The 7th Annual
TEXAS NATIONAL TOURNAMENT (TNT)

The "Texas National Tournament" (aka "TNT") is the Texas state championship. It was derived some years ago when the Texas Soaring Conference was established. This conference was started to provide some organization to the various contests scheduled throughout the state. Many flyers had begun to travel more and the location and dates of contests were a little hard to obtain at times. In addition, it was found that more than one club would schedule a contest on the same date making it difficult at times to decide which contest to attend. Over time some regular dates had been "established" by clubs using the same dates every year for the major contests.

In 1985 the presidents of each of the soaring clubs in Texas got together during January to sit down and try to better organize their schedules. Thus began the Texas Soaring Conference. While they were there they came up with the idea of having a statewide contest to be rotated around the state to select a state champion. The name Texas National Tournament was chosen for this contest. Although contestants from other states have participated for many years in the Texas circuit it did have a nice ring .

Since its inception the "TNT" has traveled across the state with every club hosting it at least once. It provides the opportunity for each club to gain the experience of holding a major contest. In addition, the sponsoring club can draw on the resources of other clubs to put on the contest. One year the equipment came from Dallas, the contest director was from Houston, and the site was at New Waverly.

Sponsored by The Heart of Texas Soaring Society (HOTSS)
HOTSS Flying Field, San Antonio
September 14 for 2 Meter; September 15 for Unlimited

Pilots meeting at 9:30 A.M. each day. Flying starts at 10:00 A.M.
Fly as many rounds as possible with the last round starting before 4:00 P.M.
Task T1 - International Duration; L-4 Spot Landing

Frequency Limitations: All 50 channels. Only gold stickered transmitters and narrow band receivers will be allowed.
Scoring: Flying will be done in flight groups each round, normalized.
Awards: 1st through 5th in each class.
Registration: Pre-registration by Sept. 1st is $15.00 per aircraft. Registration after Sept. 1st and at contest is $20.00 per aircraft.
Information: Barry Kennedy (512) 661-0961 or Arden Coher (512) 599-4031

TNT Registration Form (Please Print)

Name_____AMA NO. _____
Address_____
Telephone #:__(___)_____

Class (Circle)	Event	Freq (Ch #)	x $15 =	Total Fee
Sportsman Expert	2m Unlimited	_____	X $15 =	_____
Sportsman Expert	2m Unlimited	_____	X $15 =	_____
Sportsman Expert	2m Unlimited	_____	X $15 =	_____
Sportsman Expert	2m Unlimited	_____	X $15 =	_____

Mail to: TNT, C/O Arden Coher, 5926 Spring Cluster, San Antonio, TX 78247

R/C Soaring Digest
August, 1991
Vol. 8, No. 8

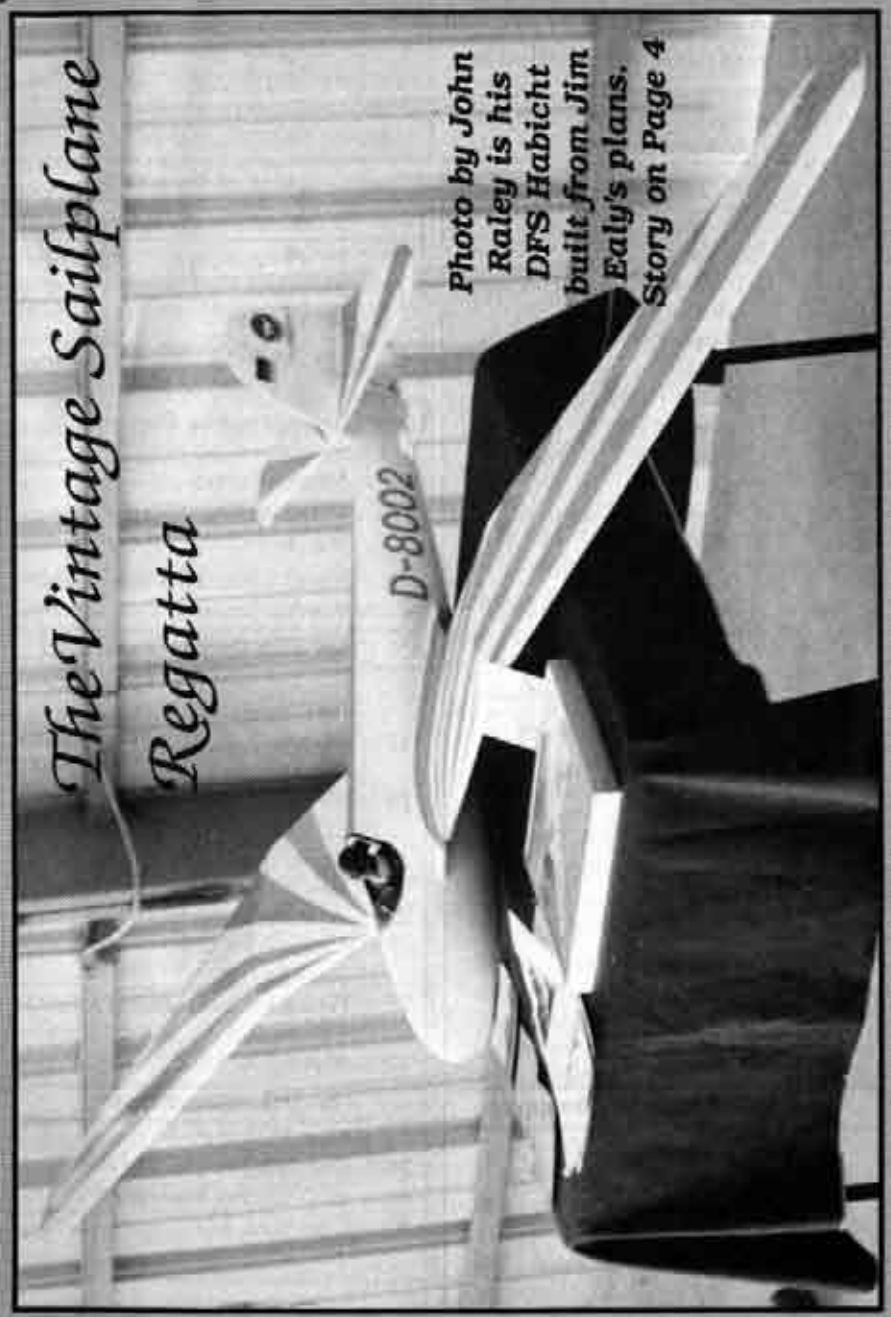

Photo by John Raley is his DFS Habicht built from Jim Ealy's plans.
Story on Page 4

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 submitted 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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The Soaring Site

For one reason or another, many of us over the last year(s) have purchased new radios or have sent our old radios to the manufacturer to have them upgraded, repaired or, perhaps, to get a frequency change. Whatever the reason, it is always a good idea to double check the frequencies to make sure that the flags, crystals and notes all match.

The manufacturer's instructions will explain how to remove the cover on the transmitter in order to check the frequency; it varies from manufacturer to manufacturer. For those of you that have never done this before, you'll find that the frequency number is a five digit number and must be translated. The manufacturer's instructions should contain a chart that will show what channel number is associated with what frequency number.

We received a note from Gene A. Frame, 4245 Lazy Acre Rd., Middleburg, FL 32068 regarding his blackberry patch. Gene says, "My blackberry patch is a real problem. I have use of a field about 1,000 feet square with nice grass in a 300 by 400 foot oval in the middle. There are no other obstructions besides the blackberries around the outside of the oval. One solution is 1/2" PVC pipe made into four foot forks set at 100 foot intervals in line. After each launch the hi-start has to be picked up on the reel and re-rigged. Over a period of time, I will complete clearing foot paths with a grass whip so I can lay the line on the ground. It's enough to make me think about going electric."

Happy Flying, Jerry & Judy

Jer's Workbench

Designing a Sailplane Part III

I started the construction of my model this month, which I'm going to refer to as the "TEST BED", because I hope to be using it later on for some miscellaneous testing, research and development for future articles.

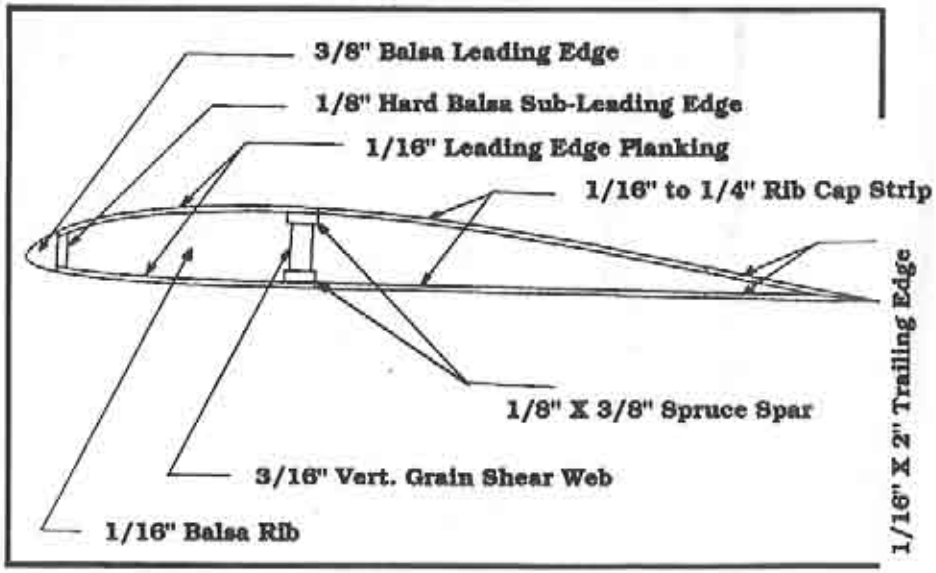
I want to talk a bit about wing construction this month. One might ask, "What is the best type of wing construction?" Well, if you put 27 model builders and engineers in one room there will probably be 20 - 27 different answers on how to construct a wing ranging from all wood built-up, foam core and even hollow core fiberglass skin wing construction. Well, the Test Bed is a simple design; the sketch shows what I consider simple and the way that I constructed the wing.

First, I have got to say that the last all wood, built-up wing that I built was about 18 years ago. The hours spent in building the Test Bed wing could have yielded two foam core wing sets.

Stack Cutting Ribs

Having selected a S3021 airfoil for the Test Bed wing and a NACA 0010 airfoil for the stabilizer, the next step was to cut a set of ribs. Now, there are a number of ways to do this. First, I have a computer and an airfoil program and it's easy to run off a set of patterns, but I decided not to use any state of the art equipment in the construction of the first Test Bed model. Having collected airfoil patterns over the years, I easily found what I wanted to use. To get the correct size pattern needed, I ran my airfoil pattern through a copy machine, enlarging and reducing it until I got the size that I wanted. These patterns were used to make two sets of 1/8 inch plywood root and tip ribs, one for the stabilizer and one for the wing.

