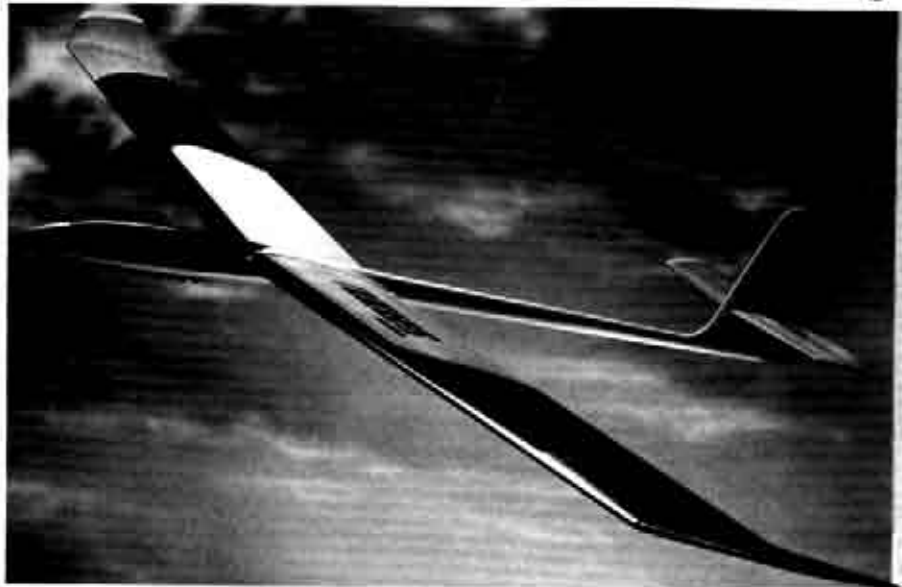


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The Shadow, by TEKOA: The Center of Design



Every now and then an industry experiences a shift in product design quality and performance. The SHADOW by TEKOA represents a shift that could only be described as revolutionary. Roger Chastain has raised the bar in R/C soaring by engineering a kit that wrecks of quality from kit content to flying performance. People all over are quickly discovering that the SHADOW represents a new standard in soaring.

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The Shadow is designed by Roger Chastain of TEKOA: The Center of Design, and is flown by NATS Champion, Blayne Chastain. Northeast Sailplane Products is the exclusive distributor.

R/C Soaring
D I G E S T

May, 1993
Vol. 10, No. 5

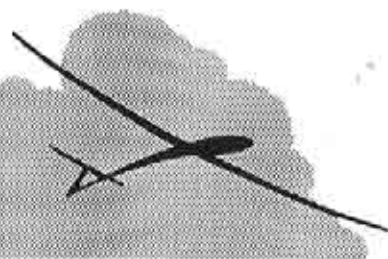
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**Soaring In Taiwan
"White Sand Beach"**
Jim Hammond & his 7 year old Sigma
are flying in February!
Story is on page 36.

R/C Soaring Digest

A publication for the R/C sailplane enthusiast!



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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.

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RCSD Staff

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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.
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The Soaring Site

Gloss Paper

R/C Soaring Digest is still printed in California by Joe Borland of J. Morgan Graphics. He does a great job, and we utilize the FAX and UPS overnight services. But, when RCSD is packaged and mailed back, it takes 5 working days for it to arrive, and the 12 boxes weigh approximately 60 Lbs. each! Well, needless to say, there is always some damage, although usually minor, before we can stuff each copy into an envelope and mail them on to you. (There is quite a bit more work involved than just stuffing the envelopes, of course!) Well, last August we did a test and found that gloss paper provides better support and there is, consequently, less damage. So, it is our intent to go to 16 pages (1 signature) of gloss on a permanent basis beginning with this issue. Several of you have sent in notes saying, "Please promise you'll never go gloss and full color!" Well, some gloss, in this case will provide that needed support so we hope that you'll forgive us, but we will probably never go to full color because of the cost associated with it, unless the technology significantly changes, of course.

You probably noticed that we're still at 80 pages... Well, it is your continued support that has caused us to gradually increase the size of RCSD from 32 pages back in September of 1990 to where it is today. It is your notes, and telephone/FAX calls with words of encouragement that keep us going. We appreciate it; it makes our day! Thanks!

For those of you who are able to send us computer disks go another special "Thanks!" This saves a tremendous amount of time (and potential error on our part) and is one very significant reason that we have been able to continue to increase the number of pages.

European Chronicles

We have a French correspondent, now, and the first of his series of articles about flying in Europe/France appears in this issue. Marc Dufresne works for DEC Corporation and was recently transferred to Paris, France from New Hampshire, U.S.A., so some of you folks probably recognize the name. Marc explains it all in his first article, and if you're over his way, be sure to look him up! Also, if you have any questions, drop him a line, FAX, or give him a call.

A Question from South Africa

Cameron Ninham of South Africa needs some help locating information on a glider wing. He says, "The glider (wing) is called a SCORPIO II, designed by Mads Bendt of Denmark. It has a 32 inch span, built of foam and covered simply with brown paper and PVA glue. It is intended as a quick build, "no-care-for" (if it crashes, just assemble another one...), aileron trainer. I only know that the plans were advertised in some model magazine. Could you please help me?"

If anyone can tell us how to obtain information on this glider or can tell us which magazine it is included in (and issue if possible), please drop RCSD a note or give us a call. Thanks!

NASSA Date Change!

For some reason, they hold a lot of conventions in Richland, Washington. So, in order to get rooms, the date for the North American Scale Soaring Association Rally (NASSA) has been changed from July 10-11 to July 24-25.

Summer Soaring Festival

On August 14 & 15, in Carson, California, the Soaring Union of Los Angeles (SULA) and the California State University at Dominguez Hills are holding a special event to raise money for the School of Science, Mathematics & Technology Scholarship Fund. Although their announcement appears in this issue, we received a note from Edward R. Kennedy, SULA Secretary and Chairman of the Summer Soaring Festival Committee, with some addi-

tional information about the event. Ed says, "We are excited that the University has joined us as co-sponsors, permitting the use of their name and logo and announcing that the purpose of the festival is to raise money for their scholarship fund. We hope this effort on our part to give something back to the school which has been our flying site for twenty years will help a budding scientist as well as help us to keep our excellent flying site in the middle of urban Los Angeles. And maybe it will attract a few more younger people to our hobby." Additional information on this event can be obtained from Ed at (310) 519-7628.

International Postal Competition

The August, 1992 issue of RCSD, page 34, has an article written by Kale Harden of Palm Harbor, Florida. The Pelican Soaring Association is extending an invitation for a few other clubs to join in this fun event, and Kale says:

"Most regular RCSD readers have read about the International Postal Contest which is organized and administered by the Pelican Soaring Association of St. Petersburg, Florida. This is a bi-yearly soaring contest which is in its eleventh year, now. 5 rounds of 6 minute precision duration are flown and the results are sent to the Pelican Club where they are compiled and mailed back to the competing clubs. Contests are flown on the last weekend in March and the first weekend in September with the following weekend being used as a rain date. FAI type winches and line lengths are used as is the FAI-F3B landing tape.

"Until recently, one club per country was allowed to enter the postal Contest, but a recent change in rules will permit more than one club per country to participate. Hence, this notice is an invitation to other clubs in the U.S.A. who are interested in participating in the IPC to contact the Pelican Club to receive full particulars. Address inquiries to the club secretary: Kale L. Harden, 3184 Brunswick Circle, Palm Harbor, Florida 34684.

"Not over 5 U.S.A. clubs will be permitted to

enter the IPC and they will be accepted on a first come basis. Most clubs currently participating have from 10 to 40 members, so clubs of this size would be most suitable for participation in the IPC."

(We're a bit late with this information and see that we have missed the March postal, but there is one coming up in September. Sorry, Kale!)

Northwest Soaring Society

On occasion, we receive letters from folks looking for others to fly with in their area. For those of you located in the NWSS area, the following information was obtained from Roger Breedlove of Beaverton, Oregon.

"The Northwest Soaring Society (NWSS) is a group of about 130 radio control sailplane enthusiasts who are sprinkled over Oregon, Washington, Idaho, Montana, Alaska, British Columbia, and Alberta. It is held together by a newsletter which is published monthly except for November, December and January.

"The purpose of the NWSS is to promote R/C sailplane flying in the Pacific Northwest. This done by scheduling and promoting sailplane contests, by reporting the results and by sharing helpful hints on building and flying. The results of each contest are sent to the NWSS Scorekeeper, and a season champion is announced at the season-ending banquet, Saturday night of the Tournament Weekend. The pilot is the NWSS member who has flown at least 8 contest days and who has the highest percentage score for the contests attended.

"In order to attract new contest flyers, two pilot skill categories have been defined: Competitor and Expert. The Expert class consists of those pilots who have flown at least four contest days during the year at an average of 80% of their possible contest points. Most contests award trophies to these two pilot classes, plus the 2-Meter sailplane class, but there are deviations, so check each individual contest announcement.

"The NWSS awards many trophies at the annual banquet, including awards for high-

est percentage in Expert and 2-Meter, Most Improved, the Cliff Mink Service Award, and several relating to the Tournament such as the Team trophy. In addition to the contest events, many NWSS member clubs sponsor other sailplane get-togethers, including fun-flies, slope races, handlaunch contests, cross country races, and scale events."

Roger Breedlove is the newsletter editor and is located at 6680 S.W. Wisteria Pl, Beaverton, OR 97005; (503) 646-1695 home or (503) 297-7691 office.

North Texas Aeromodelers

The North Texas Aeromodelers are holding a 2nd Annual Soaring Contest on July 4th at the North Texas Aeromodeler's flying field in Denton, Texas. It is an AMA sanctioned event; pilots meeting is at 9:00 A.M. and launching starts at 9:30 A.M. Entry fee is \$10.00. Al Sugar, the C.D., sent in the announcement which says, "This is a specialty event to capitalize on the concept of flying a full-size R/C sailplane contest on a football sized flying site (i.e., typical power plane field). The Task is 15 minute cumulative duration with 4 launches. Maximum flight time is 6 minutes. Landing format is L-4, 50 ft. diameter, with 15 points earned on a "in-out" basis for Sportsman, and 15 points deducted from an Expert's failure to make landing if his machine is equipped with working landing controls. (The Expert is required to make his 15 landing points, otherwise he will be penalized.) Class: any size sailplane that will launch with a 12 lb. force of a standard high start. There are two classifications: Sportsman and Expert. A Sportsman is any pilot that does not have a landing control system on the sailplane and is not classified as an Expert; An Expert is any pilot that uses 3 or more channels and has won/placed in two local or AMA sanctioned contests within 3 years. Two re-launches are permitted. The flying field is marked off for 328 feet. Max launch force will be 15 lbs., and the flights will be in 15 minute rounds." If you wish to obtain additional information, please contact Al Sugar at (214) 436-5200 days.

**Happy Flying!
Jerry & Judy**



**Jer's
Workbench**
Balsa Wood and
Carbon Lamination
the Easy Way

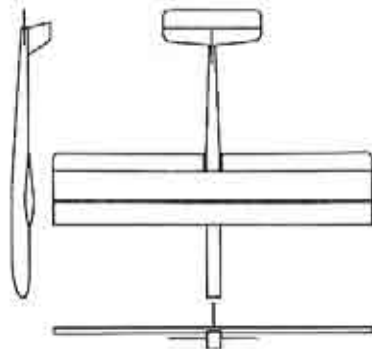
Lighter and stronger is, of course, better. To build a stronger wing we will need stronger spars, so that we can do a zoom launch that looks good without the wings folding, and the heavy, stronger spars come with a high price, called weight.

I received a package of "Iron On Carbon Fiber" from California Carbon. It looked so interesting that I had to give it a try. Unlike the carbon tows that I have been using, this product is easy to handle and separates into strips because of the way it's packaged. It will separate into 1/8, 1/4 and 3/8's inch strips with the greatest of ease, without any loose bits of carbon floating in the air.

I made a spar using a piece of 1/8 X 3/8 X 36 inch balsa, a 3/8's inch strip of iron on carbon, and thin CA glue. Making the carbon/balsa spar was quick and easy. It took longer for my iron to heat up than it did to make the first spar. First, I laid the carbon onto the balsa and ironed it at one end. To my surprise it did stick in place. Pulling the carbon out straight, I continued ironing the length of the spar; within seconds I was done. Then, I applied a coat of thin CA glue, while holding the spar over a waste basket; the CA glue covered the spar very quickly. After the CA cured, the rough edges were very lightly sanded off. The balsa spar weighted in at 3 grams. The carbon, .004 X 3/8 X 36 inches, was less than a gram. The completed balsa spar with carbon and a coat of CA glue brought the weight to 7.5 grams; after a bit of very light sanding to remove the rough edges and extra CA glue, I removed 1/2 gram so that the total weight of one spar was 7 grams.

For more information about Iron On Carbon Fiber contact California Carbon, P.O. Box 39, Jamul, CA 91935; (619) 669-6348. ■

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KIWI Tornado

...by David Griffin
Christchurch, New Zealand

After seeing my first P.S.S. project, a 42" span F-20 fly well and look great in the air, I was quite excited when fellow glider guider Dave Plumb of Nelson offered me the loan of his B52 & Tornado plans, drawn by Englishman R.M. Green. Having seen many photos and stories on Simon Crocker and Ray Jones' 16' span B52, I initially intended to build a 72" B52 from Dave's plans, but eventually decided to build the Tornado due to its smaller size and simpler construction.

After much research and head scratching, I decided to modify the wing section from a Clark Y to an Eppler 374 in order to improve penetration and aerobatic handling. Wing cores were cut and veneered with 1/16th balsa, and attached with epoxy. D-hinges were used to attach ailerons and these were driven by individual servos located at the wing centre section. I found the D-hinges very useful and ended up using them on the elevator, as well. They operate very smoothly and allow the control surfaces to be easily removed.

The fuselage has a central box construction for the nose and lower fuselage, with jet intakes, wing seat, and rear fuselage built on top. A large tail plane and fin key together, and also into the fuselage, for a very strong construction. At this stage, the plan called for short foam nacelles to be added under the tail

plane to simulate the engines. This however is quite a deviation from scale, so I decided to 'build up' the lower fuselage from the tail to just behind the jet intakes to more accurately reflect the full scale.

The item which took the most research on the entire model was the jet exhausts. The plan suggested using a commercial plastic container cut to shape... But what container? I searched the pantry...! Searched the supermarket... I even took a mold from a plastic Air New Zealand glass... Too complex to mold accurately!... Then, finally, I spotted the right size and shape in the fridge at the corner store... A yogurt container!!

The canopy was initially carved in balsa, and then the local model shop was able to provide a same day (2 hours, in fact) vacuum forming service. Two pilots and cockpit details were also added.

I found some pictures of a colour scheme I liked in a 'Flight International' magazine, and decided to cover the model in grey Pro-Film, and then add olive-drab camouflage by air brush. Nose and yogurt containers are painted matte black. Roundels and squadron details, etc., were added using Pro-Trim.

The model has two aileron servos, enabling aileron and flap operation, rudder is coupled with the aileron to balance turns, and elevator is normal. Controls are mixed via a Futaba 7UAP R/C.

At this stage, I was becoming a little concerned at the weight. The wing loading is 24 oz./sq. ft., which is 5 oz./sq. ft. more than indicated on the plan and is due to my modifications; but looking back now, this doesn't seem to be a big problem as I would not enjoy flying the model in light lift, anyway. The high wing loading problem may also be helped by the wide flat bottomed fuselage.

So, now we come to that bitter-sweet moment in every modeller's life... the first fright... Dave Morgan, my wife,

Glennis with video camera, and I headed up the hill to our slope, which is just 1/2 mile from home. Dave gave the Tornado his best "Schwartzinager" throw and.... It **FLEW!!!!**

After 3 short test flights, it was off to the real lift at Allendale, about 7 miles further up and along the hills. This site lies at the end of Lyttleton Harbour and has 1300' of smooth, gradually steepening slope. Most days in Christchurch, we have a northeast sea breeze, which blows straight down the harbor and up this slope. It is usually the home site for our local hang-glider pilots, so we don't fly here unless the wind is too strong for them - over 15-20 kts. Here we flew for about 30 minutes before the light faded. It rolls wonderfully, pivoting around its centreline. Loops are big, inverted is OK, and long low passes look great!

The Tornado and I now have about 10 flights under our wings. P.S.S. is a very impressive and interesting change to regular slope soaring and well worth a try. The range of subjects is enormous. In Christchurch there are presently 3 Vulcans, an A4 Skyhawk, an A10, a Messerschmidt 163 (I think), and 2 Bae Hawks. ■

New Zealand News

...by David Griffin
Christchurch, New Zealand

We hold our national soaring champs here in Christchurch in March expecting about 40 entries from a population of 3 million. The events include:

- * 3 rounds of F3B
- * 6 minute duration & spot, four rounds (The best 3 count.)
- * 2, 4, 6, 8, 10... duration soaring for 2, 4, 6, 8, 10 & spot (Any order is OK, but all must be within one hour! It is lots of fun!)
- * Electric 7x7, 7 cells max, 7 min. duration, landing in 15 metre circle, 3 flights (No recharging!)
- * Champagne Fly-off (Everyone launches about the same time. Last one down wins the bottle of Champagne. Flown late in the day, this is a lot of fun, too. The winner usually has < 10 min. duration.)
- * Slope Race

We now have 4 WACO 10-550's in the local area. There is a lot of very positive reaction. We hope to start 10 cell F3E soon, and build up to the World F3B champs in Australia next year.

