distance equal to or greater than two miles. This distance can be around a closed course, or an absolute distance out, or a distance out and back.

Distances are: 1/2 mile, 1 mile, 2 miles, 5 miles. The distance task may be achieved either in slope or thermal lift. A pilot seeking recognition of achievement must designate the model classification and the type of lift utilized to accomplish the task upon return of achievement recognition forms.

CROSS COUNTRY TASKS:

A flight is considered to be cross country when it exceeds a distance greater than 10 miles. Achievement awards are based on the following distances: 10 miles, 20 miles, 30 miles, 40 miles, 50 miles, 60 miles, 75 miles, and 100 miles. Special achievements awards will be given for any distance exceeding 100 miles.

DURATION TASKS:

5 minutes, 15 minutes, 30 minutes, 1 hour, 2 hours, 4 hours. Duration tasks require the model pilot to land the scale model within a field boundary area and adhering to the AMA rules book guideline. Special achievements awards will be given for any duration exceeding 4 hours. Pilot must designate whether duration time was attained from slope or

thermal lift.

CROSS COUNTRY RACE:

The objective of this task is to compete against at least one other model and pilot. A distance of at least 10 miles for the course is recommended. Model/pilots will compete against each other based on the time required to complete the course. Scores are to be awarded as a percentage of perfect; i.e., 1000 points X (fastest finish time/respective finish time).

Models of similar scale size and vintage are to be classed together. Launch may be achieved by any accepted method. Models must also utilize a start/finish gate that normalizes the start altitude. At no time during the race may a model utilize any power assisting device(s) to gain altitude.

In the event no model completes the designated course, place standing will be determined by the model/pilot covering the greatest distance.

FLIGHT MANEUVERS:

1. BASIC FLIGHT MANEUVERS

1.1 Climb To Release

From hand tow, winch, or hi-start launch, the model will directly ascend to release altitude and fly smoothly off of the towline.

Errors: Model weaves from side to side on tow. Model's nose dips or rises in a sudden of erratic manner. Model zooms excessively upon release. Winch pulsing causes model to stutter on tow.

1.2 Maintain Straight Attitude

Beginning from any attitude or altitude, with the entire maneuver visible to all flight judges, the model shall maintain a smooth, straight and level heading for a duration of approximately ten (10) seconds.

Errors: Model does not keep wings level or nose pointed straight ahead. Model dives or stalls. Note: any slight loss or gain in altitude shall not be cause to downgrade the flight, provided the model's nose continues to maintain a straight and level heading. This is to allow for flight through lift or sink conditions.

1.3 360 Thermal Turns

Beginning from any attitude or altitude, with the entire maneuver visible to all flight judges, the model shall perform two (2) consecutive 360 turns, either to the right or to the left. Turn direction shall be pilot's choice. The pilot must attempt to keep both circles concentric. Upon completion of the second turn, the model shall resume its original heading.

Errors: Model does not complete two full 360 turns. The model flies past the 360 point of the second turn. Model dives or stalls. Model does not keep two circles reasonably concentric. (Note that slight downwind drift is permissible without any downgrade, though both circles should be the same size in diameter.) Model does not leave the second turn on the same heading at which it entered the first turn. Slight loss or gain in altitude during the maneuver shall not be cause for downgrade. This is to allow for flight through lift of sink conditions.

1.4 Landing

Final approach shall be a part to the landing task. The maneuver shall begin when the model has completed its turn onto final approach, as announced by the pilot, and shall be considered to be complete when model comes to rest. The scale sailplane shall maintain an "on course" attitude toward the landing area until touchdown. Upon touchdown, the model shall slide or roll forward to a gradual stop. It is suggested that the actual landing and the final approach be scored on an equal basis by the judges.

Errors: The scale model dives, stalls or severally changes attitude during final approach. Model bounces or stops abruptly on touchdown. Model drops a wing too soon after touchdown without appropriate roll-out. After dropping a wing, model ground loops. Model turns upside-down. A model shedding parts during this maneuver shall be cause for a zero landing.

1.5 Realism In Flight

The realism score shall be awarded in proportion to how well the model simulates the complete flight, stability, airspeed, landing and roll-out characteristics of the prototype aircraft. The model's flight is judged for its attitude in flight and smoothness of control in yaw, pitch and roll axis.

Errors: Model shows signs of instability which may be characterized by an erratic flight path. Model does not fly at scale-like speed. Attitude in flight is unrealistic. Model does not fly smoothly. Model of aircraft that featured a retractable landing gear is flown with the wheel down, or do not show wheel extended during landing maneuver.

2. Optional Flight Maneuvers

2.1 Duration

Model shall, upon release from tow, remain aloft for a duration appropriate to the classification, i.e., Vintage, Modern, or PSS. Note that duration need not be flown as a separate maneuver. Time shall start upon model's release and may continue throughout the entire flight, with duration points accumulating for time aloft during performance of other maneuvers in the contestants' flight plan.

2.2 Aero-Tow

Model shall be towed aloft by a powered model airplane in the same manner as the prototype sailplane. During the Aero-Tow, turns within the confines of the flight boundaries are permitted. On the sailplane pilot's command, the sailplane shall release from tow, and both models shall immediately perform smooth 90 turns in opposite directions to each other. Release shall be made by the sailplane and not the tow plane. The tow plane and tow plane pilot shall be subject to all applicable flying field rules. Provisions for the tow plane and tow pilot are responsibility of the sailplane contestant.

Errors: Model behaves erratically during maneuvers. The scale sailplane causes changes to the tow plane attitude during maneuvers. The sailplane and tow plane turn in the same direction after release. Tow point location on scale sailplane is not at the proper scale location. For whatever reason, release occurs from the tow plane before the sailplane.

2.3 Ground Launch

The scale sailplane shall be attached to the tow-line and placed on the ground in line with launch direction. On command from the contestant, the model is towed along the ground and then becomes airborne. Upon attaining an altitude of approximately twenty-five (25) feet, the maneuver shall be considered complete and judging of climb to release shall begin.

3. Precision Flight Maneuvers

3.1 Straight Flight Out

If this maneuver is chosen as an option it must be followed by a Procedure Turn, and a Straight Flight Back. On an upwind heading, the model must be brought exactly over the center of the runway and or center of the landing circle and flown in an absolutely straight path parallel to the flight line for a distance of approximately 300 feet before starting the Procedure Turn (distance

does not have to be accurate; pilot will determine completion of 300 feet).

Errors: Model does not fly over center of runway and/or landing circle. Plane deviates to the left or right. Does not hold a constant altitude. Gallops in elevation.

3.2 Procedure Turn

After the straight flight, the model must turn exactly 90 degrees to the left or right, whichever will take the plane away from the spectator line (direction to be specified by the Contest Director), then exactly 270 degrees to the right (or left) and cross over the point where the first turn commenced.

Errors: Left turn not 90 degrees. Right turn not 270 degrees. Changes in altitude during turn. Turns not smooth and circular. Does not head back over exact outgoing path. Note: if a contestant wishes to perform this maneuver without proceeding it with a Straight Flight Out, it should commence as the model is on an upwind heading, it then begins the 90 degree turn at a point immediately opposite the judges or over the center of the flight box (if used).

3.3 Straight Flight Back

If this maneuver is chosen as an option it must be preceded by a Straight Flight Out and a Procedure Turn. The model should fly back toward the flight box along the same line as the outgoing path and pass exactly over the box. If no box is used the maneuver should terminate when the model passes in front of the judges on a path over the center of the runway.

Errors: Turns or wiggles during straight flight. Changes in attitude. Gallops in pitch, yaw or roll. Flight not along original path. Does not pass over the flight box (or center of runway immediately in front of judges).

3.4 Inside Loop

From straight flight, the model pulls up into a smooth round loop and resumes straight and level flight on the same heading as the entry.

Errors: Wings are not level throughout the maneuver. Loop inside not round or is executed endwise.