Next, I placed the tip and root plywood patterns for the stabilizer one on top of the other and drilled two holes so that they could be bolted together later on. See photo #1. Looking through my junk boxes for two long, small diameter bolts, I found two Molly screws, the kind used for hanging pictures. These looked like they would really work good, and they did. I removed the screws from the Molly assembly and, using a set of side cutters, I cut the nut from the end of the Molly assembly. Now that I had my patterns and a set of bolts, the ribs could be stacked and cut.



Twelve ribs were needed for each stabilizer half. So, using 1/16 inch balsa wood, I cut 12 over-sized pieces, one piece for each rib. These were stacked neatly and with one of the template patterns on the top, I drilled two holes through all 12 ribs using the plywood pattern as a guide. The bolts were screwed through the stack of ribs and the other plywood template was then attached to the underside of the stack. They were bolted together as shown in photo #2.

Using a small razor plane to remove most of the excess wood, final trimming was done with a sanding block as shown in photo #3. Now, because of the way this type of stack cutting works out, each rib will have a beveled edge. Because of this beveled edge I know that I must leave a bit of extra wood at the leading edge of the rib. (Having done this before, this is necessary or they will be too short.)

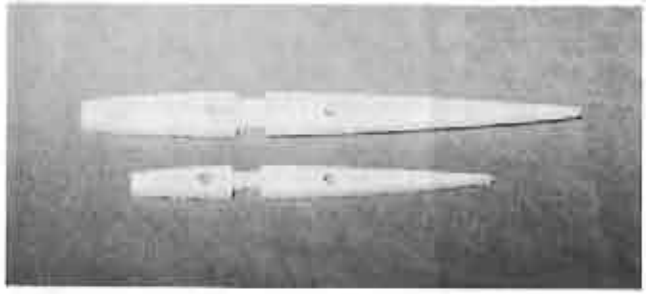


Photo #1 Plywood root and tip ribs

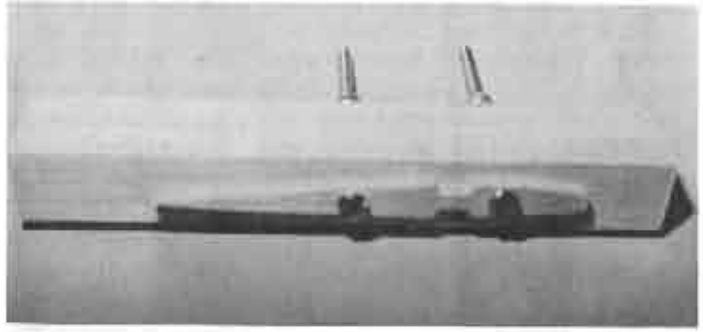


Photo #2 Stack of un-cut ribs held in place with bolts.

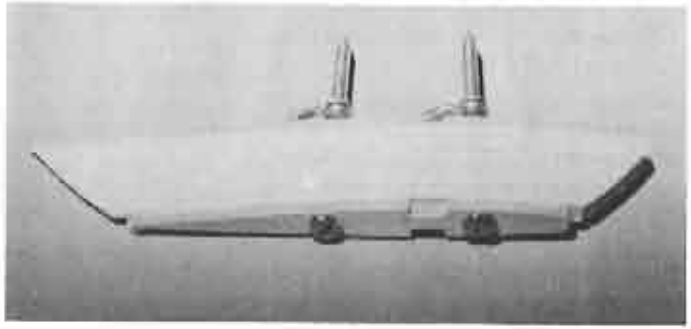


Photo #3 Sanding is complete.

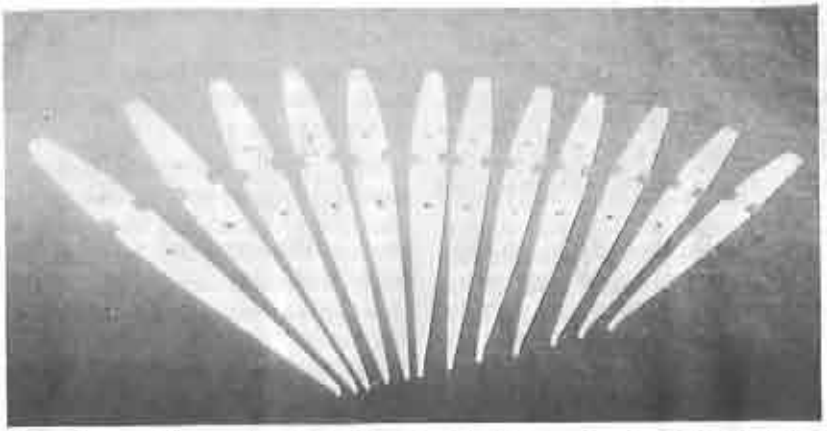


Photo #4 Completed set of tapered ribs.

Each rib was trimmed individually as the stabilizer was assembled over the plans. This provides a square edge to glue the leading edge to. Photo #4 shows a completed set of tapered ribs. Wing ribs for the Test Bed were stack cut using the same method.

Glues

Most of my building these last few years has been with fiberglass, foam and epoxy. I have never used much in CA (cyanoacrylate) glues. However, while building the Test Bed I discovered semi-instant and slow cure CA. I knew about the instant CA, but learned something new. A lot of you probably know about them already, but for those of you who don't, I would like to share what I learned. Planking a wing was always a time consuming job for me, but that was before CA glue. I found that if I pre-cut all my planking and sprayed each piece with accelerator that it could be set aside while glue was applied to the ribs. I had plenty of time to run a bead of slow cure CA glue across each rib, down the length of the spar and the length of the leading edge. Very carefully, the planking was laid in place with some rubbing across the spar, down each rib and then the leading edge. Within a couple of minutes I was done. However, if you are not careful in the placement of the planking, you could have a mess on your hands! You only get time to place the planking once! It sets up almost instantly! ■

The 4th Annual Vintage Sailplane Regatta

...by John Raley
Photos by the author.

1375 Logan Ave., Unit K&L, Costa Mesa, California 92626 U.S.A.

Although the Vintage Sailplane Plane Regatta held Memorial Day Weekend did not have a great turnout of R/C scale sailplanes, the full size gliders would have thrilled any flight enthusiast.

There were 3 flying Baby Bowluses, the only three flying today. There were various Schweizers to be seen as well as a Corcoran Cinema II. The Regatta was held at the Hemet-Ryan Airport in Hemet, California and ran from the 25th of May to the 27th. I drove out with my friend and aircraft guru, Dale Lemmons, on Saturday morning. The turnout was a bit lighter than last year but the quality was great and the weather perfect.

One of the most interesting gliders was a 1934 Bowlus Senior Albatross under restoration by Steve Lawry. It is one of four that were built and will be the oldest flying glider in the world when it's finished in 1994. It has a 62' wing span

Schweizer 1-26 built from a Sterling kit.

Bowlus Baby Albatross on tow. This glider had a mahogany plywood fuselage, with a finish like a grand piano.

Detail of Grunau Baby kit-built plane.

The winner of the best restoration award was this Schweizer TG2-8.

Winner of the best R/C Vintage Glider was this beautifully finished S6-38 Primary Glider built from a Krick kit.

Corcoran Cinema II restored by college students and now owned by Harry Irvine.

and an empty weight of only 350 lbs.. The recommended landing speed is only 21 mph. In order to help fund the restoration, Steve will be selling 1/4 scale plans for the "Senior". He couldn't give me a date on when the plans would be ready. I told him to be sure to contact *R.C.S.D.* when they were.

After the barbecue on Saturday everybody gathered in an empty hanger and watched films brought and narrated by Jack Bowlus, Hawley Bowlus' son. These "home movies" were the highlight of the Regatta. There were scenes of Bowlus trying out his first glider in the early 1930's, and soaring over Torrey Pines and Point Loma when there was nothing but open fields and hills. One film showed Bowlus' XCG 16 Cargo Glider he designed for the military. This was a twin boom lifting body glider that could hold troops or a howitzer and a jeep and men necessary to work it. It would make an excellent scale slope plane. Unfortunately, the government for some unknown reason had all the plans destroyed along with the glider.

Sunday morning was spent watching the gliders competing in spot landing. We had to leave by noon and were unable to get the results on all the contests.

The Regatta was a wonderful learning experience and worth attending if you have a chance to. It is put on by the Vintage Sailplane Society and sponsored by Sailplane Enterprises whose grounds the event is held on. There are dozens of other gliders there to look at and Sailplanes Enterprises also offers glider lessons or rides at vary reasonable rates. Next year the plan is to get more help in getting the word out to the modelers so there will be a better showing of scale sailplanes. ■

On The Wing

...by B²

Bill & Bunny Kuhlman, P.O. Box 975
Olalla, Washington 98359-0975

A review of Serge Krauss' "Tailless Aircraft A Bibliography for Subsonic Types".

This bibliography was first brought to our attention by a correspondent who mentioned a classified advertisement in one of the magazines catering to enthusiasts of homebuilt aircraft. Our request for additional information was met with a prompt reply, and we ordered a copy for our personal library.

A complete and accurate overview of the contents of "Tailless Aircraft" is best left to Mr. Krauss:

"After more than a year's work, I have just released a bibliography of literature concerning subsonic tailless aircraft and related topics. An outgrowth of a personal hobby, it began as an attempt simply to catalog my holdings and to save others some of the effort necessary to find the thousand or more tailless items I had or knew about from several years of enthusiastic nosing around. It has since grown to include nearly 1500 tailless items, 500 items of related interest, and other information of an annotative nature. The entire document contains over 120 pages. It is, to my knowledge, unique and the largest work of its kind ever published.

"My main intent in publishing this work has been to provide a bibliography substantial in its treatment of historical and technical literature concerning tailless development and technique, and well-rounded with respect to other topics of tailless interest. While such a document can be neither comprehensive nor exhaustive, this is an extensive work, encompassing literature ranging from magazine articles through patents and technical reports, and dating from the late nineteenth century to the present. Historians and those interested in design and construction of tailless aircraft should

find its listings useful.

"In addition to chronological listings of material on tailless aircraft and related topics, the bibliography includes other helpful information. A preface furnishes a brief perspective on tailless development and its chief proponents. Introductory material includes discussion of tailless guidelines, content and format of the bibliography, information on acquisition of tailless aircraft information, and suggestions for reasonable core material from the tailless literature. Listed items are commonly accompanied by notations concerning topic, content, length, presentational features, and sometimes other cross-referential material or sources. Brief lists of previous bibliographies and sources of rare materials are also included. Finally, an appendix lists dates for tailless aircraft by more than 100 selected designers.

"The book is spiral bound (helically) in durable patchco grained material, so that it can he opened back on itself without folding or otherwise damaging its pages. It can also be dragged through library stacks - or wherever - with a minimum of wear."

