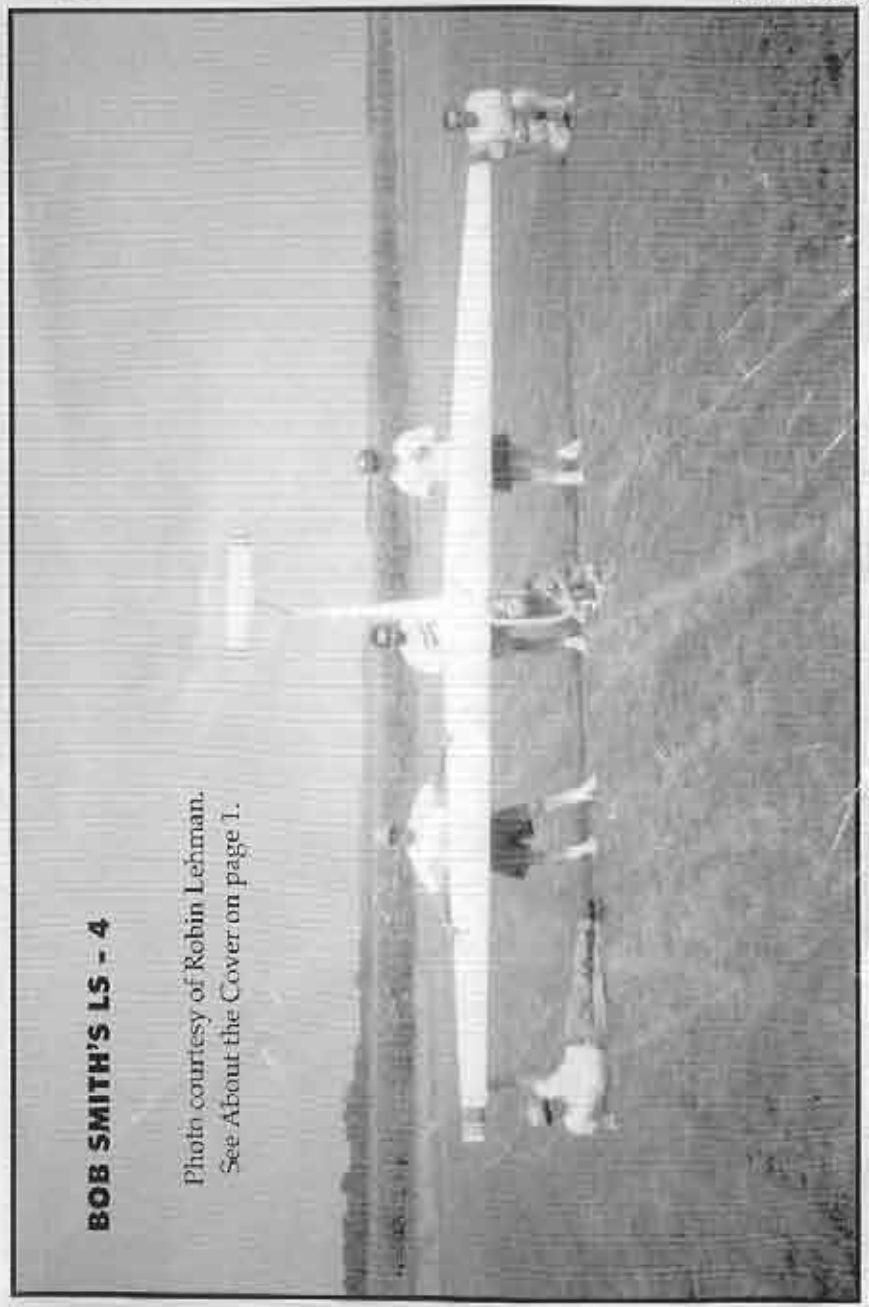
R/C Soaring DIGEST

January, 1995
Vol. 12, No. 1

U.S.A. $2.50



BOB SMITH'S LS - 4

Photo courtesy of Robin Lehman.
See About the Cover on page 1.

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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[Material may be submitted Via 3.5" Disk (MAC or IBM compatible) or 5.25" 360K IBM compatible, and is most appreciated!]

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Printing

JACO-BRYANT Printers, Inc., Sam Lencke (901) 743-3466, Memphis, Tennessee

R/C Soaring Digest is printed on recycled paper.

The Soaring Site

About the Cover

The cover photo was sent in by Robin Lehman of New York. He says, "I thought you might enjoy the enclosed photograph. It is of a 1/2.5 scale LS-4, all glass, which comes completely ARF from Mueller in Germany. The ship has a wing span of around 27 feet, weighs in at 53 pounds and currently resides on Long Island with a friend of mine who aerotows it on a fairly regular basis. This monster floats around and virtually flies itself, as do all the very large sailplanes I have flown! We tow this with a very unscale Robin with a Quadra 100 for power.

"All of the people posing with the giant LS - 4 in the photograph you have are members of the Long Island Skyhawks Club. This is an exclusively quarter scale (and larger) R/C club, and the home field of all the monsters I fly. People in the photograph from left to right are Don C. Julian, David Von Frank, Bob Smith and young Bobby, Bill Hofmann, and Joe Wecela. The LS-4 belongs to Bob Smith."

An Invitation from Hong Kong

Robert Yan of Hong Kong sent in an article on leading edge tips which appears in this issue. The article included the two photos you see here, and shortly thereafter, a video arrived at the post office box with a note from Robert telling us about his flying site in Hong Kong and inviting any traveling soarers to come fly with him.

Robert says, "I have much pleasure in sending the video tape (NTSC format). I am hoping to share with you the site and R/C flying in Hong Kong. I cannot share this with other readers in the publication, but at least this gives you some idea. I would be very much pleased to meet some traveling soarers from your place that would like to fly in our place!

"In Hong Kong, we cannot find a slope

Photos courtesy of Robert Yan, Hong Kong.

with flat grass land behind us for easy landing. Nearly all the slope sites are hilltops or ridges and it is quite tricky to land our planes. The slope in the video is for the east wind most of the time. If the wind is coming from the west, we just turn our back.

"In the video, you will see a few of my own designed, fast, aerobatic models, with Russian profiles, and some 1/4 or 1/5 scale planes: Ka6E, Grob, Discus, Jantar, Twin Astir, Cortina, Minimoa, and their actual flying.

"If you are interested, you will find that two electronic flashlights installed in the wing tips of the Grob are flashing when the pilot was checking the plane on the grass. (One light is visible in the sun at the lower right hand corner of the wingtips near the figure "8" of the date 8 11 1993.)

"After flying the Grob, you will see the multi-color model, Discus, flown in strong wind, typhoon signal #3. At this time, people should stay home for safety! The Jantar 1 was flown at typhoon signal #1. Typhoons range from 1, 3, 8, 9, and 10. It is something like your hurricane in the states.

"I hope you like the tape. I am sorry it is not recorded in English, and the wind noise has not been properly edited. Let me know how you feel about it."

Thanks, Robert! We have added your name to the resource listing so that you can be found by traveling soarers. Thank you for your invitation!

Readers, after viewing the video, we had a lively discussion as to how we could obtain a slope like Robert's here in Texas, and what it would cost us in customs charges to have it shipped by slow boat! Yes, the slope site is spectacular and does indeed compare with places like Craig Foreman's site in Australia and the WSJ site in Richland, Washington! Robert's planes are beautiful and he flies them amazingly well despite the strength of the wind. At one time, he put his transmitter down so he could use both hands to throw the plane off the cliff over the waves below, and he was leaning into the wind! It is a dynamic video and we noted that Robert has some slope flying techniques that we have not seen before! Should any of you find yourself in Hong Kong, Robert Yan's address is included in the resource section.

A Note from England

Dear *RCSD* Readers,

"Just got a modem. Paid the subscription. Loaded Ameol. Can get onto the Internet for the price of a local call. Any US conferences on R/C soaring? Also interested in GPS, full-size gliding and Psion3A. Can anyone provide some E-mail addresses?"

Thanks a lot,
(signed) Graham and David Woods
dwoods@cix compulink.co.uk

A Blue "Sticky" from California

Curt Nehring of San Dimas, California sent in the unusual artwork you see here. The blue sticky note on the back says, "My idea is to have a contest for the *RCSD* readers. I plan to make a T-shirt from the design, and need suggestions using "4 colors". Winner will get a package of SOARTOONS note cards."

Curt's address is 764 S. Knollwood Lane, San Dimas, CA 91773; (909) 592-2105 (eve).

Questions from New York

We received the following letter from Anthony Mondesire of Bronx, New York.

"This is the first time I am writing to a magazine. I have been building off and on since 1940, rubber, free flight, hand launch gliders, U-Control, R/C Power, and gliders. I found out about *R/C Soaring Digest* at the WRAMS show in 1986 and subscribed. Then, I bought all the back issues to try to get up to date on soaring. I have a few (?) questions I would like to pose to the soaring aficionados about soaring designs.

- What are the pros and cons of up/down turned wing tips?
- What is tail volume coefficient?
- The formula and how it is calculated?
- What are the effects on performance, stability, and maneuverability on hand launch, thermal, and slope soarers?
- What are the pros and cons of V-tails?
- The angle of the "V"? How is the combined stab/fin area selected?
- Do you use the projected area of the stab (top view) and projected area of the fin (side view)?
- Can this be explained in moderately technical language, and not a mathematical dissertation? I would rather fly than go through the math necessary for total design considerations.

"I would appreciate hearing the different design reasons, opinions and justifications that the soaring community would care to offer.

"I hope I haven't opened a barrel of flying fish.

"From an "Old SOAR Head"
(signed) Anthony C. Mondesire

Printing?

The December issue of *RCSD* was printed by JACO-BRYANT Printers, Inc. in Mem-

Artwork by Curt Nehring, San Dimas, California.

phis, Tennessee. They did an excellent job and returned *RCSD* overnight via a trucking line that runs between Memphis and Dallas, and this is standard delivery! How did *RCSD* get to Memphis? Well, to make a long story short, Bob Sowder worked out the details and made the arrangements with the owner of JACO-BRYANT Printers, Inc., Sam Loncke. We also sent Bob the master copy, which he delivered, and he did the final proofing when the blue line was ready for the OK. Our thanks go to Bob and Sam for a job very well done! And, of course, you may have noted that Bob is now the Assistant Publisher for *RCSD*!

RCSD was a bit later than normal getting out the door in December, and we expect that the same will be true over the next couple of months. This issue, for example, will be delivered on computer disk (not hard copy) for the most part, and there has been much to learn behind the scenes.

Since our process for preparing *RCSD* has changed, the advertising guidelines for ad preparation must change, as well. With this writing, we do not as yet have specific details. As soon as we define the new guidelines for camera ready copy, all current advertisers will be notified.

A Special Thanks

In the midst of all the things going on over the last month, several of you said or did something that was really special to us, and it made our day: David Garwood (Scotia, NY), Bob Harman (Sandy, UT), Mark Nankivil (St. Louis, MO), Curt Nehring (San Dimas, CA), Jim Gray (Payson, AZ), Steve Savoie (Gorham, ME), Barry Kennedy (Austin, TX), Tom Jones (Carrollton, TX), Kevin Fotorny (Huntsville, TX), Les Parnell (Nashville, TN), Robin Lehman (NYC, NY), and Mike Kelly (Cordova, TN). Thanks!

Happy Flying!
Jerry & Judy Slates

UIUC Wind Tunnel Studies
A Note from Herk Stokely

SoarTech
1504 N. Horseshoe Circle
Virginia Beach, VA 23451 USA
(804) 428-8064

There have been a number of questions raised about the relationship between the University of Illinois wind tunnel studies and some proprietary airfoils which have been designed by Michael Selig. Since both funds and other support are being solicited for this work, potential contributors wonder if they might be subsidizing some commercial work for which the results will not be available to them.

I want to clarify this issue by making it clear that ALL of the results generated in the UIUC wind tunnel studies will be published and available to everyone. There were some proprietary RC sailplane studies designed by Michael during the period after the Princeton wind tunnel studies (SoarTech 8), and before he became a member of the faculty at UIUC. These were developed by computer analysis only, and neither the Princeton or UIUC wind tunnels were used in the projects. On two occasions, Michael has told me very clearly that he will not be mixing and proprietary work in with the UIUC wind tunnel studies. All of this work will be available to anyone wishing to have it.

The tentative plan that Michael and I have developed is that there will be incremental publication of the data as it is generated. These will be independent publications (not part of any other SoarTech). We estimate that they will run in the range of about 50 pages and be published several times a year for as long as the project is producing data. Prices are expected to be $10 - $15 each for US purchasers, and the substantial part of the profit will be sent back to UIUC to support continuation of the project. The wind tunnel has been up and running and, at this time, modification, calibration, and testing work is in progress. If the project goes as planned, the first publication will be available in early 1995. ■

Jer's Workbench

Jerry Slates
P.O. Box 2108
Wylie, TX 75098-2108
(214) 442-3910

Laminated carbon, balsa spar

Today, high performance models can be launched from a good healthy winch followed with a good zoom. But we don't want to see our wings fold or the wing rod pull out through the bottom of the wing.

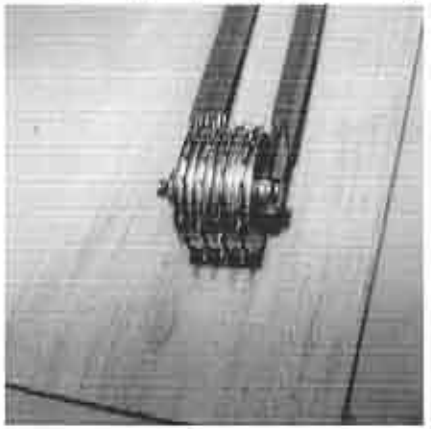
Well, I have been making foam core wings for about 30 or so years and the one problem that I have had was making an adequate wing rod box and spar system that wasn't too heavy. So, Gordon Jones, Dale King (The Head Elf) and I put our heads together and came up with a lot of ideas, but when the smoke cleared this is what we finally decided on: a full depth, very strong, but yet light wing rod box and spar system.

Looking at the pictures, I will walk you through step by step on how to make this very simple system. The wing that I am making has a RG-15 profile with a 10 inch cord at the root. This will require a 15/16th inch for a full depth spar.

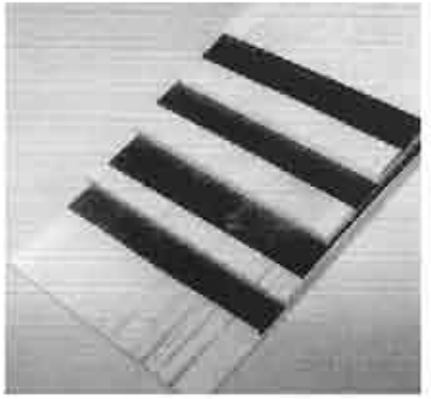
Now, since it can be a lot of work, rather than try to glue a 1/4 or 3/8 inch strip of carbon to a 1/4 or 3/8 inch strip of balsa, let's put together eight spars or a set of four spars.

Start with 3 sheets of 3/16 X 4 X 36 inch balsa and 2 sheets of 3/32 X 4 X 36 inch balsa, which adds up to 12/16th inches. Add 4 sheets of .007 thousands inch carbon, 4 inches wide and 36 inches long. This adds up to a little less than 13/16th inch, and with the added epoxy between each laminate will bring me up to the required thickness.

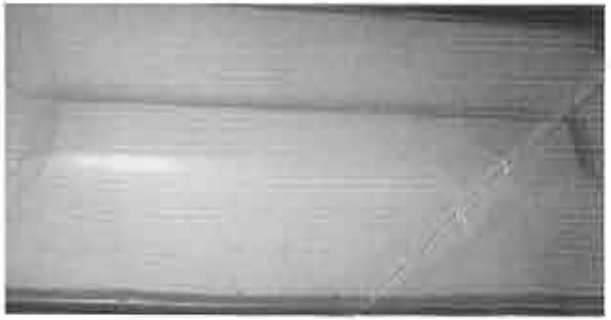
Before gluing everything together, using



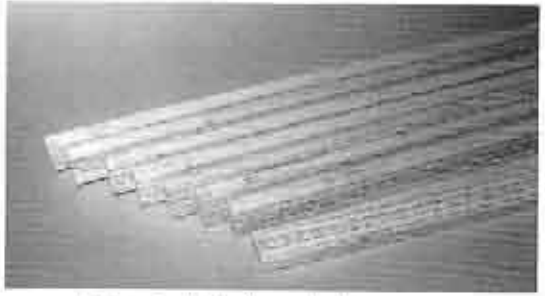
#1 Woodpecker perforating balsa sheets.



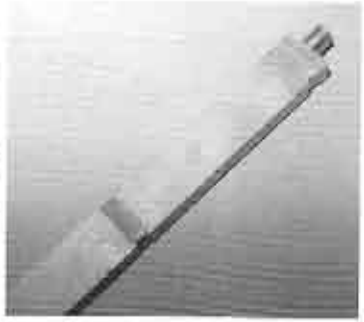
#2 Balsa and carbon sheets.



#3 Vacuum table pressing laminates together.

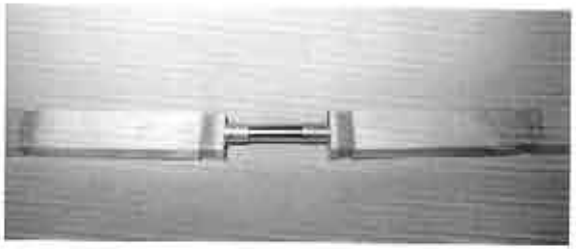


#4 Laminated balsa and carbon spars.

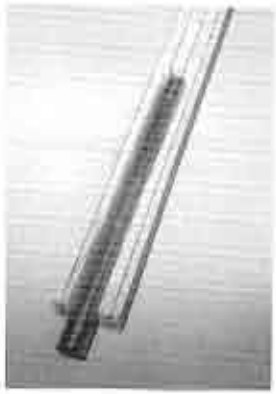


#6 Plywood facing and wrapped with Kevlar thread.

Below: #7 Completed set of spars.



#5 Selected angle cut with wing rod tube installed.



a Woodpecker, I start by perforating the 3/16th inch balsa sheets on both sides. The 3/32th sheets are only perforated on one side, as they will become the top and bottom of the laminate. (The Woodpecker works well on foam cores, too.) Stack the sheets of balsa and carbon as seen in picture #2. Now they can be epoxied all together, using (in this example) West System epoxy. Picture #3 shows the laminates being pressed in the vacuum table, but a vacuum bag can be used or they can be pressed together by using bricks or whatever.

After the laminates have cured, they are cut into 3/8th inch wide strips. This provides eight spars with a little bit left over, as seen in picture #4. Next, the required angle is cut, and the tube is installed for the wing rod, picture #5. A 15/16X12X1/32 inch plywood is added to each side at the root end of the spar. For a little added protection and to keep the wing rod from coming out of the bottom of the wing spar, each end of the wing rod tube is wrapped with Kevlar thread. To keep from having a bump where the Kevlar thread is wrapped, a small notch is cut in the top and bottom of the spar so that the top and bottom of the spar will be smooth as seen in picture #6. Picture #7 shows a completed set of balsa/carbon laminated spars.

After completed, the spars can be cut to the required length and tapered, if required. In my wing, each wing half is 56 inches long and the spars are 32 inches long. By using a 32 inch spar, the inner half of my wing is very strong with some flex on the other half and keeps the tips light. When I tapered the spar, I cut the taper on the top side, only. In doing so, the angle of the wing rod tube isn't changed.

This spar works for me. If anyone out there has a better spar that's easy to make, let me know as I am always looking for one. ■

LIFT OFF!