3.5 Outside Loop

Starting from level flight, the model noses down to perform a smooth round outside loop which is completed when the model regains its starting altitude and exits in level flight on the same heading as the entry.

Errors: Maneuver does not begin and end in level flight. Exit altitude is not the same as entry altitude. Model does not begin and end on the same heading. Loop in not round. Wings do not remain level during maneuver.

3.6 Stall turn

The model starts in level flight, noses up to the near vertical attitude, at which point the model yaws through 180 degrees, then dives and finally pulls through to straight and level flight on a heading in the opposite direction to the entry. The contestant should specify whether the stall turn shall be to the left or right.

Errors: Model does not assume the correct attitude. Model turns in wrong direction. Model does dot exit from the maneuver on the correct heading.

3.7 Wingover

Model starts from level flight and noses up to a near vertical attitude at which time it is flown through a 180 degrees arc using rudder to end up on a near vertical dive. The model pulls out of the dive at the same altitude as the entry and on a parallel path, but on a 180 degrees opposite heading.

Errors: Model not level at start. Model rolls left or right during pull-up. Model tucks under a wing during 180 degrees turn. Return path not parallel to entry. Recovery not at same altitude as entry. Model does not fly straight and level to compete the maneuver.

3.8 Split-S (Reversal)

From straight and level flight, the model performs a half roll and when inverted performs the second half of a loop and resumes straight and level flight on a heading opposite that of the entry.

Errors: Model changes heading during half roll. Wings are not level during half loop. Model does not exit from maneuver on the exact opposite heading to entry.

3.9 Roll

From straight and level flight, the model rolls at a constant rate through one complete rotation and resumes straight and level flight on the same heading. The contestant must denote what type of roll he/she is going to perform, i.e., Axial, Slow, Barrel, Snap or Hesitation.

Errors: Rate of roll is not constant. Deviation in heading during and after the roll. Loss or gain in height.

3.10 Spin

The number of turns to be performed shall be noted on the judges score sheets. The entry shall be from straight and level flight parallel to the runway. The scale sailplane must remain on a heading in a slightly nose high attitude until it stalls and commences to spin. The model should auto-rotate through the prescribed number of turns and recover on the same heading at a lower altitude. The rate at which the model rotates in the spin will depend on its size and classification, but judges will be alert to observe models which are performing a spiral dive rather that a true spin.

Errors: Entry not from level flight parallel to runway. Does not perform the prescribed number of turns. If the number of turns performed is greater or less than the prescribed number by more than one complete turn, a zero score should be given. Does not recover on same heading as entry. Wings not level during recovery. Model performs a spiral dive rather than a true spin.

3.11 Sideslip

The Model maintains the same heading while dropping first one wing and then the other while yawing at least 20 degrees in each direction. The transition from left to right slip should be smooth. If performed on landing approach, a sideslip in one direction only is required and a marked loss of altitude should be apparent.

Errors: Model changes its heading as each slip is performed. Yaw is less than 20 degrees. When performed during the landing approach, no loss in altitude is apparent. Maneuver is not performed smoothly.

General Notes:

Board of Directors: Jerry Slates, Gregory Vasgerdian, Byron Blakeslee, Pete Bechtel, Randy Holzapple, Mike Mellor, Gene Cope, Gary McVay

Secretary Treasurer: Wil Byers

During NASSA Scale Rallys, the Board of Directors recommends the preferred method for selecting an outstanding achievement in scale authenticity and craftsmanship to be the **"PILOTS CHOICE AWARD"** selection process.

Promote scale soaring through sharing! ■

R/C Soaring Resources

Do you hold seminars and workshops? Would you like to be included as a contact to answer questions on soaring sites or contests in your area? If so, please contact *RCSD*. Our address and telephone numbers are on page 1.

Seminars & Workshops

Free instruction for beginners on construction and flight techniques. Friday & week-ends (Excluding contest days) Bob Pairman, 3274 Kathleen St., San Jose, California, 95124; (408) 377-2115.

California Composite Seminars - We want to help you build better! Bring your project and let us help you with it. Thirty five dollars for a six hour plus Composite Technician lesson includes lunch! Two people minimum, please. Great mountain flying all year round! Clubs? We travel, too! Please call (805) 822-7994 and ask for Scott Metze.

Reference Material

Madison Area Radio ontrol Society (M.A.R.C.S.) *National Sailplane Symposium Proceedings*, 2 day conference, on the subject and direction of soaring. 1983 for $7.00, 1984 for $7.00, 1985 for $8.00, 1986 for $8.00, 1987 for $9.00, 1988 for $9.00, 1989 for $10.00, 1992 for $12.00. Delivery in U.S.A. is $3.00 per copy. Outside U.S.A. is $6.00 per copy. Set of 8 sent UPS in U.S.A. for $75.00, outside U.S.A. for $80.00. Last 4 (1987-1992) in U.S.A. is $45.00, outside is $50.00. Allan Scidmore, 5013 Dorsett Dr., Madison, WI 53711.

BBS

BBS: Slope Tech, Southern California; (310) 866-0924, 8-N-1

BBS: South Bay Soaring Society, Northern California; (408) 281-4895, 8-N-1

Contacts & Soaring Groups

Arizona - Southern Arizona Glider Enthusiasts, Burt Kline (contact), 2642 W. Ca Puebla, Tucson, Arizona 85745 U.S.A., (602) 882-4083. SAGE welcomes all level of flyers!

California - California Slope Racers, John Dvorak, 1638 Farringdon Court, San Jose, California 95127 U.S.A., (408) 259-4205.

California - Northern California Soaring League, Mike Clancy (President), 2018 El Dorado Ct., Novato, California 94947 U.S.A., (415) 897-2917.

Canada - Southern Ontario Glider Group, "Wings" Program, dedicated instructors, Fred Freeman (416) 627-9090 or David Woodhouse (519) 821-4346.

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

Kansas - Wichita Area Soaring Association, Pat McCleave (Contact), 11621 Nantucket, Wichita, Kansas 67212 U.S.A., (316) 721-5647.

Maryland - Baltimore Area Soaring Society, Al DeRenzis (President), 5003 Wetheredsville Road, Baltimore, Maryland 21207 U.S.A., (410) 448-0808.

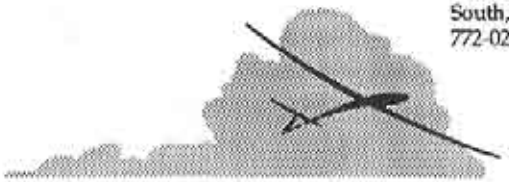
Nevada - Las Vegas Soaring Club, Steven Smith (President), 6978 Starwood Dr., Las Vegas, Nevada 89117 U.S.A., (702) 873-9591.

Northwest Soaring Society (Oregon, Washington, Idaho, Montana, Alaska, British Columbia, Alberta), Roger Breedlove (Editor), 6680 S.W. Wisteria Pl, Beaverton, OR 97005 U.S.A., (503) 646-1695 (H) (503) 297-7691 (O).

Texas - Texas Soaring Conference (Texas, Oklahoma, New Mexico, Louisiana, Arkansas), Gordon Jones (Contact), 214 Sunflower Drive, Garland, Texas 75041 U.S.A., (214) 840-8116.

Utah (U.S.A.) - Intermountain Silent Flyers (IMSF), Bob Harman (contact), (801) 571-6406... "Come Fly With Us!"

Washington - Seattle Area Soaring Society, Wald Reynolds (Editor), 12448 83rd Avenue South, Seattle, Washington 98178 U.S.A., (206) 772-0291.