We now have 2m rules and contests thanks to the interest generated by Danish 2m Postal Contest. This class grew like nothing I have ever seen before!! If anyone is coming to New Zealand on holiday, they are welcome to contact me at 98 Patterson Terrace, Halswell, Christchurch 8003. The phone number is 00-64-3-3229508. ■



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SAY NO TO HANGER RASH

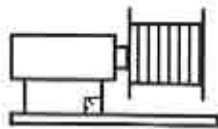
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Winch Line ...by Gordon Jones

Gordon Jones, 214 Sunflower Drive,
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After 5:00 P.M. CST

Bits & Pieces

I have always disliked the various methods of installing servos in a wing. It seems that too much silicone or epoxy or something kept me from a speedy repair of that broken gear after a hard landing or something. And it always seemed to happen on the day there was massive lift waiting for me just above launch height. Last fall a member of our local club (the Soaring League of North Texas) refined many of the ideas that have been out there for sometime; Jack Hamilton came up with a foolproof way to install servos without gluing them into the wing. Now this idea may not be new for some, and has probably been around for a while in one form or another but it is a practical idea that I would like to pass along to others who may share my sentiments on this subject.

The basic concept is to cut out a cavity for the servo that is the depth of the servo, the flooring material and cover combined. The servo is held into the wing by the servo cover and four hardwood blocks glued to the front and rear of the servo cavity. Once the servo cavity is cut out, line the inside with 1/64th plywood or obechi on the bottom (floor), the sides, and front and rear. This provides a neat installation and support through a good surface for the servo well.

The process can be as simple as you want to make it with no special tools; unless you plan to perform installation of the same type servo in numerous wings in the future. (I took this approach as I only use two types of servos for ailerons and flaps.) First, mark the wing for the intended servo and cut out the cavity for the servo in the wing. I use a Dremel Mototool with a router attachment to set the depth

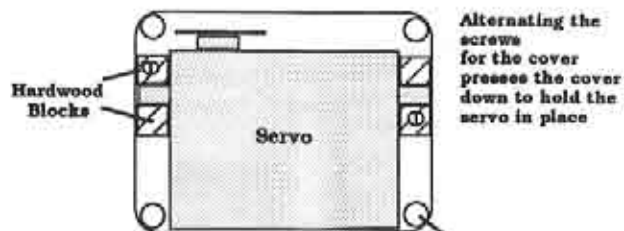
and a drill bit for the cutting. Be sure to measure the wing thickness prior to cranking up the Dremel as you don't want a hole in the top of the wing. I am personally familiar with a friend who recently had a chuck come loose and it made a not pretty hole in the top of the wing. Plus, I have come close a couple of times when I mis-measured; so be careful. The depth of the cavity will be dictated by the thickness of the servo plus the material that you use to line the servo well.

Next, line the servo cavity with your intended material being careful to get a good fit all around. I have gone to the trouble of making templates for all the pieces (sides, floor and front/rear). Once the servo well is lined, measure and cut some hardwood posts to hold the servo in place. These should be a snug fit with the servo in place to keep it from moving around. Be sure that you cut the posts to allow for the servo cover/hold down to remain flush against the top of the wing. Then cut the 1/32" plywood servo cover, drill the screw holes and route out the opening in the cover for the servo arm.

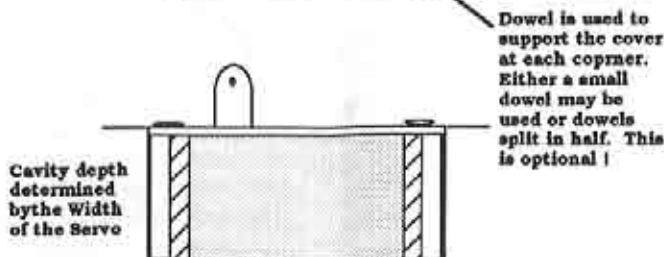
Trial fit the servo in the wing and make sure that everything fits snugly. Then run your wires for the servo, mount the servo and you are in business. Like the man said, "Try it, you'll like it". If you have any other ideas or ways to cut down on labor pass them along.

We have made plywood templates for the various servos by measuring the size of the servo at the lugs and across the servo at the output arm (plus a bit for the clevis or attachment device). Add the diameter of the drill bit and cut it out. If you use the router attachment you can make a new bottom plate of Plexiglass with a piece of brass tube for the center guide. This allows you to watch the cutting closely and avoid mistakes. If you want to try this whole thing and have questions I have some templates I can provide.

It seems that the model hardware availability comes in cycles. You will be able to find good hardware for a while and then it will disappear. Well, it seems that some



Alternating the screws for the cover presses the cover down to hold the servo in place



Dowel is used to support the cover at each corner. Either a small dowel may be used or dowels split in half. This is optional!



Servo Cover/Holddown is made of 1/32" Plywood and cut to fit just inside servo cavity. It holds the servo in place allowing easy servo replacement.

- Note: 1. The floor and sides of the servo cavity are sheeted with 1/64th plywood.
2. The above drawing is not to any known scale.
3. Make a pattern of the servo cavity bottom, sides, front and rear pieces and the hardwood blocks. Be sure to leave 1/32" off the blocks so the cover will fit flush with the wing.

good stuff is available, again. Roger Chastaine of TEKO is now making the Shadow hardware available. This is blue anodized die stamped aluminum components from his kit. He has the control horns (including a rudder horn) and a neat bellcrank. It is set up for a 1/16" OD music wire actuator, but could be drilled if you desire. In addition, he is making available three joiner rods of carbon, stainless steel and aluminum (this is the one in the Shadow kit) with the dihedral built into the rod. He can also provide carbon joiner tubes, as well.

Speaking of bellcranks, Soarcraft has come out with a neat bellcrank in addition to the servo mounting hardware which has been around for a couple of years with great success. The bellcranks come avail-

able for either 3/32" or 1/8" pivots and 3/32" actuator rods. These bellcranks come with a slot for the actuator rod rather than just a hole so that you can miss a little bit (1.5" to 1.7") and still not mess up too bad. Why have we been trying to be exact for so long? Neat idea, Mark.

The Soarcraft servo hardware is available for a bunch of different servos, and spare frames and hatches are available if you want to switch the servos between wings somewhere down the line. Each servo cover is custom routed for the particular servo and held in place with RTV or the adhesive of your choice. If you just adhere the servo on the corners as suggested, you can pop the servo loose and reuse the covers. ■

Understanding Sailplanes

...By Martin Simons

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13 Loch Street, Stepney,
South Australia 5069

Flying in Wind & Weather Dust Devils

On almost any convective day, especially over hot, dry plains, dust devils or 'willy willies' form. Quite often several such rotating whirlwinds can be seen rising out of one dusty paddock and they may occasionally ascend as writhing, snake like columns for hundreds of metres. Two or three may run into one another, somewhat like mangrove roots, to form a single powerful, spinning trunk. Dust devils are not unknown in more temperate climates but tend to be less common and, since there is less dust to be picked up, they are not always visible even when present. Litter, rather than dust, is seen rising into the air. A near equivalent is created by very hot straw fires when farmers burn off the stubble in recently harvested grain fields.

Full-sized gliders almost invariably find that dust devils are associated with strong and sometimes extremely turbulent lift. The question then arises as to whether these vortex plumes, which rotate around approximately vertical axes, are an entirely different type of thermal or whether they are associated with the ring vortex type in some way. The answer is not really known, but some reasonable arguments suggest that the two types are connected. One kind of experience indicating this is that usually, if a pilot contacts a dust devil thermal low down and circles in it, before long the dust tends to be left behind, the turbulence lessens and the climb continues exactly as in a normal thermal, although a strong one. On a day when this happens, there are many good thermals without obvious dust devils, but when dust

does appear it can be relied on practically every time to take the sailplane up into exceptionally good lift. It seems that the dust devil may be a kind of tail to a ring vortex, forming under the ring as the 'bubble' breaks away from the ground (Figure 33).

The 'bubble', as it leaves the ground, creates an inflow to fill the space that would otherwise be left. (This inflow must occur with all thermals and as mentioned above, may be a useful indication of the direction of the thermal.) This is an example of convergent flow. The most familiar example of convergence is the water running out of a bath or hand basin, which invariably rotates to form a whirlpool. The common explanation of this is the Coriolis effect which arises because of the rotation of the earth. The Earth's rotation is undoubtedly responsible on the large scale for the general circulation of air around atmospheric lows. As everyone knows, in the southern hemisphere the circulation round a 'low', viewed from above, is clockwise, north of the equator it is anticlockwise. It has been shown that if there are no other disturbing factors whatsoever, water in Australia does run clockwise out of the bath, but the least disturbance such as twitching the plug sideways on pulling it, or stirring with a finger, can set it going the other way round. With such relatively small phenomena as dust devils, a clump of bushes or an uneven patch of ground, or even the motion of a vehicle disturbing the air, can set the initial spin direction. It seems from observation that about as many dust devils spin one way as the other. But why do they spin at all?

The explanation is to do with the principle of conservation of angular momentum. Various experiments to illustrate this are done in schools. A person may sit on a rotatable stool, for example, with arms and legs outstretched. They are given a very gentle initial spin, and then,

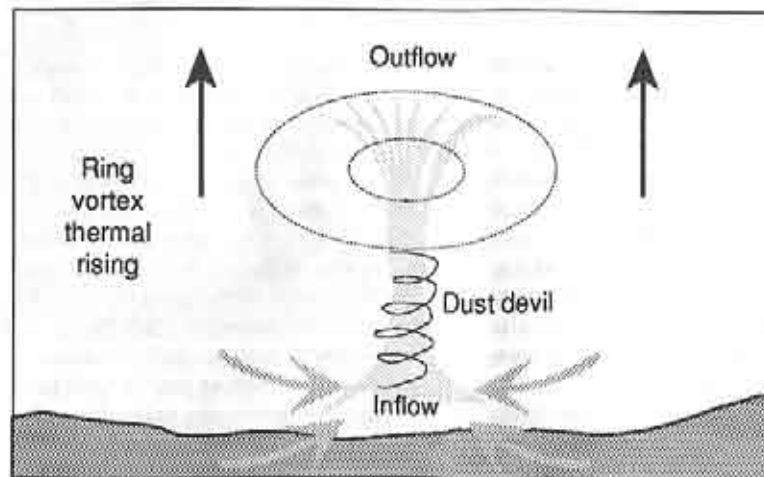


Figure 33 Possible explanation of dust devil thermals

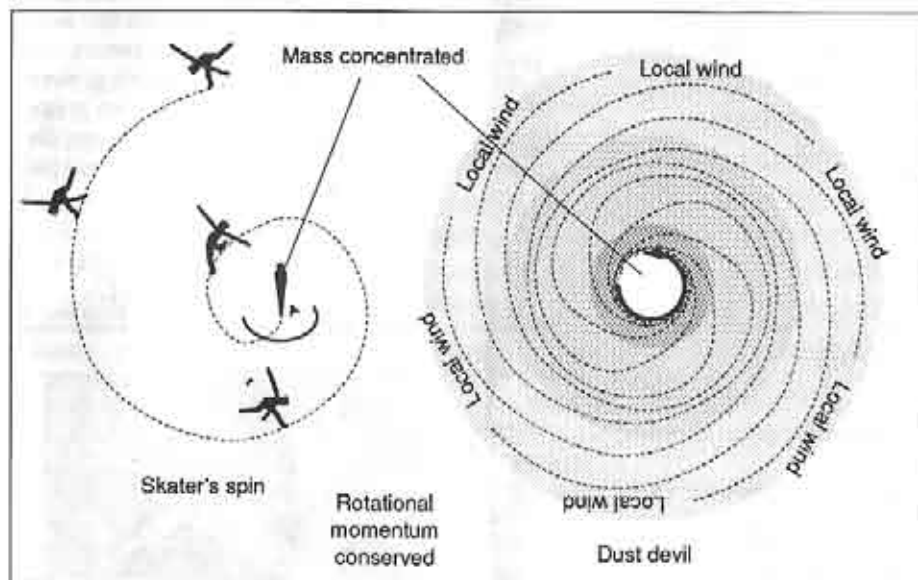


Figure 34 How the conservation of momentum accounts for the dust devil vortex

without further input from outside, when they draw in legs and arms the rate of spin increases markedly. An even more spectacular example is seen when an ice or roller skater performs a spin (Figure 34). Approaching a chosen centre on a

spiral course with torso horizontal, arms and a leg stretched, the skater's angular momentum is conserved as the spiral tightens. The body is brought upright, the arms and leg are pulled into the centre until all the angular momentum is

concentrated into an extremely rapid spin on a point. A slow rotation on large radius becomes a rapid rotation on a very small radius.

A dust devil operates in obedience to the same physical law. If air is moving in towards some centre of attraction it will not flow in an absolutely direct way to the centre, but will be a little off line to one side or the other. If nothing else provides this slight deflection, the rotation of the earth will insist upon it. The flow will therefore have some initial angular momentum. As the air moves inwards over the ground, its total angular momentum is conserved (some losses due to the effects of friction) and, like the skater, what was a small deflection at a large distance to begin with becomes a rapid rotation, as the mass nears the centre. A strong vortex forms.

It seems very likely, then, that not merely in hot, dry climates but everywhere, when a ring vortex thermal forms and begins to rise, the resulting inflow causes a rotating tail to develop. In hot

and dusty climates with strong thermals, the result is often a visible dust devil but in other conditions the spinning tail is probably there, although invisible. The stronger the thermal, the more likely it is that dust will be raised, but moderate and weak thermals must still have spinning tails. Once the rotation has begun, there is little doubt that it will continue upwards into the core of the thermal and so give the whole 'doughnut' system a certain amount of spin around its vertical axis as well as that around the ring. Some measurements taken by sailplane pilots using strips of paper to 'mark' thermals, tend to confirm that thermals do rotate around the vertical as they rise. For full-sized sailplanes this may be of some small significance since, in theory, to circle against the spin of the thermal should give better results than circling with the rotation. Unfortunately, the pilot cannot tell which way the thermal is spinning, even when circling in it. The difference is not enough to be apparent. For models too, it is doubtful that the pilot will be able to tell the difference. ■

Ridge Writer

...by Wil Byers



RT. 4 Box 9544, W. Richland, Washington 99352; (509) 627-5224 (7:00 PM - 10:00 PM weekdays, after 9:00 AM weekends)

An Interview with Joe Wurts

Hello slopers! This month's column continues with our interview with Joe Wurts. If you remember from the March column, Joe is discussing with us some of his techniques and secrets for successful slope racing. So, let's continue from where we left off.

Wil: That is interesting since I would think that on a short course one would want the model to carry as much energy as possible through the turns. Why would you not want to ballast the model beyond a certain wing loading?

Joe: Ah, on a short course most of the model's energy loss is in the turns! And, if the model is carrying a lot of weight, it actually increases the time the model spends in the turns. The truly theoretical individual will say that the model loses the same amount of height in the turns no matter what the model weighs. The real fact of the matter is that when the model is real heavy it spends more time in the turns and the lighter model can turn inside of the heavier model. Therefore, even though the lighter model is slower in the straights, it can gain more time in the turns than it loses down the straights.

Wil: Since our models carry four or five pounds of lead in their wings, construction quality is a big concern. And, because construction is so important the cost of a model strong enough to with-

stand the G forces associated with racing are high by most modeller standards. As a result, many would be racers have shied away from competitive racing. My question to you is, "How can an individual build a model that is competitive and keep the costs down?"

Joe: The airplanes I used to race before I got into F3B probably had \$60.00 worth of materials in them ready to fly. This was not counting the radio, of course. The reason this was possible is that in slope racing weight is not a big issue. So, the model could be entirely constructed out of fiberglass. It doesn't need any exotics such as carbon fiber or Kevlar in the structure.

All that is required to build a racer is to vacuum bag up a couple layers of 6 oz. uni-directional fiberglass and a surface layer (This would be a light cloth such as .6 oz./yd² to help reduce pinholes. W.B.), and you will have a wing strong enough to withstand the 11 pound weight stresses, no problem.

Wil: So, there are affordable alternatives for race enthusiasts. Is there advantage to an all molded airplane?

Joe: The advantage of the all molded airplane for F3B, is the strength to weight ratio and repeatability. The guy building his airplane in the garage can get an airplane that is functionally just about as clean as a molded airplane by vacuum bagging if he understands how to do it and knows how to finish off the airplane. The nice thing about a molded airplane is that it shows up at your door step with the proper finish. You don't have to spend the man hours necessary for a bagged wing to get the proper finish.