...with Ed Slegers
Route 15
Wharton, New Jersey 07885
(201) 366-0880 - FAX (201) 366-0549
9:30 AM - 5:00 PM (Closed Sun. & Mon.)

Young People in Soaring

Sometimes, when I go to contests or to soaring club fun flys, I notice the absence of young fliers. This is sad. The future of any sport or hobby is in the new people getting into the sport or hobby. In most cases, this will be young people. I am not sure why this is, but I would think that with all the other things young people can do these days, soaring is not a high priority. The price of planes and equipment could be another, but I think the biggest is lack of involvement by older more experienced people.

I have mentioned this to some of the flying friends I have made across the country and two of them have responded with some pictures and text on what they have done to get their sons involved.

The first is Bert Evans from Colorado. Bert's reply was lengthy, so here are some highlights. Bert says:

1) In order for young people to be involved in model aviation, it requires the support from either parents or friends.
2) For young people to be successful in model aviation, several resources must come together.
   a) They need help organizing, building and funding. This is usually done by the parents or a close adult friend. Let them do as much as they can, but be ready to help before a small problem becomes a large one.
   b) If the parent or friend does not fly, he/she needs to learn with or before the young person. The same is for building.
   c) Learning to fly successfully requires the assistance of a good instructor. Pick the person who does the smoothest and most consistent landings. That person may

Ryan Fry

Above: Nathan Evans

Below: Dustin Evans

not be the best pilot in the air, but he/she does understand how a plane flies.

d) At a contest, get help for the young person; parents should stay back and say nothing.

e) Once they can land successfully, get them lots of flying time. Again, parents, be with them, but do not give them much instruction while they are flying. They will learn on their own.

f) Get the "Old Buzzards Soaring Book" by Thornburg and read it ten times. Then have the young person read it.

g) Have patience.

h) Have more patience.

i) Never get mad or angry (i.e., have even more patience).

j) Repeat g) through i).

I would like to have listed all of Nathan and Dustin's accomplishments, but it would have taken two pages in *RCSD*. Unbelievable for their ages. Congratulations, Nathan and Dustin!!! You've shown it can be done!

The second response was from Jerry Fry in San Diego, California. Jerry says:

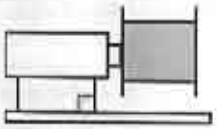
"Ryan is 11 1/2 years old and has been flying since his 10th birthday. In this photo, he's got his Spectrum 2m, a fiberglass Climax, and a Renegade. Not shown is an Olympic II that he was given on his 10th birthday party, just after I had taken him for a ride in a full scale sailplane. Warner Springs in Southern California has a great full scale sailplane airport where they'll take individuals up for 45 minutes for a very reasonable fee. Anyway, Ryan is doing really well in his first year. As I mentioned, he beat me by 600 points in the TPG International Hand Launch Festival, and we're always battling one another at the monthly thermal contests. Sometimes, but not always, old age and treachery wins out over youth and ability. Thanks for giving Ryan the chance to get into your article!"

I think we can all take a lesson from Bert and Jerry and what they have done with Nathan, Justin, and Ryan.

Another thought. Perhaps a little recognition would help. Maybe at your next contest, you could have a trophy for the youngest flyer. I know that Jerry and Judy Slates donate Junior trophies each year to two AMA sanctioned events open to Junior flyers.

I could be wrong (and I hope I am) about there not being many young people getting into soaring. Let me know if you have a son, daughter, or a friend that is soaring. Send me a picture and a brief description, and we'll see about getting them into print!

Good Flying!! ■



Winch Line

Gordon Jones, 214 Sunflower Drive, Garland, Texas 75041; (214) 271-5334 After 5:00 P.M. CST

Handy Blocks for the Shop

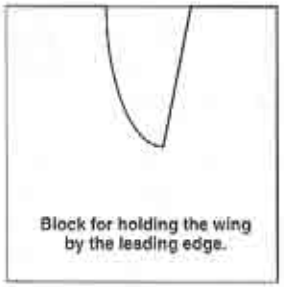
Ever really get mad when you were trying to do something to a wing and you needed another set of hands and the wing kept falling over while you tried to support it with cans or whatever? We all have at one time or another. Have some excess foam laying around not doing anything but collecting dust? You can solve the extra hands problem in about half an hour with the extra foam and a band saw.

I use blue or pink foam so that the blocks will last a long time. White form is not really suitable as it will deteriorate rapidly through wear and tear. For some applications you can even mount the foam blocks on a board as a permanent mounting (if you have the room).

I have several sets of foam blocks, each designed to hold the airplane or a portion thereof while I perform some task. I have a set of blocks in several sizes to hold fuselages, one for underneath the wing and another for under the boom. This makes radio installation a snap. And it keeps the fuselage from getting that extra amount of hanger rash that we all love so much.

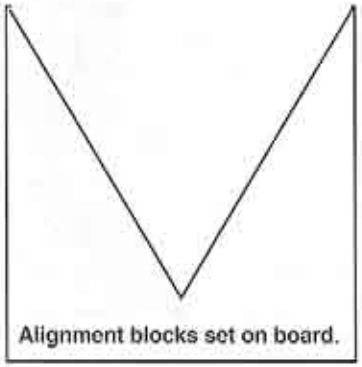
Other blocks can be made to hold the wing in place as well. You can fashion one to hold a wing panel by the leading edge and another to hold the wing by the trailing edge. Again these will make life much simpler and take some of the frustration out of building.

As you can see by the drawings these are easy to make and don't have to be works of art. The only requirement is that they do the intended job.



Another essential foam block is one to hold the wing while you are installing servos and control horns. Again, this type of block can be invaluable to hold the wing panels in place so you don't destroy the top of the wing while working on it. You can make one long block or a couple of shorter ones depending on your preference. I made this one using a top template and foam cutter only because they were handy, but you can make them with a bandsaw in about four inch sections.

Another handy set of blocks is one for aligning a fuselage plug if you are going to make a mold and you own fiberglass fuselages. Set three of the "V" blocks on a board with a center line down the board. Align the blocks to the center line and you have an alignment tool to check the alignment of the plug while working on it. It helps to have a warp free board so that you don't get things missaligned.



These are just a few examples of things that you can make with some extra foam and a little time. If you have any other ideas that others may be interested in please send them in as we are always looking for ideas to pass along. ■

ZIKA

Leading Edges

...by Robert Yan
Hong Kong

In our construction of model airplane wings, we often pay a great deal of attention to obtain the true shape, percentage of thickness and profiles. Less attention is often paid to their leading edges, especially after a few unfortunate hard landings. Once the leading edges are correctly produced, we like to keep them the way they are without any changes, and after many hours and months of flying. I have found the following ways very helpful with leading edges and would like to share them with our readers.

Leading Edge - Materials

I have flown many slope profiles, and have found one from a Japanese source (said to be used by many Russian gliders) which I am now sticking to: TsAGI. It is very powerful in aerobatic models.

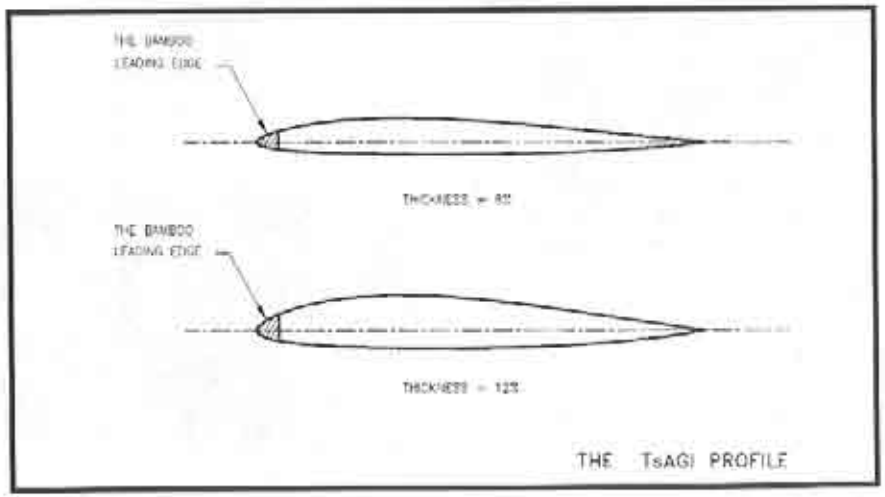
The material used is "BAMBOO". This is the same material used to make chopsticks. Bamboo material is quite easy to obtain in our area and is very cheap. Sizes of about 3/8"x3/4"x5' are obtainable. It has straight and long grains, is strong, and tough-flexible. Due to its straight grain, it is quite easy to shape. All kinds of glues that we use on balsa can be used with bamboo.

On impact, during hard landings, if the plane lands in bushes, the stems may be cut away; the edges remain intact. Depending on the angle and speed of impact into rocks, the rock may be chipped away, but NOT the leading edge!

I have found that bamboo material is by far the best material, and I would like to hear if any other readers are using it.

Leading Edge - Repair

In kits, very often, hard balsa is provided for the leading edge or is already fabricated into the wing, such as Graupner's Discus or Grob. It is a waste to change to bamboo. If I made a dent, not a serious one with cracks or broken parts, I have found that it is not necessary to cut off the dented part, repairing with fresh materials, or re-sanding to shape. Instead, I would remove a small part of the monokote (I prefer monokote covering for its color and time saving.) on the underside of the leading edge where the dent is, and apply water with a kitchen paper towel in order to wet out the dented part of the hard balsa. Let it soak for about 15 minutes, remove the paper towel, and then apply a hot iron just the way you would apply the hot iron to monokote covering. You will hear a steaming and hissing noise coming from the wood, which will then swell up and retain its original shape. When you are sure it is dry, and the hissing noise has stopped, it is time to cover the small part of the monokote which was removed earlier. You will hardly notice any repair work has been applied. ■



with
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FAX (901) 758-1842

Club Contests

Does your soaring club hold regularly scheduled club contests or fun-flys? It's no big secret that many soaring pilots relish the challenge of matching skills in competitive events. Having been a member of several soaring clubs in as many cities during the past 15 years, they all shared one thing in common: regularly scheduled non-sanctioned contests.

In Memphis, we have historically held six to eight club contests each year. The learning experience gained, both from an organizational standpoint, as well as personal soaring skills, has been immeasurable. Furthermore, our club has benefited financially enabling us to purchase some top-notch winches and retrievers.

There are many advantages available to your soaring organization by scheduling a series of non-sanctioned club events. The top ten on my list are:

1) They are easy to do. As few as 3 to 5 participants can be a lot of fun. The more, the merrier.
2) Share the responsibility by having a different contest director for each date. This builds depth in your club, plus you'll have a variety of tasks throughout the year.
3) Most everyone will participate in informal local events. Clubs that fly together stay together.
4) Encourages practice and learning without the pressure of flying in a large sanctioned contest.
5) Stimulates income for the club and offsets the need for increased dues. Charge a modest entry fee of $3.00 to $7.00.
6) Builds teamwork and vitality in your club.
7) Promotes individual recognition. Consider awarding high-point trophies at the end of each year.
8) Improves individual performance and skill levels for weekend sport flyers and avid contest enthusiasts alike.
9) A great rehearsal for holding larger AMA sanctioned events.
10) Helps the beginner become involved.

Now is the time to plan your club's 1995 activities schedule and include some local contests or fun-flys. If you would like some ideas, give me a call, I'll be happy to discuss what has worked for our club.

Club of the Month

North Alabama Silent Flyers (NASF)
Ron Swinehart, President
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"The NASF club is located in Huntsville, Alabama; which is approximately 95 miles south of Nashville, Tennessee, and 90 miles north of Birmingham, Alabama. Our club has forty one members on the rooster, with twenty five very active sailplane flyers. There is a mild interest in electric powered flight, but the major

Club contests are fun and easy to do.

Ron Swinehart, CD at MSSC in deep thought at contest. Photo courtesy of Ron Swinehart.

Bud Harris is always ready to help out the beginning flier. Photo courtesy of Ron Swinehart.

thrust of the club is towards the participation in the thermal flying of sailplanes. NASF was the host club for the second Mid South Soaring Championships (MSSC) held in Huntsville in 1993, and has already started preliminary planning for the forth annual event which will be held 15-18 June 1995. This contest will feature a two day cross country race, starting on Thursday the 15th, on a course of at least 25 miles, a hand launch contest on Friday the 16 th, and two days of unlimited class thermal duration on Saturday and Sunday, to a format that has been developed by the NASF club.

"This contest has obtained recognition at the national level, with one sailplane author in *Model Aviation*, Wil Byers, stating that this is one of the "biggest events" in the country. Much of the credit for this recognition has to be given to *RCSD* and Judy and Jerry Slates. They have faithfully co-sponsored this contest for the past three years in the form of providing the trophies for the Junior flyers in addition to attending each contest and setting up a major display tent with many sailplane related products being shown. In addition, several of the major kit manufacturers throughout the country have both attended, flown in the contest, and donated everything from high tech sailplanes to computer type radios for the raffle that has been held for the past three years at this contest.

Lars Ericsson is doing yeoman work in scoring at 3rd MSSC in Memphis. Photo courtesy of Ron Swinehart.

"As can be seen, a high percentage of our members have a strong interest in the competition side of thermal flying. I think much of this interest stems from the contest format that our club and the Memphis Area Soaring Society (MASS) have developed, which allows competitors at different skill levels to compete within their own skill levels, thus giving the newcomer a chance to win a trophy that they can be proud of. Both clubs currently offer trophies at their respective contests, for the Novice, Sportsman, and Expert level flyer. I would like to point out that this system works well when the entry level for the overall contest exceeds thirty to thirty five entries.

"Our club holds monthly meetings on the third Tuesday of each month at the Chucky Cheese Pizza parlor on Jordan Lane, one block north of University Dr. These meetings usually start around 7:00 PM, but several of the fellows always show up around 6:00 PM for pizza. Anyone visiting Huntsville on business or pleasure is always welcome to attend our meetings or to fly with us on the weekends. Weather permitting, there are nearly always some of the guys out by noon at the University of Alabama Huntsville practice fields, just east of Sparkman Drive, and one block south of Jordan Lane. At our club meetings we spend at least 80% of the time covering various show and tell items, which range from new planes/kits being built to sailplane related items that have been developed by one of the club members.

"Two of our club members have developed special building techniques with regards to cutting foam wing cores, vacuum bagging sheeted foam core wings, finishing the surface of these wings, and the final painting of fiberglass fuselages. These two individuals with nearly identical skills in all of these areas are Rob Glover and David Godfrey. The finished product that either one of these two can produce has to be seen to be appreciated. We as a club, are extremely blessed to have at our availability to answer any construction or building type question, not only one, but two individuals with these types of skills to this high degree of expertise. Enclosed is a picture of David's cross country sailplane, an SBXC, manufactured by RnR Products. David has used this plane to complete his cross country and final one hour flight towards his LSF Level IV goal. Rob also used this ship to complete his two hour Level V goal. This is a good example of the attitude our club has as a whole, in the willingness to share one's equipment, and/or help another member in the construction of their plane. I should also add that David has designed and built the five high speed retrievers (3 for NASF and 2 for MASS), four of which were used at the 1994 MSSC. I would like to also indicate that, while these retrievers may operate in a general fashion like the Rahm design, considerable design and operational refinements have been made to the final product. Given good operators, this design will function with little or no problem. Bob Sowder and I will both attest to this fact.

David is showing how big his SBXC really is! Photo courtesy of Ron Swinehart.

"Our club has two club sailplanes, and one four channel radio, which we regularly loan to prospective new members for the sole purpose of introducing them to RC soaring. At least three of our members regularly help new flyers, both as first time flyers, and in the general instruction of thermal type flying and in how to read the lift conditions. Bud Harris, in particular, is good with the new flyers, in that he seems to have the right mix of patience and encouragement to really be helpful to the new flyer.

"As might be expected, our club strongly supports the League of Silent Flight (LSF), in that we encourage our new members to join LSF (nominal $2 fee), and complete the goals, as their skills progress. At least seven of our club members are working on LSF V requirements, with several already having at least one win towards this goal. There are currently two cross country planes belonging to our club members, with several of the guys owning hand launch ships. I should point out that of our members, Cliff Smith, has hand launched a Paragon (3 meter sailplane) twice for a two hour duration flight. This feat was witnessed by several of our club members, including myself, and a detailed description of these two events has been published in *RCSD* a few years ago. Speaking of Cliff, he also won the 1993 MSSC contest on Saturday's event over 97 other contestants.

"I want to say in closing, that any club is only as good as the sum contribution of all of its members, and I can assure anyone interested in our club, that the overall support offered by our club members is second to none. All the way from helping the new flyer get started, to pitching in when asked, to help put on one of the best run contests in the country. I hope to meet any of you that may be traveling through, or visiting the city of Huntsville."

(Attention all clubs! Don't be left out. Here's your chance to introduce your club to the readers of RCSD. Send me a write-up and photos about your club and I'll include it in "Soaring East to West". Bob)

People in Soaring
Mark Vlasak, Memphis, TN

"I do not think of myself as a typical sailplane enthusiast. However, when thinking further about writing this, my next reaction was that I am not any different from other people I know involved in this sport - I Love Aviation!

"As a 38 year-old physician in solo private practice of Internal Medicine, many of my patients and all of my staff know that I love aviation, especially R/C sailplanes. Many people have asked me why I don't fly full scale airplanes. If the truth is told, motion sickness and pressure sensitive ears keep me on the ground.

"My interest in aviation pre-dates my birth. My paternal grandfather was an aircraft mechanic on Navy flying boats just after World War I and then a mechanic for a Barnstormer in Central Texas. My father began flying free flight models during the Great Depression on the bluffs and cotton fields of Corpus Christi, Texas. As a young boy, my father helped me build free flight models. College, medical school, and residency did not allow free time for model airplanes. Completing residency, I again found some free time to use free flight modeling as a means to relieve the stress of work. R/C sailplanes did not begin until a young Marine left the Memphis area and sold me his Olympic II. I eventually contacted the Memphis Area Soaring Society to help me learn to fly. Little did I know how active the MASS club was when I joined!

"Through the subsequent years of flying RC sailplanes, I have come to enjoy many things about this sport. The camaraderie and friendship among the soaring community is refreshing. I enjoy the diverse background of the people in our club and

Mark Vlasak running VMC Model 20 Retriever during a recent fun fly.

soaring pilots in general. The challenge of first learning to fly, without crashing, continued to thermal duration, landing, and then the combination of time and precision landing. Although I put off LSF for a long time, I am now realizing the benefits of attaining the specific goals within each level. I plan to continue R/C sailplanes due to the lack of noise, fuel, and dangerous props.

"Even with the joys of this avocation, I have found there are certain things I dislike. I hate sandbagging and feel guilty when I do it myself. I cringe at the sight of unsafe flying, especially when it is done by an expert in order to improve chances of winning. I feel that withholding of advice and help is a detriment to the sport. I do not like sink, but revel in the challenge that where there is sink, somewhere else there has got to be some lift. Overall, this is a tremendous sport."

Thanks for the letter Mark. I suspect that many of us share similar experiences in how we got started in this terrific hobby. "People in Soaring" will be a regular feature in this column. Drop me a letter about your soaring interests and be sure to include a photo.

Great Non-tech Ideas

If you fly on irregular or rough terrain (or even if you don't), we have found it advantageous to bolt the turn-around on a 3/4" to 1" pipe, elevating the turn-around three to four feet off the ground. This helps eliminate line wear caused by the ground and reduces line drag and battery drain. To stop the winch line from wrapping around the turn-around on down wind launches, try staking the mounted turn-around at a 45 degree angle towards the winch. Use a couple of guy-lines to keep the pipe secured in the ground. Do you have a great non-tech idea? Drop me a note and let's share it with our fellow readers.