F3B/USA

The Newsletter for the **Multi-Task Soaring Enthusiast**

Subscriptions: $12 / Year / Six Issues

Write: F3B/USA
George Spitzer
87 1/2 North Catalina Ave.
Pasadena, CA 91106
(818) 796-5024

LSF

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

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

League of Silent Flight
10173 St. Joe Rd.
Ft. Wayne, IN 46835

You are invited to join the
NATIONAL SOARING SOCIETY

- OFFICIAL AMA SOARING "SPECIAL INTEREST GROUP"
- YEARLY NSS "SOAR-IN" TOURNAMENTS
- NATION WIDE "EXCELLENCE AWARDS PROGRAM"
- EXCELLENT BI-MONTHLY NEWSLETTER
- NSS FULLY SUPPORTS THE F3B SOARING TEAM & LSF SOARING PROGRAM
- NSS IS INVOLVED IN THE ORGANIZATION AND OVERSEEING OF THE SOAHING PORTION OF AMA NATS (INCLUDING AWARDS BANQUET)
- YEARLY DUES ARE $15 U.S.A. AND $20 OVERSEAS (SPECIAL FAMILY RATES)
- NSS OFFICERS ARE FROM ALL 11 DISTRICTS

For Information, Contact:
NSS Secretary/Treasurer
Robert Massmann
282 Jodie Lane
Wilmington, OH 45177
(513) 382-4612

T.W.I.T.T.

(The Wing Is The Thing)

T.W.I.T.T. is an organization of engineers, scientists, pilots, sailplane enthusiasts, model builders and many other persons having an interest in flying wing/tailless aircraft technology. Write to T.W.I.T.T., P.O. Box 20430, El Cajon, CA 92021 to find out how you can participate.

Send SASE for membership application and flyer: "What is T.W.I.T.T." or, send $2.00 for full information package including one back issue of our newsletter, postpaid. Full membership is $15.00 per year and includes twelve issues of the newsletter. Back issues of newsletter are $.75 each, postpaid.

The Vintage Sailplane Association

VSA is a very dedicated group of soaring enthusiasts who are keeping our gliding history and heritage alive by building, restoring and flying military and civilian gliders from the past, some more than fifty years old. Several vintage glider meets are held each year. Members include modellers, pilot veterans, aviation historians and other aviation enthusiasts from all continents of the world. VSA publishes the quarterly magazine BUNGEE CORD. Sample issue $1.-. Membership $10.- per year. For more information write:

Vintage Sailplane Association
Route 1, Box 239
Lovettsville, VA 22080

1993

Northwest Championship Soaring Tournament

Northwest Soaring Society

September 18 & 19
Eugene, Oregon

- 1 1/2 days qualifying rounds
- 1/2 day final flyoffs
- team competition

CD - Tom Culmsee, (503) 667-4532

12TH Annual

LAST FLING OF SUMMER

October 16 & 17
Blue Springs Sod Farm
(160 Beautiful Acres!)
SE of Broken Arrow, Oklahoma
Expert & Sportsman
2 Meter & Unlimited
AMA License/Gold Stickers Req.
Rahm 12 Volt Winches & E-Z Mechanical Retrievers
Awards, Raffle, & Prizes
BBQ Sat. Nite Included in Entry Fee
Restrooms on Site
Entry Fee: $25.00
For both classes both days
Contact: Sandy Hay (C.D.)
(918) 665-8069 Home
(918) 838-9961 Work
Please try to pre-register by October 11 to avoid any contest delay!

SUMMER SOARING FESTIVAL

AUGUST 14 & 15 1993

Soaring Union of Los Angles, SULA
and
The California State University Dominguez Hills, CSUDH
Invite you to attend
A 2-Day AMA R/C Soaring Contest
To raise money for the School of Science, Mathematics & Technology Scholarship Fund. Entry $30.00
At SULA Field, CSUDH, Carson CA
Many Awards & Big Raffle
On-Field RV Parking
Sat. night $10 BBQ & Nite-Fun-Fly

Call Ed Kennedy (310) 519-7628

The Texas State Soaring Championship

September 18 & 19 1993
Dallas, Texas

TNT 93

9th Annual Texas National Tournament

Task - Thermal Duration 3,5,7,9,11 w/FAI Landing

CLASSES:	**AWARDS:**
2 Meter -Saturday	1-5th place Sportsman & Expert
Open - Sunday	1-3rd place Novice & Junior
Junior, Novice	Overall Winner
Sportsman, Expert	

INFORMATION: Henry Bostick (214) 279-8337
5517 Hidalgo Court
Garland, Texas 75043

Sponsored by

The Soaring League of North Texas

Pre-registration requested. AMA Sanctioned

Schedule of Special Events

Date	Event	Location	Contact
Aug. 7-14	LSF NATS	Vincennes, IN	Mike Stump (616) 775-7445
Aug. 14	LIFT Aug. Soar In	Traverse City, MI	Jim Johnston (616) 938-1272
Aug. 14	TPG 60" CL Slope Race	Southern California	Charlie Richardson (619) 630-8775
Aug. 14-15	Summer Soaring Festival - Soaring Union of L.A.	Carson, CA	Steve Addis (310) 320-2708
Aug. 14-15	F3J Hollandglide	Netherlands	
Aug. 16-22	Fun Fly Soaring Week	Salt Lake City, UT	Bob Harman (801) 571-6406
Aug. 21	2M, Open	San Antonio, TX	Perry Van (210) 658-8842
Aug. 21-22	2m & Unlimited Pelicans	Morriston, FL	Frank Strommer (813) 844-7225
Aug. 21-22	SBSS Summer Classic Open Thermal Comp.	Morgan Hill, CA	George Paige (916) 273-0415
Aug. 21-22	F3J Euroglide	Belgium	
Aug. 28-30	British Gliding Nationals		RAF Cranwell
Aug. 28-29	GVRC 2-M Champs man-on-man	Nunica, MI	Cal Posthuma (616) 677-5718
Aug. 29	TULSOAR Fun Fly	Tulsa, OK	Mike Teague (918) 747-1245
Sept.	F3J	Germany	
Sept. 3-6	LSF & Variety Owls	Morriston, FL	K. Goodwin (904) 528-3744
Sept. 4	CAMS Northern MI Sailplane CH.	Cadillac, MI	Mike Stump (616) 775-7445
Sept. 4-5	NW Soaring Meet Inland Empire Soaring Society	Washington Area	Don Hendricks (509) 534-1664
Sept. 5	609, 611 DEAF Dallas Electric Aircraft Flyers	Dallas, TX	Robert Taylor (214) 279-9296
Sept. 9-12	World Cup	Czechoslovakia	
Sept. 11	TPG 60" CL Slope Race	Southern California	Charlie Richardson (619) 630-8775
Sept. 11-12	Masters of Soaring (Sponsored by Weak Signals)	Temperence, MI	Art Slagle (313) 477-2228 Eve.
Sept. 11-12	CASA Thermal - 11th Annual	Gaithersburg, MD	George Frechette (301) 299-5268
Sept. 18	H/L	San Antonio, TX	Jerry Caldwell (210) 438-4077
Sept. 18-19	TNT Texas National Tournament	Dallas, TX	Henry Bostick (214) 279-8337
Sept. 18-19	SIG/EISS Glider Contest - Third Annual	Blakesburg, IA (Antique Airfield)	Jim Porter (800) 524-7805
Sept. 18-19	Cross Country C.S.R.	California Valley, CA	Scott Tooher (310) 323-4304
Sept. 18-19	Northwest Championship Soaring Tournament	Eugene, OR	Tom Culmsee (503) 667-4532
Sept. 25	Hand Launch Contest	Poway Flight Center, CA	Scott Condon (619) 471-2453
Sept. 25-26	2M & Unlimited Buzzards	Orlando, FL	Cy Baylor (407) 699-8750
Sept. 26	Unlimited Thermal AMA Regional	Kirkville, NY (Syracuse, NY)	Dave Zinteck (315) 656-7103
Sept. 26	TULSOAR Fun Fly	Tulsa, OK	Terry Bryant (918) 482-5817
Sept. 26/Oct. 3	2M Postal Denmark - Details in *RCSD*, "Soaring Site", June 1993	Everywhere	Steen Hoej Rasmussen
Oct. 2-3	20th Annual CVRC Fall Soaring Festival	Visalia, CA	Jerry Fox (209) 733-8091
Oct. 2-3	Annual DEAF Fun Fly - Electric	Dallas, TX	Frank Korman (214) 821-0393
Oct. 2-3	CSS Pumpkin Fly	Cincinnati, OH	Bob Lester (513) 232-3117
Oct. 9	Team Thermal Duration Contest - T.O.S.S. - First Annual	Paramount Ranch, CA	Mike Reagan (805) 529-5513
Oct. 9-10	5th Annual MASS Fall Soaring Tournament	Memphis, TN	Bob Sowder (901) 757-5536
Oct. 10	Annual Dual Elimination	Dallas, TX	Jim Truitt (214) 348-2929
Oct. 16	Open	San Antonio, TX	Jerry Caldwell (210) 438-4077
Oct. 16	TULSOAR 12th Last Fling of Summer	Tulsa, OK	Sandy Hay (918) 665-8069
Oct. 16-17	2M & Unlimited Pelicans	Morriston, FL	Bob Wargo (813) 938-6582
Oct. 16-17	Fall Speed Festival Hosted by Torrey Pines Park - C.S.R. Unlimited/TPG 60" class	Southern CA	Steve Condon (619) 565-4361
Oct. 17	TULSOAR 2M & Unlimited	Tulsa, OK	Perry Gilstrap (918) 455-5490
Oct. 24	TULSOAR Fun Fly	Tulsa, OK	Mike Stephenson (918) 445-3002
Oct. 31	G/Lady Special Buzzards	Orlando, FL	Ed White (407) 321-1863
Nov. 7	610, 612 DEAF Dallas Electric Aircraft Flyers	Dallas, TX	Jack Hamilton (214) 348-4669
Nov. 13	TPG 60" CL Slope Race	Southern CA	Charlie Richardson (619) 630-8775
Nov. 14	Task T6 Triathalon	Dallas, TX	Chuck Fisher (214) 270-2634
Nov. 28	TULSOAR Fun Fly	Tulsa, OK	Doug Drullinger (918) 838-0282
Nov. 20	2M, Open	San Antonio, TX	Gene Warner (210) 732-3101
Nov. 20/24	Slope & Thermal Scale Fun Fly	Southern CA	Scott Condon (619) 471-2453
Nov. 21	5th Annual MASS Turkey Shoot	Memphis, TN	Mike Kelly (901) 756-9410
Nov. 26-28	Variety Buzzards	Orlando, FL	Cy Baylor (407) 699-8750
Dec. 26	TULSOAR Fun Fly	Tulsa, OK	Corey Gilstrap (918) 455-5490