Wil: So, they are very repeatable.

Joe: That's the big seller of a molded airplane; every single one comes out perfect. But, you can go out with a bagged airplane that will do quite well in slope racing.

Wil: How important is a caller and a

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team to winning races?

Joe: You have to be a knowledgeable caller! Historically, I have either used my wife, Jan, or Darrell Perkins. For a winning combination you have to have a built-in trust with your caller. You need to understand what your caller is doing for you, because they will be calling not only the turns but calling traffic and judging what is happening on the course. So, yes, a caller can be very important.

Wil: Do you like lights or flaggers as an indicating system for signaling the turns.

Joe: I definitely like the concept of lights much better! The flagging gets you in trouble sometimes because the flagger can also anticipate the turn by moving forward when the model approaches. And, an experienced racer will turn on that movement. So, how do you call it? The flagger moved, but did not drop the flag. The result may be an unnecessary turn cut that the pilot is penalized for. With the light signaling method nothing is given away until the turn judge pushes the button, lighting the turn signal light.

Wil: How do you practice for an upcoming race?

Joe: I used to try to get to the site a day early so that I could learn the groove of the hill. Different hills have different fastest grooves. So, if I can get to the hill early I can learn the groove and what works best.

Wil: What other techniques do you practice at the race site?

Joe: Probably the biggest reason to get to a site early is to determine what will work best in terms of ballast and to dial in the airplane.

Wil: Are you using a computer radio and if so, do you have two separate settings: one setting for climb and one setting for race speed?

Joe: Yes, I have been using a Vision but I have mostly switched over to the Infinity 1000. I use the standard neutral set-

up for launch and climbing, with maybe just a bit of camber if I find a thermal and want to climb. It is also set up with the typical aileron rudder mixing, however when it is time to go fast, I flick it into speed mode which takes out almost all of the aileron rudder mix. In this mode, it also may reflex the airfoil just a bit and changes the amount of elevator to camber mix.

Wil: So, you are using elevator to camber mix to accelerate the turns?

Joe: Yes, that is definitely the best way to get the best energy retention in the airplane, to get the most bang for the buck.

Wil: You don't feel that flapping the airplane slows it down in the turns?

Joe: It is the most efficient solution to making the airplane turn fast. When you are going to the high Cl_q that the model will need to operate at in the turns, the addition of full span camber will shift the drag bucket of the airfoil up so that airfoil is still operating in its most efficient drag bucket at the higher Cl_q .

Wil: How much camber do you need to get that turn efficiency?

Joe: Probably about 5 degrees of camber will suffice. One thing to think about is, when you are running on a really windy day, you may want to add a little more elevator to camber mix because when you are pushing the airplane at these high speeds you are going to load the trailing edge surfaces. As a result, the model may not have as much camber in the air as it did sitting on the ground because you will get what I call "blow back", which can decamber the trailing edge.

Wil: This brings to mind another question. If air loads can decamber the trailing edge, they can certainly stall servos. On my last racer I was using JR 3021 servos which put out approximately 44 oz./inch. So, what do you like in the way of servo torque for a race model?

Joe: I don't really look at what the torque of a specific servo is. Rather, I am looking for how a servo will deflect under load. I have been very happy with the performance of Airtronics 141 servos.

Wil: Another question that plagues many would be racers is the relationship between span, aspect ratio, chord, Reynolds number, and the ability to turn the model. Since these parameters are all interrelated, what seems to be the winning combination?

Joe: Well, you have to look at the full range of flying conditions. When the air is very light the high aspect ratio model will win out all the time, every time. When it gets really windy, on the other hand, it almost doesn't matter what aspect ratio your model is flying, within limits that is, of course. So, with a model having an aspect ratio of between 8 and 15 there is almost no difference in the airplane performance in terms of elapsed time. I feel it is still slightly biased towards the higher aspect ratio, but there really isn't much difference.

Wil: How much interest are you seeing in your area now for slope racing?

Joe: There is a lot of interest in California. The California Slope Racers (CSR) has generated quite a bit of interest. So, a number of people are starting to show up for even club races.

Wil: There are a number of flyers who are just plain intimidated by 11 pound racers. My question then is two fold: Is there a possibility of creating a limited class? Say, a class where models are limited to say 60% of the 5 Kg weight and wing loading limit. A class that might attract more racers and then prepare them for the transition to Unlimited racing. And, what do you think can be done in this area to attract new racers?

Joe: What I have seen that really attracts racers is limited span races. These are races where the span is limited to some value. Currently, the races being hosted

by the Torrey Pines crowd is a 60 inch class. And, these races are attracting racers that have never raced before. One of the things that seems to be attracting individuals to race in this class is the low cost involved in purchasing a 60 size model.

Wil: What kind of model are they flying in the class?

Joe: The one that comes to mind is the Renegade by Charlie Richardson. This is a conventional design with an RG-15 airfoil and very competitive, but there are others out there, too.

Wil: Great! Well then, what about buying an unlimited racer when a pilot is ready for that level of racing? Specifically, what are a few models that come to mind that are really worth buying and will be competitive?

Joe: Any world class F3B model will certainly do the job. The RG-15 Eagle or the 7003 Eagle by Flite Lite Composites are good choices. The all molded Modi airplane would be raceable, as well. RnR Products produces the Nova which is an inexpensive way to enter slope racing. My personal recommendation, to get the absolute racer from RnR, you should buy their F3B airplane. It is a bit more pricey, but by buying that design you will get an airplane that can fly in a wider range of conditions competitively. That unfortunately pretty much touches everything available in the U.S.

Wil: What do you think of the four man format versus two man?

Joe: Well, the four man is very exciting and very adrenaline pumping, however it is quite risky to the airplanes. It is a lot of fun if you have four really competent pilots and airplanes on the course together that will fly tight formations. However, as soon as you get variable airplanes and pilot skills and the models get spread out on the course the potential for mid-air goes up exponentially.

Wil: With regards to mid-air, it seems to

me that the chance of mid-air is greatly diminished with two or four good pilots flying, then with pilots of lesser skill. So, how do you avoid mid-air?

Joe: It is true that good flyers have less mid-air. Part of avoiding mid-air collisions is picking the right caller. I'd say 2/3's of the information that the pilot is looking for from the caller is where the traffic is. They should be looking ahead of my model while I'm busy flying it, clearing the air for me and telling me where other models are relative to mine. They will, also, be telling where I need to fly my model to avoid the other model traffic.

Wil: Joe, you have flown slope races at a number of sites here on the West Coast. So, what are some of your most favorite sites for racing?

Joe: The sentimental favorite has got to be Big Creek lumber just north of Davenport, California. That is the hill where I learned how to do highly competitive slope racing and it has that deep groove to it that is so fun to fly.

The second slope would be Eagle Butte in Richland, Washington. It is big, it is open, and it has thermals, which make me a real happy guy. Also, it is extremely smooth for landing even in the high winds we raced in. It was super neat that you could fly two feet above the lip of the hill even in the 55 mph winds we raced in and not get buffeted about too much by turbulence. That is a really nice feature for a slope!

The third site would have to be Torrey Pines because of the sheer vertical face of the hill.

Wil: You touched on a subject above that is extremely important. That is "landing". As you have seen, landings can be quite turbulent and result in fliers busting their model during the first couple of rounds, thus ending the race for them, even though they may have been a good flier. What is your style for landing and

how do you slow your model down for landing so that it can be landed and remain flyable for the duration of the race?

Joe: Well, Ya! Each slope has its own character for landing. For example, Eagle Butte is very good for not breaking airplanes because it doesn't have much of a rotor and lacks much turbulence. Where as, at Big Creek, the way it is situated forces the pilot to guide the model down the length of the rotor. So, you are guiding the model through a lot of chop.

So, at a site like Big Creek you desire an airplane with good glide path control. You want an airplane that is set up similar to an F3B model where you can get the flaps to come down 90° and the ailerons to come up a bit. This will assure good glide path control and yet retain good roll control while at the same time adding drag for the landing. Although, I must point out that for the first few years I raced, I flew only a three channel airplane. I just learned how to manage the energy well.

A point I'd like to make is that, the one thing that most racers do not do is fly with the model loaded up during practice. Then they go to a contest, put this four pound chunk of lead in the airplane, go through the stress of flying a race, then they are relieved they finished the race, they may have won the race, may even be overjoyed about the win, then they come to land the model with it loaded up with lead and are not familiar with how it lands loaded and break the airplane.

Wil: Who are the HOTRODS to beat right now?

Joe: I hate to put it as to who I want to beat!

Wil: Who are the good fliers then?

Joe: That's better. I would rather the question be: Who do I like to race? I do like a competitive race!

Number one on the list, far and away, is Darrell Perkins. Darrell pushes me like nobody else pushes me. There are a number of traditional fliers like Rich Spicer,

and Rich Tiltman who have been around for quite awhile. Gavin Botha is an upcoming good slope racer. Then there is Imrose Cahn, who seems to be getting quite good down here in the south land, Thomas Pitz, and Ray Koontz, who is quite good. Then, too, I forgot about Ron Vann of Elite Lite Composites and Mark Allen who are both quite competitive slope racers. The list could go on.

It seems like what is happening in slope racing now is that there are some really good thumbs out there who do not have the right airplane! So, some people are handicapping themselves by flying the same old airplanes that just don't have the top end performance.

Wil: Last question on my list is, will you be attending the Mid-Columbia Cup in 93? And, do you think the new two man format will attract racers?

Joe: I'm planning on attending the Cup. There is no doubt I am going to make every effort to make it.

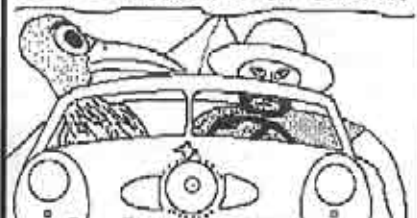
I like the format of two man races that are based on a percentage of perfect for the round. However, I am pushing for round scores rather than both round and heat scores as a percentage of perfect. So, I'm pushing for the 1000 point rounds.

Wil: Well, Joe we will have to wait and see, but I think the new race format is a good one and the Pro-Am Slope Racers Unlimited are looking forward to putting on a race for racers like yourself. Thanks so much for the extremely candid interview.

I hope you enjoyed the interview with Joe. He is a super nice fellow as well as a gracious competitor. Joe also knows how to wring every ounce of speed out of his models both in a slope race and obviously in F3B.

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Sanding Station & Canopy Latch

...by Albert M. Lies
Veradale, Washington

The sanding station illustrated is made from 3/4" plywood shelf material 5' long. (You could also use particle board.) This length allows you to sand a piece of wood 48" long without having to move the wood to finish the sanding process. All the material required can be bought at your local building supply store. There are other ways to make it depending on the type of tools you have to work with, like a table saw or band saw, router, etc.

The only tools you will need to build it this way is a drill, 3/16" and a 1/8" drill bit, screw driver & a straight edge. (Carpenter level works great, if you do not have one you can rent it or, maybe, borrow it from a friend.)

The material required is as follows:

- Suitable building board 5' or so long 1/16" x 1-1/2"x1-1/2"x5' long alum. angle
- #10 x 5/8" wood screws
- 1-1/2" carpet tape
- 2"x2" board for the sanding block, 11" long (11" is the length of a sheet of sand paper); the actual cross section will be 1-1/2"x1-1/2"
- 3/8"x1"x11" long backup block
- Glue

Start by drilling the 3/16" dia. hole 3" in from one end, and then every 6" along the length about 1/8" from the edge. Mark all hole locations first; this makes the job faster and easier. Remove any burrs from the drilled holes and set aside.

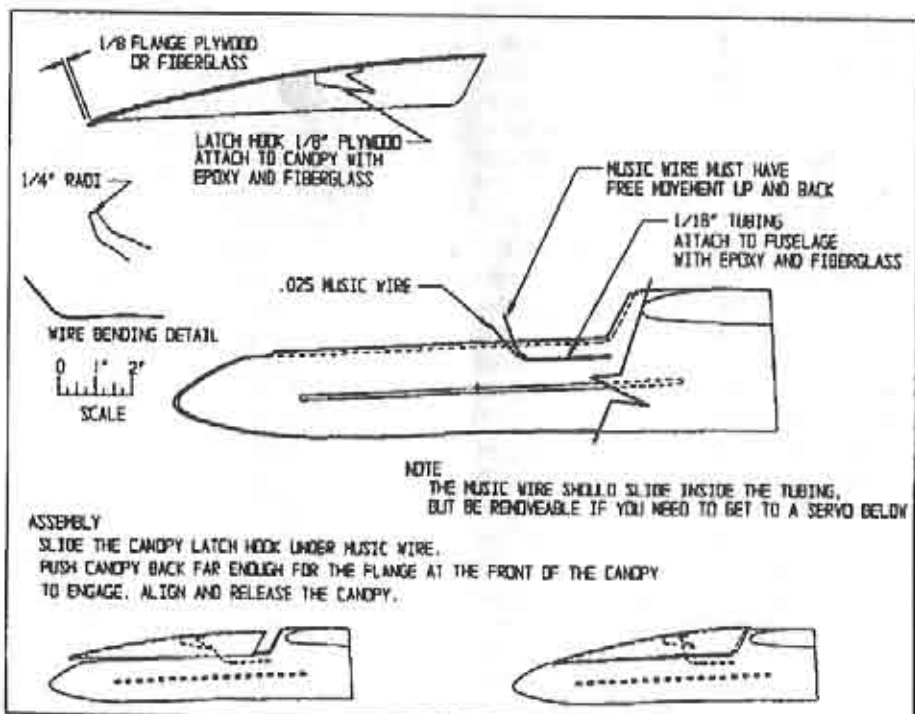
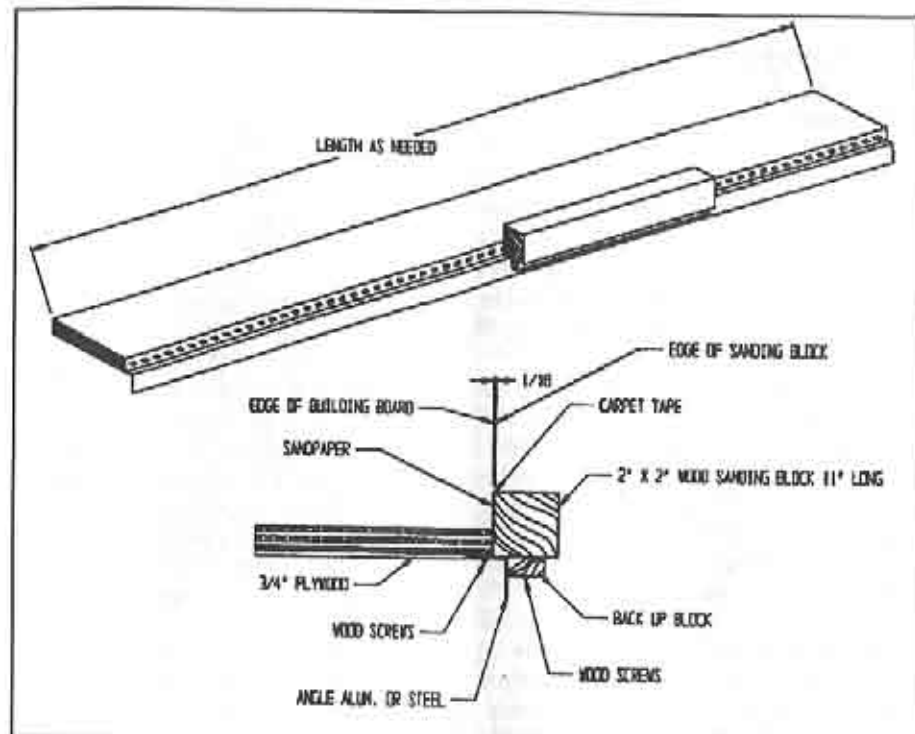
The sanding block is next started by centering the 3/8"x1"x11" wood backup block along the length of the 2"x2"x11" block; glue in place. If it is centered well, you can use both sides of the block, and use different grades of sand paper on each side, if you wish. Next, strip off 2 pieces of carpet tape 11" long. Apply 1 to

each side of the sanding block. Place a piece of sandpaper, rough side down, on a flat working surface. Remove the carpet tape backing from one side of the sanding block. Align the long sides of the sandpaper and the sanding block, and then press together. With an old knife, place the blade up against the block and trim off the excess from both sides.

Now, it is time to check if the edge of the building board is true with the straight edge. Remove any high spots with the sanding block you just made. Recheck and sand until all the high spots and low spots are gone.

With the edge of the building board straight, it's time to attach the 2x2 angle. One thing to note is that you will want a small spacer between the edge of the building board and the sanding block. This is so you do not sand on the edge of the building board. A piece of thin cardboard like from a cereal box works well. While holding the angle together with the sanding block, match (mark) the holes in the angle to the building board bottom. In other words, you will be using the sanding block with the thin cardboard attached as a gauge to locate the holes in the building board. Drill a small pilot hole for all the angle mounting screws. Attach the 1-1/2"x1-1/2" angle with the wood screws. Now, check to see if the angle is straight and true. If it is not, loosen the screws in that area and adjust as required.

