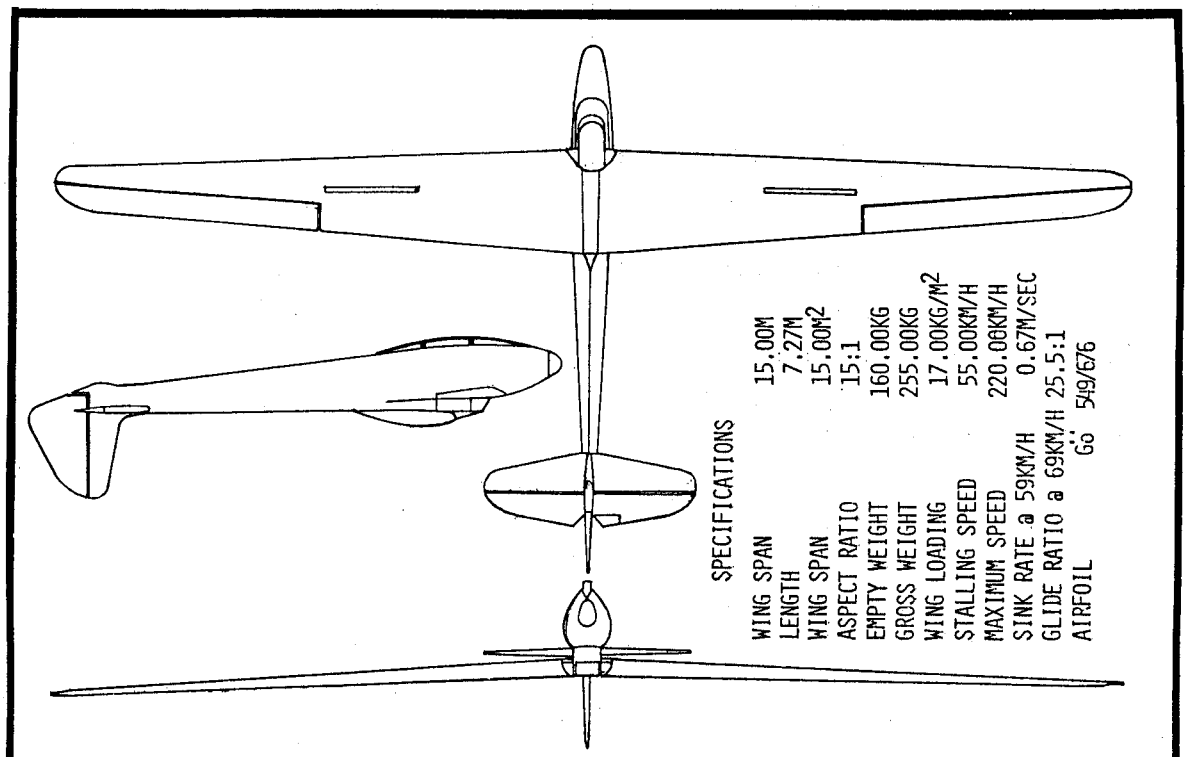
Soaring RC Digest
VOLUME 1 NO. 9 SEPTEMBER 1984

DFS MEISE "OLYMPIA"



SPECIFICATIONS

WING SPAN	15.00M
LENGTH	7.27M
WING SPAN	15.00M2
ASPECT RATIO	15:1
EMPTY WEIGHT	160.00KG
GROSS WEIGHT	255.00KG
WING LOADING	17.00KG/M2
STALLING SPEED	55.00KM/H
MAXIMUM SPEED	220.00KM/H
SINK RATE @ 59KM/H	0.67M/SEC
GLIDE RATIO @ 69KM/H	25.5:1
AIRFOIL	Go 549/676

FLYSWAPPER

CLASSIFIED ADVERTISING:

RC Soaring Digest will take classified advertising from both individuals and from businesses. The INDIVIDUAL RATE will be 10¢ per word; the BUSINESS RATE will be 25¢ per word. Addresses free. Count only the words in the main ad. Copy must be typewritten and prepayment by check is required. Please submit all advertising copy before the second week of the prior month. For example, February issue ads must be in before January 15th. Checks payable to RCSD.

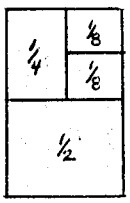
DISPLAY ADVERTISING:

RC Soaring Digest will take display advertising. The rate will depend upon the number of issues in which your ad is to appear, and the following schedule is based on frequency of appearance in RCSD. We suggest, to start, that all ads be typeset and ready for camera.