** For more information about the Inland Empire Soaring Society, contact Al Lies, 1321 S. Rotchford Rd., Veradale, WA 99037.

***Additional information on the contests listed in Europe is available from *SOARER*, a British publication. Jack Sile, Editor, telephone 0449-675190 Suffolk, England.

R/C Soaring Digest
P.O. Box 2108
Wylie, Texas 75098-2108
(214) 442-3910
FAX (214) 442-5258

R/C Soaring Digest
A Publication for the
R/C Sailplane Enthusiast

Subscription Costs

USA: $19 Bulk/Third Class
OR $26 First Class
(Texas res., please add $1.38 tax.)
Canada & Mexico: $26 Air
Europe/U.K.: $36 Air
Asia/Pacific/Middle East: $42 Air

Please allow 4-6 weeks for U.S.A. delivery by Bulk. Surface delivery outside the U.S.A. is no longer available effective August 1, 1993.

Subscription Renewals

RCSD mails out one post card size renewal notice in the U.S.A. Outside of the U.S.A., the renewal notice is placed in an envelope.

How To Read Your Label for Expiration

214 1ST 94/01

214 - The first entry is the subscription number.

1ST - This is a first class subscription in the U.S.A.

3 - 3rd Class U.S.A.
A - Airmail Outside U.S.A.
S - Surface (No longer offered.)
Other - Tracking codes. (V, for example means advertiser.)

94/01 - The subscription is good through the December, 1993 issue. It must be renewed prior to January 1, 1994, or it will be logged in as a new subscription.

Back Issues

We receive many inquiries every month about the availability of back issues for *R/C Soaring Digest (RCSD)*. So, we try to print sufficient quantities each month for those of you who wish to obtain back issues or want additional copies. We hope you enjoy *RCSD* but, if you are NOT satisfied, please return them for a full refund, no questions asked!

(Quanties are limited for some months.)

1992	1993
❒ January	❒ January
❒ February	❒ February
❒ March	❒ March
❒ April	❒ April
❒ May	❒ May
❒ June	❒ June
❒ July	❒ July
❒ August	
❒ September	
❒ October	
❒ November	
❒ December	

Please send via:
❒ U.S.A. - U.S. Postal
❒ U.S.A. - U.P.S.
(Will not deliver to a P.O. Box.)
❒ Other Countries - Airmail

U.S.A., Canada, Mexico
Cost @ $2.00 Per Issue _____
Tax (Texas Only - 7.25%) _____
Total _____

United Kingdom/Europe
Total Cost @ $3.00 Per Issue _____

Asia/Africa/Middle East
Total Cost @ $3.50 Per Issue _____

❑ Please renew my current subscription.
❑ Please enter my new subscription to the *R/C Soaring Digest*.
❑ Please send the back issues I have selected.

Name_____
Address_____
_____
_____

(Check or Money Order, only, please. U.S. funds.)

Types of Advertising

Business

Business advertising is subject to the full rates.

Classified

Classified ads are free of charge to subscribers and are printed on a space permitting basis 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.

Clubs & Non-Profit Organizations

Clubs & Non-Profit organizations are not charged for ads where it is deemed that all readers benefit from the information. Where only a small geographical area benefit, these ads are charged at 1/2 price and are subject to space permitting basis. (Ads, on a space permitting basis, are run on a first come basis.)

Deadlines

The deadline for receiving advertising material is the 5th day of the prior month. (Example: If you wish to place an ad in the March issue, it must be received by February 5th.) There are always exceptions to the rule and, if the ad cannot meet the deadline, please contact *RCSD* to negotiate an extension.

Advertising Guidelines

- The publisher retains the right to refuse any advertisement for any reason.
- All rates are subject to change.
- All advertisements are the responsibility of the advertiser. The advertiser assumes the responsibility for any claims that might arise against the publisher.
- An advertiser's copy will be provided via 1st class mail to each advertiser of *RCSD* where the full advertising rates are paid and current. (Excludes classified.)

Ad Rates Effective December 1, 1990
(Cost/month based on # of ads in a year)

Ad Size	1 X	3 X	6 X	12 X
1/8 pg	$15	$14	$13	$12
1/4 pg	$30	$28	$26	$23
1/3 pg	$40	$38	$35	$30
1/2 pg	$60	$56	$52	$45
1 pg	$120	$112	$104	$90

Notes

RCSD has neither the staff or the facilities to investigate advertising claims. However, we would hope that any subscriber would feel free to contact us immediately if they are unable to resolve any issues they may have with any advertiser.

Advertiser Index

Do You Need Help With Ad Copy?
For help with ad design & typesetting, contact:
Barry Kurath
105 N.E. 61st #12
Portland, OR 97213
(503) 236-4067

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 5th day of the month. (Example: If you wish to place an ad in the March issue, it must be received by February 5th.) *RCSD* has neither the facilities or the staff to investigate advertising claims. However, please notify *RCSD* if any misrepresentation occurs.

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

DON'T YOU HAVE ENOUGH TROPHIES?? * ATTN: CONTEST DIRECTORS!!!** Award your winners w/shirts, caps, jackets, bags, individualized w/screen art (incl. place & class). Designed by fine artist and past Natl. Champion, Tom Jones. Golf shirts from $20.00, T's from $10.00. For more info. send S.A.S.E. to: **Zoomit Creations,** 16 S. Woodstock Cir., The Woodlands, TX 77381; (713) 363-3384.