Until next month - Thermals! ■

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"Here Boy"

What's in a good dog? Maybe some cut up beef bones, steaks, or even some roast duck... But to tell you the truth, that ain't what I had in mind. I'll tell you what's in a good dog. It's a heart of gold for his or her master. A heart of loyalty and devotion. Now I know that when you get a puppy, there ain't no way to tell if it is a smart dog or just one that sits on the porch with that out-of-town look in the eyes. You know, a look that makes you wonder if there is anyone home in that brain. It is only when you try to teach that pup a trick or try to house break the thing, that you will discover the truth.

Now, for me, I was very fortunate. My first dog was, and is, the she wonder dog! I mean, that dog was smart right out of the box. At eight months, she was fetchin' birds and doin' tricks. There is no tellin' what her abilities could have been if only I would have spent more time with her. She just had a good blood line in her. Now, her youngest puppy I kept. She must have been dropped on her head at birth, but she does have a heart of loyalty. My dogs, by the way are Golden Retrievers, and their names are Holly The Wonder Dog and Camellia, named after the hurricane that came through here in the 70's.

I can hear ya'll right now, wondering what in the world my dogs have to do with flying gliders. Uh, I don't know! I guess my reason for tellin' ya'll this is 'cause they just love to go to the flying field and watch me fly them things. Why, I remember my first glider, a Gentle Lady. Some lady that thing was. She mistreated me all the time, until her last flight. There I was, launchin' and landin' with Holly. I would stand at the end of a tensioned high start, and she would bark like crazy, until I threw the plane into the air. Then, she would run out aways and sit and watch the thing fly around. You could see her head following the plane; a look of amazement glowed in her eyes. She still does it up to this day.

Anyway, up and out went the plane, only to circle around and go behind me into a pile of sod grass crates. I couldn't see it crash, but I could sure hear it. It sounded like a big two door Buick when you slam the door. I knew it was bad. Holly jumped up and ran 'round to the back side of the crates, and then slowly eased out so that I could just see her. There was a sad look on her face, and she was shaking her head from side to side. I knew just how bad it was when she walked off, rolled over on her back, and all four legs were pointing straight up into the air. (The only thing that dog couldn't do was talk.)

Neither Holly or Camellia could retrieve the high start, but they tried. They would pick it up and start runnin' back to me, only to be flung backwards. After two or three tries, they knew that thing wasn't playin' around. They tried. Now, they leave it up to me to get the parachute.

Many a days me and dogs have loaded up to go flyin'. You know, I just can't figure out why, every time we get to the field, them two dogs always do their jobs. Maybe, they're settin' up landin' mines? Anyway, I remember one day, when I was doin' landing practices. I came in from a different direction to land, only to cut the top off one of them piles with the right wing. Boy, was I happy 'bout that!

Speaking 'bout happy, it seems that every time I have a crash, them two dogs are always the first ones at the scene. I'm sure ya'll know how happy one is when they get that first look at the remains. Well, them dogs always want to get right up in my face and on the leftovers, lickin' and blowin' their breath on me. It finally got to the point where I couldn't take it anymore. I jumped up and started shoutin' and hollerin', "Ya'll get out of here and off my trash!" After all, someone had to take the blame for my bad thumb, and it sure seemed like they was the only ones around. So, why not? One thing for sure, them two caught on real quick. It got to the point that whenever my planes would crash, they would give me plenty of room.

I remember one evening at sunset. There I was, gettin' in them last few flights while watchin' a very beautiful sunset develop. My, it was prettier than one could imagine. Being the romantic type that I am, I thought it would be nice to share it with my wife. So, I hollered out, "Hey, Honey. Come see the sunset." When she didn't arrive, I figured she must not have been able to hear me. So, I turned to the house and said it again. When I turned back around to look at where the plane was supposed to be, it was gone.

There I was, in the still of the evening, and in light air. Wouldn't you just know it. The Buick car door slam, sound rang out and I knew it wasn't company comin' over. Well, over the hill ran them dogs. Like always, they were the first on the scene. They were lookin' everything over as I walked up. They took one look at me, tucked their tails under, and ran way 'round me, and back up to the house. They gave me plenty of room. I guess they figured they weren't goin' to take the blame for this one.

There have been many hours of fun flying with Holly and Camellia. If the truth were known, I would rather fly with these two buddies. One thing is for sure. They won't let me down, and they are always ready to go. I guess the reason for tellin' ya'll this story is because a pet is a good friend. If you spend some time with them, you will find a loyalty towards you second to none. You know, you could even try it with your wife and kids. Nah! They probably wouldn't understand, and they can talk back.

Signing Off,
Cornfed

P.S. Say your prayers and keep your nose clean, even if it takes both sleeves.

ATTENTION: David Woodhouse of Ontario, Canada. Could you ship me about fifty gallons of snow? My wife wants to have a snow ball fight. ■

Understanding the JR Propo X-388S Radio Part II

...by Richard A. Eckel
Winter Springs, Florida

In Part I of this series we covered the Model Setup Mode of the JR388 radio and explored the effects of different settings in that mode. Part II will explore the other main menu area of the radio, the Function Setup Mode. This is the mode where most of the programming takes place using either the pre-defined mixes or what I refer to as free mixing.

I find it useful to think of the functions in this mode in groups. The first group I call Servo Adjustments, then Predefined Mixes, Free Mixes and, for lack of a better term, Convenience Functions. For easy reference the functions are arranged under those headings in the following list. Notice that I did not have to change the sequence that they are stepped through in the radio in order to make this arrangement. (Of course you must use the UP key to step down through this list.)

Function Setup Mode

Servo Adjustments
DUAL-RATE
EXP
REVERSE SW
S.TRM
TADJ.

Pre-defined Mixes
mix E-F
mix AL-F
mix DIFF
mix F-E
mix FL-A
mix SP:
POT.5

Free Mixes
mix A
mix B
mix C
mix D
mix E
mix F

Convenience Functions
TRIM
FS
TRN.
TIMR
INT.T

Servo Adjustments

The servo adjustments section of the Function Setup Mode allows for the adjustment of dual rate and exponential for each of the three main control functions of the airplane - aileron, rudder and elevator and settings for each servo for sub-trim and travel. Each of the dual rate controlling switches on the transmitter can have a separate setup for each of its two positions. Arguably the most common setup is for the 0 (or off) position to be a strictly linear setup and the 1 (or on) position being a reduced rate or exponential (or both). However, with the X388S you are free to program the switches with any combinations you prefer for both the 0 and 1 positions.

The reverse switches, sub-trim and travel adjustments allow you to set each of the servos in the airplane for each of these settings. These are very convenient but should be used with some caution. The plane should be set up mechanically first using the defaults for these settings (except for reversing) so that the zero point and the travels are very close to the final adjustments. Use these settings in the transmitter to do the final trims. You can overdrive servos or end up with unbalanced setups if you don't use these settings sparingly. If your initial setup is very far off of flying trim you would do well to readjust your linkages rather than flying with extreme settings in your subtrim and travel adjustments.

Predefined Mixes

JR has already done a lot of the programming in the radio. The predefined mixes

are typical mixes that are used in sailplane flying. By assigning specific receiver channels to specific control surface servos, JR was able to pre-program these mixes so that you don't have to mix each individual servo/channel individually.

The mixes are referred to by the flying control surfaces affected rather than by channels. If you have used the appropriate receiver channels and set DUA.F, FLAPS and VTAL in the Model Setup Mode these mixes are easy. You simply decide which switch you want to activate the mix (or it can be ON all the time) and set the percentage of mixing you want to take place. Notice that the controlling switches can be set up in both positions. You don't have to set just on or off but are free to set up the switch such that one position has perhaps a 20% mix and the other position a 60% mix. Decisions, decisions, decisions!

Also notice that you can assign several mixes to the same transmitter control switch. This means that you can activate several mixes with a single switch throw. In cases where both positions of the switch are programmable you can assign different mix setups to each position. This is where planning your setup becomes important. You need to consider how you will assign your switches so that the mixes you want are available using the minimum of switches. Keep it simple. Particularly if you actually fly eight different aircraft! It gets hard to remember which switch to flip for which mixes!

mix E-F

Mixing flaps into the elevator function can be used to sharpen your glider's response to elevator. This function can be controlled using the FLAP switch in the up position (F-UP), the FLAP in the down position (F-DN) or the MIX switch (MXSW).

mix AL-F

Flaps mixed into the aileron function provides full length ailerons for extra roll response. You must have DUAF activated, have a separate servo for each flap and a seven channel receiver for this function to work. Like the E-F mix, this mix is controllable with the F-UP, F-DN and both MXSW switch positions.

mix DIFF

JR makes this mix available to give you an easy way to set differential on your ailerons in order to prevent adverse yaw. However, they also do not recommend using it - at least for sailplanes. They recommend the use of T.ADJ (travel adjustment) instead. This mix can effect free mixes A and B for channels 2 and 7 and it just isn't worth the hassle it can cause if you don't realize it. I think that it also messes up the automatic reverse differential that happens when you deploy the ailerons in a crow setup.

mix F-E

Mixing a bit of elevator into the flap function can correct the pitch change associated with flap deployment on landing or launching. It can be controlled with both Flap up and down (FU+D) setting of the FLAP switch, with the MXSW or with the flap down (F-DN) setting of the FLAP switch. If you can't decide on a combination with one of these settings remember that you can always set up an additional mix with the free mixes using another switch. Decisions, decisions, decisions!

mix FL-A

Don't ask me why the previous mixes abbreviated flaps as F but now its abbreviated FL. It's one of those mysteries that man was not meant to understand! But aside from that, this is a nice mix for getting full trailing edge camber or reflex. It is probably most often used to set up the FLAP switch for launch camber and speed reflex by using the FLAP switch FU+D positions. But it can also be controlled by the Mix switch (MXSW) or the down position of the FLAP switch (F-DN) or, like the other mixes it can be ON all the time. You pay your money and make your choices.

mix SP

Now here's a mix that earns its keep. It mixes three functions in one menu item - elevator, ailerons (as flaps) and flaps. It mixes these three to the spoiler stick on the transmitter and allows you to choose the stick's neutral position by setting its offset (OFFSET). This mix can be changed or activated with the CROW switch (both BTF0 and BTF1 positions are programmable).

One interesting detail with this mix is that if you set the OFFSET to the lower stick position the ratch trim for the spoiler stick will still trim the flaps when the spoiler stick is below halfway but not if it is above halfway. If you set the OFFSET in the high spoiler stick position the ratchet trim is disabled. Go figure. But sometimes with some planes it is handy to trim in a little camber when you are working a thermal.

POT.5

OK, so here's a function that doesn't fit my general category - nothing's perfect. I guess they just had to put it somewhere and this seemed as good a place as any. This function allows you to disable the pots on the transmitter that are used for trim functions.

If you look back at the pot control table from Part 1 you can see how the pot functions change with the Model Setup Mode selections. The POT.5 function will only cycle through and enable or disable the trim pots that are activated because of the Model Setup Mode selections. Don't be disconcerted when this menu sequence changes from one model to another.

Free Mixing

In addition to the above preprogrammed mixes, JR has put six additional programmable mixes into the X388S, mixes A thru F. I call them free mixes since you are free to mix any channels you want. All of these mixes are not created equal however. They differ in the switches that can be used to control them, whether or not you can preset an offset and whether they include other mixes. In some situations using mix E or F may be more appropriate than using mix A or B.

Table 2.1 gives a quick view of each of the mixes and its capabilities. Two of the settings are none intuitive. The offset here refers to the amount of master channel offset before the mix is applied. A setting of zero means that the mix is applied immediately when the master moves. A setting of 50% would mean that the master would have to move half of its defined throw before the mix would start.

INCLUDE is another tricky concept. (At least I thought it was.) It's just waiting to get you in trouble if you use the E or F mixes. Essentially INCLUDE means that the mix will be applied to a slave mix if the master channel has also been defined as a slave. For example, suppose you want to have a little elevator applied with rudder and your rudder is already mixed to your ailerons. If you use mix A and mix elevator to rudder you will only get elevator when you control the rudder with the left stick. If you use mix E you will get elevator mix both when you use the left stick and when you use the aileron stick (since the rudder is slaved to the ailerons). The problems come when you use mix D or E without realizing that it will effect an existing slave mix in addition to the master you specified. Work out your control scheme carefully before you use mix E or F.

Mix D is also a special case. Mix D comes preprogrammed to mix rudder (4) to ailerons (2). JR put this in because so many pilots use this mix. You can change the mix to any two channels you want but the D mix does not have settable offset so if you want to set an offset you

need to choose another free mix to use.

Conclusions

As you can see the JR X-388s has a wealth of mixing available. It is extremely unlikely that any one aircraft will use up all the mixing capabilities of the radio. With an understanding of the differences in the free mixes it is likely that you can find one that will perform the mixing that you want in any situation.

In Part III its time to put our understanding of the radio to work. I will propose a setup procedure to use with a new (or existing) model and let you in on a couple of mixing tips to get you started with the free mixes. ■

TABLE III

	ON	MXSW	F-DN	F-UP	BTF0	BTF1	OFFSET	INCLUDE
mix A	X	X	X	X			X	
mix B	X	X			X	X	X	
mix C	X	X			X	X	X	
mix D	X	X	X	X				
mix E	X	X	X	X			X	X
mix F	X	X			X	X	X	X

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Four Basic Concepts
Part 4

Parts 1, 2, and 3 of this series were printed and given to Bill Kubiak for comment. At the World Soaring Jamboree in Richland Washington, we spent quite a few poolside hours going over the material, assuring ourselves of both its accuracy and logical presentation. Bill had brought along a written summary of his thoughts, and in going over what he had written, we decided it should be shared with *RCSD* readers.

"In trying to use the curves for design, I concluded that the nearer the arms of the curve are to the axes, the better. This is because we are looking for a minimum amount of wing twist. I also conclude that the further down into the corner of the X - Y axis the curves penetrate, the better. This is because we are looking for a reasonable sweep angle.

"I had considerable trouble trying to compare one airfoil section to another, so I ran over to my favorite Mail Box and had transparent copies of your curves made. Then I laid the transparency of Graph 1 over that of Graph 4 and copied them onto plain paper. That's better; now I can compare these two sections of similar (almost zero) C_m. I see that there is little to choose from between the two, at least as far as C_m is concerned. L/D should be looked at. I suspect the EH 2/10 will be better. After all, that's the *raison d'etre* for camber, isn't it?

"Then I stacked the transparencies of Graphs 1, 2, and 3 to see how a cambered section compared to a symmetrical section. Wow! I assume whatever the merits of the basic section are, if #3 is used, it being so far from the axis, trim drag will be excessive compared to #1. That's why twisting a wing with a conventional cambered section just doesn't work — the trim drag is too high. Now I understand, while before I didn't. When you compare Graph #3 to both Graph #2 and Graph #1, you see that changing camber is a more effective method of controlling C_M (pitching moment of the entire aircraft) than twist is.

"You could tune, through iteration, a design to fit a specific static margin by keeping a portion of the center section untwisted and just twisting the outer portion until the trim forces just balanced the static margin. However, the graphs show it is as easy to invert the tip section as to twist the wing.

"If a wing is built using the conventional hot wire and foam method, it is given a linear twist. I now realize that only the center line and the tip of such a wing will have known aerodynamic characteristics. In the case depicted in Graph #3, where the tip is inverted, the centerline section will gradually transition to a symmetrical section at near mid-semispan, which will then transition to the inverted section at the tip.

"Since every airfoil section has a design C_l, and you wish the design section C_l could be equal to the design C_L (whole aircraft) for minimum drag, it seems that for least drag for a given lift, as much of the wing should be untwisted as possible. Most of the wing is then flying at a constant C_L, hopefully at the design C_L.

"Now that I've decided that twist by itself is not the most efficient way of controlling the overall pitching moment (C_M), it makes sense to adopt the concept of inverting the tip section. At the time that you mentioned this to me I thought it was a real hokey way to solve a problem. Now I see that you could have the center section flying at its best design C_l, the tips flying at their best inverted design C_l, and the whole aircraft would be flying at the desired C_L.

"With all of this in mind, and when speaking of swept back wings, it seems what is very much needed is a root section with very low pitching moment but high C_{lmax}. The EH 2/10 is a far better choice for this application than a symmetrical section because it is capable of much greater lift with very little drag penalty. Since the root airfoil has a pitching moment near zero, the normal down force required by the wing tips is not great. On the other hand, you would want a tip section capable of high lift as well, since a strong up force is needed to right the aircraft in pitch following a stall of the center section. This leads me to believe it is best to choose an airfoil which meets all of these criteria and can be used across the entire span. My choice would be the EH 2/10."

If you have a topic you'd like to see discussed in "On the Wing...," please forward your suggestion to us at P.O. Box 975, Olalla WA 98359-0975. ■

GRAPH #	ROOT SECTION	TIP SECTION
Graph 1	symmetrical	symmetrical
Graph 2	Eppler 205	Eppler 205
Graph 3	Eppler 205	inverted Eppler 205
Graph 4	EH 2/10	EH 2/10
Graph 5	EH 2/10	Eppler 228
Graph 6	Eppler 228	Eppler 228
Graph 7	Eppler 230	Eppler 230

Ailerons Aloft or Hand-Launch Topics

...by Scott Smith
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evenings after 7:00 PST

Announcing the 12th Prestige Riverside Classic

As is the custom, the annual ISS Riverside classic is scheduled for the first Saturday in June at the University of California at Riverside. Don't miss it!

Ailerons Have Arrived

At the December contest at Poway, Art Marchevitz won with his new custom aileron ship in some of the calmest conditions I have ever participated in. For most of the contest, there simply wasn't enough lift to stay up more than about a minute. What was interesting was that Art won the rounds in which there was little lift as well as when you could sky out. This was a new airplane; Art had never competed with it before.

How could it win? This violates all the conventional wisdom about the superiority of polyhedral over aileron configurations in light air. What explains it?

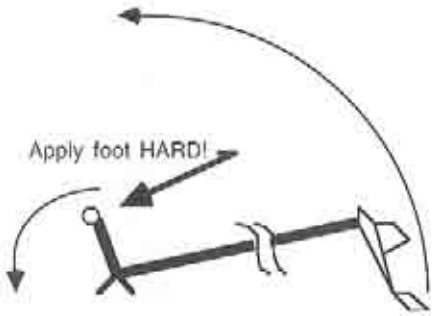
First, Art's plane has the venerable RG15 airfoil. It simply throws higher than the 7037. If there is any lift at all, it might be found only at the higher elevation that the RG15 can reach on a throw. That the RG15 has a higher launch height to start out with probably makes up for its higher sink rate.

Second, some of the hand launch rules are changing to indirectly favor the aileron plane's greater controllability. One popular new round requires that the first flight be at least 15 seconds long; each following flight must be at least one second longer than the previous flight or it doesn't count. Here a difference of a few seconds makes a big impact on your score. The pilot can throw higher than necessary, then use flaperons or spoilerons to bring it down at a slow consistent descent. In contrast, the rudder/elevator boys are frequently having to catch one fast-moving airplane!

The only reasons that the aileron planes are not going to catch on sooner are the cost of the two additional servos required, the added weight and complexity, and the reluctance of pilots to give up the elegant beauty of the simpler polyhedral ship.