Ad sizes and formats are as shown in the table below, with the requested dimensions and formats. Full-page, half-page, quarter-page, and eighth-page sizes are available.

Note: All ads, classified or display, will be half price to all clubs and not-for-profit organizations. Ads received too late for publication in the desired issue will be held for the subsequent issue, unless requested otherwise by the advertiser. Publisher takes no responsibility for the accuracy, truthfulness, or credibility of offered merchandise. Any ad repugnant to common sensibility may be turned down by the publisher as unsuitable.

1 issue	3 issues	6 issues	9 issues	12 issues	Sz.
$10	$9	$8	$7	$6	1/8
$20	$18	$16	$14	$12	1/4
$40	$36	$32	$28	$24	1/2
$80	$72	$64	$56	$48	1



Note: Dimensions of ads - 1/8th page - 1/4th-page - 1/2-page

Full: 12"H x 7"W 3"H x 3.5"W 6"H x 3.5"W 6"H x 7"W

RC Soaring Digest
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Peterborough, N.H. 03458

POSTMASTER: ADDRESS CORRECTION REQUESTED

HI START

Watching the Olympic Games certainly stirs up the emotions and causes the adrenalin to flow. For the past week, as this is being written, I have taken every opportunity to view the various events and the many and different ways each competitor handles the big moment of his and her life...whether it brings victory or tragedy. Somehow, I feel a strong kinship to the athletes - not because I fancy myself an athlete - but because I prefer to participate in a sport instead of passively watching. Most of us who fly sailplanes feel the same way, and we, too, share the same kinship of participation in a hobby/sport that is worldwide in scope. When we meet another glider pilot or designer or builder, or all three, no matter where from, there is no language barrier. Accomplishment speaks for itself, transcending mere words. In this instance, I am not using the editorial 'we' but rather the we that means you and me. In about 3 weeks the FAI F3b finals will be held in California to choose the US Team representatives who will go to Australia next April to compete in the World RC Soaring Championships - the Olympiad of Soaring.

Perhaps some of you know already that full-scale soaring was to have been an Olympic sport in the 1940 Games which had to be cancelled due to the onset of World War II in 1939. A german sailplane, the Meise, designed by Hans Jacobs was chosen to be the sailplane used by all contestants. After its choice, it became known as the Olympia Meise, and was built in some quantity...particularly in England after the War. There, it became known as the EoN Olympia, named after its manufacturer:Elliots of Newbury. Those who have flown the all-wood Olympias speak well of their beautiful handling, their harmony of control, and their quietness in the air. Some are still flying - in England and Australia, perhaps elsewhere as well.

It doesn't take much imagination to look at our own RC World Championships for radio-controlled sailplanes as the Olympics of the miniature sailplane world. In fact, not even so miniature, now that cross-country events have taken them farther than even the full-scale sailplanes regularly flew in the old days.

The competitors practice every bit as hard, meet equally strong competitors, and - in their own time - will meet victory or tragedy in exactly the same way as their Gold-Medal counterparts of the Games.

There are those who read RCSD that have told me to go lightly on F3b, because not many are interested in it...and I have listened... with only half an ear. True, there aren't many who fly F3b compared with the numbers who fly thermal duration, but those who do - and their designs and tasks - set a direction and a goal for all to follow. Improvement of design is always the result of competition, whether it be in a bobsled, a racing canoe, or a sailplane. All of us benefit by the few who persist in trying to fly farther, faster or longer. While it is true that most of us don't now, and may never, fly F3b, we all benefit from those who do.

Appropriately, the FAI F3b team selection finals will be held in Los Angeles. The Olympic Summer Games, closing there tomorrow, have set an example of organization, fun, participation, smooth operation, and class for all to follow. RC Soaring is also a World Class sport, and it deserves no less than the very best we can all give it. If we can't participate, then we can support. It is my hope that the American Team will go to Australia and bring back the Gold in 1985... but even if they don't, their effort is appreciated, and the least we can do is to give them our warmest and most generous support.

LET THE GAMES BEGIN!

Jim Gray, Publisher

This month's issue: a "HOW-TO" issue, using more information from club newsletters than ever before, and covering aspects of flying, building, trimming, etc. ENJOY!