The preface remains our favorite part of the book. It is here, in the opening pages, that we read about a few of the notable designers and their approaches to the unique problems of tailless aircraft. Mr. Krauss, however, goes further. He explains the underlying drives which relentlessly force those individuals to persist, sometimes in the face of strong personal and monetary adversity. We, not too surprisingly, see inklings of these drives in ourselves, and so the preface lends support to some of our own goals, while at the same time reminding us of the existence of fallacies.

As genuine tailless and flying wing fanatics, we have devoured this book several times over. After more than a year it still serves as an efficient source of information, and it has in fact stimulated us to catalog our own collection of materials dealing with tailless aircraft.

The first edition of "Tailless Aircraft - An Extensive Bibliography for Subsonic Types" was printed in December of 1989. Mr. Krauss adds to the tailless bibliography as he finds materials not previously listed and updates it with recent citations. A copy of the current version is available directly from Serge for $20.00, all taxes and postage included. Write to Serge Krauss, Jr., 3114 Edgehill Rd., Cleveland Heights OH 44118. Please be sure to mention *R/C Soaring Digest*! ■

Understanding Thermal Soaring Sailplanes

Part 4 of 4 Parts Continued

(This column began in January, 1990. Each part covers several months.)

...by Martin Simons

Martin Simons, 13 Loch Street, Stepney, South Australia 5069

Balance, trim and vortex drag

Model fliers are often reluctant to trim with the model's centre of gravity forward, even though this allows the use of a smaller tail. There is in fact a fairly widespread belief that having the centre of gravity aft improves the all-round efficiency. Free flight sailplane fliers still almost always rig their models with c.g. well aft, and use tailplanes with pronounced upward camber. There seems to be no justification for this kind of arrangement, other than slavish adherence to fashion. Some further explanation may be required to emphasise this.

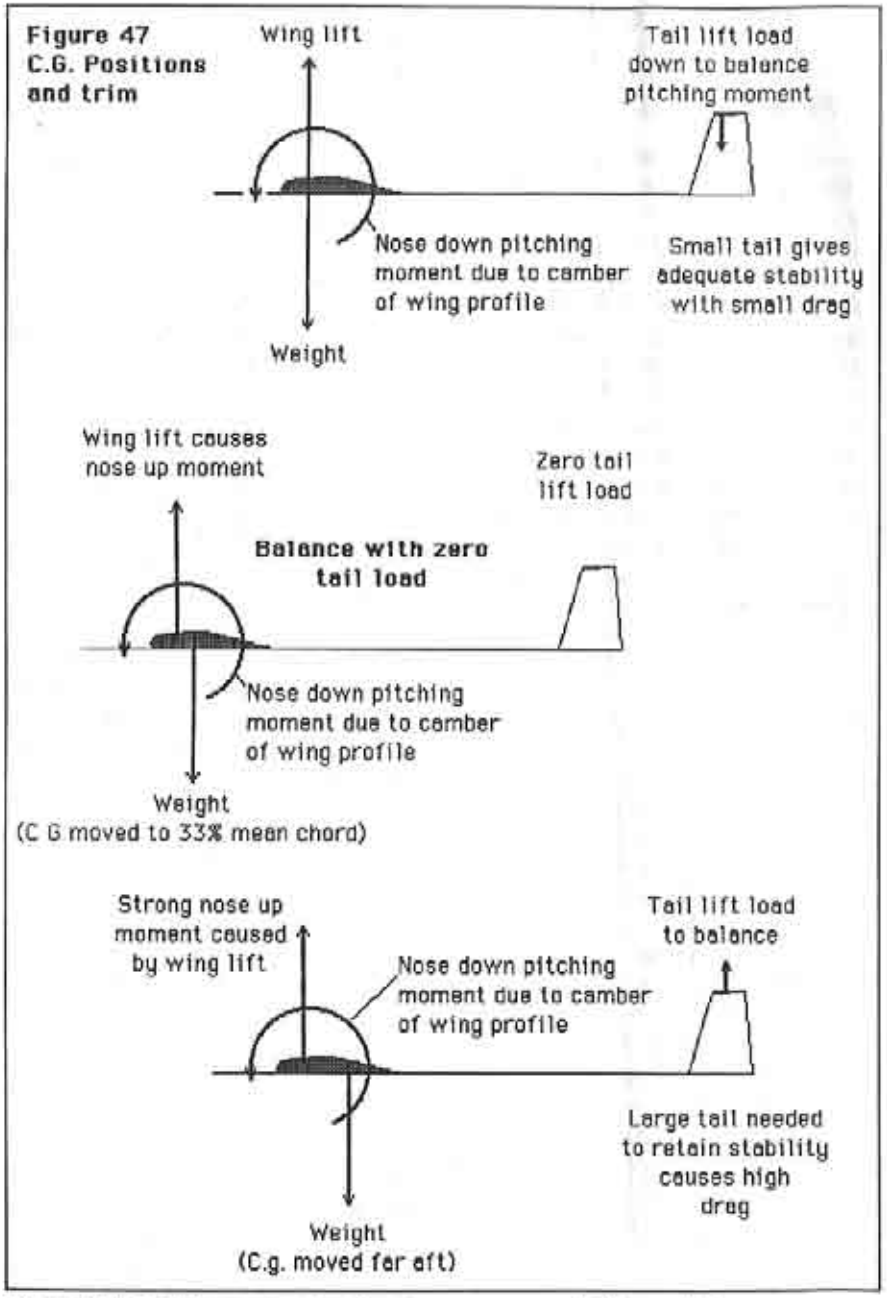
If the aircraft is to fly at a steady airspeed, in equilibrium, the total of all pitching moments must be brought to zero, that is, balanced out. The pilot accomplishes this balance by adjusting the elevator. A model can be trimmed to fly with c.g. forward or aft, with an appropriate change of elevator neutral position for each change of c.g.

Stability, and hence elevator sensitivity, will be affected, as described above. There is a range of safe positions for the c.g.: too far aft and the model becomes dangerously unstable, too far forward and the elevator becomes so insensitive that there is insufficient control. These simple effects can be investigated by anyone with a serviceable sailplane and the ability to remove, or add, ballast in the nose of the fuselage.

If the wing has normal positive camber, which in thermal soarers is invariably the case, the camber itself generates a nose down pitching moment (Figure 47). If the centre of mass or centre of gravity of the model coincides with the aerodynamic centre of the wing (always close to 25% of the mean wing chord [1]), the wing camber pitching moment will have to be balanced out by a negative (downward) balancing force generated by the tail. In full-sized aircraft practice, this is in fact considered the 'normal' situation, a download on the tail countering the wing camber pitching tendency.[2] The mainplane then has to support a total lift load slightly more than the weight of the aircraft.

There is a small vortex drag penalty. The extra load on the wing creates slightly stronger wing tip vortices and the download on the tail produces tip vortices there too. Wherever there is a difference in pressure between the upper and lower surfaces of a wing tip, a vortex will form. So, moving the c.g. forward increases both wing and tail vortex drag very slightly. But by moving the c.g. forward, the tail areas, and hence tail profile drag, can be reduced without spoiling stability. A net saving in total drag results. C.g. forward thus improves the polar of the sailplane.

If the centre of gravity is moved somewhat behind the 25% mean chord aerodynamic centre of the wing, the wing lift, acting upwards, creates a nose up pitching moment about the c.g. reference position. The wing camber still tends to pitch the nose down. It is possible to arrange the c.g. position and trim so that the lift (nose up) moment and the wing camber (nose down) moment exactly balance one another in level flight at some airspeed. The stabiliser in such a case will carry no load up or down. This rather delicately poised situation cannot be maintained perfectly over the entire range of possible airspeeds and angles of



attack that a sailplane may experience, but the zero-tail-load trim may be approximated for fairly normal flight speeds, with the c.g. at about 33% of the mean wing chord, a location frequently recommended for models.

Tail vortex drag is practically zero in this situation, and no extra load is transferred to the wing so the wing vortex drag is not increased either. But because the c.g. is aft, to retain adequate stability and control, the tail volume has to be enlarged proportionately and this increases tail profile drag more than the very small saving in vortex drag. The total drag of the sailplane is thus greater than with c.g. forward, for the same stability factor. This not, therefore, the most efficient c.g. position.

If the c.g. is moved further aft still, say to 40 or even 60% of the mean wing chord, as on some free flight sailplanes, the net pitching moment of the model without the tail is strongly nose up. The lift of the mainplane acting on its longer moment arm ahead of the c.g., more than counteracts the nose down pitch of the wing camber. To balance this, the tail has to be trimmed at a positive lifting angle to maintain the balance.

In this situation, there is some reduction in wing tip vortex drag because the wing has less load to carry, some of the lifting work has been transferred away from the wing to the tail. But the tail does develop tip vortices. More importantly, to retain stability, the tail area has to be increased and the total drag rises. Since the tail normally is less efficient than the wing, it produces its small amount of lift at a disproportionate cost in both profile and vortex drag. Despite many generations of free flight model sailplanes with so-called 'lifting' tails, moving the c.g. forward and reducing tail areas accordingly produces a more efficient aircraft, while retaining adequate stability factors.

There are other factors which enter the complete equations for tail drag and stability. For example, the direction of the airflow at the tail is influenced by the downwash from the wing. The combination of downwash and the negative tail angle of attack when the c.g. is forward, can produce a slight inclination of the tail lift vector in the forward direction. This, in a completely rigorous analysis, appears as a small force in the direction of flight, equivalent to a reduction in drag. In complementary fashion, a tail which, with aft c.g., is made to lift upwards, may produce a slight rearward component of force, and hence an equivalent increase of drag. Such effects are almost vanishingly small in practice and may safely be neglected.

♣ ♣ ♣

[1] The aerodynamic centre of the wing is not the same as the centre of pressure. Older texts used the abstract concept of a moving centre of pressure to explain the pitching tendencies of cambered wings. The same results are obtained by using a fixed aerodynamic centre at 25% mean chord, together with a pitching moment which depends on the amount of wing camber.

[2] Note that the position of the elevator is not directly related to the load carried by the horizontal stabiliser as a whole. If the elevator is slightly up this does not mean that the load on the tail is down. Similarly, if the elevator is slightly down, the load on the tail may not be up. To explain this apparent anomaly would require a much longer article. ■

Common Abbreviations

A.R.	Aspect Ratio	L.E.	Leading Edge
C.D.	Contest Director	L/D	Lift over Drag
C.G.	Center of Gravity	NAA	National Aeronautic Association
F3B/F3E/F3J	FAI Competition Classes	SMTS	Sportsman Multi-Task
FAI	Federation Aeronautique Internationale	T.E.	Trailing Edge

How to Build Scale Spoilers

...by Designer, Gene Cope

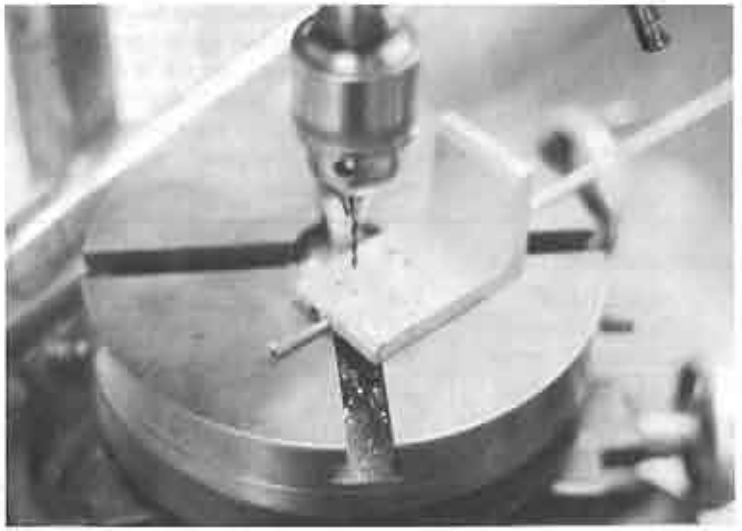
109 N. 42ND Ave., Yakima, WA 98908

Scale spoiler bays are not hard to build, but are hard to find manufactured in the right size and shape.