There you have it. Place a piece of balsa on the board, align it so that there is a little interference with the sanding block, hold it in place with your hand, and move the sanding block back and forth a few times. You should have a nice straight edge ready for gluing to your next piece. I made a 1x3x4' long pine board with a few pieces of 80 grit sand paper attached to one side. Place it over the piece of wood to be sanded back from the edge. By putting pressure in only one spot, this holds the whole piece in place. ■



European Chronicles

...by Marc Dufresne

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Domaine de Belle Croix

17, rue Albert Camus

77330 OZOIR-La-Ferriere, FRANCE

Tel/FAX: +33 1.64.40.12.24

No, No... East, man, Go EAST!!

Europe, 1992, The Single Act, Maastricht, German re-unification, the opening of Eastern Block...

These items filled our lives over the past 2 years, standing on their head a lot of things we take for granted. So, when I was offered an opportunity to leave the US and work in Europe, I jumped at it, fulfilling a long held dream. The location was Paris, France, and the arm twisting lasted about 2 seconds.

When I called up RCSD to have them change my address, Judy asked me if I would like to write about what I encountered in Europe (the planes, the equipment, the contests, the way people take to the hobby). "Anything that I felt would be of interest to RCSD readers," she said. So, I hope to report on what I see, as an ordinary modeller, discovering a completely new environment. Comments, and ideas on possible topics will be welcome.

I'm just one of many. I Love to build. Love to fly. Build'em, fly'em, break'em, fix'em and fly'em again; that's my usual style. Mostly, I fly for fun, go to a contest every so often, and latch up with some friends. Usually, I end up at the bottom of the roster. Sometimes, I even break or lose a plane in the process.

The expectation is that I will be in France indefinitely. I had to think hard about what to bring with me and what to part with. Home goods, of course, are relatively simple. All the electrical stuff gets sold/given away; it won't work here. Furniture can come, if it's worth it or fits; houses here are smaller. When it comes to gliders and associated gear, this was

confusing, somewhat.

I know, from scattered readings, that frequencies are incompatible. And that for gliders, the Europeans seem to favour the big stuff (3-4 metres). I got in touch with the French Aeromodeling Association (FFAM). They told me that, as far as frequencies were concerned, France has two sets: 41 MHz and 72 MHz.

72??? Could it be that... Naah... No such luck. The frequency increment in France is on an even number (72.000, 72.020, ...), while the U.S.A. one is on odd numbers (72.010, ...). OK - so change the crystals, you say. I'd seen some discussion on this on my company's RC Electronic Bulletin Board (BBS) and I got the sense this was really a pain. And since my gear was not all that great, I said, "Hey - When in Rome... Let's get some of this European stuff!"

So, I packed the airframes (An AN-THEM, a PULSAR and an ORCA), spare parts, hand tools, books, the kitchen, CD's, clothes, some furniture and gave the rest away. Well, not all of it; I sold the car.

Paris has 11M people packed in a circle 50Km in radius. There are CONGESTED freeways everywhere. Mass transit is extremely well developed, however. The Paris underground is like swiss cheese what with the metro, the urban rail system and 5 major intercity train stations packed with 300Kph TGV bullet trains. The food is wonderful! The arts! This place I'm going to like!

Anyway, I spent a week looking for a place to live, and found it in a quaint, typical looking (to a North American) town on the outer eastern periphery. Major feature: A garage, that I can turn into a workshop.

Impressions so far

It's impossible to get lost in this country. There are signs everywhere to tell you where you are and where to go. There are city plans posted on billboards at major crossroads. Forget about the North

American cardinal road signage system (North-South, East-West). You are told about what is the next town(s) up the road. YOU are expected to know that said town is in the direction you want to go. A map is a definite asset to get started. After that, put the map away and follow the signs. It works every time.

The road system is in excellent condition and people drive fast (130Kph is not uncommon). I've been passed by VW Rabbits doing 150. The BMWs and Mercedes come at you from the rear at 180/200 Kph with headlights blazing; you bear right and hold on tight for the shock wave. Motorcyclists abound, always going faster than you and they will pass on either side. Their life expectancy, I've been told, is low. Gas costs \$5 a gallon.

In the same vein, everything is more expensive, thanks, in part, to a VAT at 19% on everything. But the quality is also higher. With that quality comes sophistication, either in compactness, features, or simplicity of operation.

Which leads us to my first visit to a hobby shop. Finding one in my area took some doing. I had to raid the newsstand twice for airplane model magazines. In France there are three, covering all topics. One of them lists FFAM club activities as a public service. They are also useful to find out about hobby shops, at least those that advertise. Everything is grouped by area or department. I live in the Ile-de-France area (Paris and vicinity), and found a hobby shop about 35Km northeast from where I live. It was the closest, short of going into Paris (congested, no place to park and probably more expensive).

So, in about 45 minutes, taking the tourist road, I ended up in this other quaint, typical, French town, looking for a hobby shop. Being Saturday, it's congested, and there is no place to park. So much for that idea. Finally, I parked French style (i.e., dump the car wherever

you can, except where there are yellow lines. Park there and you get an (expensive) ticket.), squeezing the car between two trees, on the sidewalk, on the church plaza in the middle of town. I began walking to find the store. It's a hole in the wall, run by a guy that knows everything and has at least one of everything, ...if you are into power.

"Gliders," I asked? "Not around here. Most activity is either South or North of Paris," comes the reply. Odd, since I drove through beautiful, open, farmland, seemingly ideal for thermal gliders. Hummm. Must be missing something.

So, we talked about radio gear instead. Most of the radio gear in France is imported from Germany. A notable exception is Hitec. I'm looking for the high-end stuff, so we talked about the German stuff. There are four suppliers, most of which partner with a Japanese source. They have Graupner/JR, Robbe/FUTABA, Multiplex and SIMPROP/Sanwa. So, there are two offerings: the standard box as we know it in the U.S.A. with all options integrated, or the European tray, very extensible and extremely flexible with its software package. To put it another way: with the box, what you see is what you get. With the tray, you get to see how much you can get. Generally, the box is considered "for sportmen's use" while the tray is for the serious/expert hobbyist.

Keeping with the philosophy of "what you see is what you get", the box is typically sold as a package (Tx, Rx, 4 servos and charger). The tray, on the other hand, is sold "a la carte", usually Tx, Rx, no servos, maybe a charger and battery pack, but mostly not. No charger and battery pack you say? Useless you say? Well, not quite, 'cause you will be offered a selection of battery packs for either the Tx OR the Rx, to fit your exact needs. Ditto for the charger. Also, the top of the line model may not have all channels configured (i.e., the tray you buy is

9 channel capable, but what you buy may only have 6 channels configured. You buy additional channels or mixer as you need them.)

Where the tray really shines is in the programmability. A top of the line system by MULTIPLEX can store up to 99 models. Graupner goes a different route with specific program modules by type of aircraft (F3A, B, C, D or E). Each module can store up to 30 models.

One other thing, you get complete, detailed, technical data about all the components. This goes for the box as well as the tray. I've read a couple of magazine reviews. The article comes complete with "10x8 colour photographs with a paragraph on the back of each" as the song goes. They will go as far as to open the Tx and the Rx and analyze the technology inside!

Price? The tray is going to cost you more; about 25-30% more than the comparable box package.

By now, I've got an arm load of catalogs and getting the impression that modeling here is SERIOUS stuff. It is very sophisticated, and very well thought out, like everything else I've run into. So, we move on to ergonomics.

I'm an infirm. That is, I'm trained

wrong. I fly throttle on the left (Mode 2) while everyone here flies throttle on the right (Mode 1). Then there is the business of what you do with the fingers. With a box, you drive with the thumbs on the sticks and use the fingers to work the linear slides on the side of the box. With the tray, you drive with the index (or combination thumb/index), controlling the linear slides (up to four) located BETWEEN the sticks with thumbs. And not to mention the push buttons ON TOP of the sticks. Now, I understand why the neck strap is a mandatory item here. You can't work the tray otherwise.

The guy on the other side of the counter ends up trying to sell me a FUTABA PCM 1024, "for compatibility". Me, I'm interested by the other ones, especially the Graupner MC-20 and the MULTIPLEX 3030.

I leave the store with my pile of literature, dazed & glazed. "Now why is the European stuff so sophisticated? Even the Vision looks cloddy and doesn't cover all the bases." The market demands it, but why? I guess the next step is to find some local glider freaks and get educated some more. Looks like I'm also going to have to re-learn how to fly.

Continued next month. ■

Trimming Your Sailplane for Optimum Performance

...By Brian Agnew
Longwood, Florida

Well, for the fifth time in as many months, I've just finished reading an article in *RCSD* on how to properly trim a sailplane. All of the articles are based on the "Dive Test" and all were too technical and/or too confusing for the average pilot. I've been flying R/C sailplane for about 18 years, and what success I have had is strongly related to what I have learned about properly setting up a sailplane. If you decide to finish reading this article, you may learn what took me almost 13 years to figure out.

My father taught me to fly when I was ten. We both loved sailplanes and regularly attended contests. We both became accomplished pilots - doing well, hitting our landings, but we were inconsistent in our flight times. When it came to setting up our sailplanes and reading air, we were the blind leading the blind. For 13 years we balanced our sailplanes per the manufacturer's specifications (usually, the middle of the spar), and flew with the assurance that the manufacturers know what they are talking about or they wouldn't be manufacturers, right?

In the summer of 1988, while preparing for the AMA Nationals, I built an LJMP Meteor and an Airtronics Sagitta 600. Both planes had the Eppler 205 and both were well-suited for the thermal duration. At this time, I ran across an article written by Larry Jolly on "How to Fly the Eppler 205". Wow! Here is a world-class pilot telling me exactly how to set up and fly my sailplanes. According to Larry, the magic point on the 205 is 38% of the chord. Talk about eliminating the guess work! I immediately got out my planes and found out that I was flying them near 35%, a 3% difference. No

big deal, right? I moved them both back to 38% and headed for the field.

I cannot express the difference this made. It was like I had been hitting tennis balls on the edge of my racquet all my life only to find out the racquet actually has a "sweet spot". My first impression was that all of a sudden there was an abundance of good air. The sailplanes no longer plowed through the air, but were actually "light on their feet", reacting to the subtlest of movements of the air and controls. My planes were jumping in light lift the way they previously did when I happened into a boomer.

Now, I knew how to fly the Eppler 205. Now all I had to do was convince Larry to write an article for every other section I might be flying. Either that or figure out a way to be sure that I know when I have found the "sweet spot" for a particular section. Before I tell you how to go about doing this, let me say as little as I can about the "Dive Test". The "Dive Test" is silly, at best. I know the theory behind the Dive Test, and I know a lot of guys swear by it, but I have to say I believe that, for our application, it is nearly worthless. Some of the most properly trimmed sailplanes I've ever flown were set up according to this test, and weren't even close. I do not know of any serious competition pilots that rely on this test to find if their sailplane is neutrally stable. Never-the-less, I watch pilots use it and I read about it to the point of frustration. There is a very simple flaw in the dive test. This flaw is more apparent in sailplanes with fixed stabs than those that are full flying. The response of your sailplane to the Dive Test is going to be directly affected by your elevator trim setting at the start of the dive. The same sailplane balanced for best L/D and minimum sink will respond much differently to this test regardless of the C.G. point. So as not to totally offend all of the die hard dive testers out there, let me just conclude by saying that the dive test is

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far too subjective and inconsistent to be used for our purposes here - finding the optimum location for both C.G. and elevator trim. Whew! Try the following, and I think you'll feel the same way.

Assuming that you've purchased your world-beater 1000 and have spent the last several months piecing it together so that it is ruler straight and beautifully finished, let's find its "sweet spot". Go ahead and balance it according to the manufacturer's specifications, as this is always a good place to start. However you balance it, make sure you remove nose weight 1/8th oz. at a time.

Charge your sailplane and get to bed early because we're getting up early enough to be out at the field 1/2 hour before dawn. If we're going to test our sailplane, we need the dearest air Mother Nature can provide. By the time you set up your winch and plane, there should be just enough light to launch. It is imperative to get consistent launches, but if you can't zoom consistently, don't, just let the line fall. Time every flight. Each flight should be as hand's off as possible and in straight lines to the limits of your vision. Go straight out and straight back 'til touchdown. Record your time. After each flight, change your elevator trim to maxing your time. Once the optimum elevator setting (longest flight) is found, remove 1/8th oz. of nose weight and start over, again. Every flight should be flown as close to minimum sink as possible. This is closer to a stall than you probably realize. It usually takes 3 - 4 flights to find the best elevator trim after removing weight. If the air is dead and you are launching consistently, your flights are going to get longer and longer as you remove weight from the nose and you are going to think, "There is no end to this process," until all of a sudden, your timer peak will start to suffer. This pattern will happen regardless of whether you are flying a Sink Buster 1500 or a Gentle Lady. What

happens is simply that as the performance of your sailplane increases, your sailplane's stability decreases. This is the trade-off. You don't get something for nothing as they say. You will notice that as you remove weight from the nose, the performance (dead air times) increases, but at the same time you are having to put in more control input to keep the sailplane flying straight and at minimum sink. Eventually, the airplane requires so much input that the drag from the constantly moving control surfaces brings your Thermal Wonder 1500 down to Earth sooner. Put weight back into the nose until you reach your maximum dead air flight time and call it good. You will never have to wonder about your C.G., again, only your elevator trim.

Incidentally, I did this test on my Meteor and Sagitta 600 and, in fact, found that Larry was right. The optimum C.G. point for the E205 is 38%. How accurate and reliable is this test? Let me put it this way. I did this test several years ago on my Phoenix unlimited ship and on my Mariah 2-meter separately (both use the S4061). By the time I was done, both planes were balanced at not 42%, not 41%, but at 41.5%. That sold me.

Now, regardless of the airplane or section you are flying, you will be able to set it up for optimum performance. What this trial and error approach does not teach you is how to read air. I'll give you another pointer. If you want to learn how to truly be able to read air, stop flying at cloud-base. Buy yourself a good hand-launch sailplane, set it up for optimum performance and let the learning begin.

While I have probably oversimplified all of this, I should add a couple of points. As you move the C.G. back, you should move your tow-hook with it. I tend to put my tow-hook 1/16" forward of the C.G. This is conservative, but I'd rather give up a couple of feet on launch than pop-off.

The last point I would like to make is that regardless of how good your sailplane is or how well set up, the only things that will put you in the winner's circle is your skill. How far back you will be able to move the C.G. when testing your planes depends on your ability to keep the plane stable in its increasingly unstable state. 10 people at different skill levels will come up with different optimum C.G. locations for the same plane. This is the great part about testing your sailplane. This way, it allows you to find the optimum balance point no matter your skill level.

One final note. In competition, I fly at

minimum sink the majority of the time. It is only when I know where lift is or when I am in sink that I fly at the best L/D. I always fly assuming I will not find lift and savor every bit of altitude - every point per second.

I am sure a lot of pilots will disagree with my opinion of the "Dive Test", but all I can say is that this system has made all the difference in the world in my contest flying. I wish that I had read an article like this when I was 10 and my father and I were just starting out. I hope it helps those pilots out there looking for the edge to get them in the winner's circle.

Good Luck!! ■

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What can be done on a limited time and money budget?

...by Jim Reith
Southbridge, Massachusetts

Every year I wait with anticipation for the new NSP catalog. I always enjoy the new products and the stories. I've read about the Cape combat sessions the last couple of years and finally decided to try to make it. A group of us discussed it and decided to make the pilgrimage this year. As always, fate stepped in and I was unable to make it. Of course, a friend who went was sure to tell me what a great time it was and even mentioned that conditions were so good that "anything would fly". Another local club was getting a group together 2 weeks later to make another trip down, and I managed to arrange to be able to go. This set the stage for my preparations and I kept hearing my friend saying "anything would fly"...

Over the years I've always tried to make the most of my hobby budget. In these tight economic times, it's sometimes hard to justify a flying purchase. Most recently I've started looking at alternate wing constructions. My first step towards being able to afford a hi-tech glider was to build a foam cutter. My feeling was that I could spend some extra time cutting my own wings and save the cost of an expensive ship. As I used my cutter more and more, I started to do wings for other people. It has now turned

The organizing club, (Charles River R/C Club - CRRC) (L - R) Helmut Lemke holding Jim's Gnome, Unknown, Art Faria with his Lumina, Jim Reith with UAS-1, peeking out from the back - Dan Snow with the backup UAS-1, Lincoln Ross with his own design slope combat ship, Unknown, Unknown, Anker Berg-Sonne with a Legend with a custom wing from Elf Engineering, Unknown

If you look closely at the ship I'm holding you can see the battery in the top of the nose, the Rx and elevator servo in the side facing us, and the aileron servo at the leading edge of the wing.

into a small cottage business that is taking away from my personal building time. As I was preparing for the Cape trip, I suddenly realized that the contest season had been hard on my smaller slope size ships and if I was going to make the most of the multiple hour drive, I needed to supplement my stable of ships. "Anything would fly"...