Atlatls

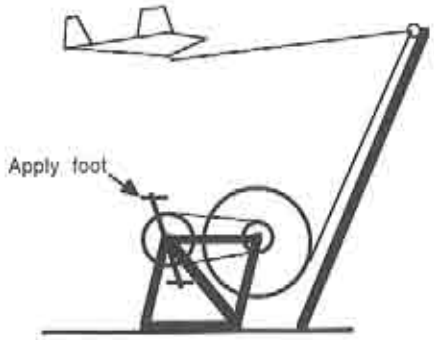
Throwing sticks, that is. The object is to apply the throwing force over a longer distance. How about a foot-powered "step-on-it" machine as follows?



A conventional tow hook is placed on the handlaunch which is engaged at the end of the long pole by an eye hook. The bottom end of the pole is attached to a hinge on a base. The foot pedal comes out at a right angle to the long pole so that when it is stepped on, the long pole whips upwards. When the pedal hits the stop, the long pole stops in its vertical position and the plane keeps going.

The ratio of the length of the pedal pipe to the pole length, the travel distance, and the weight of the body behind the foot that pushes the pedal down; all of these affect the amount of energy applied to the airplane. Seems like it wouldn't be hard for a 200 pound person to be able to impart about 125 ft-lbs of thrust to the airplane.

How about a mini-winch? Take a bicycle minus the front fork and wheel, mount it upside down, and connect the tow line to a rim. Run the tow line to a return ring and back to the glider's tow hook. Hold the glider with the line taut and step on the pedal. When the line reels in, let go of the glider.



Both of these schemes are for pilots without gorilla arms but who want to have gorilla launch heights.

Riddle Answer

Here's the riddle presented in the November issue: A handlaunch plane with rudder/elevator controls and polyhedral wing is thrown with such force that the fin falls off during the throw. What will the glider do? What should the pilot do? What will the pilot probably do?

Ted Off of Oxnard, California, sent me an exerpt from the classic book, "Circular Airflow and Model Aircraft" by Frank Zaic, published in 1964. It was fun reading the calculations for dihedral, spiral stability, and all that. Thanks, Ted!

In any case, this riddle actually happened to me. Dr. Norm and I were launching off a short bungie cord with a lot of force. On my first launch, a weakened fin separated from the fuselage immediately after I released the plane.

Here's what it did. It launched normally and I leveled it out at the top. It flew perfectly normally except I could only make it go up and down.

The pilot should get the plane down a quickly as possible without crashing it. I should have put it into tight loops to kill altitude, then bring it in as steeply as I dared.

Instead, I stood slack-jawed as the plane flew contentedly towards the horizon. Finally, Dr. Norm suggested (as gently as he could; can you picture this?) that I get it down before it drifted over traffic or the NEXT COMMERCIAL AIRPORT! I put it into a moderately steep dive and it disappeared over a school building.

Some junior high kids, God bless 'em, offered to search the school for the airplane. They found it on the roof only slightly damaged, were financially remunerated for their good deed, and happily went off to spend it for lunch at some fast food restaurant.

Have a happy and safe 1995. ■

Well Kitted

Not all days are good flying days. Whether you fly slope lift or thermals, some days the lift is just not right for your particular plane. Tick Point, on Mt. Tamalpias may have a reputation for strong winds but the day we chose was not a day for the Dodgson's Pivot. It was a great day for watching.

I sat in the warmth of the November, California sun and listened to the camaraderie of the flyers with roaring surf

background mood music. Three men were racing one meter planes using catapults to launch. The planes rose in unison to whoosh into the sky, speeding toward the turn points like graceful demons. Some flyers were doing aerobatics, others trimming their planes. Shouts of "Gotta go for a walk" (retrieval hike), and "heads up" rang through the laughter.

Each flyer had his own pile of stuff, a hobbyist's cairn guarding his two or many more gliders. Backpacks, metal cases, and wonderful Bag Lady fanny packs were arrayed behind the landing field.

What does the well prepared model glider pilot require to enjoy a day of slope flight midst the perils of rocks, chaparral, Eucalyptus trees, and Highway 1? Time for super sleuth!

The first and most important item to emerge from a field pack is a transmitter (or two) usually protected by a cardboard sleeve. Glue and tape were the ubiquitous. The consensus was that more than one type was required. Hinge and strapping tape was one choice. Blue masking, clear vinyl, and black vinyl was another. Several kits contained voltmeters for checking battery charges. Everyone had lead - lottsa, lottsa lead. Rubber bands and wing bolts were not to be forgotten. Tools included a slotted screw driver, needle nosed pliers, a hemostat, Allen wrenches, and a Swiss Army knife (my personal essential).

Those who had no time limit or who had personally encountered "Murphy's Law" included extra receiver and transmitter batteries. Those who would not be sidelined had extra frequency modules.

There were two folding chairs in the group which were looking more and more comfortable. How can hard packed ground get so hard that a body can hardly sit?

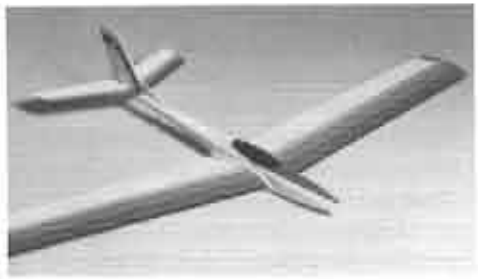
Water seemed the extent of creature comforts. Although, my detective work did uncover a waxed sandwich wrapper and a banana peel. I will presume people essentials remained in the cars.

The quintessential field pack which allows the truly obsessed hobbyist weeks of flight time without ever having to return to home base includes a few more essentials. It also weighs a total of 40 pounds.

From a large back pack emerges a plastic ammo box. From within that come: an extra antenna, airborne crystals, a compass, anemometer, 12V gel storage cell, milliammeter, portable battery charger, and transmitter/receiver battery packs. A solar charger is transported separately in a box with innumerable gliders. The portable repair kit consists of: razor blades, Kevlar repair tape, fiber glass cloth, three types of CA (Sheldon's Thin Posicure, UFO Thin for foam, and PIC Plastistick (for basket retrievals), and Kick-it accelerator. PIC's Debonder is there in case the hobbyist gets too attached to his work. Never to be forgotten are waxed paper and paper towels. There are miscellaneous washers and hex socket screws and an Exacto knife tweezers and shims. Not to be forgotten are the appropriate channel markers and a plastic wind streamer. Stuffed ignominiously into the bottom of the pack is a windbreaker, fingerless gloves, a transmitter cover, a wool hat, ear plugs (to keep out the wind, not my melodious voice) vest, sweater, rain pants, Sahara hat and binoculars. The last two, can't do withouts, are the transmitter manual and Turbulator Tape.

Now if there was only something that could be done to stop the sun from setting. Maybe a glow in the dark plane is the answer!

The real secret in preparedness seems to be attitude. Everyone was there ready to enjoy the flying, good company, and the spectacular location. ■



Coyote Modifications

...by Steve Savoie
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Three DownEast Soaring Club members have recently purchased Coyote kits, so I thought now would be the best time to discuss improvements/modifications that I've made to my Coyote in recent years. The Coyote was best described by Dave Garwood at the NERCSC (New England R/C Soaring Convention) as the "57 Chevy of Slope". The 72" wing is sheeted with 1/64" plywood and fitted into the crash resistant "Durelene" fuselage with a leading edge dowel and two 8-32 nylon screws at the trailing edge. The full strip ailerons are made from hard trailing edge stock and are controlled by internal torque rods linked to a servo in the center of the wing. The fixed vertical fin and horizontal stabs are solid 3/16" balsa stock. The wing has a delta sweep which makes it very stable at slow speeds. The stall characteristics are very mild due to a blend of two different airfoils, one at the root and the other at the tip. The Coyote requires moderate lift and can either tear up the slope face with high speed acrobatics of loft up at the higher altitudes.

The following modifications come after years of crashes and my distaste for lost flying time and repair work:

1. Use a brass tube in the center section joint and slide replacement pieces of dowel in the tube. The dowel can be notched with a razor saw to shear just outside the dowel. This makes dowel replacement easy after a hard crash.

2. Use hot glue for all glue joints to the fuselage. It is flexible and works with the Durelene instead of against it as epoxy does. Black and Decker makes a portable butane powered hot glue gun that works great for field repairs.

3. Build the horizontal stab as per plans, then cut a full length 3/8" wide spar out of it for the greatest length possible and replace it with a 3/16" x 3/8" spruce insert. Do the same with the vertical fin.

4. Replace the balsa L.E. supplied in the kit with basswood. This plane lands on its wing, so why not cover the wing bottom with light glass and spray it with paint. I have not tried this method; it's really Walter Mudgett's idea. Sounds like a good idea; I can count the number of times I've reworked the covering on the bottom of my wing. Make sure to use different colors on the top and bottom of the wing.

5. Use nylon connectors and control horns whenever possible; it's much easier to replace them on the slope than to rebuild a servo.

6. Reinforce the forward wing saddle area that keys in the wing dowel with leftover Durelene scrap. This is done by cutting the Durelene to size; conform it to shape with a heat gun and glue it with hot glue, then drill the hole for the dowel through both pieces.

7. Strengthen the nylon bolt surface on the wing with either glass or 1/32" ply. I also doubled the ply with extra layers of 1/8" ply where the wood is tapped to receive the 8-32 screws. Once tapped, reinforce the threads with thin CA and then retap.

Well that's it. The Coyote is a good slope machine, although maybe its design is dated, but I haven't seen a slope machine that can take the shear abuse that this plane will take. Just remember to bring lots of 8-32 nylon screws.

P.S. In my article a few months back I failed to mention that Wayne Fredette from the Soar Club of Illinois gave me the idea for the "nail towhook". Wayne tolerated every excuse I could think of while he patiently instructed me to solo with an Airtronics Olympic II during the very hot summer of 1989. Many thanks, Wayne. ■

Understanding Sailplanes

...by Martin Simons

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Back to Basics

Introduction

I am sometimes asked why any model flier should bother with theory. The short answer is, because it is interesting and useful. I would not pretend that deep knowledge of theory is essential. We do not expect every automobile driver to comprehend how the engine works before being allowed on the road. In the same spirit, people can and do fly model aeroplanes quite successfully and safely without understanding much about them.

As a child I myself had a lot of fun just throwing little gliders up and watching them, chasing, repairing, and so on. A good many adult model fliers have much the same approach. Why shouldn't they? We fly models for fun.

But it is also fun to understand what goes on when our models are aloft and when we understand, we manage our flying better.

It is not necessary for the model flier to delve deeply into mathematics. A little simple arithmetic helps sometimes but the more profound realms of advanced algebra and calculus are not required. What does matter is getting some clear ideas of how air behaves. It is surprising how often people who depend on higher mathematics alone for their understanding of flight, make serious errors, not in their figuring but in the ideas on which the figuring is based.

A whole edifice of pure mathematical reasoning, quite correct in itself, may be based on a fundamental conceptual misunderstanding or confusion. I have told the story before of the person who sent me a twelve page, carefully developed argument in calculus, the purpose of which was to discover the correct conditions for a model aircraft to develop least drag. The conclusion was expressed in a grand formula on the last page.

What was finally demonstrated, in mathematical symbolism, was that the least possible acrodynamic drag of a model sailplane occurs when the model is not flying. This is true, but we did not need twelve pages of calculus to tell us. The entire argument was circular; having begun from a false position, the final conclusion expressed the same false position. The error was made before any calculation had begun.

In what follows I shall use no mathematics, although from time to time a little arithmetic may creep in. I hope to get the basic concepts sorted out, no more. Anyone who wishes to pursue theory into higher realms will find plenty of more advanced texts to work with. At these elevated levels, mathematics becomes a useful tool. Unless the fundamentals have been sorted out first, however, it can be seriously misleading.

The theory of theory

I recently had a letter from a reader who said "Your theory (about xx) is suspect." He then, briefly, offered another theory. In my reply, I said, among other things, "Every theory is suspect until it is disproved." This applies to all theories, mine, his, yours, and all the rest.

People talk too much about theories being proved. The root of 'prove' is in the Latin word *probare* which also comes down to us in another form as **probe**. Proving a theory is probing it; putting it on trial. A proving ground is not a place where a car is given a gentle run around. The vehicle is driven as hard as possible, submitted to the fiercest tests until, in the end, something breaks. Something does break in the end, if the test goes on long and hard enough. If we knew a vehicle was infallible we wouldn't need a proving ground. The same with a test flight for a model sailplane. If we were certain of it we would not need a test flight.

Every theory is there for probing and every flight is a test of flight theory. When theory breaks down we must change our minds and probabaly change our models too. A theory is a mental model, which may sometimes crash. If we cannot construct a completely new theory we may have to patch up the old one to get it to go again but whatever happens, when our understanding fails our ideas must be improved.

This makes a crucial and fundamental difference between a **scientific** theory and matters of opinion, fixed belief, or certainty of faith. We can never say that any scientific theory is final. The most we can ever hope for is to know a theory which has passed every trial so far applied. We may be shocked if it collapses on the next test but we must be prepared for this. Tomorrow, or next week, someone may discover unexpected flaws in our most precious beliefs. Then we must then change them. If we cling to old certainties in the face of contrary experience, we lose touch with reality.

To mention only one famous example, Newton's supposedly universal 'laws of motion' passed test after test and for some centuries were taken to be absolutely certain. The Newtonian vehicle ran smoothly for a long time but at last a series of small breakdowns began to occur. The theory was patched up and patched up again and again, but eventually the breakdowns became too many. It is now accepted that space and time are not what Newton and his many believers thought them to be.

More recent theories of relativity and quantum mechanics have been constructed, not because they are themselves beyond doubt but because they achieve two important things.

They account successfully for everything that Newtonian theory dealt with, but also explain some of the events which Newton could not, passing many of the tests that Newtonian mechanics failed.

Secondly, the new ideas indicate why we can continue to apply Newton to most of our practical affairs, such as model flying. Newton has not been discarded by relativity. His laws are included within and explained by the much grander new theories; they form a necessary small part of them. On the one hand it is now understood that they are not universally true but on the other hand, for practical things like flying models and even for sending rockets to Mars, they have been very thoroughly probed and have turned out to be extremely reliable.

But the probing will go on and if it goes on long and hard enough, even the theory of relativity will reveal unexpected flaws and we shall have to think radically again. Indeed, it has been argued that difficulties with relativity are already discovered. Once again, it is not likely that Albert Einstein and Max Planck will be thrown out but there may be a new, still larger theory one day that encompasses everything before it and yet extends beyond. It is not going to affect us very much when we are flying our models!

Every flight a probing flight

The point of the foregoing is to change our attitude to model flying slightly. Every flight becomes a probing flight. We test ideas, not to show they are everlastingly true but to find their weak points, to falsify our theories, not to demonstrate their truth. At the end of the next test, we may have to change our minds. We must train ourselves not to become mentally frozen in any falsifiable belief system. Fixed beliefs have no place in science and, in so far as model flying is scientific, it is a proving ground where theories are tested until they break. Often the models break before the theory does!

Before a theory can be tested and possibly falsified, you have to know it. Just as you cannot fly a model until it has been built properly, you cannot test a theory unless you have it right. The theoretical model you have in mind, has to be constructed according to a good plan. You cannot build a good model sailplane unless you have all the bits, and see how they all fit together.

The accepted theories which are to be found in reputable aeronautical books, haven't fallen apart yet. They are like the plans of a well tested, frequently flown model sailplane. No one has, so far, found anything wrong with them. Every actual event in practical flying experience, so far, can be explained within the established theoretical framework. This does not show the orthodox ideas to be infallible, it only suggests that they are awaiting more tests. Maybe the discovery that will force everyone to adopt a new theory is just around the corner. You might be the person who gets round that corner first, the next time you fly a model sailplane. More likely, of course, others are ahead of you! Unless you are prepared to find out what others have already discovered, you won't make much headway on your own.

Very probably, when your model is flying, things happen that puzzle you. You might have discovered something which could make you famous! Maybe you are the first person ever to notice some event that will change previous theories.

Before claiming any marvellous discovery, though, you'd better make sure you do understand the old theories pretty well. Books describe what other people have observed and show how events similar to ones you have noticed have been explained hitherto. To develop a new idea, we have to have the old idea in our minds first. Before you can falsify an idea, you have to grasp it! That means, study, and there is no escape from it. But we do not have to make a detestable labour of it. We can have fun flying our sailplanes, and learn as we have fun.

You will probably find that other people have already seen what you have seen, and attempted to explain it. Most likely, your puzzle has been already solved at least to some extent. If so, you will not win the Nobel prize this year! But you will finish up understanding the behaviour of your model a little better than before. This will add to the interest of your sport, raising it above the level of a childish game.

The possibility remains that next time you go flying, the great discovery will happen! But for such a thing to happen you must keep your eyes and your mind open.

Forces and flight

Having said all that, let us have another look at the fundamental theories that represent the best human attempts so far developed to explain not only model glider flying, but everything else that we do.

Model sailplanes do not move anywhere near the speed of light, relative to us and the ground we stand on, or relative to the air in which they fly. Nor are the distances involved so great that we need to worry about the apparent curvature of space, or the effects of mass on light. Within our limited realm of model flying, relativity theory and Newton come together in harmony. The Newtonian principles still seem to apply. Of all the theories you may disprove next Saturday afternoon, these seem the most unlikely to be found wanting. Model sailplanes within the speeds, sizes and distances that we are familiar with, have always, so far, conformed very exactly to the familiar laws of motion that all wide awake children learn in school:

(1) **A glider in equilibrium will continue in this state unless acted on by some force tending to change its motion.**

(2) **The strength of a force required to upset a glider's equilibrium and so change its motion, depends on the mass of the glider.**

(3) **To every action or force on a glider, there is an equal and opposite reaction.**

Applying these three laws is not specially difficult.

A glider flying straight at a constant airspeed in equilibrium, is acted on by gravity which, in Newtonian terms, is a force tending to accelerate every object toward the centre of the planet we happen to be living on, in this case, the Earth. (There are slight variations of Earth's gravity from place to place but when measured these turn out to be so small as to be negligible for our purposes.)

The glider has a certain amount of substance in its structure; wood, glue, plastic, glass or other fibre, covering material and paint, probably some ballast, a radio receiver with battery and servos, pushrods etc. The total of all this substance is the **mass** of the glider. The downward action of gravity on the mass of the model, creates the **force** which we know as **weight**.

We are already in some small conceptual difficulties but these will be dealt with quickly. Every tiny particle or atom of the glider has its own mass, indeed, within each atom there are sub atomic units (it is probably wrong to call them particles) which also behave like tiny objects with individual masses of their own. The action of gravity on each bit of the substance of the model produces a separate weight, so there is not one single weight force, but a very great many, billions in fact, of tiny weights spread throughout the substance of the model. The concentrations of mass will vary from place to place. Lead, for example, used as trimming ballast, is a very dense material and produces more weight for its volume than balsawood or foam plastic, which is much less dense.

If we have used suitable materials and have glued the model together properly, however, these billions of particles are joined to form a single, more or less rigid structure. For most of our succeeding argument, we may take the total of all these small masses and replace them, in our minds, with a single mass which we can imagine as replacing all the individual atomic weights. Mentally, then, we invent a single, conentrated force which we call the weight of the model and we suppose it to act at some more or less definite centre, which we call the **centre of gravity** (Figure 1).

If the glider were flying above the surface of another planet (assuming there was some atmosphere like our own to sustain it), its mass would be the same. It would contain the same amounts of wood, fibre, glue and so on. It would not have the same weight, however, because the gravitational force on the other planet would be different.

In a space ship or space shuttle in orbit, the mass would still be there, but the weight would be zero. The astronauts themselves become weightless, but they are still there as human beings with bones, muscles, fluids and even a little fat. They are weightless, but not without mass.