SILENT FLIGHT CLASSIFIEDS, and more each month! List the gliders and electrics you no longer fly in our free ads. Radios, winches, snifflers and accessories, too. List it free in SFC. Subscriptions are 1 issue @ $1.00, 1/2 year @ $5.00, yearly @ $9.00. SFC, 329 Little Ave., Ridgway, PA 15853.

GLIDER RETRACTS - high quality, 1/5, 1/4, 1/3 scale made in U.S.A. 1/4 are standard or heavy duty. Contact Bill Liscomb, 7034 Fern Place, Carlsbad, CA 92009; (619) 931-1438.

CARBON FIBER, 100 ft. 12k tow ... $9.95 plus $2.00 shipping and handling. (For information, send S.A.S.E.) DISCOUNT COMPOSITES, P.O. Box 96, Bountiful, UT 84011-0096.

IRON ON CARBON FIBRE 3.7 Oz./yd^2, .007 - 2"x48"... $9.00, 12"x48"... $18.00, 1'x10'... $42.50. Iron on S-glass, 12"x48"... $10.00. Chopped carbon fibre... $2.95 bag. 100# test kevlar pull-pull system, 25' plus teflon-teflon sleeving... $7.00. 100% satisfaction guaranteed. Only $1.00 S&H. CA res. add 7.75% tax. Send LSASE for brochure & free samples to: California Carbon, P.O. Box 39, Jamul, CA 91935; (619) 669-6348.

SAILPLANE PERFORMANCE ESTIMATION easily done on your computer. Software contains wide selection of airfoil data, calculates polar curves and performance summary. Requires IBM PC, XT, or AT. Specify floppy disk size and density. Price: $30, or info. $1 + SASE to: Pete Steinmeyer, P.O. Box 67, Arvada, CO 80001-0067.

SCOUT G-72: 72" span, R/C sailplane kit designed for the traveling flier. Components pack into 8" x 8" x 22" kit box. Limited availability. Price: $26.00. Shipping: $3.00. Frank Zaic, Box 135, Northridge, CA 91328-0135.

For Sale - Personal

Immaculate RTF (never flown) Dodgson Designs LOVESONG, set up for Vision radio, harness included... $500.00 obo. Bob Sealy ULTIMA, NIB kit... $200.00; Dodgson Designs CAMANO, NIB kit (jig built fuselage included)... $125.00; Dodgson Designs CAMANO kit w/complete jig built fuselage... $125.00; EZ UP POP UP tent, 8' x 8'... $290.00 + freight. Contact Kevin Webb, 335 Shockley Rd., Auburn, CA 95603; (916) 823-9458 after 6 PM PST.

Robbers ASW-24, beautiful 4 meter with Graupner spoilers, unbuilt, brought this one back from Europe. Make me an offer I can't refuse or trade for F3B ship. Mike Smart 3 meter RAVEN plan pack, pre-sheeted wings, just need a fuselage, gull wing. Call Jeff at (702) 459-8100 Nevada.

Airtronics Vision 8SP CH 38, 4 FM receivers, extra Tx battery, (2) 1200 MAH receiver batteries, charger, 11 servos, extra gear sets, miscellaneous switches, Y-harnesses & extensions plus other accessories... $750.00 plus S&H; 2 meter DUCK... $400.00 w/o servos OR $625.00 with servos; 2 meter MERGANZER... $375.00 w/o servos OR $600.00 with servos. Call Mike Stump (616) 775-7445 eve. or (616) 775-1263 days.

Grob Twin Acro, Graupner 4 meter, new in box, lots of goodies... $495.00; Rowing LS 5, 5.5 meter, all glass, very good condition, 1/4 scale... $695.00; over 1/3 scale KA6 C, beautiful flyer, excellent condition, approx. 28 lb. flying weight... $1950.00; 1:2.5 scale LS4, 6.5 meter, completely finished, unbelievable German quality, approx. flying weight 40 lbs... $2495.00. Contact Dan Troxell at (714) 831-8013 Calif.

Müller COMET 88A, RG-15, capable of sub 20 sec. speed runs, 112" span, very strong three piece wing, slip-off nose cone, standard tail, NIB except for small wing fillets and tow hook installed. Cost me $700.00. I'm asking $600.00 plus shipping. Make me an offer I can't refuse! Contact Gerald Arana, 114 Corinne Ave., Santa Cruz, CA 95065; (408) 475-1939.

Multiplex ASW-22, 4 meter scale, retract, servos in wings, clear canopy, great flying sailplane... $375.00; PULSAR, 90% complete obechi covered wings, bass wood leading edges, painted fuse, wiring installed in wings... $160.00; JR Century 7 radio, 7 channels, great radio in perfect shape... $150.00. Call or write Darryl James, 1461 Manzana Way, San Diego, CA 91239; (619) 267-5771 (H), (619) 622-5701 (W).

2 Fantastic giant floaters (I have too many.) w/ servos & wheels perfectly balanced & flown many times - mint condition. Grob Twin, 24' span... $2500.00. LS4, 26' span... $2600.00. Robin Lehman at (212) 744-0405 NY.

Kraft 5-C with receiver and 5 servos on 53.600... $90.00; Ace Silver Seven with 2 receivers, 1-#810, 1-Silver Seven on 53.400... $175.00; frequency board, complete with pins, very compact, uses Ace freq., stickers have all 50, 53, 72 Mhz freq.... $50.00; Catalina X-C, SD 6060, 8.5 lbs. unballasted, never contest flown... $400.00. Gary Anderson (509) 773-5257 Washington.

Airtronics Vision VS 8 SP, CH 24, 92985 Rx, 700 MAH batt., sw. harness and all acc's., all used once, then batteries kept charged, plus the original 94102 servos (never used). Also, Futaba servos: 4 FPS1355 NIB, 2 FPS133 NIB, 2 FPS133 (used once, in new cond.). S.R. 450 mah batt. (like new), Ace Datamaster w/RF interface, M.E.N. automatic R/C system, charger C-50/4 (4 cell/8 cell), Litco auto fast charger. Any reasonable offer considered. Call Chris Grady at (913) 649-3074 Kansas.

SAGITTA 600... $50.00; CUMIC PLUS... $105.00; WHISPER... $80.00; MIDWEST SOARER... $35.00; MIDWEST ELECTRIC HOTS... $55.00; MIDWEST AERO ELECTRIC... $55.00; Airtronics LEGEND... $155.00; ACCIPITER XL... $165.00; CMP MARIAH... $165.00, extra wing core set... $30.00. Tom Gressman, 7753 Emerald Peak, Littleton, CO 80127; (303) 979-8073.

Airtronics VANGUARD, 6 CH XMTR + Rx (less batt, servos & harness), CH 28... $125.00 obo; Airtronics VANGUARD, 6 CH XMTR + Rx (less batt, servos & harness), CH 56... $125.00 obo; PULSAR RTF with wing bag, ailerons & flaps, less Rx & battery... $250.00 obo; 2M VORTEX, in the box, wood fuse, foam wing.. $45.00; CHEETAH RTF with wing bag, less Rx + battery... $275.00 obo; PANTERA RTF w/ wing bag, less Rx & batt... $200.00 obo; 2M Gnome RTF with wing bag, less Rx + battery... $150.00 obo; GNOME HLG RTF, less Rx + battery... $60.00; LUMINA ARF poly, needs radio + cover wing + cut out flaps... $150.00 obo. All planes wired for Airtronics. Call Curt Nehring at (714) 592-2105 (H) So. Calif.

Wanted

Airtronics Super Grand Esprit, Grand Esprit and Aquila. Joseph C. Hayes, 2468 Arrowhead Cir, South Bend, IN 46628.