PLOTTING AIRFOILS

One of the most time consuming aspects to scratch building is the necessity to hand plot the airfoil you intend to use, and then to make the necessary cutouts for the sheeting, spars, etc. All of us have done this, but after a while I found that I was putting off building because I really don't like that part of the job. Being of an essentially lazy nature, and since I have a quite capable computer, I decided it was time to write a program that would do this for me.

With the first version of the program written it became obvious that simply interpolating the (often sparce) co-ordinates with straight lines led to a pretty chopped up airfoil, some form of smooth interpolation was necessary. After investigating many different ways to do this I came to the conclusion that altho none of them was exactly right, it was possible to adapt a technique called splining, the principal difficulty being that splines are not intended to be used on functions that have more than one Y for each X, as an airfoil does. It took a lot of work, but smooth airfoils were the result.

Since I was into this pretty heavily at this point it was a rather simple task to "reverse engineer" an airfoil, i.e. to separate it into the mean line and thickness distribution. This is not commonly done in aerodynamics any more but there is a lot of information that can be gleaned in the process. And since I was at it (you know how these projects grow!) it was also not too difficult to fit the thickness distribution to the standard power series as used by NACA, but of course with different co-efficients. I used a least squares fit to find the co-efficients, and inevitably found that when the airfoil was reconstructed with the power series, the worst case error was so small that it is meaningless. To me it was truly a surprise to find that <u>any</u> airfoil can be described with a standard equation and 5 constants, plus a mean line. I had expected to find many discrepencies.

As I started to analyze various airfoils it rapidly became apparent that, despite the claims of novelty and great performance that were being touted by various and sundry, many airfoils were little more than scalings from others, and that the differences between even the "newest and best" and some pretty old ones were trivial.

For example: Mike Bame's MB253515 is essentially identical to an Eppler 374, but scaled to 15% thickness from 11%. Helmut Quabeck's HQ 2.5/X series (X=8,9,10, or 12) has a standard NACA 63 series laminar thickness section from 40 years ago. This is not to say that they were derived from the older sections, but one does wonder if there is anything new under the sun, and knowing this certainly tempers the wild claims that are frequently made.

But I stray from the main purpose of this article. It seemed that other modelers could benefit from my program in the same way that I have, i.e. from the plotting capabilities of the computer. Let me explain just what I can do for you, and what I need from you to do the best job.

1. The computer will plot any airfoil for which co-ordinates are available. It will also generate any of the NACA 4 digit series. I presently have all the popular Eppler airfoils in memory as well as Quabeck's, and if I don't have it and you can provide it, I will plot it. I have all the usual references, so in most cases just tell me what you want.

2. I can plot any thickness distribution combined with any mean line, so if you want an Eppler 205 thickness combined with a mean line from a NACA 2412, no problem. I strongly recommend that you not get too fancy in this regard as it offers no advantage that I know of.

3. I can plot a series of any length up to 20 inches chord. The series can all be the same size or they can be in a straight taper. Examples: you can have 5 airfoils all 15 in. or 7 starting at 12 and ending at 6 in. with a 1 in. taper per airfoil, or any other dimensions. You tell me what you want.

FITTING AIRFOILS (Continued)...

1. You can specify a relief from the surfaces to account for sheeting, spars, leading and trailing edges. If you ask for a tapered series, the computer will keep the spar at the same percent of chord thruout the series, but will keep the width of the leading and trailing edges constant, since this is the way we normally build. I must know exactly what the dimensions of the spar etc. are and where they are located. A dimensioned sketch is the best way. A word of caution: keep your spars near the 25% point unless you are going to sheet the wing - it decreases the tendency to flutter. One other point, on the airfoils with very thin trailing edges remember to use a wide enough t.e. to leave some height at the rear of the wing rib after subtracting the thickness of the sheeting or rib caps.

5. You can have the airfoils on paper or mylar. The mylar is nicer, but it costs more. Unless you are going to build more than one set of wings, I recommend the paper, but it's your choice.

6. The computer presently plots with a standard period (.). The lines aren't as fine as those drawn with a pen but you will have no trouble getting the airfoil right when you cut it out.