It is important to remember that mass does not change when gravity varies, but weight does. Hence all those effects which arise because a glider has mass, always arise, whatever the weight.

When a model is flying, gravity is the only significant force acting on its mass from the Earth. (We will leave out magnetic influences, radiation and various kinds of particle impacts which have effects too small to bother us.) Gravity creates the weight which always acts vertically down. To maintain flight in equilibrium there must be an **equal and opposite reaction** which must come from the air. Weight force straight down, air reaction force straight up and equal to

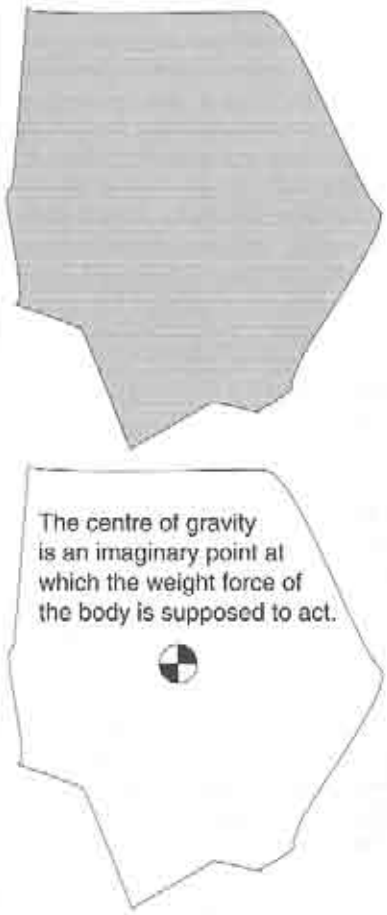


Figure 1

The Meaning of 'centre of gravity. Each tiny particle of an object has mass. The centre of gravity of the whole object is a point at which the individual centres are imagined to be concentrated.

weight; equilibrium, sustained flight (Figure 2).

Then there is the law that **the force required to change motion, depends on the mass of the object**, not on the weight, not on the local gravitational effects, not on the size of the planet, only on the mass. And **any action changing motion creates an equal and opposite reaction**. Both these laws are **to do with mass**. The strength of the force required to alter a sailplane's motion will be large if the sailplane has large mass, small if the sailplane has small mass. The equal and opposite reaction is **a reaction of the mass** and is known as **inertia**.

In a zero weight situation in a space craft, or on another planet with different gravity, if the mass of the object is the same it will react in exactly the same way to any force applied to it. To change its motion by a given amount, the same strength and direction of applied force will be needed as if it were on Earth. The mass inertia will be equal and opposite to the applied force and, again, independent of the location, dependent only on the mass.

To mention only one situation where misunderstanding of these basic laws arises, a great many people have invoked inertia to explain what they see, or think they see, when their glider turns upwind or downwind in flight. Confused articles about this have appeared, and unfortunately continue to appear, in modelling magazines and even in some otherwise useful modelling textbooks. (I don't know how many innocent beginners have been misled on this point by persons who should know better.)

Inertia arises only if a force is applied to change the motion of the glider. No such force can arise from the ground because the glider is not in contact with the ground. Hence any change of speed over the ground, while it is flying, cannot possibly create a force to cause any mass inertia reaction. To get an inertial reaction from the aircraft, a force must be applied to the mass and the only possible force that can arise is a force from the air in which it is flying.

The observer standing on the ground certainly sees the glider changing its

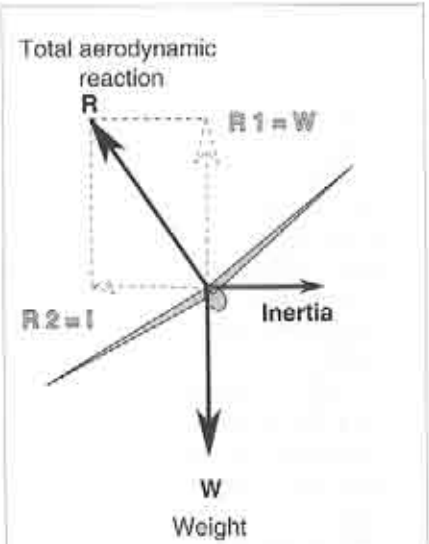


Figure 2

Forces acting on a glider in turning flight

To turn, a force, R2, is required to change the motion, disturbing equilibrium. The force is obtained from the air by banking the wing. Inertia is the equal and opposite reaction of the glider's mass to the disturbing force

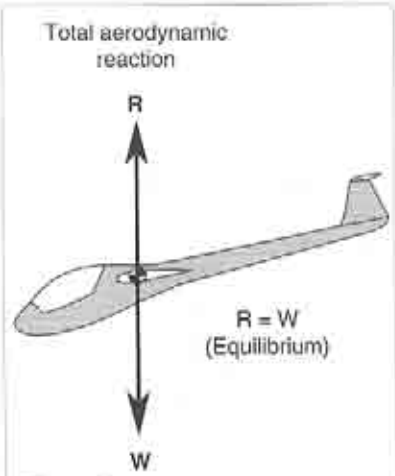


Figure 3

Forces acting on a glider in flight in equilibrium

motion relative to this standpoint but this in no way alters the fact that the forces felt by the glider (apart from its weight always vertically downwards), are air forces. It is the mass of the glider itself which reacts. This reaction which the model mass produces against the air forces, has nothing to do with the apparent velocity of the model relative to the ground, or its change of velocity seen from below, as it turns this way and that. No force (other than gravity) reaches up to act on the flying model from the ground.

For an aircraft to turn in flight, a force must be applied to it laterally, making it divert to one side (Figure 3). This force must be an aerodynamic force. The instant the turn starts, the mass of the aircraft reacts with equal and opposite inertia. If the turn continues at a steady rate, the lateral force from the air and the mass inertial reaction remain equal and opposite. Whether or not the air itself is moving over the ground, is totally irrelevant to this. The mass of the model reacts to the aerodynamic turning force, not to any mystical influences reaching up, so to speak, to grab it from the ground. What the person standing on the ground sees, is the motion of the glider relative to this standpoint but with a little appreciation of the nature of flight, it should be understood that the motion of the glider relative to the air, flying, is what matters.

The theory that turning up and downwind creates varying inertial reactions depending on the wind direction is a good example of a theory that has been tested and found to be false. It has been falsified times without number, in practical experience of aircraft in flight. Measurements have been taken, innumerable tests have been performed and the theory has been discarded. Sad to say, having been misled by confusions in the modelling press, thousands of model fliers, some with great reputations, still hold on to fixed beliefs about this. ■

What to do with your butterfly wings if you are over 50.

Part I

THE LARVA

...by Clark Bowlen
Manchester, Connecticut

I am over 50 and a novice HLG pilot so I need any advantage I can get. A Monarch, I thought, would be perfect — clean enough to throw high, and light enough to float on my wishes. But I am over 50 and a novice, so I am too old to learn to throw without snapping my wrist hard, and too slow to recover from low altitude aerobatics. So, instead of having a clean, beautiful airplane, I have a clean, beautiful wing.

I decided what I needed was an ugly, strong fuselage to go with my clean beautiful wing. I needed to step back a couple of development stages. I needed a Larva. I am over 50 and a novice, so this is not a how-to article. It is more of a philosophical article — with an example. The example is my Larva (see drawing) wing by DG Aerotech, balance by Bowlen. The balance is kind of crude. It's a slab-sided box fuselage and solid sheet empennage with stolen areas and moments.

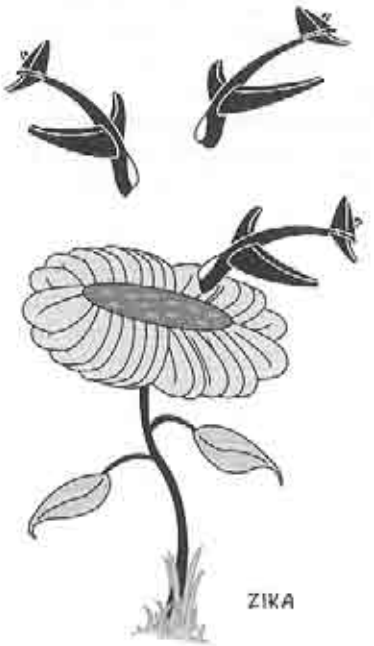
But the Larva has some high-tech features:

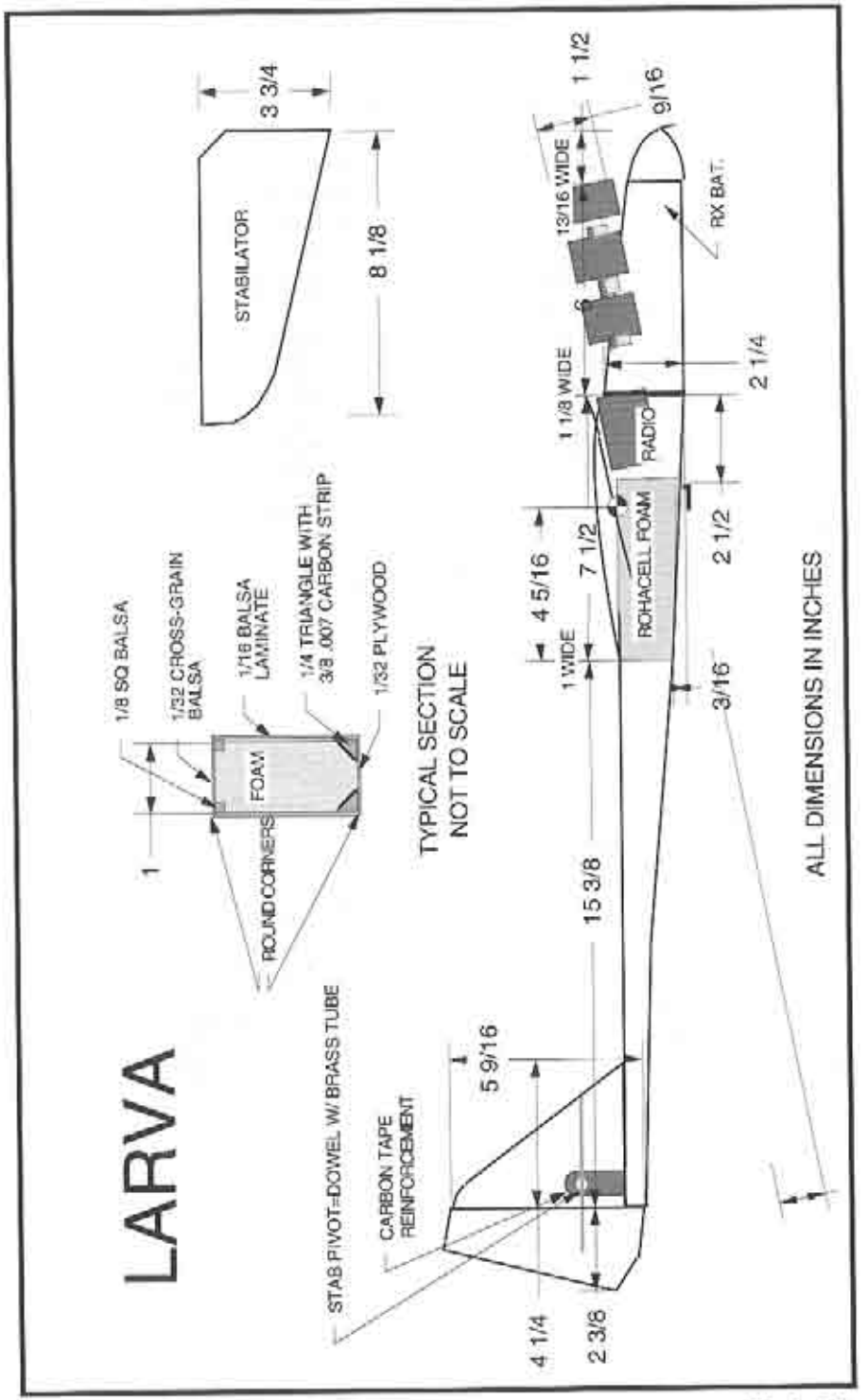
- The slab sides are 1/16 contest balsa laminated in a vacuum bag with .2 oz. carbon mat and .75 oz. glass cloth on both sides, and .25 oz. Kevlar mat on one side.
- The 1/4 triangle stock longerons have 3/8" .007 carbon strips the length of their hypotenuse.
- The empennage is 1/16 contest balsa laminated with .25 oz. Kevlar mat and .75 oz. glass cloth.
- The central former is a block of 3.1 lb., 1" thick Rohacell that lets me get a death grip on the fuselage.
- The finger hole is at the trailing edge of the wing so I can snap my wrist all I want.

My beautiful Monarch weighed 11.5 oz. My ugly Larva weighs 13. And it bounces. It does beautiful three point landings — right tip, left tip, rudder. It landed so hard on the rudder that the Kevlar thread pull/pull system stripped the plastic servo gears and it didn't hurt the airframe at all!

I'm over 50 and divorced so I don't spend weekends at home. I spend them with a friend who has an HLG-sized field next to her house. So I go out there and I throw and I throw. And I bounce and I throw some more. And when the control seems too twitchy I take out the scissors on my little key-ring pocket knife and I munch a strip off the stabilator or the rudder until things seem right.

I still find sink much more than I find lift, but I'm beginning to like this HLG thing. I'm over 50 and a novice, so I develop slowly, but maybe by spring I'll be ready for a.... Pupa perhaps? ■





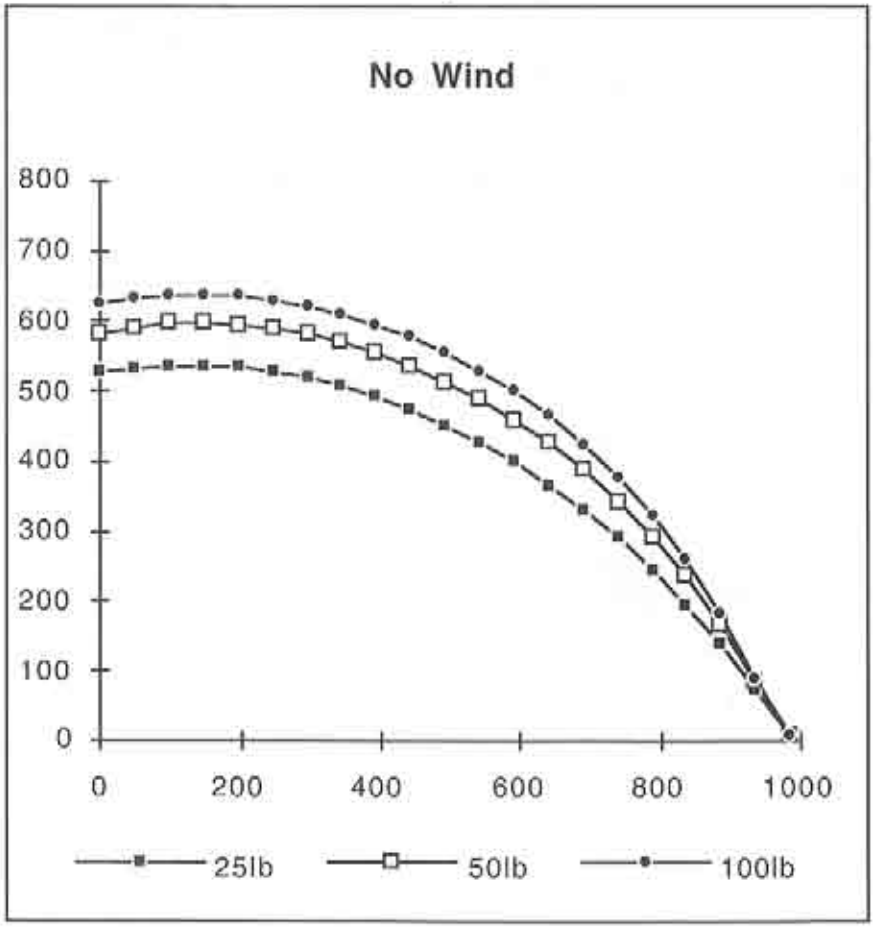
Winch Launching Study #1

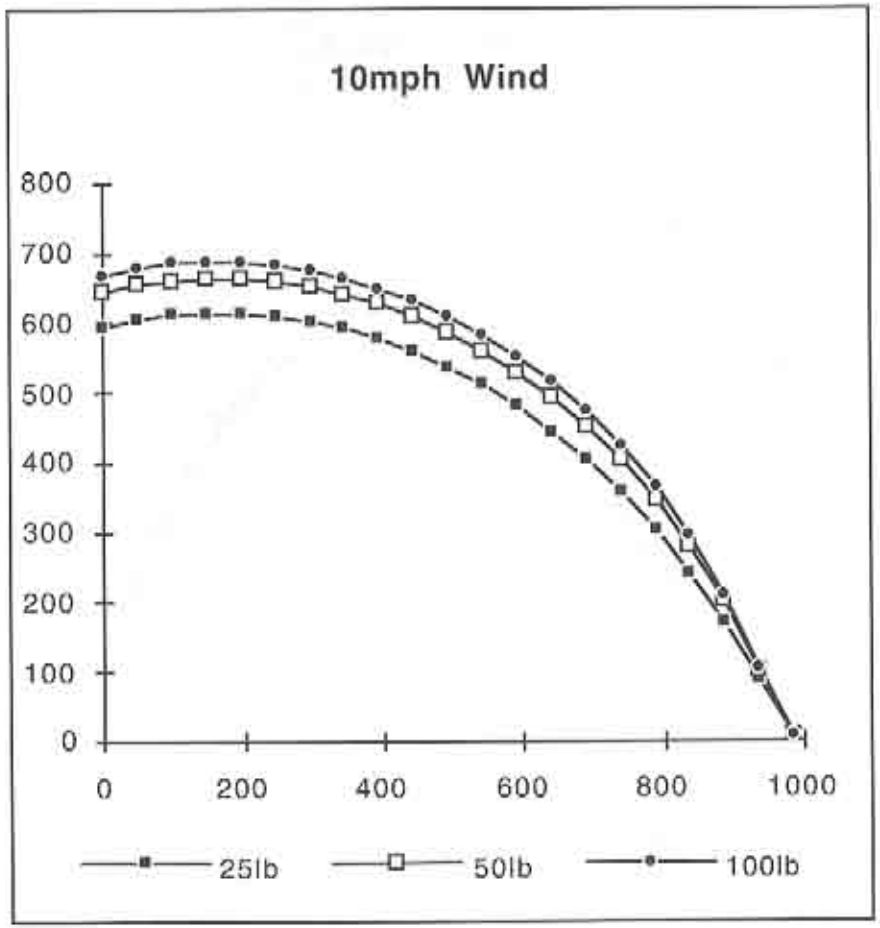
...by John Hazel
1009 Westmoreland
Kalamazoo, MI 49006-5567

The following graphs depict the effect of wind and tension on the launch of RC sailplanes. These graphs were created by a computer simulation of winch launching using typical hardware found at a RC soaring contest. The plane is a 70 oz, 900 in^2 standard class with full span flaps. The lift coefficient (1.4) and parasitic drag coefficient (.08) are held constant. The motor is an approximation of a long shaft Ford starter with power limited by pulsing the foot switch. The weight and drag of the launch line is included. It accounts for two thirds to three quarters of the total drag on the sailplane. The effect on drag of line angle due to wind and sailplane position is accounted for, also. The wind gradient is included in this simulation so that its effect on dynamics could be studied.