One problem with running a part-time business and having a full-time job is that you quickly run out of "spare time". My glider flying group has a running joke that if someone is going to an auction or a hobby store and they ask if we need anything, the stock answer is "pick me up some spare time". After hearing about the combat ships, which Stan and Sai flew this year at the cape, I decided I could probably throw something together that would fly. I ended up getting into my shop about 7 P.M. one night with the idea of putting something "quick and dirty" together. The foam cutter had a constant chord Clark Y set of templates on it, so that choice was made. I ended up cutting 4 panels that were 32" by 7" out of some scrap blue foam and decided that I needed to reinforce them with a spar. I found some 1/4"x1" pine strips left over

from a trellis I made and cut a 16" slot into each panel. The pine was trimmed to the thickness of the airfoil and glued in place. Since this was to be a slope ship with ailerons, I didn't build in any dihedral. Next, I used a 3" square piece of foam for the fuselage (from some packing material I had set aside) and tapered the back half to 1.5" square with a flat bottom. For flying surfaces I chose the cheapest thing I could find, corrugated cardboard. With the corrugations running spanwise, I cut 1" wide by 30" ailerons and found them to be stiff enough. I had left about 1/4" thick trailing edge on the cores and I attached the ailerons to the wing with clear box sealing tape. A couple of reclaimed control horns from my wreckage pile were then attached to the top side near the fuselage. The tail group was similarly cut from cardboard with the corrugations running from root to tip and the fin was slipped into a slot cut in the foam. The elevator was hinged by cutting out the cardboard on one side along one of the corrugations and allowing the other surface to become the hinge. A horn was attached to the top of the elevator and it was glued to the bottom of the fuselage with the hinge line slightly behind the rear of the foam. This being done, I headed upstairs. I had built two ships (I wanted a spare in case one self destructed immediately) and it was only 10 P.M.!

The second night, I installed the radio gear in one of the ships. I had come to call it UAS-1, Ugly As Sin - one. The radio gear was installed with a 500mAh square battery pack pushed into a hole dug out in the top about half an inch back from the nose tight enough to keep it from slipping out. Next, the aileron servo got stuck into a tight fitting hole just in front of the spar on the top of the wing, parallel to the spar. The aileron linkage was hooked up using EZ connectors to facilitate easy adjustment. Likewise, the receiver and elevator servo were installed into the side of the fuselage. An elevator pushrod was made out of a few pieces of scrap wire and a piece of 3/

16" dowel, and put between the servo and the horn. This was found to flex too much in the middle so I installed a piece of cardboard in the middle as a guide. Having done this, I mounted the wing on the top of the fuselage with rubber bands (around the fuselage and connected to short dowels across the bottom of the fuselage) and, sliding the fuselage back and forth, set up the balance point at about 1/3 the wing chord from the leading edge. The wing would move too much with just the rubber bands so I took a 3" nail and pushed it through the foam wing into the fuselage. One nail was used to allow the wing to pivot in case of a tip first crash.

Initial test flying was done at a local soccer field with a friend giving it a heave (after he stopped laughing). Control was positive (I like aggressive throws) and I was satisfied that the plane justified "trunk space". Word got out among my flying buddies and a mostly power flier asked if I'd sell him my "spare". Embarrassed to accept money for the plane, I offered to let him fly it if he wanted to drive down with me. He accepted and I did quick repairs on a couple of HLGs and was ready to go.

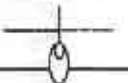
The day turned out to have a quartering wind on most of the slopes we stopped at and we went all the way out to the tip of the cape before finding a reasonably onshore breeze. We got out the planes and headed to the slope which consisted of a 15-20 foot dune that ran 300 feet along the beach. After some group pictures and a discussion of who had what frequencies, we were off. The UAS-1s flew "different". It seemed the tape aileron hinges were a bit stiff and the wings warped when they were deflected. The warping caused the plane to turn very flat for an aileron only plane and kept the lift under the wings. The plane was able to stay up for 7-8 minutes in the very light lift, we initially saw. It turned out to be a very interesting experience.

Next time, I would do some things a little differently. The rubber bands cut into the foam only center section and tried to

split the wing halves. The spar prevented them from separating, but a piece of cardboard over the center section would have solved that problem. The elevator was "stubby" compared to the aspect ratio of the wings. I intentionally left the nose of the fuselage blunt to prevent injury. This worked out well, but didn't help the drag of the ship. One more thing I've been

playing with since is covering white foam cores with posterboard. This gives you a nice colored surface and reinforces the wings enough for these disposable planes. Yes, they are intended to be disposable. Cheap in cost and time and easy to improve from session to session. I had a ball doing it and I hope this gets some of you into the shop to see if "anything will fly". ■

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Wing Saddle Reinforcement

...by Gregory Vasgersdian
Concord, California

I've been flying an NSP Sparrow now for about a year; at 60" it has become one of my all time favorite gliders; it looks great and it flies great. Yet, there is one problem with the Sparrow that is not uncommon to a lot of models out on the market that have a glass fuselage and a shoulder mounted wing. The wing saddle area is just too weak for the knock about life of a slope glider.

No doubt, if you have had a Sparrow "go in" you've probably broken the fuselage somewhere in the saddle under the wing. Part of the problem is with the wonderfully light fuselage, which is great until impact, and then you pay the price. The other problem is with the nylon bolt wing mounting method in that, when you do make an abrupt landing and a wing tip hits, it applies a torque right to the wing saddle area. Even on larger open class models an unreinforced saddle is just begging to be broken.

So whether it's a Sparrow or another model, let's increase our model's crash survivability and do it with minimal weight gain. First off, your aileron ser-

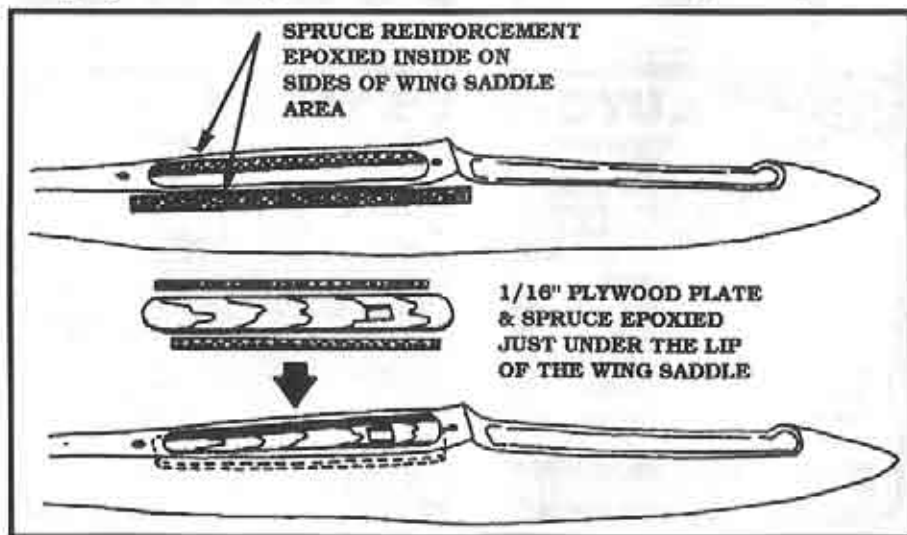
vos are out in the wings, right? If not and you are operating the ailerons with one servo in the center of the wing, you can kiss that servo good-bye after your first crash. It only takes one crash hard enough to pop the wing off and your servo gets ripped into the side of the fuselage, breaking the servo horns and usually stripping the servo gears, not to mention adding more damage to the fuselage. Save yourself the headache and buy two micro servos for the ailerons and mount them in the wing. My Sparrow uses Hi-Tec's micro HS-101's; they're light and the price is right for my limited budget.

METHOD 1: Epoxy 1/8" x 3/8" spruce to each side of the fuselage right under the top of the wing saddle. The spruce should extend beyond the opening on both sides. Use C-clamps to hold the spruce while epoxy cures.

METHOD 2: As per method 1, but wrap spruce with 2 oz. fiberglass, or Spectra, instead.

METHOD 3: As per 1 and 2, but add an additional strip of either 2 oz. glass or Kevlar to the fuselage sides.

METHOD 4: Trim to shape a 1/16" plywood plate that fits just under the top of the wing saddle. Cut a hole in it to allow the aileron servo leads (to go) through and into



the radio compartment. Epoxy the plate in place. Epoxy a 1/8" x 1/4" piece of spruce on each side. For a larger model I would go with a 3/32" or 1/8" plate.

Methods 1 and 2 I would consider minimal. If you want your fuselage to last, 3 makes it even better. By just strengthening up the sides we still leave enough room for a center mounted servo or for a ballast box. The 4th method is for wing mounted servos and is my favorite. It is not only the

lowest "Tech", but I think the best. You'll be amazed at how much stronger this makes the fuselage. You can also build a ballast box into the plate should you want to add lead. These methods have all been tried and proven and I would not build a plane without one of these improvements. I have had some hard hits with my Sparrow since an initial crash a year ago, and with the plate added I have yet to crack the fuselage, again. ■

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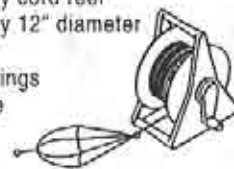
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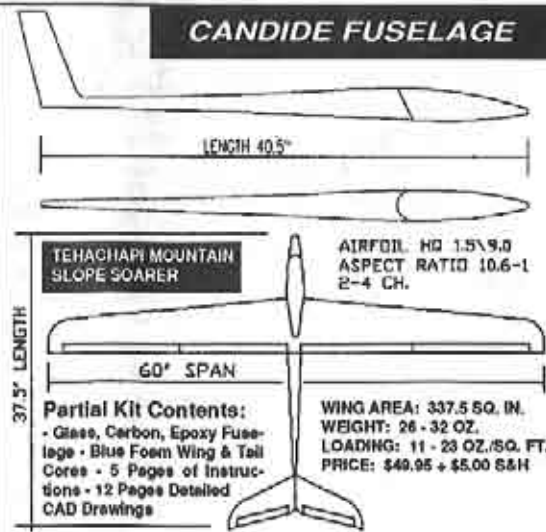
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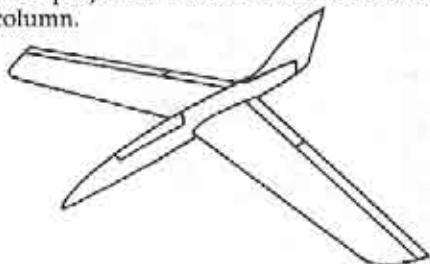
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Toucan

Larry Renger, of "Foamme Fatale" fame (RCSD 01/93), is currently involved in three projects of interest to readers of this column.



Another of Larry's designs, "Toucan", will appear as a construction article in the August issue of *Model Airplane News*. "Toucan" is a 42" span tailless design which features forward sweep. At home on the slope, "Toucan" has a rapid roll rate, turns quickly, and looks spectacular in the air. With a symmetrical airfoil and no twist, it is just as happy inverted as it is upright.

"Toucan" lends itself well to a variety of construction materials and methods. The plans show the wings constructed of one pound density foam cores covered with epoxy soaked brown wrapping paper. Alternative coverings include fiberglass over paper, fiberglass and epoxy alone, and 1/64th" plywood. All have been used successfully. The wing is thick enough to hold micro servos, with direct connections to control surfaces.

Fuselage cross section is minimal, and there's just enough room for a 225mah battery pack, RCD Micro 535 receiver, and two Futaba 133 servos. A wing loading of 8 to 12 oz./ft² yields a good flying machine. For the experimentally minded, Larry suggests enlarging the "Toucan" to 1.5

size - thus making it a "Threecan." We're contemplating building a "Fourcan"!

A second project is a swept forward 'wing for the 60" span slope racing class. The airfoil for this yet to be named 'wing will be the SD 8020. Larry's construction method involves cutting the cores as though there is no sweep. Once the cores are cut, the sweep angle is cut into the planform. This thickens the wing section a bit, with the SD 8020 turning out to be about 9% thick. Plans are currently being drawn utilizing CAD, and so should be very accurate.

Larry is also working on an advanced slope soaring book to be published by *Radio Control Modeler* magazine. Included will be a section on scale soaring gliders. While power scale slope soaring is very popular in Larry's area, he has made a concerted effort to cover the truly powerless 'ships, too. We're looking forward to publication!

If you are designing, building, and/or flying your own tailless creation, we'd like to hear about it! Descriptions, sketches and photographs are always welcome and eagerly accepted. ■

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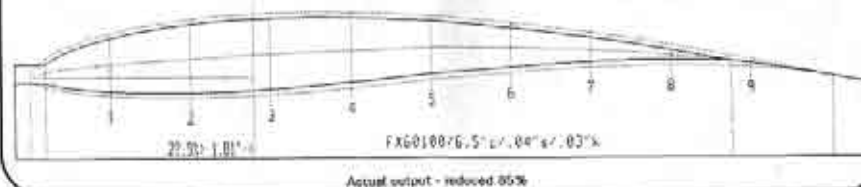
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Entering Electrics?

I still get a lot of calls and letters from non-powered glider pilots who want to try and electrify their planes, but are not sure what to use. So, for them, I'm going to recap some of the articles I've done on this subject.

First, it is appropriate for me to stop for a moment and reflect back over the last year. While I've written in the past about most of the planes and accessories that I wish to mention here, again, I was not affiliated in the past with these manufacturers or sailplane related businesses what-so-ever! I voiced my personal opinions and preferences which, as you know, may not necessarily reflect that of others, each of us having his/her own personal likes and dislikes. However, with this issue of RCSD, I find myself the proud father of a new business venture called Slegers International and am now affiliated with several of the businesses that sell these sailplanes and accessories. (Of course, many of the accessories can also be obtained from your local hobby shop or direct from the manufacturer, etc.)

Consequently, as new products become available, where Slegers International is a distributor, they will be included in the New Products section of RCSD.

In any event, remember, if you have any questions, please feel free to give me a call. This is indeed an exciting time for the ever-evolving World of Electrics, and I will continue to give you my personal opinion as to what I think your different options may be, based on your flying skills and preferences!

Plane

Because this is being written from the other corner, I would recommend any of the 2-meter electric planes on the market, today.

As an alternative, any 2-meter sailplane that has a nose large enough to be cut off and a motor installed will also do. Some of the planes that I've reviewed in the past that would make an excellent choice are: the 2-meter electric from Dave Hill, the Falcon 550E, the Saturn 2.2E and the Arcus. The electric Chuperosa, when it becomes available, will also make a fine plane for entry level. For the more experienced pilot who wants to be a little more daring, there are a few planes that fly exceptionally well. For example, Electric Breeze, Pro Arcus, and Weston 7-cell. For those who like large electric sailplanes, the Falcon 880E is about as good as you can get.

Motors

This is a tough one for those who have some experience in electrics. It seems that every week someone in the world is coming out with a new, more powerful and efficient motor. But, because we are writing about getting started into electrics, the choices aren't too overwhelming. Most of the 2-meter planes will use either a 6 or 7-cell motor, with the 7-cell being the most common. With the tremendous interest in recent years in RC car racing, many manufacturers have been making motors that will also work very well in aircraft use. The car motors that work well would be any motor that could be called modified. Modified means adjustable timing, replaceable brushes and ball bearings. If you're going to use a car motor, use one with no less than 21 turns. Less than this would be for a pylon racing type plane. With a light plane like the Chuperosa, you can get very good performance for about \$40. For the slightly heavier planes, that need a little more power, the Astro Flite FAI .05 is about as good as you can get for the money. I would recommend an 8x5 prop for best results. For blazing performance on 7-cell, but at a much higher cost, there is the Ultra 800-4, the HP 270-4, and the Keller Pro 335-4. For the 10-cell, I would recommend the Astro .15, HP 320-4, or the Keller Pro 525-4. If you are thinking of putting a 10-cell combination in a 7-cell airplane, make sure to sub-

stantially increase the strength of the airplane. The difference between 7 and 10-cell performance is considerable. The extra weight and speed is going to stress some of the 7-cell planes to their maximum. If you decide to electrify a slow thermal type floater, you may want to try a geared motor. The Astro Challenger works very well with an Astro geared .05.

Batteries

The only batteries I use are the Sanyo's or S&R's. I use mostly Sanyo 1000ma SCR's. I have found them to be the best as far as weight vs performance goes. They also will take a lot of abuse as far as charging and discharging. For those who want more run time, the Sanyo 1400ma works very well. As far as cycling, matching or memory, don't think about it. This is for later after you've gained more experience.

Charging

There is absolutely no question in my mind that a good peak detection charger is the only way to go. They cost a little more, but all you have to do is over-charge and destroy one battery pack, and you could have

bought a peak charger! There are many chargers on the market and they all seem to work well. So, the choice is yours. For the new modeler getting into electrics, I would suggest a charger that will handle up to at least 10-cells. This way, if you start out with 7-cells and, at a later date, want to try 10-cells, you would not have to buy a new charger. If you get a charger that has adjustable current, I would only charge the 1000ma batteries at 3.5 amps until you gain more experience to fool around with higher charge rates.