The spoilers in my on-going sailplane are a 62% cord, so there's no room for standard, off-the-counter spoilers. Besides, they're not to scale size in my case. I started by making a sectional view by computer for the cord areas in the spoiler section of the wing. Now you can calculate the thickness of the wing where the spoilers are located cord-wise. This is the working measurement for how deep your spoiler bays will be. Most spoiler caps on full-size sailplanes are about two inches wide, so my 1/4 scale cap width will be 1/2". This is the max width of the spoiler channel. All you need now is the length of the full scale spoiler bays, which can be measured from 3-view or taken from the geometric data found in full scale documentation, or by measuring the full scale ship.

The next step is to make a mold for the channel. This can be made from wood or metal so that there's an outside dimension and an inside dimension. The difference is from 1/32" to 1/16" and the filler material is fiberglass, Kevlar, or carbon fiber. (To each his own.) One note: Fiberglass mat only works with polyester resin due to the bonding agent required to hold the mat together. There is good news, too. The new UFO glues bond polyester and foam together without the common results of melted foam, or epoxy not bonding to polyester.

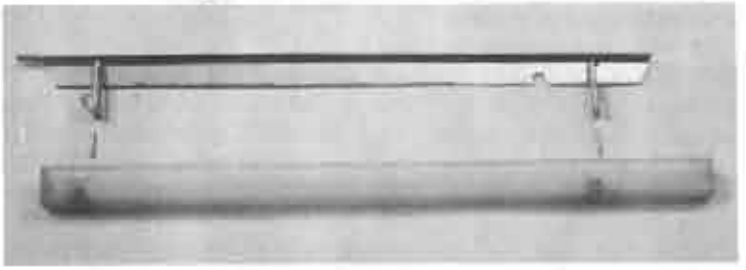
The mold is sealed and sanded smooth if made of wood. Metal requires moderate sanding to smooth out tool marks. The mold is then waxed liberally. The material to be molded is cut and laid on a piece of wax paper. The resin is then pored on the material and another piece of wax paper is placed over it. Now squeegee the resin back and forth to saturate the material completely. Place the sandwich of wax paper and material over the mold equally. Now the inside mold is pushed down over the material, forcing the form to take shape. Clamp tight until the resin sets. When set, trim the edges and let cure fully before removing. Repeat this process for each spoiler bay. After fully cured, trim to length and cap



Drilling Jig

Soldering Fixture

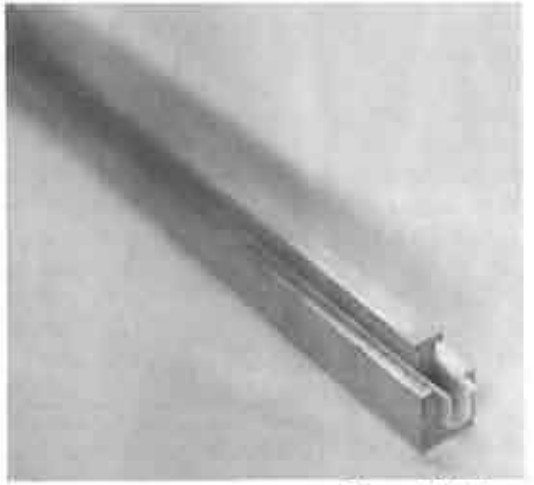
fixtures necessary for completing the spoilers. You will need a piece of hard wood or aluminum. Start by making a channel that will hold the long tubing diameter (I used 5/32" tubing.) snugly and drill two holes at the center line measurement determined with the compass and graph paper earlier. This fixture is to be used to drill 3/32" holes in the long tubing for the upper and lower pivot points. Take a piece of tubing that is used for the



Spoilers in different configurations

with 1/16" ply or suitable material. The blade is made from .025 6061 aluminum or in glass fiber from the same mold used to make the channels. The exact shape and size will be determined by your scale ship, or standard sailplane.

The spoiler dog bones are made from brass tubing. The size I used for pivots was 1/16" ID because the top can be tapped 1-72 for attaching the blades. The lower unit used 1/16" music wire as a pivot, but can be changed to suit your situation. To determine the length of the dog bones, get some graph paper and draw out the spoiler bay and blade to full size. Use a compass to rotate the given height of the blade back into the bay. When you work out the length necessary to rotate the blade from inside the bay to the height required in your application, it's time to start making the



Channel Mold

long section of the dog bone and drill one 3/32" hole through it while in the channel, using a drill press, as shown in photo. Now put a piece of 3/32" tubing or wire down one of the holes, pining the section of tubing in the channel. This will align and maintain the distance between holes

during this stage. Don't worry about cutting the tubing until all the holes are drilled. Cut the tubing so that half of the drilled hole is exposed on each end of the long tubing. The lower tubing is cut to just fit inside the channel. The short top tubing is just longer than the diameter of the long tubing. The fixture for soldering the unit together is made from aluminum because the solder won't stick. Start by drilling two holes 1/16" diameter on the center line determined earlier. One hole counter bore with a 3/32" drill to a depth that will position the blade within the channel so it will move freely. Use a soft silver solder (400°) to solder the 3/32" to the long section. Install short 1/16" wire in the two holes. If done properly, they will be parallel. Make sure the 1/16" wire does not extend through the tubing, as the solder will stick anywhere the flux flows. Now install one short 3/32" over the lower pin and one long 3/32" down in the counter bore so it bottoms. Lightly flux the tubing and install the long section. Heat the ends of the brass tubing until the silver solder flows evenly; at no time leave cold joints. Let set until cool and carefully pry off the pins with a small screwdriver. Clean up with sandpaper and set aside for the next step.

Acquire a piece of .030 X 1/4" brass from your local hobby shop and cut in 3/8" lengths for soldering to the drive links. The number is only restricted by how many spoilers you build. Reinstall a dog bone on the soldering fixture and position the 1/4" X 3/8" brass either on the left or right. The measurement is controlled by the height of your spoilers. Now solder the brass plate to the dog bones. Drill holes in plate to accommodate your measurements.

It's time to start assembling the parts to make that scale spoiler. First, determine where the dog bones attach to the blade and drill a 1/16" hole in the blade. Tap the upper pivot point 1-72 and attach blade. Install the blade in the bay centering the blade lengthwise and square. You will locate the lower pivot and drill 1/16" diameter holes. Make sure all channels are drilled equally or your spoiler blades will exit a little lopsided. The drive can be from the side or end; that's up to you and your installation. An added note: Beef up the lower pivot points by adding 1/16" washers to the outside of the channels. The time you take in building the fixtures will be evident on the finished spoiler. My 12" spoilers, complete, weigh 1 oz. each.

I would like to give special thanks to James Norris, 7337 Elmhurst Pl., Goleta, California 93117, for providing full-size measurements and technical information. Without his support my scale project would be stalled in mid-air. ■

Gene has been designing scale sailplanes for many years. His craftsmanship is nothing short of excellent. For those not wishing to undertake the building of scale retracts, Gene has indicated that he will be offering these systems for sale. ■

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)

This month's article will address thermals. More precisely, thermals that your model encounters while it is flying in a slope environment.

Slope Thermals

A long time ago when I was just entering the hobby a fellow said to me, "Flying at the slope is no challenge. All one has to do is fly their model back and forth in front of the hill and it will stay up as long as the wind is blowing." Well, that statement is and isn't true. This individual missed a simple fact. That fact being,

F-15 and pilot...I lost his name somewhere in the box.

etc.). As we rise through the atmosphere a cooling takes place because a decrease in atmospheric pressure also occurs. This is similar to how an air conditioner functions or how a can of CO_2 can produce a cooling gas. Therefore, a parcel of air that is heated may or may not retain the heat that is stored in it as it rises in the atmosphere.

Under normal conditions, a parcel of air will cool at between 2.7°F and 5.4°F per 1,000 feet of altitude gained in the surrounding environment. Now here is the interesting part. When the adiabatic lapse rate is exceeded by the environmental lapse rate, the environmental condition is considered to be unstable. Therefore, when a quantity of heated air is displaced during this unstable condition it will rise and continue to rise until the condition no longer exists. When the inverse of this condition exists and the environmental condition is said to be stable this would not be possible. A parcel of air that was displaced would then tend to return to its original altitude or even fall.

Thus, when the clouds are puffy, have defined edges, and appear billowy soft it is fairly safe to say the atmospheric condition is unstable. During this unstable period thermal generation is enhanced.

Don Stewart holds his fun little Silhouette.

thermals are also present in a slope flying environment. Because this is true, a number of other factors come into play. These factors can both enhance and detract from the lift generated by the face of a slope, when an air mass strikes it and moves up and over it.

A particularly interesting topic with regards to thermals found anywhere is the Lapse rate. The Lapse rate is defined as the change of temperature with a change of altitude. We can talk about two kinds of lapse rates. One rate of change is the environmental lapse rate and the other the adiabatic lapse rate. The differential in temperature between varying levels in the atmosphere is what we would consider the environmental lapse rate. In other words, the air becomes cooler as you rise through the atmosphere. On the other hand, the adiabatic lapse rate is the rate at which a parcel of air cools as it rises through the atmosphere.

Note, a thermal or a heated parcel of air is going to have a differing composition from its surrounding environment (i.e., it may contain moisture, dust, smoke,

However, when an inversion condition exists, the temperature of the surrounding air increases with temperature. Thus any lift generation is inhibited or overcome by the surrounding air. A very simple analysis is the hot air balloon flying on a cool day. Why would a balloonist prefer a cool day? The answer is intuitively obvious. Because on a cool day it requires less energy for the balloon to rise. However, on a hot day the balloon would have to be heated to a higher temperature to create the same amount of lift.