I have verified the results of this simulation in windy and still conditions at thermal duration contests through measurement of launch heights and times. I also checked the predictions for F3B style planes and have found the real world trends to be in agreement with those predicted by the simulation. Although the simulation and measurements seem to be in agreement (difference <15%), you should view the numerical results only as indications of trends. Many real word variables have been assumed as constant, but I hope the most significant ones have been accounted for here. The zoom and the release oscillations can be modeled and will be discussed in another article. I plan on extending this simulation to the three dimensional cases of cross winds and circle tow. This current simulation assumes the launch is straight and directly into the wind.

The graph's origin or zero-zero point is the location of the turnaround. The sailplane is thrown from a point near the 1000 ft mark on the graph and follows a path from there up and to the left. I chose 1000 ft so that the results could be easily scaled to any winch length. Although the results do not actually vary linearly, they are very close. A 750 ft winch will launch about three quarters as high as a 1000 ft winch. The linear relationship works best with high tension and reasonable length line. Wind velocity given in the title is the wind speed at 1000 ft altitude and varies according to the generally accepted exponential velocity profile for rural terrain. At 10 ft above the ground, the wind speed is about half that in the title. Each

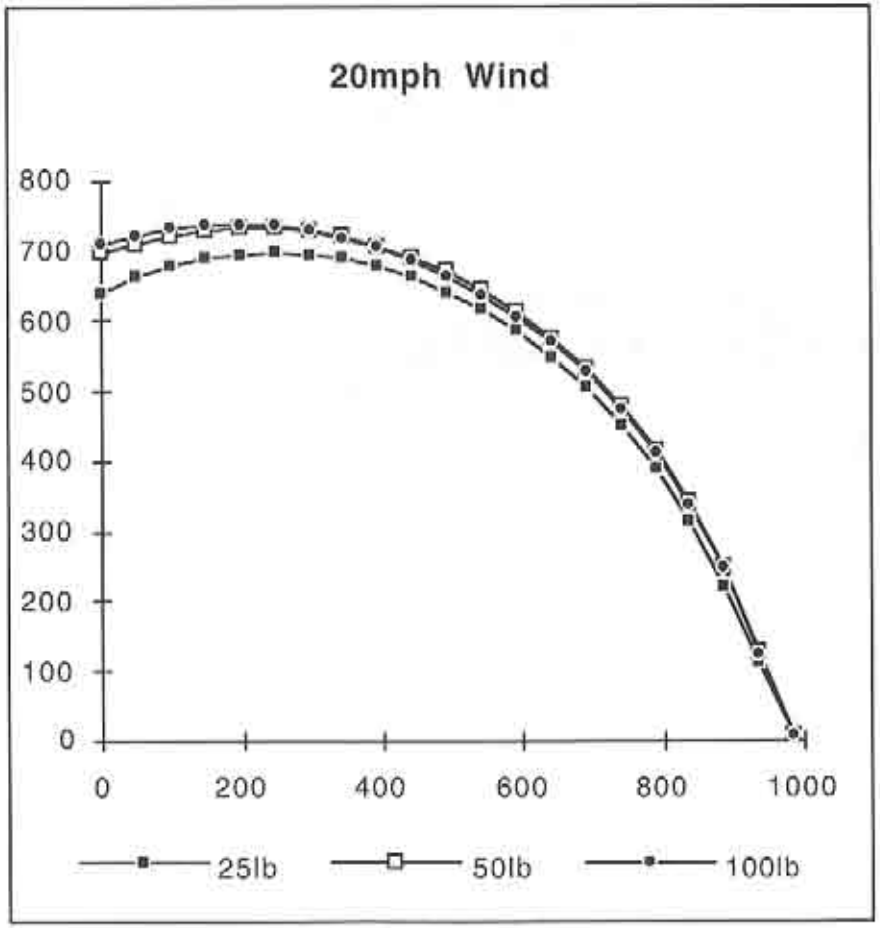




line shows the launch path for an average line tension of 25, 50, and 100 pounds force. The actual tension value was varied to better simulate real conditions.

The graph titled "No Wind" shows the change in launch path as the line tension varies. Notice the 100 ft improvement possible if you can avoid plane or line breakage. As wind speed increases though, the improvement in altitude for increased tension begins to disappear. In the graph titled "20 mph Wind" we see only small improvements for increased tension. Also, a significant trend here is that in windy conditions, the altitude loss for staying on tow after reaching the maximum height is much steeper than the still air launch. This is a result of the reduced velocity due to the ship going into the wind.

One might conclude then that the only time a full pedal launch helps gain altitude is in low wind or downwind conditions. If the energy available for zooming is taken into consideration though the full pedal launch is best at all times. There are two reasons for this conclusion. The energy for zooming is stored in the stretch of the line and as kinetic energy due to the velocity of the glider. In both cases, higher tension launches give more available zooming energy. ■



Modellflug-Sprachführer in Englisch

...by Manny Tau
San Clemente, California

There are a couple of RC soaring related magazines (*Aufwind*, *FMT*, *Modell*) that I receive from Germany, thanks to my good friend, pen-pal, and fellow electric and glider enthusiast, Andrzej Uminski. These magazines provide a wealth of information about the fantastic European gliders available, so long as you can translate the German info. Well, Andy came to the rescue, and was able to come across a list of RC soaring related words, translated from German to English to French to Italian. (I believe this was in *FMT*). I hope you'll find the following German to English translations useful. (BTW, Andy and I are constantly sending each other soaring related decals for our flight boxes, and the ones from Europe, especially Germany, are fantastic! Thanx Andy... Keep them coming!)

absaufer...sink, downdraft
absturz...crash
anstellwinkel...angle of attack
antenne...aerial
auftrieb...lift
akku...battery
ausklinken...release towline
ausklinkvorrichtung...towline release mechanism
außenlooping...outside loop
balsabrett...balsa sheet
batterie...battery
baubrett...building board
baukasten....kit
baukasten (segelmod.)...kit (sailplane)
bespannpapier...covering tissue
bespannung...covering
bügeleisen...electric iron
bügelfolie...heat shrink film
druckanschluß...exhaust pressure
ein-aus-schalter...on/off switch
einstellwinkel...angle of setting
einstellwinkeldiff...longitudinal dihedral
einziehfahrwerk...retracting gear
empfanger...receiver
endleiste...trailing edge
fahrwerk...undercarriage; U/C
feder...spring
fernsteuerung...R/C gear
fläche...wing
flächenansatz...wing root fairing
flächenbelastung...wing loading
flächenhalterung...wing fixing
flächenoberseite...wing upper-side
flächentiefe...wing chord
flächenunterseite...wing under-side
flächenverwindung...washout
flächenverzug...wing warp
flachstahlflächenbefestigung...steel band wing tongues
fliegen...flying
in max. möglicher höhe fliegen... flying at maximum altitude
fluggeschwindigkeit...airspeed
flugzeug...aeroplane
flugzeug aus d. hand starten... hand launch
flugzeug auswiegen... establish CG position
flugzeug austrimmen... trimming for flight
föhn...heat gun; hair dryer
frequenztafel...frequency marker board
gabelkopf...clevis; quicklink
gerissene figur fliegen...performing flight manoevres
gewicht...weight
gewindebuschse...screwed bush
gleitzahl...glide angle
gummi (befestigungs-)...wing retaining rubber bands
gummihochstart...rubber high start
hang...slope
hangflug...slope soaring
hangkantenfliegen...flying close to slope
hangwind...slope wind
hartkleber...balsa cement
hauptholm...main spar
heckrad...tail wheel
himmel...sky
hochstart....high start
hochstarthaken...high start hook
hochstartseil (mit gummi)...high start (with rubber cord)

höhenruder...elevators
holen gehen...to collect; retrieve
holm...spar
hucke-pack...pick-a-back
innenlooping...loop
kabinenhaube...cockpit canopy
kastenrumpf...box fuselage
klippenflug...cliff soaring
kunstflug...stunt flying
kurve...turn
kurven...turning
kurvenflug...spiraling
ladegerät...battery charger
ladekabel...battery charger leads
laden...charge
laubsäge...fret saw
laminarprofil...laminar wing section
landeklappen...wing flaps
landung...landing
leim...glue
leitwerk...tailplane fin; rudder
looping...loop
luft...air
messing...brass
messingrohr...brass tubing
modell...model
modellbau...modelling
modellflugzeug...model aircraft
motorseitenzug...side thrust
motorsturz...down thrust
nasenleiste...leading edge
oberfläche...surface
papierbespannung...tissue cover
pendelruder...all flying rudder
pfeilform...sweep back
profil...section
profildicke...section thickness
quarz...crystal
querruder...aileron
rad....wheel
rippe (balsa-)...rib (balsa)
anschlußrippe...root rib
rolle fliegen...flying a roll
ruder, die...rudder
ruderausschlag...rudder throw
rudergestänge...servo pushrod
ruderhorn...rudder horn
rudermaschine...servo
rückenflug...inverted flying
rumpf...fuselage
rumpfwand...fuselage side
scharnier...hinge
schaumgummi....foam rubber
schleifklotz...sanding block
schleppflug...aerotow
schraube...screw
schraubenzieher...screw driver
segelflug...sailplane; glider
segeln...gliding
segelflugmodell...model sailplane
seide....silk
seitenruder...rudder
sender...transmitter
servobrett...servo tray
senkgeschwindigkeit...sink speed
spannweite...span
spanten...former
stahldraht....steel wire;piano wire
standschub...static thrust
start...take off
starten...start motor
steuerknüpel...transmitter sticks
strömungsabriß...stall
sturzflug...dive
thermik...thermal
thermik auskurbeln...fly out of thermal
thermikblase...thermal bubble
trimmblei...lead weights
turn...stall turn
überholen...overhaul
v-form...dihedral
verkastung...spar webbing
verwirbelung...turbulence
vorbeiflug...fly by
weißleim....PVA
wind...wind
windenstart...winch launch
windenstart elektro...electric winch
windrichtung...wind direction
windstärke...wind strength
winkelhebel...bell crank
wolbklappen...glider flaps
wolken...clouds
wolkenhöhe...cloud height
zange...pliers
zusammenbauen...build together

Aufwind, Herausgeber und Verlag, die mediadidee. Verlag, Horst Kropka, Ottacker 25, 87477 Sulzberg/Allgau, telephone: (0 83 76) 87 35, FAX: (0 83 76) 87 36

FMT, Verlag fur Technik und Handwerk GmbH, Robert-Bosch Strasse 4, 76532 Baden-Baden, telephone: 07221/5087-0, FAX: 07221/5087-52

Modell, NECKAR-VERLAG GmbH, Klosterring 1, Postfach 1820, 78008 Villingen-Schwenningen, telephone: (0 77 21) 89 87-0, FAX: (0 77 21) 89 87-50

Have fun...Auf Wiedersehen Manny. ■

The Drowning of a Sacred Cow

...by Rob Glover
Huntsville, Alabama

This is an article about just one of the many ways to race cross country. It's not the way to finish first, or even finish the course. It is a way to win the race if, like myself, you believe that learning a lot while having fun is winning.

It all begins a year or so in advance of the event. Good buddy David Godfrey and I had pretty much agreed that getting in the back of a truck and riding around the countryside, while flying a glider, is great fun. It's one of those things that either grabs you or leaves you cold, and it grabbed us. There is nothing like trying to keep up with a specked out Synergy '91 on the open road to get your adrenaline up.

I decided that a calmer and larger airplane would be in order, so I purchased an airplane that rapidly became known as "The Excavator" when the tail blew off on the first flight. David came to the rescue when he finished his SBXC.

The SBXC metamorphosed into a bird called "The Sacred Cow" after some minor damage was repaired and large black spots added to cover the patches. Thus was born the Southeastern Bovine Cross Country Racing Team. Various of us flew the thing without much success before our first real race, the Mid South in June of '94. The thing was more or less trimmed out and had a brand new sniffler installed when we arrived, ready to race. Right?

Our team looked really spiffy in the T-shirts that wife Valeta had painted up to match David's airplane. We even managed to flesh out our team at the last minute with the addition of the Legendary Bob Champine (LSF level 10 and recent AMA Hall of Fame Inductee), who agreed to help us out. (I guess we looked like we needed help worse than anybody else there, proving his wisdom and keen eyes.)

One of the really great things about Cross Country Racing is that you get to fly all that you want to. You win by keeping your bird in the air until you hit lift, and then enter the course and boogie. Lift was scarce for the two days of this event, so that meant lots of launches.

During one of the earlier flights, I discovered that the radio got squirrely when the plane was close to the ground a long way off. After some extensive ground checking, we discovered that our new sniffler was interfering with the radio. We changed over to a backup sniffler and life got better.

David finally got into some lift and we entered the course. I drove. Legendary Bob rode shotgun (Timer, Flight Manager). Sam Fara (SBXC team member, spotter, and fellow competitor - nothing like a friendly competition) rode in the back with David who piloted the Sacred Cow. Our vehicle was a specially prepared (I had changed the oil more than once this year and we threw a bean bag chair stolen from David's kids in the

bed.) Mazda "pickemup" truck.

Sam and David screamed instructions from the back. Sam yelled, "Slow down!" David yelled, "Go faster!" Legendary Bob lent his expertise from the Flight Managers position saying, "Honk the horn when you pass the Texans!" The sniffler screamed. Next year I'll bring a tape of Das Ring Der Neibelungen by Wagner and play "The Flight of the Valkyries" at full blast to drown out all of the noise. I drove like a maniac on the dirt roads trying to chase down an airplane that is much faster than even a specially prepared pickemup truck. What fun!

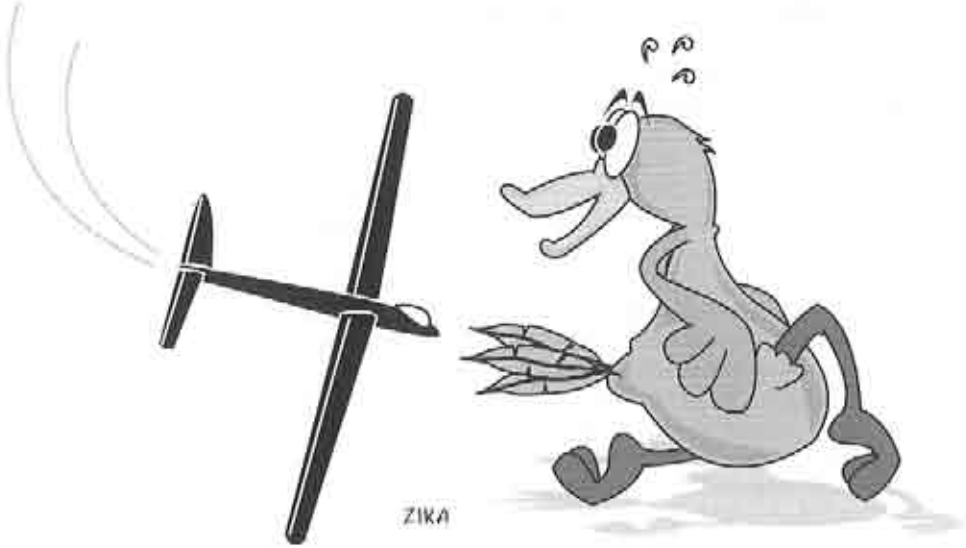
The plane was way out ahead of us, around the corner, when it ran out of altitude, airspeed, and inspiration. We drove in as close as we could to where we thought it had landed. We were in a swampy area, no Sacred Cows in sight. We attempted to use the sniffler as a direction finder, but it was decidedly quiet. Bad sign.

Legendary Bob pointed to a spot, and sounded sure of himself, so we began the searching for the glider portion of our race. This was to last a half hour or so and included the sighting of some spectacular flora and fauna, including a rather large and healthy bobcat. David finally noticed the vertical fin of the airplane rising above the surface of the swamp. I wished I had a camera as he picked up the bird and several gallons of swamp water poured out of its tail. The cow motif had proven to be ironically appropriate.

Back at the start point we were able to dry out most everything, replace one servo, and fly again the next day. If you attempt to fly cross country over swamps it pays to have a composite airplane.

Nobody was able to complete the 25.5 mile course this year. The winner was declared to be Pat Flinn of Michigan, who had completed 9.2 miles of the course. Rich Spicer of California was hot on his heels with 9 miles. Tom Ernst of Memphis was our able CD. Great fun was had by everybody I talked to.

There will be another cross country event at the Mid South in Huntsville in '95. I had so much fun at Memphis that I decided to CD this year's event. Ya'll please come and join us, we will need pilots and crew members. And be gentle with the CD, wherever you go. ■



(L-R) Vern Foutch, J. Pat Flinn, N. Christopher Knowles, Mike Wade Mike built the Catalina that Pat flew. Christopher Knowles is presenting J. Pat Flinn with the first place trophy.

Second Annual SWIFT/Western Flyers X-Country

...by Christopher Knowles
Omaha, Nebraska

Saturday, July 9, 1994 promised absolute grandeur for our second time out of the blocks. WRONG! (Murphy's law catched [sic.] up to us!) If you weren't standing an 82° lean into the wind, you might have been blown over. It was grim.

I asked my crew to be at the flying site at 8 Ayem. Two of my five helpers beat me. I was six minutes late! One member brought a sun shelter, another pop, weenies, and buns. The wife of the fellow who brought the butane driven grill brought health food. It was actually a relish plate with slivered carrots, celery, broccoli, cauliflower, and radishes. It was quaint and funny until you decided to eat a carrot stick or two and discovered that they were all gone.

While the shelter, registration table, and other incidentals were being attended to, I laid out the course. It was a little over 8 miles. It was a neat circuit, but one leg had traffic. Next year, it will be better thought out.

There were thirteen entries into the event. Pat Flinn and his team came the greatest distance. He is an engineer with Ford in Dearborne, Michigan. There were four people in his team. (One was his wife!) Two fellows came from Des Moines. It is worth noting that the people who came the greatest distances had the largest planes, sixteen feet at approximately eleven pounds. Four fellows were up from Lincoln. The rest were locals.

First place went to Pat Flinn. Second went to Dwight King from Lincoln who sponsors a unique contest in the fall. Third was taken by Bob Baker, another person from far away Des Moines.

Big time X-Country events have competitors provide their own winches. The Lincoln contingent brought a retriever and attached it to my winch... without being asked. There were three or four other instances like that during the day; people doing what enhanced the event without being asked.

There were lots of give aways provided by various manufacturers and publications. Those people awarded prizes were encouraged to thank the providers who were listed. It was a grand time. We all thank you. All of you who came and particularly those of you who contributed to the success of the event.

Our sanction is now in the hands of AMA for a two day next year. It will be July 22 & 23. A pig roast is planned for Saturday night!

Thermals! ■

Gerry Knight with his 1/4th scale Olympia 2b.