Excellent condition, ready to fly with servos: Alcyone 121 in., Falcon 880, Shadow Plus, Genesis, Synergy 91. Call Kelvin at (205) 837-8106 Alabama.

Multiplex ASW-22. Prefer an unbuilt kit but will consider any degree of construction or condition. Will also consider any other quality scale kit of 3.5M or larger. Joe Thomas (408) 923-3045 days or weekends Calif.

ELF ENGINEERING

Hand Crafted Pre-Sheeted Obechi Over Foam Core Wings

High Quality
Replacement Wings
for
Most Sailplanes

and

Custom Wings
for
The Creative Modeler

Call Dale King
(214) 475-8093

or
for more information, send S.A.S.E. to the realms of:
Elf Engineering
1111 Highridge Drive
Wylie, Texas 75098

VACUUM BAGGING TOO EXPENSIVE?

Not Any More...

RENT
THE BEST PUMP IN THE HOBBY!
when you purchase supplies from
CST

Call or write for details
(For FREE catalog-send $3 for shipping and handling)

CST
Composite Structures Technology
Dept. M F • 2090 Andre Ave.• Los Osos
CA 93402 • 805/528-4875

"AERO-TOWING SAILPLANES"
A new video that demonstrates techniques on how to tow even the largest R/C sailplane into the air. VHS, only. $19.95 includes S&H.
SHIPPED 1ST CLASS, PRIORITY MAIL!

"ATRACS VERSION 3.0 UPGRADE FOR VISION 8 & AIRTRONICS 7 SP" and other videos are available in VHS for $15.00 ea; includes S&H.

Need a Super Towhook? $5.95 + $.50 S&H

For more info., send S.A.S.E. to: JOHN F. CLARKE, 911 COVERT AVE., N.H.P., NY 11040

VS Sailplanes NW Inc.

Vmax-PLUS
...more really fast stuff from VS Sailplanes

723 Broadway East
Seattle Wash. 98102
(206) 860-7711

CALL OR WRITE TO REQUEST OUR COMPLETE CATALOG

PERFORMANCE

Like you've never known, unless you own a ROTOR, that is!
- *Huge loops/ballistic exits*
- *Climbing axial rolls - no problem - inertial carry-through to spare*
- *3 rolls/ sec if you can handle it, or*
- *Continuous axial rolls/ no nose drop*
- *Acceleration/ top speed exceed any competition*
- *Tremendous climb rate in good lift/ maneuver cycle time a minimum*
- *Precise and powerful control response at any speed*
- *Docile handling/ no tip stall possibility*
- *Great high angle flight for high drag landing approach*
- *Not bad in light lift either (7-8 mph at Torrey Pines)*

MODULAR FEATURES

Like the other pitch/yaw airplanes from VS, our modular approach increases flexibility of Vmax-PLUS. The following wings can be used:
- *Standard Vmax(E374- balsa) o Standard Vmax(E374 ply)*
- *Vmax thermal(S3021-balsa-84in span)*
- *All three WINGS(ply/sp wings/HQ LS(1)-SD6060/E374) with slight mods*

BUILD TIME - CONSTRUCTION

SHORT! These features cut 50% off normal build time:
- *Glass/kevlar molded body/pre-drilled holes*
- *Blue foam cores/pre-sheeted option(extra cost)*
- *Only two sheet style tail surfaces*
- *Ultra simple pitch/yaw control- no long pushrods,wing bellcranks,hinges)*

Estimated time to complete: 15 hours(fast builder) 20 hours (good builder)

CONTROL SYSTEM

PITCHERONS: Articulated wing panels give pitch and roll. No tail surfaces. Behaves just like aileron/elevator but less drag
Requires aileron mix transmitter/standard size gear/2 ch
60 oz in servos reqd
WINGERON/ELEVATOR: Builder option- no mix reqd- add elevator to
stabs-use std servo to drive wings for roll only

SPAN = 58 INS	WEIGHTS : 29 OZ (min poss)
AREA = 305 SQ INS	57 OZ (FAI max)
ASPECT RATIO = 11	STRESSED FOR :
WING SECTION = THIN E374	ANY MANEUVER / SPEED

NEW
Airfoil Plot Program 6.0

New features include screen display of airfoils, automatic foam core templates for Feather Cut hot wire foam machine, and ease of use. Other features include:
- Any PC using MS-DOS 3.2 0r later (286 or better with math coprocessor recommended for Laserjet printers)
- CGA, EGA, or VGA graphics adapter required to display airfoils to screen.
- Alter camber and thickness
- Combine airfoils
- Enter coordinates
- Supports most popular dot matrix and HP Laserjet printers

COMING SOON Model Design program 4.0. Order Model Design 3.0 and receive a free upgrade

Model Design Program $50
Airfoil Plot Program $35

Send SASE for more information or call (615) 455-6430 after 7 PM central time.

Chuck Anderson, P.O. Box 305
Tullahoma, TN 37388

"THE NEST"

A PERFECT CONTAINER FOR RC MODELS!
SHIP IT-TRANSPORT IT-STORE IT!
CONVERTS TO FIELD STAND!

WE'RE SPEAKING FROM 20+ YEARS OF EXPERIENCE!
MOST POPULAR SIZES AVAILABLE:
(S&H IN U.S.A. INCLUDED)

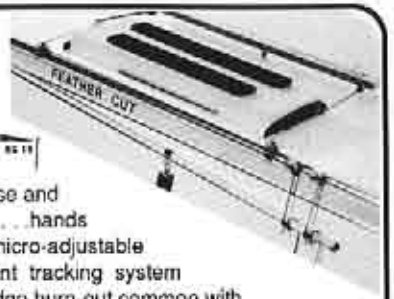
√ **7"X13"X52" $79.95**
(FITS MOST STANDARD AND 2 M WITH 50" MAXIMUM FUSELAGE LENGTH)
√ **7"X13"X57 (FALCON) $84.95**
√ **7"X15"X60" (SUPER-V) $89.95**
√ **7"X13"X62" (EAGLE) $89.95**
√ **ACCESSORY KIT $17.95**
("2 PILLOWS", "PERCH", "BLANKET")
√ **CUSTOM - NEED A SPECIAL SIZE? CALL OR WRITE FOR QUOTE. PRICES BASED ON BOX SIZE & MAT'L REQ'D.**

√ PACK-LITE™ NEST MATERIAL
√ NYLON SHIPPING STRAPS
√ COMPRESSION STRENGTH OF 3700 LB./FT.
√ EASY TO LABEL W/CARTER'S MARKS-A-LOT PERMANENT MARKER - RMV. W/ISOPROPYL ALCOHOL

D&D SPECIALTIES
7935 S. NEW HAVEN, TULSA, OK 74136
(918) 492-3760 - FAX (918) 492-5641

HOT-WIRE FOAM WINGMACHINE™

FEATHER/CUT



"FEATHER CUT" creates a new standard in the ease and accuracy of cutting white or blue foam wing cores . . . hands off! Precise single wire tracking in concert with micro-adjustable balance weights guided by an exclusive three-point tracking system guarantees ripple-free surfaces. No more trailing edge burn-out common with two wire systems. Couple "FEATHER CUT" with Tekoa's "THERMAL GENERATOR" for fool proof temperature control and you'll be a "Pro". . .first time out.

• Cuts straight or taper wings, fins and stabilizers — automatically. • Mounts with tape to the edge of any workbench, even your dining table and stores in its own heavy duty mailing tube. • Complete kit with anodized and plated components - no hardware store trips. • Instructions include "cutting your first wing", "making templates" and more. • 28" fold•bow. 40" and 52" available. Power supply required. • Guaranteed to out perform the rest. • "Simply" the best!