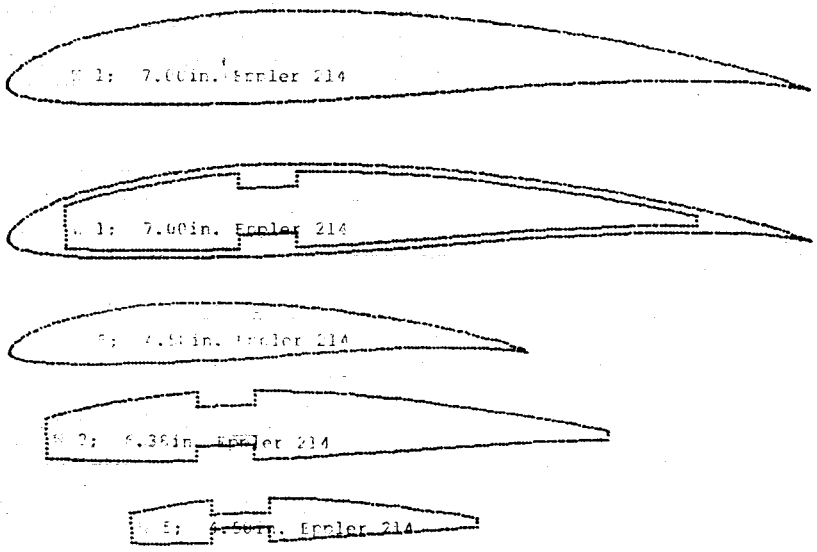
7. The tariff is as follows (check, cash or money order): series of 6 plots of one airfoil, any size, straight or tapered, but without cutouts, on paper: $8.00. Same thing but with standard reliefs, (leading and trailing edges, two spars, sheeting or rib caps), $12.00. On Mylar, add $5.00. If you need something special, tell me about it and we'll work out a price.

8. If you want an analysis of the airfoil, which includes 10 in. plots of the section, mean line and thickness distribution as well as the co-efficients for the power series, it's $5.00. (For those who are really into aerodynamics.)

9. Shipping will be in a tube if on mylar over 11 inches, otherwise in a standard 9 by 12 in. envelope.

10. So far I can't blend one airfoil into another as the series progresses. Maybe later on.

David Fraser
Fraser-Volpe Corp.
1025 Thomas Drive
Warminster, Pa. 18974



SOME COMMENTS ON AIRFOILS by Dr. Richard Eppler

The following was excerpted from a letter from Dr. R. Eppler to 'Woody' Blanchard of the ESL, and was printed in the Eastern Soaring League's newsletter Eastern Soaring Lines. The following abbreviations will be used: Cl= lift coefficient; Cd=drag coefficient; @=approximately. The curves are not reproduced but may be obtained from Gordon Stratton, 255 Brevoort Street, Kew Gardens, NY 11415.

"Concerning the Quabeck airfoils, I include some computer results. These airfoils seem not to be developed by my program, as the co-ordinates are not smooth. I had to do a lot of smoothing until I got the included results. You see the following differences to my airfoil 211, which was developed for unflapped F3b models.

A) Both HQ airfoils are better for $0.2 < CL < 0.7$

B) Both HQ airfoils have for the RE=50,000 one lift coefficient without bubble warning (Cl @=0,75). For this special point, they are probably much better than 211. It should be noted, that the area without bubble warning only seems to be relatively large for HQ 2.5/9. This airfoil shows for RE=50,000 already severe separations on the lower surface below Cl=0.6, which reduce Cl.

C) Airfoil 211 is much better in Cl max, and around minimum sink and optimum glide. It has a better Cd there and less bubble warning. (Note: it is possible that Dr. Eppler is referring to burble, meaning separation bubble, indicationg imminent flow separation...JHG).

D) 211 also covers a much wider area of lift coefficients at the lower end of the polar. This was designed specifically for F3b models. The bubble warning of the upper surface does not matter in this area, as it concerns only the trailing edge. The HQ airfoils have a little less warning at the lower surface for Cl=0.25, but much more separation there. All airfoils have been analyzed for the same lift coefficients. Where they show no points, they have a separation before 40% chord.

Of course(this)information concerns the exact profiles. I cannot judge if one or the other airfoil is less sensitive to production errors. Moreover, in a contest, the airfoil contributes little compared to the pilot. (Emphasis supplied...JHG).

If you look for a precise airfoil which is good for medium Cl ranges, which is very important for normal 'flying for fun', I would more recommend my airfoil 212, which was designed for this application."

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FLAPS DO MAKE A DIFFERENCE, BUT NOT THAT MUCH

This information was written by Herk Stokely, and appeared in Soaring Flight, newsletter of S.O.A.R. As most of you know, Herk is a member of the Tidewater Model Soaring Society, and also has a column in Flying Models magazine. He edits Soartech, and has designed and built many of his own designs. Herk is a careful engineer and his opinions are worth listening to.