In Summary

For the person who just wants to try electric power without getting involved with all the high tech and high dollar equipment, I would make the following suggestions: use a light plane of about 2-meters with an RG15 or E387 airfoil, a 7-cell motor powered by a 7-cell 1000ma battery pack, an 8x5 folding prop, and a peak detection charger. With this combination, it would be difficult to not get good results!

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Construction:	All molded in glass, carbon fiber and Rohacell.
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Soaring in Taiwan

...by Jim Hammond
4FL-1, NO 38, KUANG FU RD,
SEC 1, HSIN-CHU, Taiwan, R.O.C.
(035) 788927, FAX (035) 788926

The Beginning

I came to Taiwan from England some years ago where I had been an avid soarer for some time. In fact, I even went to the U.S.A. years ago to compete in the SBSS (South Bay Soaring Society) Slope Races with Chiris Groengrass, Dave Woods (Graham's brother), Mark Passingham, et al, where we acquitted ourselves passably well with our Sigma slope racers.

When I first arrived in Taiwan, I had to try to retrieve my precious slope racers and radios, etc., from customs. In order to do this, I had to sign a form stating that I would have to convert my 35 mhz radios to 27, and the whole admin red tape bit took about 6 months. Having actually obtained said planes and radios, the first of my "lessons" in Taiwan began. Being an honest fellow, I trolled down to the local R/C model emporium where, through a translator, I communicated my desire to convert said radios. The initial reaction from the proprietor was not particularly encouraging, consisting of a long intake of breath through numerous gold teeth. "Gwei!" was his eventual reply. "Spensive!" said my translator. "How much?" I asked. Following a long discussion between the

proprietor and my man, it transpired that it would be cheaper and quicker to buy new sets. "Sierra, Hotel, India, Tango," I muttered under my non-gold teeth.

"OK," says I. "Waddya got?" I was shown an array of Japanese radios differentiated only from the ones I was used to by price. (Spensive!) I asked, "What different 27 mhz crystals do you carry?" This was translated. "27? What? Nobody uses 27 in Taiwan!"

You have ten million crazy taxi drivers all using 27 on C.B.! But, I was told... OK, hold it. Now I understand, thought I. (Bye, bye!) "Got a 72! Got two 40's!" enthusiastically yelled the shop man. "Any 35's?" asked I. "Nobody uses 35!" yelled the shop man. "Why?" I asked. "Don't know!" said shop man. "Not available..." "Bye!" said I. *The dawn of realization...*

Finding a Site

Taiwan is a big rock. There are mountains and hills all over. Ideal you might think. Not so. Taiwan is sub-tropical, and so plant growth is prolific. Most hills and mountains are covered either with trees or elephant grass. Elephant grass is worth a mention. This is a tough, sharp-leaved plant similar to reeds. It grows ten feet or more in height and can cut you to ribbons trying to retrieve your plane from a less than ideal landing. The good part is that, provided you can find the damn thing and, not having expired due to loss of blood from the razor-like leaves, it is very unlikely to have sustained any damage.

After much driving around on the coast, I located a good site. The top was flat with short grass. The slope was at 45 degrees and about 300 feet high. This site, named in Chinese, is translated to White Sand Beach. It is actually a promontory or arm of land and provides good flying with good to phenomenal lift in most wind directions. The only direction non-flyable is directly south. Flying over the ocean is really idyllic.



This site, although perfect for northeast and westerly wind directions, covers winter soaring well, but in the summer, the wind blows from the south. After much more driving, another south facing site was found. This was a very frustrating business as I had no references on sites. As far as I know, I am the ONLY soarer on this rock! No amount of inquiries have unearthed another kindred spirit. (But, I live in hope.)

The south site is inland and great to fly. Landings are tricky needing a sideways technique as this is a ridge and if you go over the back, you are going down! Energy management is the key point on this site.

Taiwan Flyers

These, as far as I can determine, are 100% of the power persuasion. Most, although not all, fly ready built (ARTF) planes, although the claim invariably is that they are scratch built. Egg beaters are also flown to some degree. What I have found is a lot of interest in soaring. "Seeing is

(L) Cumic Plus held by Dan (my wife) at Tang Mei, my inland soaring site. (Below) Dan holding SFX prototype after first flight tests.



believing" is a fundamental creed of the Chinese People, so I am sure that if more people flew, then more people would. In fact, I intend to try to actively promote R/C soaring this year in Taiwan. Expense, to the Taiwan enthusiast is of no object. This island has so much money, I am surprised it does not sink. Gold imports alone total 300 TONS! on a monthly basis. ■

Well, planning a vacation? As Jim says, he is the only known flier in Taiwan. He would really like to hear from you. His address and phone/FAX numbers are included at the beginning of this article. The country code is 886. Oh, and if anyone knows of another flier in his area, please be sure to let Jim or RCSD know! We can't let him keep those beautiful flying sites all to himself! ■

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Sparrow Racer (\$199.95): Wingspan: 60" (designed for the new 60" racing class), RG15 foam wing sheeted with fiberglass, Kevlar reinforced fuselage, glassed stabs (yes, take our word for it, this baby is SLICK and FAST!)

Now that the Sparrow has been out a while, it certainly is turning some heads. Could it be the sheer beauty of this 66-inch sloper, or maybe the incredibly smooth flight characteristics? We love the Sparrow because it can be flown in both light and heavy wind conditions. Others tell us that it is one of the most "pleasing" airplanes they have ever flown. Most everyone likes the fact that the Sparrow is very easy to build, and has excellent kit quality. Top all of that off with a reasonable price and it's no wonder that the Sparrow is quickly becoming one of the most popular birds on the slope. NSP extends a hearty thanks to all of our Sparrow owners!

We are pleased to announce that due to the popularity of the Sparrow we have expanded the Sparrow line. In addition to the standard Sparrow kit, we also offer a built-wing version. Featuring the SDB000 airfoil, the Sparrow Pre-built comes with foam wings that are pre-sheeted with obeechi. We even rout out the ailerons for you! For those interested in serious 60" racing, we now offer the Sparrow Racer (in limited quantities). Glassed RG15 wings reinforced with carbon fiber, glass stabs, and a Kevlar-reinforced fuselage make the Sparrow Racer a force to be reckoned with! Soon we'll offer the SparrowHawk, a big brother to the Sparrow. If you like your Sparrow, then the SparrowHawk will be a must-have airplane. If you don't have a Sparrow, please give it a try. We know you'll love it!



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Reference Material

Madison Area Radio Control 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.

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

Contacts & Soaring Groups

California - California Slope Racers, John Dvorak, 1638 Farrington 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.

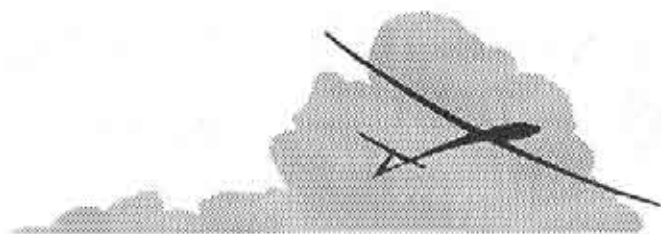
Nevada - Las Vegas Soaring Club, Steven Smith (President), 6978 Starwood Dr., Las Vegas, Nevada 89117 U.S.A., (702) 873-9591.

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



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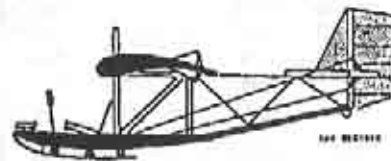
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Send SASE for membership application and flyer: "What is T.W.I.T.T." or, send \$2.00 for full information package including one back issue of our newsletter, postpaid. Full membership is \$15.00 per year and includes twelve issues of the newsletter. 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
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This F3B style ship is at the helm of the Modi Series. The molded wings are designed to be strong enough to handle the abuse of F3B competition. Specs: 116" wing; 50" fuse, 949"² area; 96oz wt; 14.5oz/ft² loading; RG-15 Profile; Price: \$900.

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Daryl Perkins came in 1st Place in Open Class at the 1992 LSF Nats with this plane. The planform is the same as the molded version, but it has blue foam and beautiful laminated wood wings. RG-15, S3021, SD7037 Profiles; Price: \$800.

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NEW PRODUCTS

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

On The 'Wing... The Book

Bill & Bunny (B²) Kuhlman

"On the 'Wing...," after more than four years, remains the only monthly column appearing in the modeling press which deals specifically with tailless soarers. "On the 'Wing... the book" is a collection of the first 52 articles and columns which have appeared in *R/C Soaring Digest* - from 1988 through 1992.

All of the information, diagrams, airfoil coordinates, and computer programs of the original articles and columns are included, plus additional material not previously published in *RCSD*!

"On the 'Wing... the book" consists of over 250 pages printed in 8 1/2 by 11 format. It is soft bound, with wrap-around cover. Cost is \$28.00, packaging and postage included.

Structural Dimensioning of Radioguided Aeromodels

Dr. Ing. Ferdinando Gale'

Anyone building RC aircraft needs to read this book! Beginning with a description of balsa's characteristics, Dr. Ing. Gale' de-

scribes the materials and methods of building model aircraft structures which can withstand the stresses of intense flight. Such structures need not be heavy or difficult to build. From sticks to sheets to foam and fiberglass, Dr. Ing. Gale' explains it all. Some simple math skills are required, but numerous examples assist with understanding.

"Structural Dimensioning of Radioguided Aeromodels" is over 105 pages in length, printed in 8 1/2 by 11 format, and soft bound with wrap-around cover. The cost is \$18.00, packaging and postage included.

"On the 'Wing... the book" and "Structural Dimensioning of Radioguided Aeromodels" may be purchased directly from the publisher: B² Streamlines, P.O. Box 976, Olalla WA 98359-0976. Washington residents must add 7.5% state sales tax to listed prices. Books shipped outside the U.S., Canada and Mexico will be sent by surface mail unless the order is accompanied by an additional \$10.00 to cover airmail postage. ■

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Slegers International is owned and operated by Ed Slegers, a feature columnist for *R/C Soaring Digest*, which is a publication for the *R/C Sailplane Enthusiast*. Over a period of time, in responding to questions raised by sailplane readers of his column, Ed realized that he could help them obtain previously hard to find electric sailplanes from other countries around the world, and accessories such as props, spinners, and adapters. So, through reader encouragement and individual requests for help, Ed has launched Slegers International and will start taking orders beginning **May 1** for the brand name products which are listed here.

Aero Naut...*Props, Spinners, and Adapters*
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Airtronics...*Planes, Radios, & Accessories*
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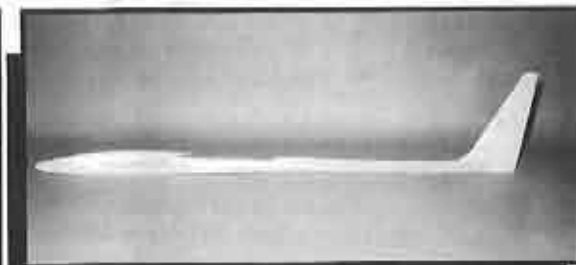
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Requests for catalogs have already been tremendous (The "Sailplane Network" moves fast!), and a full size **FREE** catalog will be available in June. Anyone having an interest should let us know now and get on the list to receive one the minute it is available!

The shop is located jointly with Slegers Cycles on Route 15, Wharton, New Jersey 07885, and visitors are always welcome. There is plenty of parking available; office hours are 8:30 A.M. to 5:30 P.M. every day except Sunday and Monday, which are our days off. Visitors are encouraged to call first. The phone is (201) 366-0880 and the FAX is (201) 366-0549. Just ask for Ed. We also accept Visa, Mastercard, American Express, and Discover for your convenience. ■

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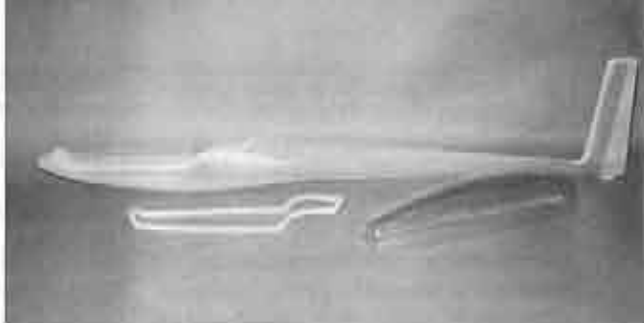
New Products

Kestrel

...from Viking Models, U.S.A. Glas Flügel, after its success with the Libelle, wanted a new glider with a more roomy cockpit and longer wings. The first prototype Kestrel was flown in late summer of 1968, and went into production the following year, 1969. This new open class sailplane featured a wing with camber-changing flaps, retractable wheel and a fixed T-tail.

A semi-kit is offered by Viking Models, U.S.A., and consists of a kevlar reinforced epoxy fiberglass fuselage, epoxy fiberglass canopy frame, clear canopy, building drawing and a documentation package with photos and 3-view. The building drawing shows a fully sheeted built-up wing, but for ease of construction, foam wing and stabilizer cores are available when ordering the semi-kit.

Thermal, slope or aero-tow this beautiful scale Kestrel. Two wings are being offered: the Kestrel-17 with a wing span of 167 inches or the Kestrel-19 with a wing span of 187 inches. Both of these wings with its Ritz airfoil will fit the 63 inch long fuselage. There is ample room in the 20 inch long cockpit for full cockpit



Kit Features

- Kevlar reinforced epoxy fiberglass fuselage 63 inches long with a clear canopy, epoxy fiberglass canopy frame, building drawing & documentation package with photos & 3-view.
- Does not include wood or hardware.

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details and retractable wheel. The controls required are: rudder, elevator, ailerons, flaps, spoilers and a retractable wheel is optional.

For more information on our other products, please write or call Jerry Slates at Viking Models, U.S.A., 2 Broadmoor Way, Wylie, Texas 75098; (214) 442-3910, FAX (214) 442-5258. ■

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The helicopter transmitter has the flight mode switch positioned on the top front left side of the transmitter, the most common and convenient position for heli pilots. The airplane and glider versions are similarly designed so that the switches and knobs are positioned according to customary preferences and practices. While customizing each transmitter, though, JR has left the X-347's superbly balanced and ergonomically-formed radio case - The case that gives a JR radio that special JR "feel".

The external refinement of the X-388S is perhaps only rivaled by its internal sophistication. With 8-model memory, the X-388S sports numerous new programming options. For airplanes, there's now trim memory, 6 programmable mixes, and new trim and include and include mixing. For helicopters, stunt trim, hold rudder offset, auto dual rate, and 2 programmable mixes, make the X-388S heli competition-ready. Glider pilots will benefit from full trailing edge mixing, 6 programmable mixes, trim offset memories and a programmable 3-position switch, among others. Best of all, regardless of the transmitter purchased, the X-388S contains the new computer software for all three versions, permitting the use of any transmitter for any flying model.

True to form, JR gives the X-388S pure mastery of signal transmission. The S-series PCM in the X-388S produces ultra-precise 1024 servo resolution and indus-



try-leading servo response time. It is also sold with JR's new 649S receiver. The smallest and lightest 9 channel receiver made, the 649S includes a new, more purifying version of their patented and legendary ABC&W™ circuitry. This fantastic signal transmission assures glitch-free model operation on all eight of the X-388S' channels.

JR radio control systems and accessories are available through hobby dealers nationwide. JR is exclusively distributed by Horizon Hobby Distributors. ■

RC Gliders Downunder

...from Mark Foster

Some years ago through my own video involvement (Top Eight Slopes), I had the good fortune of meeting Trevor... Trevor Broadbent has created and produced a most entertaining video that includes footage of RC soaring from Australia, U.S.A., and U.K. The aero-tow segment from the U.K. is clearly worth the overall purchase. Vintage and modern scale sailplanes are featured predominately throughout the film. If you would like to see RC soaring with a bit of international lift, send \$22.50 to Mark Foster, 826 Oneonta Dr., South Pasadena, CA 91030. ■



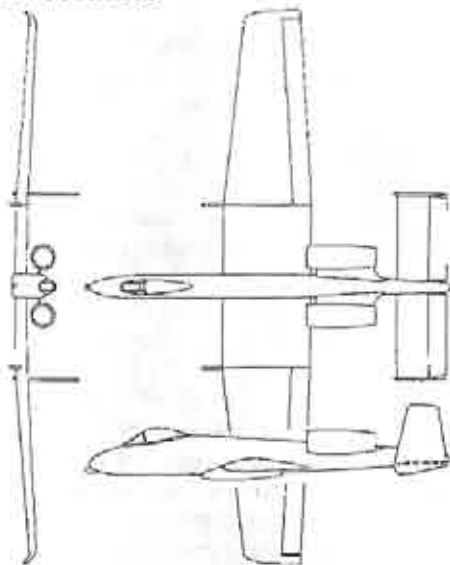
A-10 Warthog
...from Greg Goris

The A-10 Warthog is one of the most unique and recognizable of all the modern warplanes. Like the real one, this little slope soarer is not at all "pretty", but is very functional and emphasizes slow speed, high lift, ruggedness, and great maneuverability. Your finished plane will certainly become one of your favorite fliers and, while the other combat scale planes are grounded from lack of wind, you'll be up chasing the Gentle Ladies!