FEATHER CUT
$149.50 + 8.50 S&H
THERMAL GENERATOR
POWER SUPPLY - $119.50 + 4.50 S&H

TEKOA: THE CENTER OF DESIGN
3219 CANYON LAKE DRIVE
HOLLYWOOD • CA • 90068
PH 213•469•5584, FAX 213•469•3006

FEATHER/CUT GOES *CAFC*
WITH CompuFoil Professional
"COMPUTER ASSISTED FOAM CUTTING

-CompuFoil calculates Feather/Cut taper ratios
-CompuFoil auto-draws Feather/Cut templates
-and much more!

$75.00 plus $3.00 S&H

ZEPHYR
FROM...McLean's Models

The Zephyr is an all composite 2 Meter sailplane designed for high performance slope soaring and slope racing. The use of pivot wing technology, a streamlined fuselage, full flying stabilizer, and rudder results in an extremely fast and efficient sailplane. The Zephyr is also available with 90" wings for unlimited slope racing and light lift cruising. The Zephyr finished 2nd place at the Miguelito Canyon CSR race on March 2, 1993 in the 2 Meter division. The Zephyr took two firsts and a second in three heats.

Zephyr Deluxe Kit includes:

• Vacuum bagged wings with 100% carbon fiber wing skins, fiberglass outer layers, kevlar leading edge, PRB blue foam cores • Fiberglass fuselage with uni-S-glass and kevlar reinforcement, glass canopy, airfoil shaped vertical fin • Deluxe hardware kit containing 3/8" steel wing rod, heavy duty wing drive assembly, pre-cut 1/4" plywood for wing roots and servo tray, wing pivot hardware, 5/32" steel wing drive pins and misc. wood, brass tubes, wires, etc. • PRB blue foam SD 8020 stabilizer cores or optional composite stabs • Full size drawings and construction manual.

Specifications		Prices	
Wing span	2 M - 90"	2 Meter Kit	$219.95
Wing area	450 - 560 Sq. In.	90" Kit	$229.95
Wing airfoil	SD-7003 or S-6062	Partial Kit	$99.95
Wing loading	14 - 16 Oz./Sq. Ft.	Hardware Kit	$29.95
Wing aspect ratio	13.5 - 14.0 to 1	Composite Stabs	$19.95 (w/kit)
Fuselage length	45 inches		
Stabilizer area	65 - 72 Sq. In.		

Coming Soon! 'Lil-Zephyr 60" Slope Racer

Brian J. McLean, 75 Fleurance, Laguna Niguel, CA 92677; Phone (714) 363-7331 Evenings

From Germany

VOLZ STAR SERVOS

MICRO STAR II

All precision metal gear and ball bearing. Powerful, lightweight solves installation problems in narrow wings. With a torque of 1.8 kg/cm @ 4.8v it has the ability to perform well in almost any application. Weights 18 grams with a transit time of .17 sec/45°.

Retail: $91.00
Special: $55.12

MINI STAR II

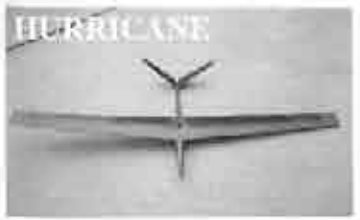
All precision metal gear and ball bearing. Offers up a powerful 3.1 kg cm @ 4.8v. Weights 32 grams with a transit time of .16 sec/45°.

Retail: $76.00
Special: $44.25

The Micro-Star II is a very popular servo and widely used in Europe. It comes with a high quality potentiometer with four sliders. This design offers high reliability. This servo also features a narrow profile which helps satisfy installation requirements of aircraft with thin wings and fuselages. Peter and Klaus Kowalski used Micro-Star IIs in their 'Spark' designs, including Klaus's model which broke the world speed record at 149 mph. The fastest lap was at speeds in excess of 180 mph, where these servos were definitely put to the test. Nick Wright, who has been on several British F3B teams, also uses them.

The striking blue cover of these servos not only looks nice but they are strong and functional as well. The covers are impregnated with fiberglass for added strength and have additional fixtures at the center of the servos so they can be used from both sides.

Exclusively Distributed in the U.S. By GRECO TECHNOLOGIES (213) 680-2070
Post Office Box 10, South Pasadena, CA 91031



OTHER PRODUCTS AVAILABLE FROM GRECO

To introduce the many new items now available we are offering our customers, for a limited time, substantial savings on all of our products.

GRECO PRODUCT	Retail	Special
Molded Modi 900	$900.00	$900.00
Thermal Modi 900	$800.00	$800.00
Duration Modi Kit	$350.00	$265.00
Javelin Hand-launch Kit	$150.00	$135.00
Hurricane 60" Slope Racer	$ 80.00	NAP
F-18 Hornet Slope Glider	$420.00	$375.00
2 Meter Glider	$350.00	NAP
Greco F3B Winch	$1,500.00	$1,500.00
Greco F3B Winch Stand	$350.00	$350.00
Aluminum Belcrank w/Precision Bearing	$ 30.00	$ 25.50
Standard Towhook	$ 6.50	$ 5.53
Standard Towhook for Ballast	$ 6.75	$ 5.74
F3B Towhook	$ 7.50	$ 6.38
F3B Towhook for Ballast	$ 7.75	$ 6.59
48" long Music Wire Push-Rod	$ 5.00	$ 4.25
14mm Carbon Fiber Wing Joiner, 5 Degrees	$ 55.00	$ 46.75
1/2" Carbon Fiber Wing Joiner Rod, 0 Degrees	$ 30.00	$ 25.50
11/32" Heat Treated Steel Wing Joiner Rod	$ 17.00	$ 8.50
Hinge Tape, 10ft Roll	$ 9.00	$ 7.65
Gap Seal Tape, 10ft Roll	$ 10.00	$ 8.50
Introduction to Vacuum Bagging Wings Video	$ 30.00	$ 30.00
Mini-Star II, All Metal Gears	$ 76.00	$ 44.25
Micro-Star II, All Metal Gears	$ 91.00	$ 55.12
Mounting Tray for Micro Servos	$ 10.00	$ 9.00
Mounting Tray for Mini Servos	$ 10.00	$ 9.00

SLEGERS INTERNATIONAL

Route 15, Wharton, New Jersey 07885

(201) 366-0880 - FAX (201) 366-0549
9:30 A.M. - 5:00 P.M. (Closed Sun. & Mon.)

High Quality Electric & Non-Electric Sailplanes, Radios, and Accessories for the Sailplane Enthusiast

Our inventory includes brand name products from many sailplane related businesses. For information on additional brands, specific products and availability give us a call, or send a S.A.S.E. Send us your name and address now to get on the list for your FREE catalog.

Aero Naut... *Props, Spinners, and Adapters*
Agnew Model Products... *Sailplanes*
Airtronics... *Planes, Radios, and Accessories*
Asto Flight... *Motors, Chargers & Speed Controllers*
Composite Structures Technology... *Vacuum Bagging Equipment and Composite Material*
Culpepper Models, Inc.... *Sailplanes*
Flightec... *Speed Controllers*
Kennedy Composites... *Obeche & Composite Material*
Layne/Urwyler... *Electric and Non-Electric Sailplanes*
M.A.P. of France... *Electric and Non-Electric Sailplanes*
Pacer... *CA Glue & Epoxies*
RCD... *Receivers, Servos, and Speed Controllers*
Robbe... *Planes, Keller Motors, and Accessories*
R&R Products... *Sailplanes*
Rudolf Freudenthaler... *High Performance Electric Sailplanes*
S&R Batteries... *Batteries*
Soarcraft... *Servo Mounts, and Control Horns*
Wright Manufacturing... *Sailplanes*

Having a hard time getting props, spinners, and adapters? Call Slegers International. Most 7 - 10 cell props, spinners and adapters in stock and at reasonable prices! ☆

☆ VISA ☆ MASTERCARD ☆ AMERICAN EXPRESS ☆ DISCOVER ☆

SATURN 2.2E

A Layne/Urwyler Design

Layne/Urwyler manufacturer a fine line of Saturn Sailplanes. Their first electric design, the SATURN 2.2E, is available exclusively from Slegers International or direct from Layne/Urwyler. Additional information on their sailplanes is included in this publication.