So you say, "What does the lapse rate have to do with slope soaring?" It has a whole lot to do with slope soaring, because slope soaring is not just going to a hill and flying a model in the wind. It is more precisely flying in different wind environments that are enhanced or inhibited by the lapse rate. For example, when a model is flown at a particular site there are conditions that influence how much lift is generated. These conditions are things like how warm of a day it is, is it morning or afternoon, does the slope face east or west, what is the valley floor made up of, etc, etc. Because these conditions can influence the lift that is generated they can detract from them, too. Therefore, where there is lift there is also sink. Yes, this is just like at the thermal field. So, often times when the wind is blowing it does not mean that all a model has to do is fly back and forth on the face of the hill to stay up.

One of the very exciting things about flying slope is learning to read these environmental conditions and understand what influence they will have on the lift conditions on a particular day. When one becomes familiar with a slope they will often find that there are conditions that will allow absolutely superb flying with very little or no wind. This statement may be hard for those who are inexperienced slope flyers to understand, but it is not without good foundation. On many a day, lift may be very poor in the morning and terrific in the evening or vice versa. This is because factors, such as ground radiation, can play a significant role in enhancing slope lift. In other words, when the ground warms up it will feed the thermals that float through in the air. Or that these heated parcels of air will travel along in the wind only to strike the face of the hill and be broken loose from their ground attachment. And, of course, once they break loose from the ground they will rise with relative ease through the atmosphere.

Pavel Ehrlich's Vival scale motor glider.

All this discussion is fun and exciting, but the singular fact is that the slope environment is a complex one. It is an environment that is not only made up of wind but also of lift and sink. Therefore, just as at the thermal field, a great deal of pilot ability is required to utilize this lift

to its fullest. As a testament to this, all one needs to do is talk to the fellow who just arrived back on top of the hill after sinking out on a 100°F day. Without a doubt, after you give him a cold drink, he will tell you how the conditions appeared to be ideal and he was sure the model would climb like a "home sick angel." But what really happened was his model could not get out of the sink that accompanied the lift or the air condition was inverted! Thus, his model sank in a mass of unfriendly air.

Slope Scene

This month there are three photos that you should enjoy. The first is from our friend from Czechoslovakia, Mr. Pavel Ehrlich. Pavel sent a picture of his gorgeous Vival motor-glider model. It is pictured here with its full-size counterpart. You tell me which one is real, because these two ships are so similar it is hard to tell them apart. Pavel must be an excellent builder on account of his models being so accurate in detail.

The next model is owned by Don Stewart. He is a power flyer that has discovered the exhilaration of slope soaring. The model is a Cox Silhouette. It is a small model with very good responsiveness and is quite fast for its weight and size. Don's first flight with the model was in 30 mph winds and it flew just fine. The model also has an extremely good roll rate. As well, it likes to fly upside down and all around. So if you are looking for a fun little slope aileron and elevator ship, this just might be a good choice.

The last photo I have is of a model F-15 Eagle. This model was born as a power plane. The owner/pilot thought it would be fun to fly at the hill. As a result, the motor was removed and the model was re-balanced. Not surprisingly, it performed very well in a 20 mph wind. I had a chance to fly the ship and it was a lot of fun. It flew quite well upside down and did nice rolls. If the owner, an *R/CSD* reader, will send me his name, we will put it in the *Digest* so others might contact you about the model and its specifics. (I lost your name and address out of my tool box.)

Have a great month of slope/thermal soaring. Send me any pictures and stories you have to tell about them. Reader interest is in sites, designs, construction techniques, radio equipment, and just about anything that pertains to slope soaring. We are information hungry and you have the food.

Aerobatic Event

OOPS, almost forgot. Jef Raskin is hosting a slope aerobatic event. The event is scheduled for August 25th, 1991. It will begin at 1:00 PM at Milagra Ridge in Pacifica, California. Pacifica is just south of San Francisco, CA by five miles. If you are interested in the event or want to attend it, contact Jef at Box 1638, Pacifica, CA 94044. Or, you can contact him by phone at 415-359-8588. ■

This red and blue plane is Bob Champine's creation. Photo courtesy of Frank Weston.

Electrics

...by Ed Slegers
Route 15, Wharton, New Jersey 07885

Once again, I'd like to thank all the readers who responded with words of encouragement, suggestions and questions to articles on electric sailplanes. I've known for some time now that electric would find its way into our hobby, but to be honest with you, I'm pleasantly surprised at how fast and in what volume it's progressing.

Now that it has been a few months since the first article, a pattern of what you want to read about is starting to form. The first wave of letters were mostly in reference to converting the higher performance hi-tech glider into electric. In this case, the most asked about conversion was the Falcon 600. A large group are interested in converting slope soaring type planes. Many people showed interest in the Swift 400. Converting small hand launch type planes into electric also had a lot of requests, the Chuperosa being the most popular. The largest number of requests for information on electric came from the novice type builder and flyer. The questions were more on what motor, batteries, props and speed controllers to use. Then, it was in what airplane to use them. There were also a lot of people who want to convert large sailplanes into electric without the sophisticated and expensive support equipment. All of these subjects will be covered in future articles.

One of the reasons I started to convert sailplanes into electric was that there were no electric planes being manufactured that I liked; especially in the 7 cell 05 type plane, the 7 cell being the easiest to purchase and maintain. Well, there are exceptions and one has come out of the workshop of Weston Aerodesign, 944 Placid Court, Arnold, Maryland 21012; (301) 974-0968.

Frank Weston, owner of Weston Aerodesign, called me a few months ago about electric conversions and since then has become an electric convert. One of the things Frank wanted was to have a high performance F3E 10 cell type plane. About three days after we talked about it, Frank called and said he had made one. It's pictured next to the 7 cell thermal plane. Frank sent me the prototype to fly and I'll talk more about the F3E 10 cell at another time. Weston Aerodesign is the manufacturer of the Magic, Terminator, Merlin and Fun; all use the latest in hi-tech composite construction. What this means is that a plane can be de-

Six year old son, Sean, holding 7 cell V-tail.

signed, built and flown in two or three days. Believe me, it's true. Frank faxed a copy of a computer print of his F3E .015 10 cell. Three days later, he flew it, and a few days after that he sent it to me and I flew it.

Both Frank and I agreed that at present there is a need for a 7 cell thermal duration sailplane, designed from scratch for electric. So, Frank designed the WACO 7-570. Its 7 cell 05 motor makes it easier (less expensive to purchase batteries, motors and chargers) and, because of its size (90 inch wing span), it should appeal to those that want a larger sailplane. Its flight performance should appeal to everyone. It's excellent!

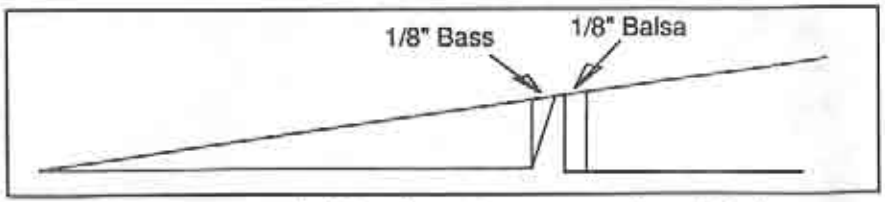
The WACO 7-570 specs are Kevlar and Spectra fuselage, one piece wing made of gray foam cores with Spectra and Kevlar, fiberglass covering using the West system resins and vacuum bagged, wingspan is 90 inches with a WA001 airfoil 570 sq. in., for a wing loading of about 9 oz., V-tail with a micro servo in each stab (This gives more room in the fuselage for batteries.), a servo in each wing half, power is a 05 FAI Astro Flight cobalt on 7 cell. The really good part and one of the reasons it flies so well is that the ready to fly weight is only 38 oz. For the novice that may not know yet, this is incredibly light for a 90 inch electric plane.

I've ordered, received and flown one and have to admit it is one of the best performing electric sailplanes I've flown. The rate of climb is excellent. In about 15 or 20 seconds it's about as high as you'd want and still see what it's doing. Speed range is also excellent and because of its light wing loading, it thermals very well. I have flown it with elevator, aileron and motor control which means that you do not have to have a computer radio, just some Y harnesses. But both Frank and I found it a bit more refined if you use a computer radio and mix rudder with aileron and use spoilerons; about 45° on the spoilers. The C.G. is interesting. It flies best at about 45-50 percent. If you want a large sailplane for a 7 cell 05 motor that flies super, get in touch with Weston Aerodesign. I think this could be a whole new concept in light weight designed from the ground up electric sailplane.

One of the nice things about writing articles on sailplanes is that you get to talk to a lot of the manufacturers about their products, future products and their building techniques, most of which can be applied to both non-powered and electric powered sailplanes.

A few of these "trade secrets" I'll pass on to you with the permission of Mark Allen and Brian Agnew of Flite Lite Composites.

When sheeting a foam core with 1/32



balsa or obechi, you may find that the adhesive you used bleeds through (especially when you vacuum bag), making the outer surface hard to finish properly. Well, add some micro balloons to your adhesive giving it more body. This will prevent the bleed through.

Cutting flaps and ailerons straight and at the proper angle is not easy. Next time if you have or can borrow a router, try this...Use a 1/4" bit and the trailing edge as your guide. Rout off the flap and ailerons. Then, cap the trailing edge of the wing with 1/8" balsa, use 1/8" bass wood to cap off the flaps and ailerons. Bass will add some strength, but at the ailerons cut and sand the bass on an angle (see diagram) to give down aileron. with this technique you'll get a straight and true hinge line with no gaps.

Gluing push rod tubes for the rudder and elevator in a long thin fuselage can be a hassle. Try putting some cotton balls around the push rod tubing in the tail and put a few drops of thin CA on the cotton. Do this about every four inches until you get to about the trailing edge of the wing. You'll find this to be a fast, easy and very light way to install push rods.

Next month I'll cover converting small gliders into electric sailplanes.

Great Flying! ■

Frank Weston is handing Josh Glaab his radio. Photo courtesy of Frank Weston.

Flying Lady Site in California...Photo by Pierre Duminel.

Launching

...by Pancho Morris
2715 Eastbrook, Mesquite, Texas 75150

The launch can be the most important part of a good flight.

The more altitude you have at launch, the better your chances are of finding lift. Thermals are stronger and larger at higher altitudes and, the higher you are, the more time you have to hunt for lift. The launch also puts you in position to begin your thermal search.

Many people will launch and climb very steeply, almost vertically, and get good altitude at the beginning of the launch, but will then get off the line at the top of the steep portion of their launch without penetrating upwind at all. They will get good height but not a great launch. Others will launch and climb at a shallow angle. They will not get much altitude and will often get off at about one half to two thirds of the way down field to the turn around. The ZOOM is a misunderstood maneuver to many people. Some people will get a good launch in terms of altitude and penetration and then put their ship into a steep dive followed by a very steep pull-up. This can look rather spectacular, but the plane usually stalls out just slightly higher than it was before the dive and it is just over the turn-around.

The launch consists of four parts. The four parts are the throw, climb, transition and release. Some fliers like to throw very steeply feeling that they get extra height by this. If you want to throw steep, you must build up a great deal of line tension and throw HARD! I like to build up great line tension and throw more out than up. I have seen too many ships stall and crash at this point in the launch. I have done it myself. If the plane is trimmed and set up properly, it will almost immediately snap up into a vertical climb. I would rather give up a few feet of altitude than risk a stall on throw.