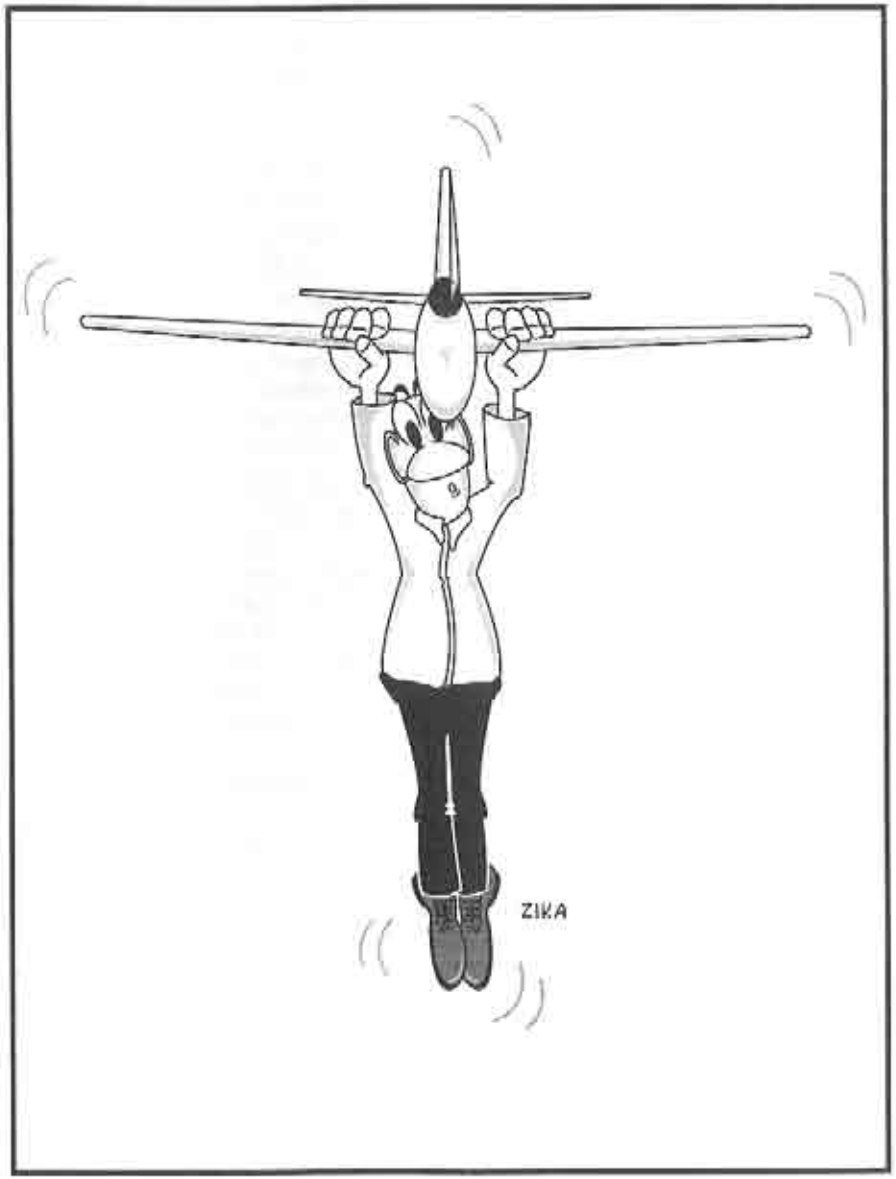
NASSA NEWS

...by Gregory Vasgerdsian
Martinez, California

Erik Eiche sent in the following pictures saying, " On Saturday, the 28th of May, which was a wet and blustery day, both guys in the cockpit became very cold, they wanted a thermos.. Or so I was told. So, they got one!" Erik also added a first aid kit. Erik is, of course, not about to stop with the OBS and is now onto a 1/4 scale Wein. The Wein is a beautiful gull wing ship from 1929, with struts and a very high gloss finish over the wood sheeted fuselage. Eric thinks the Wein may well rival his 1/4th scale model of the Fafnir. *(The OBS was featured on the cover of the July, 1994 issue of RCSD. Ed.)*

Gerry Knight of Saint Catherines, Ontario, Canada sent me a nice photo with his arms wrapped around his newest scale flier, a 1/4th scale Olympia 2b. Built from Cliff Charlesworth plans of England, it's beautifully finished with red and white sunburst wings, and red fuselage. Spanning 3.75 meters, Gerry says it's a real floater and flies much slower than his Charlesworth ASK-18. A great example of a vintage model that really performs from the flat! Send your scale photos or other contributions to NASSA (North American Scale Soaring Association), P.O. Box 4267, W. Richland, WA 99352. ■

The cockpit of the OBS. Photos by Erik Eiche.



Understanding the JR Propo X-388S Radio Part III of III

...by Richard A. Eckel
Winter Springs, Florida

Now that you have suffered through the verbiage about all of the radio functions it's time to put your knowledge to practical use. One of the best parts of the sailplane portion of the JR manual is the last section. It is there that the writer gives a sequence of steps to set up the radio for a sailplane. I suspect that many users of the JR388 have gotten their radios to work using that last section, but find themselves facing obstacles when they try to vary from those specific instructions. Hopefully, the previous two parts of this series have shed a lot of light on how to successfully vary the programming in the radio. To pull it all together and add some fun to this otherwise dreary mess I will now propose a procedure to follow when setting up a new plane or resetting an existing plane.

Sailplane Setup

Setting up the radio starts before the servos are mounted in their final positions and begins by resetting the model memory that you are going to use.

The following procedure will get a plane set up and ready for additional mixes to be added. I can tell you from experience that if you fail to get the basic setup right mixing can be a nightmare.

Servo Setup

1. Clear the model memory using the RSET function and set all ratched trims to their centered position.
2. Set DUAF to ACT and FLAPS to SW+T (if setting up a full house plane with a 7 channel receiver) and then switch to the transmit or Function Setup mode.
3. The servos should now be in their natural zero positions.
4. Check and adjust the throw direction of each servo. Use the Flaps switch to check the throw direction of the flap servos but don't worry about the amount of throw yet. (If you have the flap servos travel backwards you won't be able to use the Flaps Switch and the SP offset and mixes will be backwards). Reverse as required.
5. Adjust (by moving the arm on the shaft splines) the arms on the wing servos so that arms stick vertically out of the wings. (Servos can now be rigidly mounted in the wing.)
6. Adjust linkages to neutralize the rudder and elevator
7. Adjust flap and aileron linkages for 10 deg. of down flaps and 10 deg. of up in both ailerons with the servos in their neutral position (both ailerons are up at this point).
8. Adjust subtrim of Flap to neutralize the left flap (the right flap will move also). Adjust subtrim of AUX2 to neutralize the right flap (the left flap will not move). Flap servo arms should now be offset aft about 10 to 15 degrees.
9. Adjust the subtrim of AIL1 to neutralize the left aileron. Adjust the subtrim of AUX1 to neutralize the right aileron. Aileron servo arms should now be offset about 10 to 15 degrees forward.
10. Use travel adjust to adjust the travel of the elevator, rudder, flaps and each aileron. Set the ailerons for 1/2 to 3/4" of up travel and 1/4" of down travel. Don't go for an extreme setup on the first try, just set up moderate throws on flaps and ailerons.

The plane should now be flyable using the basic controls. The following two procedures will add full wing trailing edge control for launching and speed flight as well as flaps or full crow for landing.

Flaps Switch Setup

(With FLAPS set to SW+T)

Since we selected SW+T for our FLAPS settings in the Model Setup Functions we can now use the three position Flaps switch for programming two flap preset positions for selection with the switch. If we had not selected SW+T the Flaps switch could only be used to control some of the Free Mixes.

Remember that when you set FLAPS to SW+T the travel adjustment (T.Adj) for Flaps became the offset settings for the Flaps Switch. Put the Flaps Switch in the up (F+U) position and use the Flaps T.ADJ. to set perhaps 1/8" reflex into the flaps. Put the Flaps Switch in the down (F+D) position and use the Flaps T.ADJ to set in about 1/4" of down flaps for launching. Move the switch to its mid position and the flaps should center.

The Flaps switch is now set for launching and speed flying. You will probably want to fly the plane and experiment with different amounts of reflex and flaps. Some fliers also use the AL-F mix to add the ailerons for full trailing edge movement.

Crow Switch and Throttle Stick Setup

The Crow switch is generally used as a landing setup selection switch. JR has provided the SP mix for easily setting up all the mixes usually included in the landing function.

The SP mix is used to set up the Flaps, Ailerons and Elevator to move with the Throttle Stick.

1. Set the Crow Switch to the 1 position (BTF1) and step thru the menu to the mixSP function.
2. Set the throttle stick offset by placing the throttle stick where you want neutral to be (full down is recommended) and pressing CLR while in SP offset.
3. Move the throttle stick to full up position.
4. If you want to crow the ailerons change to the Aileron% subfunction and use the + or - key to move the ailerons to about 1/4" up.
5. Change to the Flap% subfunction and use the + or - keys to set in about 45 degrees of flaps
6. Wait until you fly the airplane to set any elevator mix or set additional flap or aileron throw. Try the flap function at high altitude and see if the plane dives (unlikely) or pulls up (likely). Add the appropriate elevator mix to compensate for the change in pitch. (You can select the mixSP function and the elevator% mix before you launch and adjust while you fly if you wish.)

With the Crow switch in the 1 position (BTF1) the throttle stick will activate the flaps and ailerons. With the Crow switch in the 0 position (BTF0) the throttle stick will be deactivated. If you want flaps available all the time simply program both positions with the same settings.

Rudder on Right Stick Setup

Many fliers like to mix the rudder to the right stick with ailerons in order to have coordinated turns using only the right stick. This can be done using mixD of the Free Mixes. The radio is preprogrammed for mixing the proper channels. Simply select an activation switch or use ON for full time mixing, and set the % of rudder to mix to the right stick. Be aware that the left stick will still also control the rudder and any left stick movement used for rudder will be additive to the right stick movement.

Additional Mixes

You now have the basic mixes to fly a full function sailplane set up. Additional mixing, either preprogrammed mixes or free mixes can be added according to your preferences. I recommend flying with the basic setups for a while and getting everything tweaked in before you add additional mixing. Remember that if you are getting seemingly unpredictable results on a mix or function it is always wise to reset the entire model setup and start from scratch. I haven't counted the number of times that resetting has cleared up my problems.

Programming Tips

I have picked up a couple programming tips from other fliers and developed one myself. I will pass two of them along to you. They are excellent tips on their own, but they also illustrate how the radio becomes more than just the built in functions with a little imagination and programming.

Example Programming

Snap Flaps

I got this tip from Dennis Phelan while corresponding via Model+Net:

"The 388 doesn't have snap flaps, but the programmables make it easy. I leave them on all the time, if you try it this way, you will too. Use the 3>5 and 3>6 mixes to get ALL surfaces into it. Set the travel for them so you have an even camber change across the TE. Now OFFSET by pulling the elev stick back about 3/4 of travel, get all surfaces to kick in at the same time, 1/8 to 1/4 inch will work for travel. This is an easy mix on the Vision, just as nice on the JR. Now you have camber added only when you use a LOT of elevator, most of the time you'll never see it added. Most pilots don't like snap flaps as they sensitize the elevator when they start acting from the moment the stick is moved, also BAD when you have it set up to push reflex on down stick."

To implement this trick use the A and B mixes if you will leave it on full time. If you want to switch it on and off you will have to use two mixes that can be activated with the same switch such as B and C mixes.

Proportional Throttle for Full Function Electric Sailplane

I developed this mix for flying my full function electric sailplane. I wanted full trailing edge control (flaps and ailerons) as well as proportional throttle. Simply plugging the speed control into channel 1 made the motor active with any movement of the throttle stick. Plugging the speed control into channel 8 made the motor come full on any time the Crow switch was turned on. Neither of these gave me the flexibility I wanted.

So I program mix B for channel 8 as master and channel 8 as slave with the Crow switch activating it. I set the offset with the Crow switch on. Then I set the Crow switch off and adjust the % until the motor is turned off. This effectively defeats the coupling of channel 8 with the Crow switch.

Next, I program mix C for channel 1 as master and channel 8 as slave with the Crow switch off. I set the throttle stick position and offset and then adjust the % until the motor goes full speed with maximum throttle and stops at minimum throttle. When I fly I launch with the Crow switch off and have full proportional motor control. When I reach altitude, I flip the Crow switch on so that I have flaps for landing.

Summary

The JR Propo X-388s radio is a very flexible transmitter for sailplanes. It has been preprogrammed to a large extent to make the basic sailplane functions easy to set up. The eight free mixes provide for an amazing amount of added flexibility. Having the X-388s radio is almost like having a bunch of new airplanes. Making adjustments to the flying characteristics is fast and easy. The variety of mixes makes every day at the field an day of new experiments. It's almost as if I have taken up a new hobby! Hope you all have the same experience. ■

NASSA
NORTH AMERICAN SCALE SOARING ASSOCIATION

The North American Scale Soaring Association is an organization of scale soaring enthusiasts dedicated to the furtherance and enjoyment of scale soaring in North America. Membership dues are $10.00 a year or $5.00 after August 1st, and provide for sponsorship of NASSA Scale Fun Flys & Rallies, and for the implementation of a National Scale Building and Soaring Achievement Program. Join NASSA and join a network of scale soaring enthusiasts that influence the direction of scale sailplanes in North America. Please provide your address, phone #, and AMA #, and we will send you a membership card and membership roster. A bi-monthly column keeping NASSA members up to date is included in *RCSD*, with additional information available periodically direct from NASSA. Help promote and support the continuation of scale soaring by sending $10.00 (or $5.00 after Aug. 1st) to: NASSA, P.O. Box 4267, W. Richland, WA 99352.

F3B/USA • F3F/USA
RC Sailplane Technical Journal

F3B/USA is a bi-monthly publication dedicated to the sports of F3B and F3F. The journal is intended for the beginning as well as experienced multi-task soaring enthusiast. Articles cover a wide variety of areas including: technical data issues, description of techniques, and articles written by and about the top people in the sports.

Subscription Rates: $14 per year (6 issues)
For More Info Write: F3B/USA,
87 1/2 N. Catalina, Pasadena, CA 91106

LSF

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

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

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

The Vintage Sailplane Association

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

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

T.W.I.T.T.

(The Wing Is The Thing)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation which is dedicated to furthering education and research in a variety of disciplines. Full information package including one back issue of newsletter is $2.50 US ($3.00 foreign). Subscription rates are $18.00 (US) or $22.00 (Foreign) per year for twelve issues.

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

You are invited to join the
NATIONAL SOARING SOCIETY

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

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

R/C Soaring Resources

The contacts listed here have volunteered to answer questions on soaring sites or contests in their area.

Contacts & Soaring Groups - U.S.A.

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

Arizona - Southern Arizona Glider Enthusiasts, Bill Melcher (contact), 14260 N. Silwind Way, Tucson, AZ 85737; (602) 325-2729. SAGE welcomes all level of flyers!

California - California Slope Racers, John Dvorak, 1063 Glen Echo Ave., San Jose, CA 95125; (408) 259-4205.

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

California - Desert Union of Sailplane Thermalists, Buzz Waltz, 3390 Paseo Barbara RD, Palm Springs, CA 92262; (619) 327-1775.

Florida - Florida Soaring Society, Ray Alonzo (President), 3903 Blue Maidencane Pl., Valrico, FL 33594; (813) 654-3075 H, (813) 681-1122 W.

Georgia - North Atlanta Soaring Association, Tim Foster, (404) 978-9498 or Tom Long, (404) 449-1968 (anytime).

Illinois (South & Southwest) - Silent Order of Aeromodeling by Radio (S.O.A.R.), Jim McIntyre (contact), 23546 W. Fern St., Plainfield, IL 60544-2324; (815) 436-2744.

Illinois (North & Northwest) - S.O.A.R., Bill Christian (contact), 1604 N. Chestnut Ave., Arlington Heights, IL 60004; (708) 259-4617.

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

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

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

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

Maryland - Baltimore Area Soaring Society, Bill Cavanaugh (President), 1428 Park Ave., Baltimore, MD 21217; (410) 523-0778.

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

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

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

Nebraska - S.W.I.F.T., Christopher Knowles (contact), 12821 Jackson St., Omaha, NE 68154-2934; (402) 330-5335.

Nevada - Las Vegas Soaring Club, Jeff Burg (President), 853 Shrubbery Lane, Las Vegas, NV 89110; (702) 459-8100.

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

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

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

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

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

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

Tennessee - Memphis Area Soaring Society, Bob Sowder (contact), 1489 Wood Trail Circle, Cordova, TN 38018, (901) 757-5536, FAX (901) 758-1842.

Texas - Texas Soaring Conference (Texas, Oklahoma, New Mexico, Louisiana, Arkansas), Gordon Jones, 214 Sunflower Drive, Garland, Tx 75041; (214) 271-5334.

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

Washington - Seattle Area Soaring Society, Waid Reynolds (Editor), 12448 83rd Avenue South, Seattle, WA 98178; (206) 772-0291.

Outside U.S.A.

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

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

England (BARCS & Europe), Jack Sile (Editor), 21 Bures Close, Stowmarket, Suffolk, IP14 2PL, England; Tele. # 0449-675190.

Hong Kong - Robert Yan, 90 Robinson Road, 4th Floor, Hong Kong; (852) 5228083, FAX (852) 8450497.

Seminars & Workshops

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

Schedule of Special Events

Date	Event	Location	Contact
Jan 13-15	18th Annual IMS	Pasadena, CA	Anita Northrop, (702) 896-2162
Feb. 5-6*	Southwest Winter Soaring	Gilbert, AZ	Iain Glithero, (602) 839-1733
Feb. 18	2M/Open	San Antonio, TX	Greg Dickerson, (210) 656-1796
Mar. 18	Open Floater 2 CH Highstart, Open w/Winch Launch	San Antonio, TX	Gene Warner, (210) 732-3101
Apr. 8-9	Masters of Soaring	Covina, CA	Pete Olsen, (909) 597-2095
Apr. 23	Handlaunch	San Antonio, TX	Tom Meeks, (210) 590-3139
May 5-6*	Rosebowl Soaring Festival	Pasadena, CA	
May 20	Six Rounds of Open	San Antonio, TX	Jerry Caldwell, (210) 438-4077
May 27	SASS HL 1	Redmond, WA	Jim Thomas, (206) 488-2524
June 15-18	Mid-South Champs (International Contact)	Huntsville, AL	Ron Swinehart, (205) 883-7831 Tom Ernst, (901) 767-9518
June 24-25	TNT Open	San Antonio, TX	Perry Van, (210) 658-8842 Mike Howell, (210) 657-3332
July 15	HL/Open	San Antonio, TX	Mike Howell, (210) 657-3332
July 15-16	SOAR 95 (Unl, 2M)	Redmond, WA	Jim Thomas, (206) 488-2524
July 21-24	Wasatch Mt. Scale/PSS Soaring Festival	Pt. of the Mt., UT	Bob Harman, (801) 571-6406
July 22-23	SWIFT/Western XC	Mead, NE	Christopher Knowles, (402) 330-5335
Aug. 12-13	Thermal Grabber **	Redmond, WA	Jim Thomas, (206) 488-2524
Aug. 19	Handlaunch	San Antonio, TX	Jerry Caldwell, (210) 438-4077
Sept. 2	SASS HL 2	Redmond, WA	Joseph Conrad, (206) 630-2670
Sept. 16	2M/Open	San Antonio, TX	Gene Warner, (210) 732-3101
Oct. 7-8*	Fall Soaring Festival	Visalia, CA	
Oct. 21-22	Canyon Lake Classic 2M, Open, HL - Potters Creek Park	Canyon Lake, TX	Greg Dickerson, (210) 656-1796 Tom Meeks, (210) 590-3139
Nov. 19	Open	San Antonio, TX	Perry Van, (210) 658-8842
1998	World Soaring Jamboree		

* Western States Triad
**Unlimited, 2M

Reference Material

Still a few copies available of some issues of the printed transcripts of talks given on RC Soaring at the Previous Annual National Sailplane Symposium. Prices reduced to clear out stock. Talks were on thermal meteorology, flying techniques, hand launch, cross country, plane design, airfoil selection, vacuum bagging, plastic coverings, flying wings, etc., etc. Send SASE or call for flyer giving details. Many copies of most recent (1992) transcript left. Clubs have found them good for raffle prizes, gifts, etc. Al Scidmore, 5013 Dorsett Drive, Madison, WI 53711; (608) 271-5500.