"I read an interesting article in this publication a while back. It was titled 'DO FLAPS MAKE A DIFFERENCE' by Herk Stokely. It was an intersting paper, but I didn't write it. I'd really like to get the credit given to the right person, RICHARD STROOP, and I'd also like to go on record as saying that my experiences with flaps have been somewhat different than his. Don't get me wrong, I'd encourage anyone to write up their experiences, and I don't think any of us has the whole story. The more of us that write, the more we'll think about it, and maybe the closer we'll get.

"First, I've flown sailplane models with flaps much longer than the three years mentioned by Mister Stroop (though I don't think that necessarily adds any authority to mine). I think it's been about nine years, but I don't remember clearly. Second, I don't agree that large flap deflections help much with launch height.. Richard recommends that 60 degrees of deflection be used, but I think that more than 5 degrees causes a loss in launch height for a well set up model. Certainly more than 15 degrees causes a big increase in model drag which

FLAPS (continued)...

DOES affect final launch height. Contrary to the impression held by some pilots, drag is important during launch. If you don't agree, picture the result if you tried to get a good launch with an open parachute attached to the tail of your model.

"I do like using flaps, and I think that they do add to the performance of most models. The effects are pretty subtle, though, and they complicate the pilot's job enough to be a problem at times. We did some performance studies based on the Althaus wind-tunnel data which showed that flap deflections beyond 5 degrees caused a loss in climb performance.

"Flaps do let you fly more slowly, and that can be an advantage in a small thermal where the smaller circle diameter helps you stay in the lift. They also help a lot in landing just as the author said. The slower landing speed makes it easier to hit the spot, and reduces the length of the post-landing slide. When I work lift with a flapped model, I like to pull in about 3 degrees of down flap when I enter a thermal. The camber increase allows the model to fly more slowly in the circle, and the increase in downwash over the tail has the effect of putting in up-elevator trim. When I want to go fast, raising the flap above the neutral point has the effect of putting in down-elevator trim, and the reduced camber seems to make the plane more stable in pitch at very high speeds. (This, in effect, reflexes the airfoil and reduces the pitching moment...JHG).

"This pitch change with flap deflection may be the most important problem with flaps, too. If you move flaps up or down very much in flight, the plane will pitch up or down violently. Some people think that this is enough disadvantage to make flaps undesirable. I have tried lowering the flaps during the turns in FAI speed runs myself, and found the turns were tighter, but my in-coordination of the flaps was so destructive to smooth flight that I quit trying to use them. A smooth speed run is hard enough without all that. Rolf Decker used them to help his speed runs but they were electronically coupled to his elevator control. I think he used rather small deflections, too.

"As to the drag of the seam between the flap and the wing: the Althaus wind-tunnel data shows about a 7% increase in section drag caused just by the hinge line. That ISN'T negligible if you're planning to go fast."

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DIVE/HIGH-SPEED TRIMMING by Don Broggini

Don Broggini is a member of the Long Island Silent Flyers (whose newsletter LI SILENT FLYER this article was taken from). He is a graduate mechanical and electrical engineer(with a minor in aeronautical engineering) with Grumman Aerospace, an avid sailor (a national champion) author of magazine articles on design theory and construction, a veteran free-flighter (former national record-holder) and the current holder of the LISF club duration record.

"Trimming a glider at low angle of attack (high speed, dethermalizing, etc.) is an important procedure and it deserves emphasis. Recently some articles have appeared on 'dive/high-speed trimming' that could lead one to the conclusion that if a diving glider,with controls neutralized, does an outside loop, this is a problem caused by the center of gravity being too far aft. The real problem is insufficient decalage, also called longitudinal dihedral. (Decalage is the difference between the angle of incidence of the wing and the angle of incidence of the horizontal tail; and usually means that the angle of incidence of the wing is positive while the angle of incidence of the tail is negative, compared to the centerline of the aircraft...JHG). The low-angle-of-attack, high-speed glider with too little decalage will exhibit this adverse outside loop behavior regardless of, within reason, of c.g. location.