The next portion of the launch is the climb. During this part, you are grabbing for altitude and developing line stretch in the winch line. You should climb as steeply as you can and still maintain stability and not overload your ship's structure. During this part of the launch, you should not be going very far down field toward the turn around. You should be climbing fairly vertical.

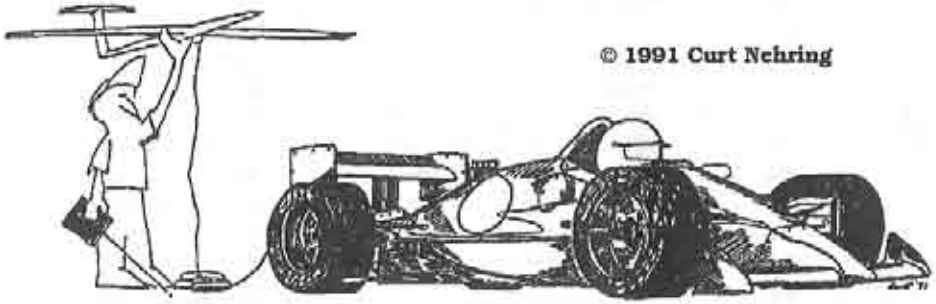
The transition is the next part of the launch. Once you have reached good altitude, let the plane arc over and travel toward the turn around. You should still be climbing, but you are mainly picking up speed during this phase of the launch. Increase your speed as you approach the turn around without overloading your ship.

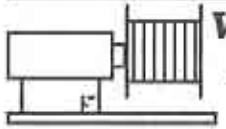
Now is the time for the release. As you approach the turn around, you really go for speed by going into a shallow dive. Rounding over into this dive is where the most stress is put on your wings and where most wings fail, and not at the beginning of the launch. You should dive briefly going for maximum speed and then pull up into a shallow climb. This is when the release takes place. If you have a releasable tow hook, it should be released just prior to the pull up. Being late on the tow hook release can have grisly results on the plane. The climb out should be shallow. You are using your wings to translate the speed built up during the transition and zoom into altitude. You are also using the speed and momentum to throw you far upwind into what Thornburg calls the RIVER OF AIR. It is upwind where thermals come from. The farther upwind you can find them, the better.

Tow hook location is very important during the launch, especially during the climb phase. Most kits or plans relate the tow hook location to the center of gravity. Many say that it is really the aerody-

namic center of the wing that is the critical point against which to measure the tow hook location. Without the knowledge or means of determining the aerodynamic center, the C.G. makes a handy reference point. Generally, the tow hook is located slightly ahead of the C.G. or right on it, and almost never behind it. As you start to move from a forward tow hook position to a rearward one, the climb goes from shallow to increasingly steeper to finally unstable. You want to move it back as far as you feel comfortable.

This discussion has been dealing primarily with winch launching and higher performance planes, but the same principals can be applied to lighter planes and high start launching. Like all phases of flying, launching is something that takes practice. Get out there and practice! It is also a fun and exhilarating part of flying. ■





Winch Line ...by Gordon Jones

Gordon Jones, 214 Sunflower Drive, Garland, Texas 75041; (214) 840-8116

LJM Plywood Templates

A short time back Jerry Slates provided information on a set of 3/8 inch thick plywood foam cutting templates that Lee Murry of LJM Associates was starting to put out. It mentioned that these templates were cut by computer with a laser as the cutting device. Jerry noted that the accuracy and look of these templates was excellent. To add to the whole thing Lee had provided Teflon tape for installation on the cutting surface for a smooth cut. With all this going for them I decided to order a set. (I hate doing foam wing cutting templates with a passion, as I can never get them the way I want.)

Lee will want to know a few items of information when you order the templates: The airfoil you want (He has most of them in the computer.), the thickness of the material that you will sheet the wings with, and the thickness of the wire you will be doing the cutting with. He even goes to the trouble of confirming everything prior to making the templates so there is no confussion.

When the templates arrived I was impressed! Upon opening the shipping container, the templates come in the plywood board that they were cut from. This is not only handy for shipping but it gives the user a place to store the templates as well. Along with the templates comes a mylar sheet with the outline of the templates and a sheet of Teflon for installation on the cutting surface. If you purchase a set of these templates don't be in a hurry to throw away all the paper; be sure you remove the Teflon first.

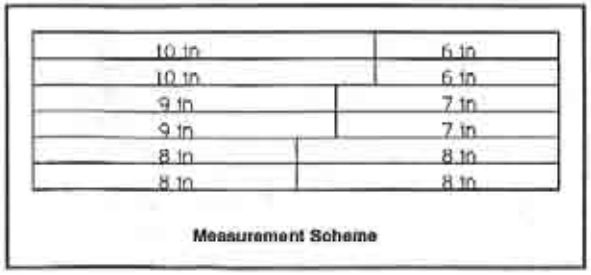
To see how close a match I got, I ran off a set of computer plots and matched them against the templates. The match was perfect! It is nice to see quality work provided just the way you want it.

The next step is to install the Teflon on the templates; no, it does not come already on the templates. When Lee first started this operation he did not have any instructions accompanying the templates for the Teflon installation. This has been added to the package now. Actually, it is very simple but at the cost of the Teflon just the amount required for each set is sent, with not much extra due to the cost.

First, inspect the templates for minor holes and imperfections in the plywood. There are occasional imperfections in the laminate used but these imperfections do not affect the template, but will allow separation of the Teflon if not filled. Fill any of these imperfections with spackling compound and allow them to dry completely.

Using 320 grit wet-or-dry sandpaper, gently sand the surfaces of the templates to remove the laser black from the cutting process and remove the excess spackling. This provides a clean surface for the Teflon and allows it to adhere properly. While you have the sandpaper in hand, smooth the edges of the templates to remove any splinters and other imperfections at the same time.

Carefully measure the Teflon sheet to ensure you do not mis-cut and run out of Teflon. Note that each template is 3/8 inch wide and that the lengths vary dependent on the size of the airfoil template. When measuring the Teflon allow for approximately 1/2 inch overhang for each end. The best way to lay out the Teflon is to make a drawing of the Teflon prior to cutting the Teflon sheet. The figure represents the measurement scheme.



Measurement Scheme

Cut the strips of Teflon to fit each of the templates on the cutting surface. Note that cutting is easier with a new blade in your X-acto knife or use a new razor blade. Teflon is tough stuff and cutting should be accomplished with care. Once the Teflon has been cut, use an X-acto knife to separate the Teflon from the backing. **DO NOT** pull the backing off the entire strip of Teflon as it will try to roll up!

To apply the Teflon to the templates, apply the Teflon as you would stripping tape by aligning the Teflon and pressing it on the template in short lengths. Repeat this procedure for each of the templates. If you have some trouble with the ends of the Teflon not adhering as you would like, use some double sided tape to keep the ends down.

The Templates come with pre-drilled small alignment holes to allow the user to drill the size he desires. This is a nice feature and it allowed me to try something new for hold down pins instead of using nails like we have for years. I drilled the holes out to accept a piece of 1/16th inch music wire. I then made six 1/16th inch music wire pins to use to hold the template against the foam. I cut these pins at varying lengths so that I could swap them around to insure a good hold on the foam for each cut. I cut one 2 1/2 inches, one 2 3/4 inches and the third I cut 3 inches long. By doing this I can rotate the pins when I make the second cut and still have an excellent hold on the foam. Plus, the longer lengths provide a more stable hold on the foam at all times.

The cuts you get using these templates is

GREAT! The cores come out really smooth and the accuracy of the airfoil is right on. After the first cut I again checked the foam wings with computer plots and once again was given a great match. As the saying goes this sure beats my attempts at templates. Another positive from the size of the templates is that they seem to support the wire better than thinner templates allowing a better cut. Since I have gotten mine I have heard of others who have ordered templates from Lee and everyone has had nothing but compliments. If you are interested in some quality templates for cutting foam give Lee a call.

♣ ♣ ♣

Last year I made a pilgrimage to California to see how the other half lived in the world of soaring. I combined seeing the grandkids (This keeps the wife happy.) and visiting some friend and doing a little flying. (This keeps me happy.) I was invited out by Judy and Jerry Slates to meet Martin Simons and others I had known over the phone for some time. I had an excellent time as I got to fly some, talk some and generally just enjoy a real nice vacation.

This year was a little different! First we had an extra grandchild to visit and more territory to cover, and secondly *RCSD* was hosting a trade show at the Western States Championships. Needless to say it would make for an interesting trip and would consume a few more days.

After visiting the grandkids and stopping at Reno for a little entertainment we made it to Jerry and Judy's. We spent the first day catching up on latest happenings and final preparation for the trade show. We even managed a side trip up to Mark Allen's shop in the afternoon to see his operation and chat for a while. It was nice meeting Mark and Brian after so many phone conversations. It was then off to the airport to pick up Lee Murray of LJM. With all the running around completed, it was time to load the van and pickup and get ready for the contest. You would be amazed at how much stuff you can put in Jerry's van.

Saturday was an early start and the drive to Farmington to the contest site. There we set up the tents and tables. Richard Tiltman and Richard Spicer from RnR (the Synergy folks) and Roger Chastain, with his Feather Cut foam cutter and other goodies, arrived to set up their wares. Plus, Jerry had an assortment of the Viking Models fuselages set up on display, as well. We had material (kits, literature, video tapes, built airplanes, computer software, catalogs, and other assorted products) from over 30 advertisers and manufacturers. It was quite a turnout after all the phone calls and organizing that was done over the preceding four months.

During the course of the contest we met a great many people and answered an untold amount of questions on the various products. It seemed there was a continuous stream of people making their way through the tent area picking up catalogs and fliers, and asking questions. While there were over 200 contestants and spectators there were but ten of us; you can imagine that the pace was fast and furious. Even with two days of insanity we met some really great folks, had some very interesting conversations and in all had a great deal of fun.

There were some humorous instances along the way as well. Lee Murray setting off the airport metal detector with the forgotten tow hooks in his pocket, Judy looking for bigger rocks to hold down the catalogs and flyers against the infrequent gusts of wind, and my wife saying I could buy the pink airplane [Synergy 91] if I wanted while not knowing the price. And as the man said, "A good time was had by all."

I guess that I will have to return again next year just to see if it is as much fun the second time around. ■

Western States Soaring Championship from the Eye of a Midwesterner

...by Lee Murray

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My trip to the Western States Soaring Championships resulted from an invitation by Judy and Jerry Slates who were my hosts. I was very impressed by the incredibly warm fraternity of sailplane enthusiasts who are willing to share their knowledge, resources and friendship. Judy and Jerry have to be contenders for the number one position in this category although high honors may have to be shared with many of the people I met at Farmington.