SATURN 2.2E
Thermal for 7 - 10 Cells

★ Ultra light epoxy glass/kevlar fuselage featuring an all molded motor mount for precise motor alignment, and a molded stab mount to insure perfect incidence ★ Strong, yet light and practical, three piece wing featuring precision cut foam cores, a light weight spar, and obeche skins ★ Great climb speed under power and thermal performance you would expect only from a traditional sailplane ★ Strong enough to fly at high speed, and through aerobatic maneuvers without risk of wing failure ★ HQ 2.0/9 - 2.0/8 Airfoil

★ VISA ★ MASTERCARD ★ AMERICAN EXPRESS ★ DISCOVER

Agnew Model Products Design

BANSHEE

Agnew Model Products is the manufacturer of a fine line of sailplanes. BANSHEE is an American made sailplane kit designed by Brian Agnew, Agnew Model Products. His contest winning designs are well known in competition circles around the U.S.A. for their extraordinary flying abilities.

BANSHEE - Thermal 2M

★ Pre-sheeted wings w/polyhedral pressed into each panel
★ Pre-sheeted stabs
★ Fiberglass fuselage and canopy
★ All hardware & instructions
★ Root rib pre-glued
★ Ailerons and flaps pre-cut
★ E387 airfoil

SLEGERS INTERNATIONAL

Route 15, Wharton, New Jersey 07885 (201) 366-0880 - FAX (201) 366-0549
9:30 A.M. - 5:00 P.M. (Closed Sun. & Mon.)

TNR TECHNICAL INC
YOUR BATTERY STORE

Authorized SANYO Distributor

STANDARD	SIZE	CAPACITY (mAh)	DIA	HT	WEIGHT (oz.)	PRICE
N-50AAA	1/3AAA	50	.394	.591	0.13	$ 1.65
N-110AA	1/3AA	110	.551	.650	0.38	$ 1.50
N-150N	N	150	.453	1.122	0.39	$ 1.50
N-200AAA	AAA	200	.394	1.720	0.35	$ 1.75
N-270AA	2/3AA	270	.551	1.161	0.50	$ 1.50
N-600AA	AA	600	.543	1.945	0.92	$ 1.50
N-650SC	1/2SUBC	650	.866	1.016	1.02	$ 3.00
KR-1300SC	SUBC	1300	.866	1.654	1.70	$ 2.00
KR-1500SC	SUBC	1500	.866	1.654	1.66	$ 3.00
KR-2000C	C	2000	.992	1.969	2.47	$ 4.00
KD-4400D	D	4400	1.272	2.362	5.30	$ 7.00
KR-7000F	F	7000	1.272	3.543	8.13	$13.00
HIGH CAPACITY						
N225AE	1/3A	225	.650	.842	0.42	$ 3.00
KR600AE	2/3A	600	.650	1.094	0.77	$ 2.00
KR800AAE	AA	800	.543	1.949	0.85	$ 2.50
KR1000AE	4/5A	1000	.650	1.654	1.09	$ 2.95
KR1100AAE	7/5AA	1100	.543	2.520	1.06	$ 3.25
KR1200AE	A	1200	.650	1.969	1.06	$ 2.95
KR1400AE	A	1400	.650	1.969	1.09	$ 3.95
KR1700AE	4/3A	1700	.650	2.598	1.48	$ 4.95
KR1800SCE	SUBC	1800	.866	1.654	1.65	$ 3.50
KR2800CE	C	2800	.992	1.969	2.75	$ 5.95
KR5000DEL	D	5000	1.272	2.598	5.28	$ 8.95
FAST CHARGE						
N600SCR	1/2SUBC	600	.866	1.016	1.02	$ 3.25
N800SCR	A	800	.650	1.969	1.16	$ 3.00
N1000SCR	2/3SUBC	1000	.866	1.299	1.44	$ 3.50
N1400SCR	SUBC	1400	.866	1.654	1.87	$ 3.50
N1700SCRC	SUBC	1700	.866	1.654	1.99	$ 4.50

Specify Solder Tabs *FREE* of Charge

4 CELL RECEIVER PACKS (Flat or Square)

4N-50AAA	$ 8.95	4N-800AE	$11.95	4KR-1300SC	$11.95
4N-110AA	$ 7.95	4KR1000AE	$12.95	4KR-1500SC	$13.95
4N-150N	$ 8.95	4KR1100AAE	$17.95	4KR-1800SCE	$18.00
4N-200AAA	$ 8.95	4KR1200AE	$13.95	4N-1400SCR	$16.00
4N-225AE	$12.95	4KR-1400AE	$16.95	4N-1700SCRC	$19.95
4N-270AA	$ 7.95	4KR-1700AE	$19.95	4KR2000C	$20.00
4N-600AA	$ 8.95	4N-650SC	$13.95	4KR4400D	$34.00
4KR-800AAE	$11.95	4N-800SCR	$13.95	4KR6000DEL	$42.00
4KR-800AE	$10.95	4N-1000SCR	$15.95		

5 CELL RECEIVER PACKS

To order a 6 volt Battery Pack add the cost of a single cell to the 4 Cell Battery Pack.

CONNECTORS

FUTABA	J	$4.00	AIRTRONICS		$4.00
FUTABA	G	$4.00	JR/HITEC		$4.00

TRANSMITTER PACKS

8N600AA 8KR800AAE	1 row of 8 AA	$15.95 $20.00	8N600AA 8KR800AAE	2 sticks of 3 1 stick of 2	$15.95 $20.00
8N600AA 8KR800AAE	4 sticks of 2 square	$15.95 $20.00	9N600AA 9KR800AAE	3 sticks of 3 10.8 volt	$18.00 $22.00

GELL CELLS

6 volt	1.2 AH	$12.00	12 volt	7.0 AH	$15.00

TNR Technical Inc.
279 Douglas Avenue • Altamonte Springs, FL 32714 • (407) 682-4311

1-800-346-0601
FAX (407) 682-4469

Add $4.00 shipping & handling
7% sales tax for Florida residents
DEALERS' INQUIRIES WELCOME

VISA

★ *Designs by LAYNE / URWYLER*

FOR PERFORMANCE OUT OF THIS WORLD

SATURN 2.9T

FEATURES:

- ★ High quality, light weight, epoxy/glass/kevlar fuselage with solid wire pushrod tubes pre-installed;
- ★ Precision cut white foam cores with pre-installed spar for use with ultra strong 3/4" X 36" T6 aluminum alloy wing rod; Obeche wing skins;
- ★ Strong, ultra light, easy building T-tail featuring Layne/Urwyler carbon fiber bellcrank assembly and molded glass stabilizer mount;
- ★ One of the strongest and lightest airframes available in its class, producing maximum altitude on winch launches;
- ★ A world class HQ airfoil that provides great "hang time" in light lift, and the penetration required to move out in the wind, with or without ballast;
- ★ Ideal flap area designed to slow it down and hit the spot every time with maximum control.

Winner 1993
NASF/MASS MID-SOUTH SOARING CHAMPIONSHIPS
flown by David Layne

Standard Kit Price: $239.00
Deluxe Kit W/Pre-Sheeted Wing & Stab: $339.00
Plus $15.00 S&H Continental U.S.A.
(CA res. add 7.25 % tax)

LAYNE/URWYLER
1808 Applegate Dr.
Modesto, CA 95350
(209) 529-8457
FAX (209) 549-1642

SPECIFICATIONS:	2.9T	2.5T
Wing Span:	113"	99"
Wing Area:	938 Sq. In.	825 Sq. In.
Airfoil:	HQ 2.0/9 - 2.0/8	Same
Weight:	65 - 72 Oz.	57 - 65 Oz.
Wing Loading:	10.0 - 11.0 Oz./Sq. Ft.	Same