"Now let's look at some'high-speed trimming'in a step-by-step fashion. With a glider trimmed for normal (slow, high angle-of-attack) thermalling flight, push the stick forward and put the plane into a

TRIMMING (continued)...

dive. Return the stick to neutral and observe the glider. If the nose comes up gently, fine. If the nose does not come up, or if it lowers (outside loop) this means insufficient decalage. Similar results will occur with an aft or a forward c.g. Gliders that have been trimmed for low-speed flight with too little decalage (Error # 1) will probably have the c.g. too far aft as well (Error # 2) in an effort to compensate for Error # 1. These two opposing errors may produce (stable) results at low speeds, but at higher speeds the effects of too little decalage will become apparent (outside loop, nose tuck-under). Increased decalage will fix the high-speed (low angle of attack) outside loop. BUT, for the plane to perform well at the low-speed, high angle of attack regime (thermalling, for example) with this increased decalage, the c.g. will want to be moved forward. This procedure eliminates both Error # 1 and Error # 2. Other, extraneous factors can also lead to these symptoms, or others...for example: servos that do not center well, or excess control friction.

SUMMARY:

1) At high angle of attack, slow, thermalling flight, the effects of decalage and c.g. are each evident.

2) At low angle of attack, fast, flight, theeffects of decalage are increased, and the effects of c.g. location are subdued. "

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TRIX by Jeff Troy

This information was gleaned from Hear Ye, newsletter of the Valley Forge (PA) Signal Seekers, Inc. Jeff is president of that club, and a contributing editor of the newsletter. He is also one of the better builders and finishers around, and his award-winning models have appeared at trade shows. Jeff says:

"I picked up this month's helpful hint from Joe Krush while I was doing the lettering on my WRAM'S winning Grand Esprit wing panels. I had just very neatly hand-cut about 20 letters and numbers from a Monokote trim sheet, when I was suddenly faced with the problem of getting them from the backing sheet to the wings and still keeping the centering and spacing accurate. No small feat, I assure you!

The X-acto blade under a corner tends to distort the marking,fingers are a definite no-no, but the biggest problem was placing them down without wrinkles or having them grab in the wrong places while positioning them. Joe noticed my predicament (as I was screaming at him for help) and suggested the following:

1. Remove the excess material around your markings from its backing sheet. You should be left with only the markings, all neatly spaced and even, just as you cut them. They should appear on the backing sheet exactly as you will want them on your aircraft.

2. Cut a sheet of Friskit masking paper (obtained from an art supply house) slightly larger than the work you are going to apply to the model.

3. Apply the Friskit over the markings and gently smooth it down tight.

4. Clean the area of the model where this transfer will be located.

5. Gently roll back the Friskit from the backing sheet, and the markings will lift up right along with it, all neat and tidy.

6. Since the Friskit is clear, you can see just where to lay the markings on the airplane. Carefully line it up and gently lay the whole thing in place.

7. Now, simply press firmly over the Friskit and markings. The markings will be secured in place without bubbles or wrinkles. Most important, you have eliminated any distortions or fingerprints.

8. Lastly, peel off the Friskit and you're done. The Friskit can be used over and over again as long as the adhesive side doesn't get dirty and dusty.

TRIX by Troy (continued)...

This method works equally well for any type of Mylar transfer; not just trim Monokote. It's especially nice on markings that have clear areas holding them together (no more fingerprints under the LSF emblems anymore). Try it on Coverite graphics and you'll have AMA numbers that are straight and evenly spaced for a change.

Thanks, Joe. This was a great solution to a problem I've lived with for a long time. By the way, did you know that Joe Krush did the original work on the official seal of the United Nations...?

Try this method...it works."

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MONOCOTE FINISHES -- KEN BATES AND KEITH SHAW.....
(REPRINTED FROM A.A.FALCONS AND G.D.H. & S.S. NEWSLETTERS)

THERE ARE TWO BASIC "MONOCOTE" FINISHES: A SHOW FINISH, AND A UTILITY (READ SPORT) FINISH. REGARDLESS OF WHICH YOU SELECT, THEY MUST BE SHRUNK PROPERLY, OR WRINKLES, SAGS AND BUBBLES WILL REAPPEAR WITH THE PASSAGE OF TIME. PROPERLY SHRUNK MONOCOTE WILL GIVE OFF AN ALMOST METALLIC "TING" WHEN TAPPED WITH A FINGERNAIL, WHEREAS INSUFFICIENTLY SHRUNK COVERING WILL GO "THUNK". THE ONE PROBLEM IN GETTING THE COVERING TIGHT ENOUGH IS THAT THE REQUIRED TEMPERATURE IS ABOUT TWO DEGREES BELOW THE MELTING TEMPERATURE. THE OTHER PROBLEM IS THAT THIS TEMPERATURE IS DIFFERENT FOR EACH COLOR OF MONOCOTE WHICH YOU USE, DUE TO THE DIFFERING THICKNESSES OF PIGMENTS AND ADHESIVES. FOR A SHOW FINISH, THE WORST COLORS TO USE ARE YELLOW, BLACK, WHITE AND CHROME. THE ONLY OPAQUE LIGHT COLOR MADE IS CREAM.