I came to participate which I did at different times as a timer, winch operator, landing judge and as a representative of LJM Associates products at the trade show tent. I'm glad that I didn't bring a sailplane since this would have cut down on my interaction with exhibitors, contestants, and other observers which was my main objective in coming.

The information that I picked up included how to get quality results in the application of obechi to foam cores from Oscar Rico; I hope that Oscar or Jerry will share this knowledge in *RCSD*. Jerry shared his experience in making wings, fuselages, canopies as well as novel ways to install control systems. Lynsell Miller had unique products such as a 2 hour battery pack for the Vision transmitter and neat servo covers for pushrod exits on the underside of wings. Tom Overton had, rubber ducky antennas for 72 MHz

Mark Triebes (L) & Dave Squires (R) Photo by Lee Murray.

Contest Results

Place	Name
1	Mark Triebes
2	Brian Agnew
3	Jerry Arana
4	Bob McGowan
5	Brad Clasen

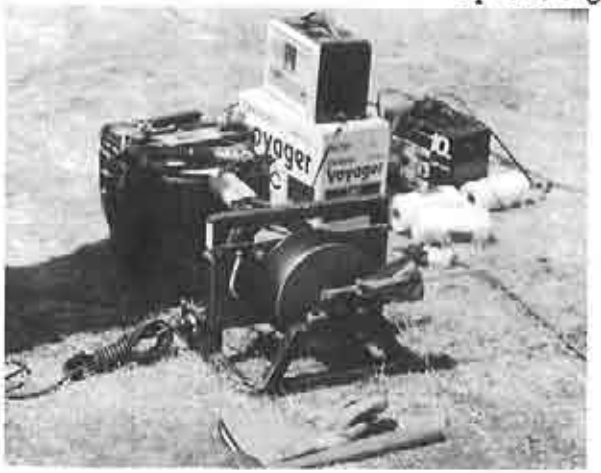
The contest director Arlie Stoner and his wife, Shirley, kept the contest running smoothly and finished both days with time to spare. Kevin Webb, Ron Lenci, Brad Clasen and many others put forth extra effort to help. Photo by Gordon Jones.

Trade Show Brochures, Materials and Displays. Photos by Gordon Jones (top) & Lee Murray (below).

tape on programming the Vision radio by John Clark is very helpful and I am learning from that, now. The variety of specialty products was too vast to include here, so you will have to look for yourself next year. The kinds of merchandise was much wider than you would ever find in a hobby shop or in a trade show such as the WRAMS or Toledo show. There were opportunities to look over the Synergies, Falcons, Legends and sundry other models.

transmitters that won't break or catch your wing during launching. There was a wealth of new and hard to find products from Fabrico such as the hard to find Rocket City tow-hook connectors. I picked up an economical winch line parachute from Poncho Morris. The video

Some of the sights that stick in my mind's eye include that of Mark Triebes flying a prototype static "V" tail, pivoting wing, hand launch glider, HLG. Dave Squires (wing rod fame) had made a light fiberglass fuselage for the design which I hope to get along with some plans before too long. The thing I noted about the model was that it would fly very slow and turn on a dime. The one female competitor, Joan Nolte, made a notable fashion statement by dressing in the plumb and yellow color scheme



Winch photo by Lee Murray.

Tom Overton's method of transport. Each level easily rolls in and out and is designed and organized to hold wings and fuselages neatly in place. Photo by Lee Murray.

of her beautiful model. Another image is that of Brian Agnew hand launching his Falcon 880 and skying it out twice in about 15 minutes. Is it Brian's skills, the Falcon 880 design, or both? The winch launches were sometimes brutal. The 200 pound test line was broken on several occasions. The winches were 6 volt Ford starters connected to 12 volt batteries using HEAVY welding cable. Also included were ball bearing shaft supports and a simple but novel break which uses inexpensive shock absorber bushings to keep the drum from rotating in reverse. There were obviously some industrial strength wing spars in use. Even so, wing flutter on the zoom launch was not uncommon.

In summary, if you lived within a few hours of travel and missed this opportunity to attend, shame on you. Take it from someone who probably travelled the greatest distance, there was much more going on at Farmington than a competition. The trade show provided a rare glimpse of unique and hard to find soaring products. ■

What's Buzz up to? He's practicing for the next big contest. He sits around for an hour, then throws his plane into the landing circle!

Flying In the Heart of Dixie

...by Cliff Smith
1513 Elkton Rd., Athens, AL 35611

I am writing this article hoping to accomplish two things. First, to share an experience that I recently enjoyed and secondly, to thank those who were involved that help make this an afternoon that I will not soon forget.

I am a member of the North Alabama Silent Fliers which is based in Huntsville, Alabama. I live in Athens which is about 25 miles west of Huntsville. On this Sunday afternoon I drove over to a field we use quite often on Redstone Arsenal, just west and south of Huntsville. Upon arriving at the field, Ron Swinehart, Rob Glover, and Lars Ericsson had already assembled their gliders and had made a few flights. After some quick hellos and minor repairs to the electric winch, I brought out my two planes. One is a Larry Jolly Pantera and the other is a Paragon built by Al Clark. Lars was flying his Saggita which was on the same channel as my Pantera. We agreed that I would fly my Paragon and we would avoid any radio interference. Lars launched his Saggita and worked some lift at the end of the field. After a few minutes of flight, Lars was working some lift right over the flying field. By this time I had my plane assembled and had decided to give it a hand toss to check my trim. This is where it really started!

When I stepped out on the field, I noticed Lars working lift that looked to be rather good. He was circling at about 40 feet. I decided to go ahead and really give it a big heave hove and see if I might be able to launch this 118 inch bird into this thermal. I remember hearing Ron Swinehart say, "Watch Smith hand launch his Paragon into this thermal." At this point I must tell you that I really enjoy hand launch gliders and that I probably take it to the extreme at times. I really felt that Ron was poking fun at me. We have a very humorous bunch of people in our club and this really adds to the enjoyment of our flights. The humor quickly turned to adrenalin and my heart rate increased. Yes, the Paragon was rising in some good lift! After several tight turns this big bird was really going up. I noticed that not many of the fliers or spectators were saying much, for they were as astonished as I. After a couple of minutes, I was able to reach Lars' Saggita. By this time my heart was really racing. In just a few more minutes I was able to climb above Lars. Who would believe that a 118 inch plane could really be hand tossed and get "up" in a thermal?

By the time my plane had 200 to 300 feet of altitude I decided that it would be great to start my watch and just see how long this hand launch would last. This

(Left to Right) Ron Swinehart, Cliff Smith, Lars Ericsson, Rob Glover (Notice rocket just over Rob's left shoulder.)

first thermal lasted for about 18 minutes and really took the Paragon up until it looked small. I left this first thermal when it was so far down wind that I was feeling uncomfortable. By this time we had a real laugh at the fact that it "maxed" out from a hand launch. When I came across the field I noticed that Ron was working some good lift with his Laser, so I moved in on top of this lift and worked it until the Paragon was small again. I remembered telling the others, jokingly, that I needed a 2 hour flight for my level V LSF. At the 1 hour mark we all began to realize that it may be possible to get a 2 hour flight in today.

At this point each one of the pilots seemed to take turns going up and spotting lift for me. I also remember Rob's wife loaning me her folding chair... my neck was beginning to ache! Realization of a 2 hour flight really "sunk" in at the 1 hour and 45 minute mark. Rob Glover and his new Legend found the last thermal that I needed. The field became very cool and I knew that it would be close. Lars held my watch as I set up for a landing. I remember Lars smiling as he showed me the time which was 2 hours, 0 minutes, and 9 seconds. Altogether I remember benefiting from six different thermals and utilizing the entire perimeter of the field.

It was Sunday, June 9, 1991 at about 4 o'clock when I touched down. This was one flight that I will not soon forget, nor will I forget the help and support of the club members and spectators as they contributed to this special afternoon of flight. ■

About T.W.I.T.T.
The Wing Is The Thing

The following information is from the T.W.I.T.T. flier and was provided by Andy Kecskes, President of T.W.I.T.T. Ed.

T.W.I.T.T. began in the summer of 1986 in a hanger at Gillespie Field, San Diego, California. The co-founders, Bob Fronius and Hernan Posnansky, gathered around them a small group of engineers, craftsmen and pilots who shared their fascination with tailless aircraft. They envisioned achieving high performance flight with a flying wing utilizing an electro-hydraulic control stabilization system to assist the pilot in flying at the edge of the aircraft's envelope. Their overall goals were and are to: promote the design and construction of tailless and all-wing airplanes; provide a forum for the exchange of ideas and experience through guest speakers and a monthly newsletter; assemble a technical library devoted to tailless aircraft; and ultimately to build at least one powered tailless and one high-performance tailless sailplane.

In the almost four years since TWITT was first formed, it has grown to slightly over one hundred members throughout the United States, Australia, Italy, Germany, Switzerland, and Canada. The membership is comprised of engineers, theorists, pilots, and model aircraft enthusiasts who all share TWITT's common goals, including such notables of tailless flight as Dr. Karl Nickel, Peter Selinger, Don Mitchell and Al Backstrom.

In 1989, TWITT became affiliated with the Hunsaker Foundation, Incorporated of San Diego, a non-profit, public benefit corporation, placing it in a Federal and State tax exempt status. This was necessary due to the growing size of the organization and to provide a means of accumulating the needed financing through donations and grants to begin realizing the ultimate goal of constructing a tailless aircraft.

TWITT holds monthly meetings at its headquarters in Hanger A-4, Gillespie Field, on the third Saturday of the month at 1:30 P.M. The meetings have an average attendance of about 20 to 25 members and guests from throughout Southern California. Each meeting includes at least one featured speaker whose presentation provides the membership insight into some phase of tailless flight or aerodynamic phenomenon related to development of tailless aircraft. Throughout the past years speakers have included: Paul MacCready, Jack Lambie, Bruce Carmichael, Karl Sanders, Kermit Van Every, Barnaby Wainfan, and Irv Culver. Films, slides and hands-on activities are included whenever possible.

In addition to the meetings, a twelve page newsletter is published each month which includes extensive details of the last meeting so the entire membership can share in the information exchange. The newsletter also includes letters discussing various projects, asking for advice, or sharing other relevant information. Technical data which has come into the library is also published and members are informed of any material which may be purchased from vendors who specialize in tailless flight.

TWITT membership is open to anyone interested in pursuing the goals of developing tailless aircraft to their ultimate capabilities. Membership is currently (May, 1990) $15 per year which covers the cost of publishing and mailing the newsletter. (The fee is $19 for foreign subscriptions.) an information package, including one back issue of the newsletter, is available for $2, and back issues can be obtained for $.75 each.

If you are interested in further information or in joining TWITT, the address is: TWITT, P.O. Box 20430, El Cajon, CA 92021. (Telephone: (619) 224-1497 after 8:00 P.M. PST.) ■

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*.