The Warthog was designed for light to medium slope lift. The construction methods and materials result in a lightweight but rugged plane. This design concept provides a good compromise between high maneuverability and a relaxed stability. The roll rate is good, but not "snappy". The pitch rate (or turn rate) is exceptional, owing to the high-lift airfoil in combination with the short tail moment. Stall characteristics are extremely mild and it refuses to tip stall. It circles very well in a thermal, with no tendency to spiral out. The plane's speed is not impressive, due to the light weight, "engine" drag and the relatively thick airfoil. This drag becomes an asset in a prolonged near-vertical dive or when flying in confined areas. The overall design results in a plane that will give you great confidence and fun very close-in and terrain-hugging flying.

The airfoil is based very closely on the SD 4233, with the forward 70% taken directly from the published coordinates and plotted using CAD software. This airfoil, with a "trip" placed at 20% of chord, provides an outstanding L/D ratio especially at high

New Products



Specifications

Span	45.5"
Length	30.0"
Area	267 Sq. In.
Weight	23 oz.
Loading	12 oz./sq. ft.

lift coefficients and at low speed. The result is a very efficient wing with a remarkably soft stall. Because the airfoil is considered only medium camber, aileron rolls are still smooth and inverted flying is very practical.

The fuselage and nacelles halves are formed from high-impact styrene which provides an excellent combination of light weight, toughness and stiffness. The material is also very easy to work with in that it sands, carves, drills, bonds, and paints very well. The parts provided in the kit are pre-cut and, with little work, are ready for bonding.

A simple balsa "box" structure is placed inside the forward fuselage. This device ties together the nose, radio, and wing mounting points and provides extra strength where it is most needed. For those less concerned about weight, a thicker and stronger ABS fuselage is also available.

Construction is fairly straight forward, the only "new" technique is in the bonding of the plastic halves. Reinforcement strips (provided in the kit) are placed inside one fuselage half prior to the final joining. This provides for a very strong, seamless joint and for easy alignment. All bonding work is done with liquid plastic model cement. The wing is very conventional construction - 1/16" balsa over white foam. The ailerons are built along with the wing and cut out only after final sanding, assuring an exact match.

The kit includes pre-trimmed fuselage and nacelle halves, molded canopy, wing

cores (three sections), formed aileron torque rods and nylon wing and stab mounting screws. The full-size plans are well-detailed with notes and section views. The seven-page instruction manual covers the general construction and highlights areas requiring special attention. Wood is not included.

A limited quantity of kits are currently in hand. You are welcome to call or write for the latest status. The price is \$39.95 plus \$3.95 for UPS delivery. The ABS fuselage option is an additional \$4.00 (please specify). Contact: Greg Goris, 951 Woodland Ave., Ojai, CA 93023; (805) 649-2680 evenings. ■

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New Products

Shadow 2 Meter Tekoa: Center For Design

...from Northeast
Sailplane Products
A Shadow for two
meter competition -
GREAT!



Roger Chastain has done his homework on this sailplane, providing some nice enhancements to give the Shadow 2M a real performance advantage against the competition.

Here's a beautiful and lightweight (under 5 ounces) fuselage, reinforced with Kevlar, shaped and designed for low drag, yet able to take those hard competition landings (dorks, in our terminology). The canopy is molded separately and has a very accurate fit.

Similar to the Shadow Plus, this 2 meter has fully sheeted obeche and foam wings and tails with the ailerons and flaps routed. The wing comes in two pieces, with the dihedral angle cut into the root. The tips can be left straight or cut and angled up like the Shadow Plus; the builder has the option. Wing tips are fiberglass like the Shadow 3M. With the carbon fiber composite spar structure, one-piece wing, and nickel-plated stainless steel wing joiner system, this wing is strong! Zoom launches are the norm for this glider; stand on the pedal if you want. Another bonus of the large area of the wing is a very high launch. A stiff wing with large area and low drag profile - and let's not forget the SD7037 - can give very steep launches and a great zoom. With this planform the Shadow 2M can out-launch most open class ships! One of the benefits of more wing area on the Shadow 2M is an increase in Reynolds Numbers, for more efficiency with little penalty. In building a high performance 2 meter sailplane with computer radio and six servos, you quickly realize that even though the airplane is smaller and

Specifications

Wingspan:	78.75"
Wing area:	690 sq. in.
Weight:	45 oz.
Wing loading:	9.3 oz./sq. ft.
Airfoil:	SD7037
Skill level:	INT/ADV

needs to be lighter, it has to carry the same radio weight as the open class sailplanes (which have a distinct advantage as they have more area; the radio gear is a smaller percentage of the overall weight). With 690 square inches of area, the wing on the Shadow 2M better supports the weight used in a full-house six servo system, and consequently has a much better sink rate than the average high performance 2 meter that has to carry that same radio weight. Glide ratio is not affected, largely due to the fact that as you raise the operating Reynolds Numbers, airfoil efficiency goes up.

Another factor to consider is the taper ratio of both Shadows, which puts more area at the tip, thereby increasing the stability in the turns by forcing the stall to occur more inboard on the wing. It's so important to prevent tip stall when thermaling, because then you are flying very close to the stall with high coefficients of lift. This wider tip improves the performance of the airfoil and makes it less critical to the angle of attack. This is with no significant increase in drag. Landings become slower and more controlled, with a higher probability of hitting the spot.

Hardware is of the same quality as the Shadow Plus; it doesn't get any better than that. And includes a newly designed nickel stainless towhook which can take all the

abuse you can heap on it. A full plan set is included, which is really not needed considering the pre-fabrication of the kit, but it is nice to have for reference. Also included is a construction manual, making it an easy task to complete this beautiful ship.

Many factors come together in this de-

sign to make the Shadow 2M a superior competition sailplane. So, if you need that advantage to help move you up the ranks, I can't think of a better choice.

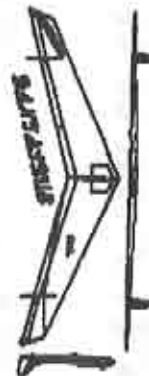
Available from Northeast Sailplane Products at 1-802-658-9482, the Shadow 2M price is \$275.00. ■

Fantasquel

...from Nichols Research
Fantasque is a full house R/C flying wing sailplane for thermal duration. Despite its looks, Fantasque is not all that radical for a high tech R/C of today. With all-glass construction, it comes to you ARF, requiring approximately 10 hours from box to flying field with simple tools.

With a four channel radio, we recommend the following controls: elevators, ailerons, flaps, and airbrakes. The elevators are located outboard of the vertical fins, and their hinge line is rotated slightly forward to provide a more powerful response. Ailerons are located mid-span to reduce adverse yaw to a minimum. Flaps are useful in thermal turns, and slows landings to a pleasant stroll. (When you lower the flaps, the nose goes up, not down as on most flying wings.) Rudders are located aft of the elevator/aileron separation and are attached to the fins. Aero braking and yaw translation damping are provided by a simple pull-pull system.

With a computer radio, FULL SPAN CAMBERING is possible! Full span cambering is an effect of the airfoils chosen and the sweep of the leading and trailing edges. Cambering the entire trailing edge yields higher lift over the entire wing span than using flaps alone, for



Specifications

Total Span	115 in.
Wing Length	67.2 in.
Height	15.4 in.
Total Wing Area	9.91 sq. ft.
Critical Area of Lift	7.8 sq. ft.
C.A.L. Loading	Very light (Very light 3 lbs. = 6.17 oz./sq. ft., Medium 5 lbs. = 10.25 oz./sq. ft., Heavy 7 lbs. = 14.35 oz./sq. ft.)

more efficient thermal turns and slower approach speeds. (No more of the smoking landings that wings are infamous for!) Also, with the addition of a fifth channel, rudders may be used for very flat, smooth turns. Use of rudders, aero brakes, and flaps provide a killer landing/approach package. If you fly alone, where no high start or winch is available, Fantasque flies very well on a T.D. .09 or equivalent electric power. The center keel is sizable from 3/8" width, intended for tow-hook location, to 4 inches for power launch.

Aerobatics are a must in any ship you plan to keep for a long period of time. Fantasque won't let you get bored. It effortlessly performs loops, rolls, wing overs, Split S, Cuban 8, and spins. Try inverted flight! You won't believe it!

Introductory price is \$170.00 ppd; retail price is \$210 ppd. Cash or money order only, please. For more information, contact Nichols Research, 20614 N. 18th Ave., Phoenix, AZ 85027; (602) 582-0768. ■

Schedule of Special Events

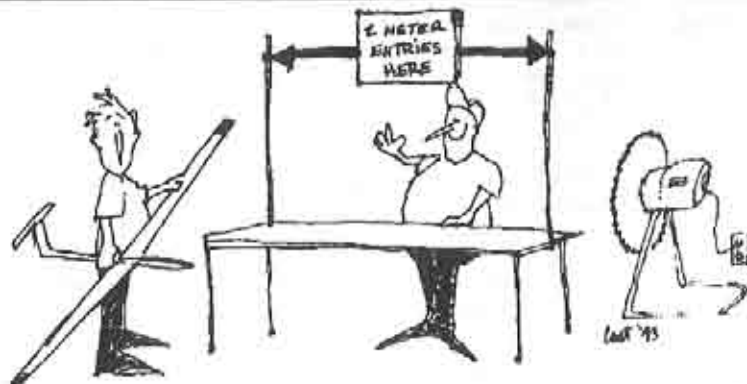
Date	Event	Location	Contact
May 8	MASS Handlaunch Glider Contest	Memphis, TN	Max Hurst (901) 989-3508
May 15	Art Brown Memorial Open	San Antonio, TX	Bart Como (210) 650-4318
May 15-16	13th Annual Santa Maria Soaring Society X-Country Race	Santa Maria, CA	Steve Bircher (805) 928-3904
May 16	TULSOAR Task T4	Tulsa, OK	Perry Gilstrap (918) 455-5490
May 22	Modelers Symposium	Cerritos College Southern California	Mike Taibi (310) 865-3220
May 22-23	4th Annual Memphis in May Electric Contest	Memphis, TN	Bob Sowder (901) 757-5536
May 23	Davison Hilltoppers Spring Soar	Davison, MI	Gene Pastori (313) 636-7722
May 23	Task T1 Contest	Dallas, TX	Don Chancey (214) 495-8688
May 29-31	Radioglide	Pitreavie, Dunfermline	Brian Sharp 0738 828 646
May 29-30	Cross Country	Montreal, Canada	Etienne Dorig (514) 449-9094
May 29-30	GVRC Spring Dual Meet	Nunica, MI	Cal Posthuma (616) 677-5718
May 29-30	Memorial Day Contest - Inland Empire	Washington Area Soaring Society	Frank Wheeler (208) 772-9400
May 28-31	Mid Columbia Cup Slope Races	Richland, WA	Roy Lightle (509) 525-7066
May 29-31	Sport & Vintage Glider/Sailplane Meet	Mayville, NY - DART Airport & Museum	(716) 753-2160
May 30	TULSOAR Fun Fly	Tulsa, OK	Sandy Hay (918) 665-8069
June 5	10th Annual H/L Inland Soaring Society	Riverside, CA	Ian Douglas (714) 621-2522
June 5	Metro Soaring Contest	Wadsworth, OH	Brian Smith (216) 825-5456
June 6	610, 612 DEAF Dallas Electric Aircraft Flyers	Dallas, TX	Jaime Colley (214) 690-0247
June 13	F3B Benefit Contest- Inland Soaring Society	Riverside, CA	Joe Rodriguez (714) 924-9537
June 12-13	Lift Summer Soar	Traverse City, MI	Jim Johnston (616) 938-1272
June 13	Great Rocky Mountain Handlaunch Contest	Denver, CO	Lenny Keer (303) 737-2165
June 13	Tasks T1, T7, T8 Contest	Dallas, TX	Gordon Jones (214) 840-8116
June 19-20 Chevrier	F3J EOLE	Paris, France	Jean Francois (33) 35 55 88 13
June 19-20	International Slopeglide II	Ribble Valley	Ian Benson 0254 387176
June 19-20	Renewed CVRC North South Soaring Challenge	Visalia, CA	Ed Hipp (209) 625-2352
June 19	2M, Open Canyon Lake Classic	Austin, TX	Tom Meeks (210) 590-3139

June 20	H/L Canyon Lake Classic	Austin, TX	Gene Warner (210) 732-3101
June 20	TULSOAR Contest	Tulsa, OK	Mike Teague (918) 747-1245
June 26-27	NASF/MASS Mid-South Soaring Champs	Huntsville, AL	Ron Swinehart (205) 883-7831 Eve.
June 27	TULSOAR Fun Fly	Tulsa, OK	Jim Stephenson (918) 627-3809
July 4	610, 612 DEAF Dallas Electric Aircraft Flyers	Dallas, TX	Gary Warner (214) 235-1124
July 4	Soaring Contest North TX Aeromodelers	Denton, TX	Al Sugar (214) 436-5200 Days
July 11	Annual Handlaunch	Dallas, TX	Bud Black (214) 235-0867
July 17-18	GVRC Summer Dual Meet	Nunica, MI	Cal Posthuma (616) 677-5718
July 16 27 July 24-25	AMA NATS North American Scale Soaring Assoc. Rally	Vincennes, IN Richland, WA	Wil Byers (509) 627-5224
July 24-25 July 31-Aug. 1	F3J Interglide Thermal Contest	West Midlands Montreal, Canada	Etienne Dorig (514) 449-9094
Aug. Aug. 1	F3B World Championships - 60-Min Enduro	Sava, Israel Dallas, TX	Chuck Fisher (214) 270-2634
Aug. 7-8	Dallas Electric Aircraft Flyers Sailplane Meet	Washington Area Soaring Society	Robin Kirpatrick (509) 489-5841
Aug. 8	Contest - Inland Empire Task T1 Contest	Dallas, TX	Tom Peadon (214) 644-6131
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. 14-15	Summer Soaring Festival - Soaring Union of L.A.	Carson, CA	Steve Addis (310) 320-2708
Aug. 14-15 Aug. 16-22	F3J Hollandglide Fun Fly Soaring Week	Netherlands Salt Lake City, UT	Bob Harman (801) 571-6406
Aug. 21	2M, Open	San Antonio, TX	Perry Van (210) 658-8842
Aug. 21-22 Aug. 28-30 Aug. 28-29	F3J Euroglide British Gliding Nationals GVRC 2-M Champs man-on-man	Belgium Nunica, MI	RAF Cranwell Cal Posthuma (616) 677-5718
Aug. 29	TULSOAR Fun Fly	Tulsa, OK	Mike Teague (918) 747-1245
Sept. Sept. 4	F3J CAMS Northern MI Sailplane CH.	Germany 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. 11-12	Masters of Soaring (Sponsored by Weak Signals)	Temperence, MI	Art Slagle (313) 477-2228 Eve.
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. 26	TULSOAR Fun Fly	Tulsa, OK	Terry Bryant (918) 482-5817
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. 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. 17	TULSOAR 2M & Unlimited	Tulsa, OK	Perry Gilstrap (918) 455-5490
Oct. 24	TULSOAR Fun Fly	Tulsa, OK	Mike Stephenson (918) 445-3002
Nov. 7	610, 612 DEAF Dallas Electric Aircraft Flyers	Dallas, TX	Jack Hamilton (214) 348-4669
Nov. 14	Task T6 Triathlon	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. 21	5th Annual MASS Turkey Shoot	Memphis, TN	Mike Kelly (901) 756-9410
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.



Curt Nehring
Southern California

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EVERYTHING ELSE



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FLYERS PLACING FOURTH OR BETTER IN AN AMA COMPETITIVE CLASS EVENT ARE INELIGIBLE. DURATION WILL BE 3, 5 OR 7 MINUTES. SCORING WILL BE ON A MODIFIED BELL CURVE SO EVEN A 30 SECOND FLIGHT WILL SCORE POINTS. BONUS POINTS WILL BE SCORED FOR LANDING IN A 50 FOOT CIRCLE WITHOUT LANDING CONTROL DEVICES OR A 25 FOOT CIRCLE WITH DEVICES. IF YOU DON'T KNOW WHAT ANY OF THIS MEANS, WE WILL BE GLAD TO SHOW YOU. AMA OR KING CO EQUIVALENT LIABILITY INSURANCE REQUIRED.

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EXPERT ONLY



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BESIDES TWO METER AND UNLIMITED THERE WILL BE SEPARATE CLASSES FOR COMPETITOR AND EXPERT. EVENTS WILL BE 3 AND 5 MINUTE PRECISION AND 3, 5, 7 OR 10 MINUTE DURATION AT THE DISCRETION OF THE CD. SCORING WILL BE ACCORDING TO THE AMA SCORING CURVES. LANDING POINTS WILL BE BASED UPON LANDING ON A 50 FOOT RUNWAY. THE CLOSER TO CENTERLINE THE GREATER THE LANDING BONUS. IF YOU DON'T KNOW WHAT ANY OF THIS MEANS, WE WILL BE GLAD TO SHOW YOU. AMA OR KING CO EQUIVALENT LIABILITY INSURANCE REQUIRED. 1991 GOLD STICKERED EQUIPMENT REQUIRED.