SEAM LOCATIONS -- SEAMS SHOULD OVERLAP BY 1/8 INCH MINIMUM. FOR SHOW FINISHES, SEAM OVERLAP SHOULD BE AS MUCH AS 1/4 INCH. SPLICES IN THE FINISH ON FUSELAGES SHOULD OVERLAP TOWARD THE TAIL, WHEN THE SEAM IS VERTICAL, AND TOWARD THE BOTTOM, WHEN HORIZONTAL. COVER THE FUSELAGE BOTTOM FIRST, THEN THE SIDES, AND FINALLY THE TOP. DO EACH SURFACE IN ITS ENTIRETY, FROM FRONT TO BACK, BEFORE GOING TO THE NEXT. WINGS SHOULD BE COVERED BOTTOM FIRST. FOR A SHOW FINISH, IT IS VERY DESIRABLE TO HAVE THE COVERING FREE ON WRINKLES **BEFORE** SHRINKING. PATIENCE PAYS HERE. A SIMILAR PHILOSOPHY WHEN DOING A SPORT FINISH WILL PREVENT WRINKLES FROM COMING BACK MONTHS LATER, EVEN WHEN PROPERLY SHRUNK. SHOW FINISH WINGS ARE ONLY IRONED-ON AT THE LEADING AND TRAILING EDGES, THEN SHRUNK WITH A HEAT GUN. ANY ADHERED PLACES ALONG RIBS SHEETING ARE PULLED LOOSE WITH A LOOP OF MASKING TAPE, STUCK TO THE COVERING AND "POPPED-OFF". WING SEAMS SHOULD BE BELOW THE POINT OF THE LEADING EDGE, AND ON THE LOWEST CORNER OF THE TRAILING EDGE.

MONOCOTE HAS NO STRUCTURAL GRAIN, BUT SOME COLORS (NOTABLY METALLICS) HAVE A COLOR GRAIN. THIS MEANS THAT TWO PIECES OF MONOCOTE CUT AT RIGHT ANGLES TO EACH OTHER, OUT OF THE SAME ROLL, AND OVERLAPPED, WILL APPEAR TO BE DIFFERENT SHADES OF THE SAME COLOR.

CUTTING -- WHEN CUTTING MONOCOTE, USE A METAL STRAIGHTEDGE, AND CUT ON A PIECE OF GLASS. THE GLASS IS ESSENTIAL IF CURVES OR INSIGNIA ARE TO BE CUT OUT. DRAW YOUR EMBLEM ON TYPING PAPER, REMOVE THE BACKING FROM THE MONOCOTE, TAPE THE MONOCOTE STICKY SIDE DOWN TO THE GLASS (2 LAYERS, IF 2 EMBLEMS ARE NEEDED). TAPE THE TYPING PAPER ON TOP, AND GO TO TOWN WITH A BRAND NEW RAZOR BLADE OR XACTO. A BLADE THAT WORKS EVEN BETTER IS THE UBER SKIVER, BUT DON'T SIDE-LOAD THE BLADE, OR IT WILL BREAK. ALL TRIM CAN BE MADE FROM REGULAR MONOCOTE. (IT MUST BE FOR A SHOW FINISH. STICKY TRIM IS FORBIDDEN ON A SHOW PLANE, IF YOU WANT TO WIN.) PINSTRIPES AS FINE AS 1/32 INCH WIDE CAN BE CUT THIS WAY, BUT IT TAKES PATIENCE AND A STEADY HAND.

PREP YOUR IRON -- MOST MONOCOTE IRONS, EVEN NEW ONES, HAVE MINUTE NICKS AND SCRATCHES IN THE SURFACE OF THE SEALING AREA. THESE FROST OR GOUGE THE MONOCOTE, RUINING YOUR SHOW FINISH. A WORN, REPEAT, WORN PIECE OF 600 GRIT WET OR DRY SANDPAPER USED WET (UNPLUG THE IRON, DUMMY) APPLIED LIGHTLY TO THE SURFACE WILL GET RID OF THEM. A DOUBLE THICKNESS OF OLD BEDSHEET WRAPPED AROUND THE IRON WILL SCRATCHPROOF ALL BUT THE MOST-MANHANDLED MODELER'S JOB. BE PREPARED, HOWEVER, TO REDO THE ENTIRE PROCESS OF DETERMINING THE PROPER SHRINK TEMPERATURE.