BBS

BBS: SLOPETECH, Southern California; (714) 525-7932, 2400 - 8-N-1

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

1995 LSF Nationals

...by Jack Iafret
LSF Vice President
Grand Blanc, Michigan

Last year at the LSF Nats, we had a really fun time sitting around the tent and discussing what Nostalgia should be as the rains fell and flying faltered. So this letter is to let everyone know that the Nostalgia event will be tried again at the 1995 LSF Nats. The interest was surely there, as we had about 35 advanced entries and the talk while at the nats was all excitement about the event.

Last year in *RCSD*, I volunteered to be the "keeper of the rules" for the next 100 years, or at least one, and would entertain changes to the 1994 rules if they were returned in writing. Well I did get some requests in writing, and a lot of word requests at the Nats. I took the written requests and tabulated them for use in an independent written voting procedure by the LSF officers. The voting was almost unanimous on each independent item, so I feel confident the agreed upon rules changes can be classified as continuous improvement and not revolutionary.

This is important as almost all of the discussions at the 1994 LSF Nats centered around the fact the rules were basically solid and most contestants did not want major changes. The overall reading I got was that we should try the rules as is for a few years, then make changes that are really widely supported.

The result of the voting process shows up in the 1995 rules as underlined items.

The largest number of requests were for a few more years worth of planes to be legal as a lot of good ones were designed between '77 and '80 and these were still basically 'low tech' airplanes, which is important to keeping the vision of the nostalgia event... This request was accepted. Along this line, some requests were made to eliminate the rule that requires the plane to be built off of a published magazine plan or produced kit (or produced kit plan), but this was not supported as proof of vintage has to be easily verifiable by the contest management.

By the way, an overwhelming majority of the contestants voiced the opinion that they wanted the rule to remain as is, so I am sure this also influenced the voting.

Most of the other requests were singular and directed to make a personal idea or plane legal and did nothing for the overall good of the event; or they were items pertaining to contest management (CD's responsibility) and not the aircraft, so these were unanimously rejected.

The rules attached are for the 1995 LSF NATS and as CD for this event are the ones I plan on using. We (the LSF officers) do not plan on making any other changes for 1995, so participants can be building to fit them. The good news is that if you built a plane for last year, it is still legal this year with no modifications.

I believe the rules should be downward compatible for some number of years.

Last year, we made some exceptions as the rules were not tested or discussed much before the NATS, and this was only fair. This will not happen in 1995 as there has been an overwhelming acceptance by the participants, and an ample amount of time to request changes, so I see no reason for deviation this year.

In conclusion, I would like to tell a story about the '94 Nats...

Jack Beatley brought an original Zaic design with an all stick fuselage, lifting stab, high lift wing and all red transparent covering. Jack let me fly it on Friday evening and I can only say that Jack has totally captured the spirit of Nostalgia. It launched great and safely with the stronger wings and flew like the old free flight it really is; only an occasional touch of rudder was needed to steer it, and it did its best to own the calm late afternoon air. Gosh it was fun!!!! ■

1995 LSF NATIONALS

Nostalgia Sailplane Event Rules

Design Release Requirements:
Date of Release:

The latest accepted magazine date for the published design, or the release of a kit will be 01JA80.

If the kit or published design had several release dates that included modifications to the design, only those prior to 01JA80 will be accepted.

Airframe Requirements:
Items That Must Duplicate the Original:

- The plane must replicate the original ***styling and appearance*** and comply with the vision of the Nostalgia event. (Vision is stated under Special Items.)
- Airfoil, flying surfaces plan forms, moments and surface areas.
- Fuselage form or styling in outline both in side and plan views.
- Basic construction... i.e., open bay wing structure, wood vs. FRP, etc.

Items That Can Deviate from the Original:

- Control surfaces... if desired, on a plane with no glide control capability, spoilers may be added to the upper wing surface as long as the plans do not call for any other glide control device. If the plans have a glide control system, it must be the one used and shall not be deviated from.

  If spoilers are added, they must be designed to minimize the affect on the styling of the original aircraft. (An example would be on an open structure wing, the spoiler system must be of minimal dimensions including the area around the spoiler bay used to attach the covering.)
- Any interior, non-visible, structural modifications to enable the plane to handle modern launch equipment and techniques... some examples:
  - Substitute spruce for balsa
  - CF reinforcements
  - Larger joiner rods
  - Stronger tow hook systems
- Wing incidence and decalogue
- Wing mounting (bolt-on vs. rubber bands)
- Removable or bolt-on stabs rather than permanent stabs as long as the assembled position replicates the original and visible architecture is unchanged
- Dihedral (either tips or center or both) can be modified a maximum of 25% of the original for personal handling characteristics

Special Items:

- Radios can be of any type legal to operate, and electronic mixing is allowable on any set of surfaces.
- The use of landing arrestors devices is prohibited. This does not eliminate the use of a smooth surface skid to protect the bottom landing surface of the aircraft from scratches and nicks.
- The CD will have the final vote on legality for 1995 on any item not covered in this document... Bear in mind that the ***vision*** of the event is to duplicate the spirit of the old days in styling and form of aircraft and flying capability of said aircraft and only those changes consistent with launch and landing safety will be allowed.
- The final proof of legality of the design for this event lies with the contestant and having an original set of plans would be the optimum way to settle any questions. ■

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*.

ASK-21 2m Kit

...from ICARE Sailplanes

ICARE sailplanes is pleased to announce the availability of a new scale sailplane kit: ASK-21 2m. (The full-size 17 meter ASK-21 is a two seater performance glider still in production. It was designed for instruction, training, aerobatics and cloud flying, and has a glide ratio of 34.)

The 2m model is a stand-off reproduction. The difference is in the wing area, which was slightly increased to keep performance above average. This kit is an economic way to get into scale sailplane building. The kit is highly pre-fabricated, and is designed for the newcomer because it offers maximum versatility and forgiving flying characteristics. It features a Ritz airfoil which is an easy to fly all around airfoil, and the low wing loading makes it well suited for thermal and slope, including aerobatics.

The kit comes with a high quality white epoxy fiberglass fuselage, and obechi sheeted foam wings ready to cover. Wing servos require installation. Tail surface is made from 3/16 balsa; the rudder is built up. Kit includes: clear plastic canopy, wood and hardware, building plan and instructions. Wing span is 83" (2.1m), 42 oz. weight, 516 sq. in. wing area, and 11.5 oz/sq. ft. wing loading.

The ARC wing kit price is US185.00 + US15.00 S&H. A built up wing kit is US125 + US15.00 S&H. For more information about our products, send SASE or $1.00 to ICARE Sailplanes, Etienne Dorig, 381 Joseph-Huet, Boucherville, Qc J4B 2C5 Canada; (514) 449-9094 EST. ■

California Soaring Products

...from Paul Ikona, Owner

California Soaring Products (CSP), a West Coast dealer and distributor for Slegers International, is proud to announce the recent opening of its well stocked showroom, warehouse and hobby shop at 1010 N. Citrus Ave., Covina, CA 91722, displaying everything from today's basic entry-level glider kits and radio systems to the latest, most technically sophisticated competition ships and equipment. CSP also stocks a complete line of quality building and covering materials including a vast assortment of adhesives, modeling tools, and hardware. In addition to this, a wide array of slope, scale, electrics, and previously owned sailplanes will also be on hand. CSP is geared to the R/C soaring enthusiast, so purists, fun flyers, and competition pilots alike are encouraged to visit this product-packed facility open to the public daily from Monday through Thursday, 9:00 A.M. to 6:00 P.M.; Friday, 9:00 A.M. to 9:00 P.M.; Saturday and Sunday, 11:00 A.M. to 6:00 P.M.

Although our toll free 1-800-520-SOAR is reserved for orders only, CSP has convenient 24-hour access by dialing direct or using our voice-mail message center at 1-818-966-7215, and handy FAX line at 1-818-966-7913.

We believe CSP's full line of R/C soaring products, low competitive pricing, friendly atmosphere, no-hassle guarantee, and prompt delivery policy make us your one-stop shopping choice. So, if you're a beginner or seasoned glider pilot, give CSP a call. The only thing we don't sell is thermals!! ■

Hobby Shops

Action Hobbies
3723 S. Mendenhall
Memphis, TN 38115
(901) 365-2620

Air Capital Hobbies
8989 West Central
Wichita, KS 67212
(316) 721-4164

California Soaring Products
1010 North Citrus
Covina, CA 91722
(818) 966-7215

Gunnings Hobbies
550 San Anselmo Ave.
San Anselmo, CA 94960
(415) 454-3087

Gyro Hobbies
23052 Lake Forrest Dr., Unit C2
Laguna Hills, CA 92653
(714) 583-1775

HiTecHobbys
284 - B Wellsian Way
Richland, WA 99352
(509) 943-9241

Hobbies'N Stuff
9577 L Osuna Rd. NE
Albuquerque, NM 87111
(505) 293-1217

Hobby Counter
1909 Greenville Ave.
Dallas, TX 75206
(214) 823-0208

Hobby Town USA
8090 S. 84th St.
La Vista, NE 68128
(402) 597-1888

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

Tim's Bike & Hobby
2507 Broadway
Everett, WA 98201
(206) 259-0912

Advertiser Index

Classified Advertising Policy

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

Personal ads are run for one month and are then deleted automatically. However, if you have items that might be hard to sell, you may run the ad for two months consecutively.

For Sale - Business

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

"There are two kinds of critics, professional and ourselves." One of over 670 quotes and stories by Frank Zaic in **FRANKLY SPEAKING.** $6.95 plus $1.25 postage. Model Aeronautic Publications, Box 135, Northridge, CA 91328.

SILENT FLIGHT CLASSIFIEDS, the newsletter for sailplane and electric builders and pilots. Our classifieds sell your "experienced" planes and equipment. Latest info. for the sportsman and contest pilot. Yearly for $10.00, 12 issues, sample $1.50. SFC, 329 Little Ave., Ridgway, PA 15853.

CANNON R/C SYSTEMS, world's smallest radio systems in business since 1953, is your best choice for HL sailplanes, R/C assisted FF or electrics. Servo weigh .35 oz., 4 ch receiver weighs .54 oz. Flight Paks available for most other make transmitters. Free catalog. Sky Bench Aerotech, Ray Hayes, 58030 Cyrenus Lane, Washington, MI 48094; (810) 781-7018.

POWER SCALE SLOPE - BAe Hawk (T-45 Goshawk) Fiberglass fuselage, foam wing and stab cores, Obechi sheeting, all hardware and Cad drawings. Span 47.5". Weight 35 oz. $120.00 plus shipping. TLAR Enterprizes, 14221 45th Pl. W., Lynnwood, WA 98037; (206) 743-9358.

VIDEO - "THE 1994 INTERNATIONAL SLOPE RACE - RETURN TO DAVENPORT". Don't miss out on this Hot Slope Race Video narrated by Mark Allen who says, "This is slope racing at its best!" Running time approx. 80 min. Send check or money order for $24.95 + $5.00 S&H. (CA res. add 7.5% sales tax.) Tallant Productions, 6922 Hutchins Ave., Sebastopol, CA 95472; (707) 823-3534.

For Sale - Business

SPECIALS on new and pre-owned kits: ROKE 1/4 scale B-4, built, never flown, NEW... $650.00; Multiplex DG-500, two place, very nice... $475.00; Multiplex DG-300, 1:4 scale... $475.00; Fiber Glass Flügel (FGF) Salto H101, all glass, 2.7m, flaps, RTF... $525.00; FGF ASW-20L, 4.15m, all glass with retract gear, outstanding performance... $1000.00; FGF SALTO H101, 2.7m, all glass, spoilers, RTF, new, never flown... $600.00; Vern Hunt ACRO, L39, PSS, painted, RTF... $385.00; JR Radio PCM-10, new with case... $495.00. Pete Bechtel, Windspiel Models, (208) 667-2276, FAX (208) 667-8712, Idaho.

LJM Associates announces the availability of PC-Soar Version 3.5 for use with all versions of DOS. Previously, different PC-Soar versions were required for DOS 3.x, DOS 4.x & 5.x, and DOS 6.x. Free upgrades are available for 1994 customers while others will be charged a minimal $10 upgrade fee. Also new is a one command installation and new manual with index. PC-Soar Sailplane performance analysis program is available to new customers for $40 for the basic programs and $30 for the extensive libraries of sailplanes and airfoil polars. Please include $3 P&H for upgrades and orders. LJM Associates, 1300 Bay Ridge Road, Appleton, WI 54915; ph: (414) 731-4848.

For Sale - Personal

VISION transmitter by Airtronics, w/ATRC version 3.0 upgraded by Control Systems Laboratories. It holds 8 model memories and has alphanumeric naming capabilities and is capable of using Futaba (positive pulse) as well as Airtronics (neg. pulse) receivers. Transmitter has a rubber ducky antenna. I will include TWO battery packs: the standard 700mAHr Airtronics pack and an additional 1700 SCRC pack that will last for about 5 hours on a charge and is QUICK chargeable. I would like $300.00 for this baby, including original documentation (instruction manuals). Nick Trubov, 7112 South T street, Fort Smith, AR 72903-4118; (501) 452-7806 eve., (501) 441-4000 and ask operator to page me. It takes an extra minute, but it works any time, day or night.

WINDSONG, very good condition, computer radio not necessary, epoxy glass fuse, lot of carbon in wing, good flier... $275.00 + S&H; SAGITTA X-C kit, NIB... $225.00 + S&H. Jim Johnston (616) 938-1272, Michigan.

RnR SYNERGY 91, includes 6 new Airtronics 94141 servos, 800 mAH battery & switch harness, like new condition, 18 total flights, just add receiver and program your Vision with included setup sheet listing all setup parameters and fly... $850.00 + shipping OBO, will consider airframe only offers. John Ihlein (505) 294-7943, New Mexico.

Robbe ASW-24, 138" span... $350.00; Multiplex DG-600, 138" span, 2 canopies (clear & blue tint)... $350.00; DG-202, 156" span, imported from Switzerland... $350.00; Southern Sailplanes 1/4 scale KESTREL 17, fiberglass fuse, canopy, frame, plans & instruction manual, 168.4" span (not a complete kit)... $150.00; High Performance Sailplanes WARRIOR T-tail, SD7037 airfoil... $325.00; Svenson Fieseler STORCH, 1/6 scale, 96" span, used for aerotowing in Europe (kit is a collector's item, out of circulation)... $500.00. Call or write Sal Iasilli, 75 Walnut Ave., East Norwich, NY 11732; (516) 922-7432.

All glass Multiplex DG-300 w/servos, excellent... $975.00; Robbe ASH-26E w/wing servos, excellent cond... $850.00; Rowing LS-4 w/wing servos, excellent... $1300.00; custom EAGLE, RG-15, natural obechi, Arrow shaft hinges, nice, w/wing servos... $600.00; Alpina MAGIC, w/wing servos, fixed wheel, very good cond... $550.00; ASW-17, 3.5m, w/flaps, Quabeck 2.5/13... $350.00. Call Ray Franz @ (714) 362-5545 (eve), (714) 830-8928 (days), Calif.

RTF ALCYONE, glass fuse, average condition... $250.00; ALCYONE kit, glass fuse... $175.00; VAMPIRE flying wing kit, presheeted, European kit... $125.00; Airtronics ADANTE, built & ready to cover, glass fuse, HQ airfoil... $125.00; AQUILA, glass fuse (not duralene)... $50.00; foam cutter, works like Feather Cut™... $75.00; WINDSONG, RTF, has some Lovesong features... $400.00; SABER fuse... $75.00; NIB HS-80 servos... $27.00; HS - 80 MG NIB... $37.00. All above are plus S&H. George Voss (405) 692-1122, 8am - 9pm, Oklahoma.

Twin Astir (Wik), 4m span, all glass, in excellent condition, completely finished, ready to fly, slight hangar rash, immaculate-detailed twin cockpit (competition worthy), all servos rigged for Futaba radio, nose tow release for aerotowing... $1000.00; Thermoflug all glass 4m SALTO with Futaba servos, slight hangar rash, absolutely ready to fly... $900.00; NIMBUS 3, glass body, foam with balsa covered wings, 6+ meters wing span, retract including Futaba servos, nose tow release... $950.00; Krause LIBELLE-5 meter span, ready to fly, brand spanking new and never flown... $1300.00; Robbe ASW-24, 3.5m, 900ma battery plus 8 Futaba servos, airtow release in the nose with flaps, slight damage to the stab, otherwise completely RTF... $200.00. Call Robin Leluman @ (212) 879-1634, New York.

GENESIS, NIB... $325.00; FALCON 880, 2 seasons, ec, with or w/o servos, 2... $300.00; SAGITTA 900, ready to cover... $200.00; WINDSONG w/3 sets of wings... $125.00 or best offer; Multiplex ROYALE MC, PCM/FM... $150.00 or best offer. Ron @ (614) 761-0704 (D), (614) 268-3363 (E), Ohio.

Wanted

DEAD NICADS OR SERVOS with Airtronics adapters. Will pay shipping. Will take anything and all! Jim Gell (810) 476-3506 (eve), (810) 358-0400 (days), Michigan.

Source of surgical rubber for bungees / hi start, 3/16 inside dia., 5/16 outside. I'd like contact address, ph/FAX, etc. so we can arrange bulk purchase. Please contact David Griffin, 98 Patterson Tce, Christchurch 8003, New Zealand. FAX: 64 3 384 4400.

SKY HAWK

Michael Lachowski, Soaring Editor for *Model Airplane News*, wins 1994 prestigious, Eastern Soaring League, Daniel Boone Contest flying the SKY HAWK guided by a JR Radio.

Sky Hawk kit features a kevlar - carbon reinforced, fiberglass fuselage with carbon reinforced obechi - foam, pre-sheeted wings. A unique direct drive elevator servo is installed in the vertical fin.

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Specifications

Wing Span	116"
Weight	58 - 65 oz.
Airfoil - Root	SD 7037 or S7012
Airfoil - Tip	SD 7037 or S7012 - 8%
Wing Area	900 sq. in.
Wing Loading	9.5 - 10.5 oz./sq. ft.
Aspect Ratio	15:1
Price	$345.00 + S&H

Sky Hawk is designed by Mark Allen and packaged by Slegers International.

Sky Hawk Attributes

- ✓ High aspect ratio wing
- ✓ "Swift" wing tip technology
- ✓ Thin airfoils at the wing tip
- ✓ Large control surfaces
- ✓ Large tail surfaces
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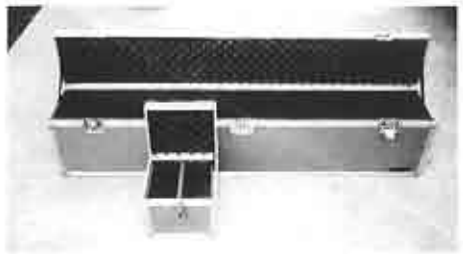

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(1-2 Planes)	(2-3 Planes)	(2 TXs)
62" Long	62" Long	$65
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11" Deep	15" Deep	
$229	$249	

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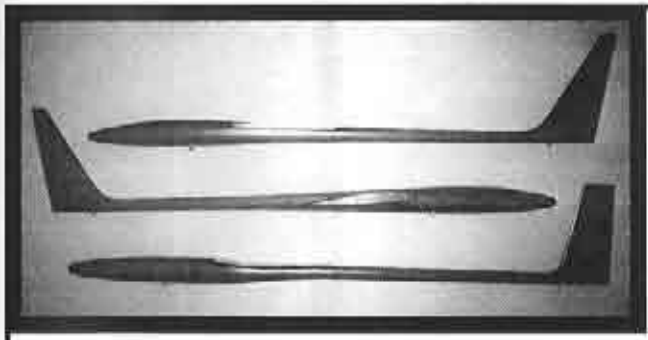

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