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_____	XXL T-Shirt	\$15.00	_____
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MIKE TAIBI

Superior Aircraft Materials
8 a.m. - 8:30 a.m.

Presentation Outline:

BALSAWOOD:

Origin
History

UTILIZATION:

Properties
Applications
Commercial uses

BALSAWOOD DENSITY:

What is the difference
How do you put it to use
Why is it important

BALSAWOOD GRAIN:

What is "A" "B" "C" grain
Where do you use them
How can you benefit

PROCESSING BALSAWOOD:

Grading process
Equipment used
Special Blades
Dio cutting

ROGER CHASTAIN

Feather / Cut
8:30 a.m. - 9:45 a.m.

Presentation Outline:

FOAM BASICS:

Styrofoam
Urethane Foam

FOAM CUTTING:

The Old Way
What we have learned
The New Way

TEMPLATE DESIGN:

Single Template System
Two Template System
Free Form Cutting System

FEATHER / CUT DEMO:

Theory behind Feather / Cut
Blanking Foam
Cutting Straight & Tapered Wings, Slots

WING SHEETING:

Wood — Balsa, Obechi
Plastics
Card Board
Fiberglass

JOE WURTS

World Soaring Champion
10 a.m. - 12 p.m.

Presentation Outline:

VACUUM BAGGING:

Balsa wood, Obechi
Fiberglass, Carbon Fiber

WHAT KIND OF LAY UP:

How much material
How strong
How heavy

HOW TO:

Prepare Core
Wing joining
Wing lip preparation

BAGGING PROCEDURES:

Lecture walk through
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Finished article

OK, I HAVE A PART:

How to finish it
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For more information contact:

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AWARDS: 1st-5th both days
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"A bold new concept that eliminates tangled and twisted lines and puts an end to chasing that chute!!!"



Operates w/high-start or winch
Requires light weight 12 V battery; winch source, OK
2 foot activated levers facilitate solo operation; no line finger contact
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Mark Tribes, South Bay Soaring Society, CA

"A few innovations that have made my forty years of modeling more enjoyable and easier are plastic covering, CA glue, computer radios and now, the VMC Model 20 Retriever. The VMC Retriever is a well engineered and constructed piece of equipment, and I have found the follow-up service to be excellent!"

Ed Slegers, "Lift Off" column, R/C Soaring Digest

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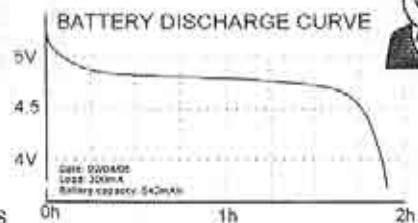
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National Sailplane Symposium Proceedings

...by Al Scidmore

(For the last ten years, the Madison Area Radio Control Society (M.A.R.C.S.) has been bringing together a very impressive group of speakers to speak before the gliding community. This two day conference is available in transcript form and is called the *National Sailplane Symposium Proceedings*. ED.)

Each of the *Proceedings* contains transcripts of the speeches given or the hard copy that was submitted by the speaker. Some of the talks given at Symposia in past years were timely for the period that they were given, but are of lesser interest, now. However, a good number of the talks are of lasting value and still valuable to the soaring community.

In order to expedite the sale of the remaining copies of the past years *Proceedings*, we have lowered the price of the *Proceedings* from past years. At this time there are *Proceedings* still available for each of the past years. However, we do not plan to reprint them again. The 1992 *Proceedings* are now available.

If you are interested in obtaining copies of any of the *Proceedings of the National Sailplane Symposium*, please write to Al and indicate clearly which *Proceedings* are of interest and include your name, mailing address, and the appropriate remittance. (Al Scidmore, 5013 Dorsett Dr., Madison, WI 53711)

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1992 SYMPOSIUM PROCEEDINGS

- Walt Good examined the use of Frequency Analyzers in R/C model sailplanes.
- Terry Edmunds and Steve Metz used their experiences as pilots of full scale sailplanes to present Similarities of Full Size and R/C Models.
- Tim Renaud, of Airtronics, discussed the state of the art and future of Computer Radios as related to R/C soaring.
- Pete Waters presented the background, history and current state of the Muncie Flying Site.
- Steve Neu, just back from successfully representing the USA in international F3E competition discussed the current stat of Electric Sailplanes.
- Al Doig described some of his experiences and observations on New Kits, New Materials, and Techniques for the Sailplane Builder.
- Lee Murray, Dave Beck, and Al Scidmore gave details of their project in designing and building an airborne computer controlled data gathering system for model sailplanes: Instrumentation and Telemetry.
- Martin Simons, recognized internationally as an expert in soaring theory, gave a presentation on Sailplane Aerodynamics.
- Jeff Raskin, recognized left coast leader in slope soaring, gave an extensive talk on Sailplane Precision Aerobatics.
- Maynard Hill's talk on World Duration Record Attempts described his recent successful venture in capturing the international R/C duration record.
- Prof. Roland Stull returned to give us the meteorological basics of thermal formulation and development and the latest findings in Meteorology for Model Sailplane Flyers.

1989 SYMPOSIUM PROCEEDINGS

- Walt Good's talk on the Militky Cup Electric Event held in Pfaffikon, Switzerland. The event is named after Fred Militky, one time Chief Engineer for the Graupner Company.
- Larry Jolly passed on some of his many years of experience and observations with respect to sailplane design in his talk "Designing to Win".
- Walter Pankin's presentation on flying wing sailplanes, "Flying Rainbows," provided an excellent common sense approach to flying wing design.
- Michael Selig, John Donovan, and Dave Fraser gave a full report on the preparations,

equipment, measurements, theory, and results from their Princeton Airfoil Tests.

- Bob Steele of LSF led a discussion on the Direction that soaring is, should be, was, or might be going.
- Tim Renaud, of Airtronics, reported on the direction that developments could be expected to go in RC RADIOS for the soaring enthusiast. Much food for thought.
- Terry Edmund's detailed report on his impressions of the F3B World Championships that he observed at Melun, France.
- Resident soaring Meteorologist Ed Eloranta of the University of Wisconsin provided a fresh look at THERMALS. We transcribed his words, but couldn't capture the videotapes that he made of 3D lidar pictures of the development, growth and movement of thermals.

1988 SAILPLANE SYMPOSIUM

- Walt Good: The Gutsy Gentle Lady Walt described modifications to the Gentle Lady that provided better contest performance.
 - Noal Rossow, Dave Mroz: Composite Vacuum Wing Construction. They discussed their efforts and equipment used for vacuum bagging in wing construction.
 - Charles Fox: Crescent Shaped Wings. Charles presented and discussed a report from the Flight Dynamics Laboratory of Wright-Patterson AFB on a number of airfoil planforms.
 - Craig Christensen: Electric Powered Sailplanes. Craig talked on recent state of electric powered sailplanes.
 - David Fraser: How to Design the Perfect Sailplane. The late David Foster discussed his computer sailplane design program, Sailplane Design, and it's application.
 - Byron Blakeslee, Rich Burnoski, Wayne Fredette, and Bob Sealy: presented a Panel Discussion on F3B
 - Ed Elaranto, meteorology research scientist discussed Meteorology for Modelers
 - Larry Jolly: gave a report on recent Trends in F3B Design
 - Hewett Phillips: reported on the Use of Electric Equipment to Detect Boundary Layer Separation and Turbulence
- ### 1987 SYMPOSIUM PROCEEDINGS
- Walt Good on "The Battle for Frequencies" as the AMA dealt with the FCC to procure us space in the frequency spectrum.
 - Lee Murray's in depth article comparing the weight, strength, puncture resistance, shrinkage, etc. of PLASTIC COVERINGS,

like Monokote.

- Roland Stull, a Meteorology Professor whose specialties is thermal mixing in the lower boundary layer talked on THERMALS.
- Pete Waters: "1991 and all that jazz". Pete on 1991 radio.
- Leon Kincaid's excellent talk on his efforts in DESIGNING SAILPLANES FOR COMPETITION.
- Paul Carlson's gave a short report on Michael Selig's progress at Princeton.
- Gary Tschautscher's report on his latest gleanings from reading GERMAN SOARING publications for the past year.
- Paul Carlson's talked on DESIGN AND DESIGN FACTORS FOR COMPETITIVE SAILPLANES.
- Ken Bates gave an update on his progress in the area of FLYING WING DESIGN and described his latest field trials and results.
- Joe Wurts talk on COMPOSITE TECHNOLOGY IN CROSS COUNTRY AND SLOPE RACING gave us the latest in construction ideas, techniques, and design ideas in these two areas.

1986 SYMPOSIUM PROCEEDINGS

- Walt Good gave an interesting talk about the "very FIRST RC SAILPLANE".
 - Bob Sealy reported on the F3B USA Team Selection Finals for which he recently was a contest director.
 - John Grigg and Terry Edmunds headed a panel discussion on the AMA, F3B, and WHERE WE ARE HEADED.
 - Jeff Troy, Bob Sealy, and Cal Posthuma held a panel on contest organization, CONTESTS DON'T JUST HAPPEN.
 - Warren Plohr and Pete Waters spoke on the recent radio spectrum changes as FREQUENCY MYTHOLOGY.
 - Maynard Hill spoke on the design and application of electronic ELECTROSTATIC STABILIZERS.
 - Gary Tschautscher and Willy Pfister related information on some recent German Sailplane Experiments.
 - Tom Brightbill spoke on the advantages and virtues of straight wing sailplane designs in "Straighten Out and Fly Right".
 - Joe Wurts gave an inspiring talk on the current technology of fiberglass over foam construction in his talk, Glass Wings.
- ### 1985 SAILPLANE SYMPOSIUM
- Frank Baker discussed the basics of model aerodynamics and how to interpret polar L/D diagrams in "Intro to Aerodynamics: Air

foil Polar Diagrams"

- B. Dan Pruss gave a talk and slide presentation on the 1985 F3B finals in Australia.
- C. Roland Stull's talk, R/C Soaring and Meteorology, was a review and update on a similar talk given at the 1984 Symposium. An excellent 28 page primer on soaring meteorology.
- D. Bryan River of the US Forest Products Lab spoke on ADHESIVES and applications.
- E. Ken Bates gave a talk and slide presentation on FLYING WINGS.
- F. Ken Bates, Pat Flynn, Noal Rossow, and Stan Watson led a panel discussion on CROSS COUNTRY soaring.
- G. Jack Hiner, holder of many cross-country soaring records, talked about the R/C VARIOMETER and their application in R/C soaring.
- H. Bob Sealy, spoke on FIBERGLASS FUSELAGES.
- I. Michael Selig gave a presentation on the theoretical optimum F3B speed run, sheeted vs. unsheeted wings, and some recent airfoils: AERODYNAMICS.
- J. Scott Christensen, Terry Edmunds, and Greg Seydel: a panel on winning competition tactics in CONTEST STRATEGIES.
- 1984 SAILPLANE SYMPOSIUM**
- A. Steve Bowman, Tom Kunath, Terry Edmunds, and Carl Mohs each contributed a view of a NATS from a different perspective. AMERICAN, CANADIAN, AND BRITISH NATIONALS.
- B. Ross Swenson discussed his clubs experience with the "Oly 650 - a club one design contest"
- C. Bob Johnson provided details and reported on the experience of their club with the "1 Hundred Minute Club".
- D. Mike Fry presented a thoughtful discussion on "Your Flying Site as a Tool for Growth".
- E. Prof. Roland Stull, a meteorologist whose specialty is vertical mixing in the boundary layer of the atmosphere, presented an excellent talk on the theory, practice, and detection of THERMALS.
- F. Tom Kunath discussed the experience of the Milwaukee /Thermal Soarers with HAND LAUNCHED GLIDERS.
- G. Herk Stokely presented some THOUGHTS ON CLUB NEWSLETTERS
- H. Lee Murray gave a theoretical talk on STABILITY FACTORS, COMPUTERS AND THE MODEL SAILPLANE.
- I. Steve Moskal exhorted the symposium

participants to get involved with Scale Sailplanes: WHY NOT SCALE.

- J. Rich Burnoski presentation was on BASIC FOAM CORE PREPARATION AND TECHNIQUES.
- K. Dick Buescher led a panel discussion on RADIO EQUIPMENT, WHAT'S NEW, WHAT'S AHEAD.
- L. In CROSS COUNTRY SUPPORT EQUIPMENT, Mark Stidham suggested that every sailplane flyer needs a CB radio equipped pickup truck.
- M. Dan Pruss (moderator), Terry Edmunds, and Wayne Fredette combined to lead a PANEL DISCUSSION ON F3B.

1983 SAILPLANE SYMPOSIUM

- A. Stan Watson's interest in F3B inspired his talk on R/C Sailplane Speed Events: Why and How.
- B. Lusk Edmunds, Fry, Kunath and Scidmore collaborated on a panel discussion on Competition Classes and Events.
- C. Al Scidmore discussed the construction and tuning of: Winches, can you afford one?
- D. Batey, Kunath, Guehrer, and Hoff led a panel discussion on Hand Launched Gliders.
- E. Pruss, Batey, Stegal, and Watson in a panel discussion on Record Attempts and Cross Country Soaring.
- F. Lee Murray showed that computers could be used in design with Computer Aided Wing Construction.
- G. Scott Christensen gave us the benefit of his experience with Top Flite Models in his talk about how to design Sailplane Kits.
- H. Peter Waters used his crystal ball to prognosticate in Radio Systems: Then, Now, and Soon.
- J. Keith Scidmore discussed a number the newer materials and techniques in his talk Composites for Strength with Low Weight. ■

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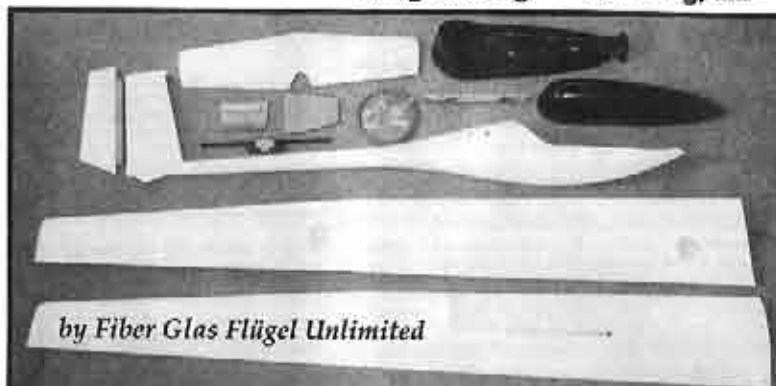
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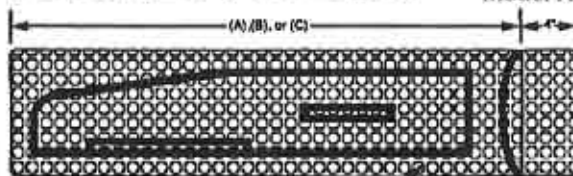


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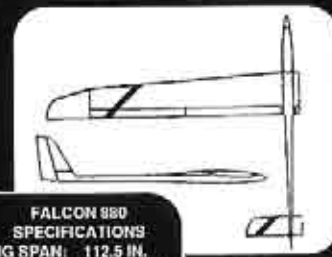
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winning designs are well known by many
soaring enthusiasts around the world and
these new all-molded composite planes have
the same touch of excellence that marked his
original designs.



Coming Soon

...from Allen Development

WRIST ROCKET - All-molded H/L Sailplane

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BANSHEE

Agnew Model Products Design

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



BANSHEE - Thermal 2M

★ Pre-sheated wings w/polyhedral pressed into each
panel ★ Pre-sheated 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
May 1993

SATURN 2.2E - Thermal Electric Sailplane



Standard Kit Price: \$179.00
Pre-Sheeted Wing & Stab: \$299.00

Plus \$15.00 S&H Continental U.S.A.
(CA res. add 7.25 % tax)

Features:

- ★ 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.

Specifications

Wing Span: 85 In.
Wing Area: 660 Sq. In.
Airfoil: HQ 2.0/9 - 2.0/8
7 Cell Wt.: 47 Oz.
10 Cell Wt.: 52 Oz.

IF YOU WANT AN ELECTRIC THAT WILL DO IT ALL, TRY A SATURN 2.2E.

Special thanks to Ed Slegers for his expert assistance and support in the design, engineering, and performance testing of the Saturn 2.2E Thermal Electric Sailplane!

LAYNE / URWYLER

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

Also available from Slegers International, Rte. 15, Wharton, NJ 07885
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Designs by
**LAYNE /
URWYLER**

FOR
PERFORMANCE
OUT OF THIS
WORLD



SATURN 2.5T

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

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.

SPECIFICATIONS:

	<u>2.9T</u>	<u>2.5T</u>
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