Greeting Cards

...from SOAR TOONS

SOAR TOONS is pleased to announce a new line of humorous greeting cards for ANY sailplane enthusiast. These imaginative cards (blank inside) feature attractive pen and ink illustrations depicting soaring at its best. Designed by Southern California artist and flyer Curt Nehring, these creative note cards give a humorous tilt to this unique sport and hobby. Packaged in assorted sets of ten, each with its own envelope, the cards retail for $10.95 plus $1.25 postage and handling. California residents need to add 6.5% sales tax. Christmas cards will be available by mid-October. Future items include stationary, calendars, pins, badges, earrings, and postcards. For more information, please write to SOAR TOONS, 469 N. Central Ave., Ste. #261, Upland, CA 91786; (714) 920-1261. ■

Schedule of Special Events

Date	Event	Location	Contact
Aug. 3-4	Dual Soar-In	Grand Ledge, MI	Larry Storie (517) 626-2290
Aug. 3-4	13th Annual Garden State Soaring Classic	Allentown, NJ	Tony Matyl (609) 275-0549
Aug. 10	Thermal Festival	Maple City, MI	Jim Johnston
Aug. 10	Slope Race	Davenport, CA	Rich Beardsley (805) 934-3191
Aug. 10-11	Unlimited Thermal	Seattle, WA	S. Pugh (206) 874-2429
Aug. 10-11	2 Meter & Unlimited	Lakeland, FL	F. Strommer (813) 938-6520
Aug. 11	Multi-Task	Dallas, TX	Gordon Jones (214) 840-8116
Aug. 17	Canyon Lake Thermal	Austin, TX	Tom Meeks (512) 590-3139
Aug. 17-18	OHIO Cup Man-on-Man	Dayton, OH	K. Davidson (513) 864-1774
Aug. 17-18	F3J Second Thermal Soaring Convention	Belgium	(Details avail.)
Aug. 18	Canyon Lake Slope	Austin, TX	Tom Meeks (512) 590-3139
Aug. 18	Hand Launch	Dallas, TX	Gordon Jones (214) 840-8116
Aug. 24-9/2	F3B World Championships	Holland	Don Edberg
Aug. 24-25	2 Meter (Only) Champs - Man-On-Man	Nunica, MI	Cal Posthuma (616) 677-5718
Aug. 30-9/1	2 Meter & Unlimited	Ocala, FL	K. Goodwin (904) 528-3744
Aug. 31	Northern MI Sailplane Championships	Tustin, MI	Mike Stump (616) 775-7445
Aug. 31-9/1	Champs. 2M +	Farragut State Park, ID (Athol)	R. Kirkpatrick (509) 489-5841
Sept. 7-8	Open , Thermal/ Soaring Task T1	Gaithersburg, MD (National Geographic Society)	Bill Krajci (301) 884-5004
Sept. 14	Slope Race	L.A. Area, CA	Rich Beardsley (805) 934-3191
Sept. 14-15	TNT 2 Meter & Open	San Antonio, TX	A. Coher (512) 599-4031
Sept. 15	Distance	Houston, TX	Julian Tamez (703) 540-3944
Sept. 15	F3b Speed Trials	Denver, CO	John Wyss (303) 494-0363
Sept. 22	Hand Launch	Dallas, TX	Gordon Jones (214) 840-8116
Sept. 24	2 Meter & Unlimited		L. Montgomery (407) 793-8179
Sept. 28-29	ESL 2-Meter Contest	Pottstown, PA Bob McKeever (609) 538-8368	Joe Krajci (215) 632-4215
Sept. 29	Old Timers	Dallas, TX	Gordon Jones (214) 840-8116
Oct. 5-6	Visalia Fall Soaring Festival	Visalia, CA	Ed Hipp (209) 625-2352
Oct. 5-6	2 Meter & Unlimited	Lakeland, FL	Bob Wargo (813) 938-6582
Oct. 6	SMT Contest	Denver, CO	Lenny Keer (303) 737-2165
Oct. 12	Slope Race California State Champs	Santa Maria, CA	Rich Beardsley (805) 934-3191
Oct. 13	Dual Elimination	Dallas, TX	Gordon Jones (214) 840-8116
Oct. 13	Unlimited Thermal	Kirkville, NY (Syracuse area)	Dave Zinteck (315) 656-7103
Oct. 19	Duration 2M & Open	San Antonio, TX	Tom Meeks (512) 590-3139
Oct. 20	Hand Launch	Dallas, TX	Gordon Jones (214) 840-8116
Nov. 9	Duration 2M & Open	San Antonio, TX	Tom Meeks (512) 590-3139
Nov. 10	3-6-9 2M & Open	Dallas, TX	Gordon Jones (214) 840-8116
Nov. 10	Dual Elimination	Houston, TX	Julian Tamez (703) 540-3944
Nov. 17	Hand Launch	Dallas, TX	Gordon Jones (214) 840-8116
Nov. 29-12/1	2 M & Unlimited - Tangerine Soaring Champs	Orlando, FL	C. Baylor (407) 699-8750
Dec. 8	2 Meter Only	Dallas, TX	Gordon Jones (214) 840-8116

R/C Soaring Resources

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

Seminars & Workshops

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

Free instruction for beginners on construction and flight techniques. Sunday - Thursday. Bob Welch, 1247B Manet Drive, Sunnyvale, California 94087; (408) 749-1279

Fall & Winter 1 day seminars on composite construction techniques. Free with purchase of Weston Aerodesign plan set ($35.00) or kit. Frank Weston, 944 Placid Ct., Arnold, Maryland 21012; (301) 757-5199

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 $9.00, 1984 for $9.00, 1985 for $11.00, 1986 for $10.00, 1987 for $10.00, 1988 for $11.00, 1989 for $12.00. Third class postage included. For 1st class include additional $1.50 per issue . (U.S. funds) Walt Seaborg, 1517 Forest Glen Road, Oregon, WI. 53575

BBS

BBS: Slope SOAR, Southern California; (213) 866-0924, 8-N-1

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

Reference listings of *RCSD* articles & advertisers from January, 1984. Database files from a free 24 hour a day BBS. 8-N-1

Bear's Cave, (414) 727-1605, Neenah, Wisconsin, U.S.A., System Operator: Andrew Meyer

Reference listing is updated by Lee Murray. If unable to access BBS, disks may be obtained from Lee. Disks: $10 in IBM PC/PS-2 (Text or MS-Works Database), MacIntosh (Test File), Apple II (Appleworks 2.0) formats.

Lee Murray, 1300 Bay Ridge Road, Appleton, Wisconsin, 54915 U.S.A.; (414) 731-4848

Contacts & Special Interest Groups

California - California Slope Racers, Rich Beardsley (Director), 2401 Country Lane, Santa Maria, California 93455 U.S.A., (805) 934-3191

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

Eastern U.S.A. - Eastern Soaring League (Covers North Eastern U.S.A.), Frank Weston (Editor), 944 Placid Court, Arnold, Maryland 21012 U.S.A., (301) 757-5199

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

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

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

League of Silent Flight
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For Information, Contact:
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Robert Massmann
282 Jodie Lane
Wilmington, OH 45177

T.W.I.T.T.

(The Wing Is The Thing)

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

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

The Vintage Sailplane Association

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

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

Classified Advertising

Advertising Policy

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

For Sale

PROPHET 941 kit, 99.5" span, E-193, 2-3 channel...$75.00. Gregory Vasgerdsian, 1946 N. 3rd St., Concord, CA 94519; (415) 671-7121.

HOBBIE HAWK, never been crashed, case & manual...$120.00; Jim Harger, 1911 Wolcott Dr., Columbia, MO 65202; (314) 443-6708.

CAMANO, never dinged...$125.00 or w/1991 Futaba Gold radio (4 ch w/ afart)...$200.00; ADANTE, 13 oz./sq ft...$90.00 or w/7 ch 1991 Futaba...$200.00; ADANTE kit...$75.00/B.O.; Sealy PULSAR kit...$70.00/B.O.; Sealy CATALINA kit...$100.00/B.O.; Graupner DISCUS kit...$250.00/B.O.; Goldberg ELECTRA kit, deluxe edition...$40.00/B.O.; all prices negotiable; Don Winiecki, P.O. Box 288, Minetto, NY 13115; (315) 343-1197.

BRILLIANT "E" (electric) German sailplane, ready for cover and radio and electric installation, 100"+ span, fiberglass fuselage (white) with integral (pusher) power pod, blue-tinted canopy, never flown, like new, makes excellent electric or non-electric flyer...best offer over $100.00, shipping included free. Jim Gray, 210 East Chateau Circle, Payson, AZ 85541; (602) 474-5015.

For Sale

ELECTRICS, never opened, original packaging; Mabuchi RX 540 VZ, 17 A - 6-9V motor, 25,400 RPM peak; Two separate 7-cell battery packs, one with Sermos connectors, one without connectors; Graupner remote control power switch - 20A; 4 packages Sermos connectors (2 per pack); Aristo-Craft Multi Charge-A-Matic charger; 2 Graupner Speed 600 folding prop sets - scimitar blades - 7"-3"; 2 extra Graupner sets of scimitar blades 7"-3"; one wooden prop (fixed) 7"-3 1/2" Rev-Up; one wooden prop (fixed) 7"-5" Rev-Up. Opportunity to get started in electrics with nothing else to buy except sailplane or airplane to carry it all! Value over $200...sell best offer over. $150.00 as a package, only. Jim Gray, 210 East Chateau Circle, Payson, AZ 85541; (602) 474-5015.

FIESTA competition sailplane, like new, perfect, needs only cover and radio to fly, bottom surface wings already covered new Maroon Monokote, 2 rolls white and another roll Maroon included, white fuselage, blue-tinted canopy, rarely flown...best offer over $150.00. Jim Gray, 210 East Chateau Circle, Payson, AZ 85541; (602) 474-5015.

REIHER scale sailplane kit (Triton Models), new in box...best offer over $200.00. Jim Gray, 210 East Chateau Circle, Payson, AZ 85541; (602) 474-5015.

Wanted

Source for purchasing a supply of wing L.E. stock as found in Airtronics Sagitta 900, Cumic or Legend sailplane kits. Brian Smith, 493 17th NW, Barberton, OH 44203; (216) 848-0394.

Fab Tec Inc. Winch, Sportsman Model. Fran Le Clercq, 1127 Bond St., Green Bay, WI 54303; (414) 499-6624.

Wanted

Bob Sealy PULSAR, complete and ready-to-fly, radio eq. not required. Curt Nehring, WK (714) 972-7811, HM (714) 592-2105.

Wanted: Engineering Employment

Knowing that a good portion of the RC soaring community is composed of engineers, I thought I'd see if one of you could help me find a job. I will be receiving my BSMAE from the University of Missouri - Columbia in May with a 3.6 GPA. My areas of study have been Machine Design, Manufacturing Methods and, of course, Composite Materials and Aerodynamics. If anyone knows of any possible positions, please let me know. Reward: A free E-Z Retriever for any info. leading to employment. Jim Harger, 1911 Wolcott Dr., Columbia, MO 65202; (314) 443-6708.

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