PREP THE SURFACE -- A MONOCOTE JOB IS ONLY AS SMOOTH AS THE SURFACE UNDER IT, ESPECIALLY WHERE THE COVERING IS STUCK DOWN TIGHTLY, SUCH AS THE FUSELAGE. WHITE VINYL SPACKLE IS VERY GOOD FOR FILLING DINGS, BUT MUST BE PAINTED WITH LIGHT GRAY PRIMER, OR IT WILL SHOW THROUGH AS A LIGHT SPOT, AND THE MONOCOTE WON'T STICK WELL TO A CHALKY SURFACE. "BALSARITE", APPLIED THINLY TO SPRUCE, PLYWOOD OR EPOXY (EPOXY MUST BE SANDED LIGHTLY FIRST) WILL INSURE GOOD ADHESION. THE SURFACE MUST BE SMOOTH (400 GRIT MINIMUM) AND UNIFORM IN COLOR, WITH NO GAPS IN JOINTS FOR THE BEST SHOW FINISH.

TO OBTAIN AN ACCEPTABLE SHOW FINISH, YOUR WORK MUST BE ALMOST SURGICALLY CLEAN. BALSA DUST, CAT HAIRS, AND OTHER ASSORTED DEBRIS MUST BE SWEPT UP, AND THEN A SHOP VACUUM USED TO GET THE HIDDEN STUFF OUT OF THE CRACKS AND CREVICES. EVERYTHING IN YOUR SHOP, INCLUDING THE WALLS, FLOOR, AND LIGHT FIXTURES (EVEN RAFTERS AND JOISTS) MUST BE VACUUMED **TWICE** TO GET THINGS CLEAN ENOUGH FOR A SHOW FINISH. MERELY DOING THE WALLS, WORKBENCH, AND LIGHTS WILL SUFFICE FOR A SPORT FINISH. WASH YOUR HANDS PERIODICALLY TO AVOID CONTAMINATING THE ADHESIVE ON THE MONOCOTE.

PATCHES -- PUNCTURES AND SPLITS CAN BE REPAIRED BY CUTTING OUT THE DAMAGED AREA, LEAVING ROUND EDGES. A PATCH OF THE SAME SHAPE, BUT 3/8 INCH LARGER ALL AROUND, IS THEN CUT OUT. CLEAN THE SURFACE WITH ACETONE, MEK OR LAQUER THINNER (IN ADEQUATE VENTILLATION) AND TACK THE PATCH DOWN ON ALL EDGES. THEN SEAL THE ENTIRE EDGE AND SHRINK LIGHTLY. TOO MUCH HEAT USED HERE WILL CAUSE THE PATCH EDGES TO PUCKER AND WRINKLE, SO PROCEED CAUTIOUSLY.

ONE ADDITIONAL NOTE ON EMBLEMS OR A.M.A. NUMBERS: THE PAPER PATTERN, EVEN BEFORE CUTTING OUT, CAN BE USED TO LOCATE THE EMBLEM, LINE-UP THE NUMBERS, OR CHECK THE SUITABILITY OF THE DESIGN FOR A GIVEN LOCATION. ONCE THE PATTERN HAS BEEN CUT, USE THE CUTOUTS AS A TEMPLATE TO LOCATE AND LINE-UP THE EMBLEMS OR NUMBERS BEFORE TACKING AND SEALING THEM DOWN. WHEN SEALING, START AT ONE EDGE, AND WORK ACROSS THE EMBLEM, SEALING AS YOU PROCEED. DO NOT SEAL ALL AROUND THE EDGE AND TRAP AIR BETWEEN MONOCOTE LAYERS, OR A GIGANTIC BUBBLE WILL FORM.

ON BUBBLES -- VENTILLATE ALL YOUR WING RIBS BY DRILLING A 1/16 INCH HOLE THROUGH EACH OF THEM. A SINGLE PIN PRICK IN ONE WING PANEL WILL THEN PREVENT YOUR WING FROM BLOWING UP LIKE A BALLOON ON THE FIRST HOT DAY THAT YOU FLY THE AIRPLANE.

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THORNBURG'S RULES

Most of us know Dave Thornburg by his works which include Bird of Time, a superb thermal duration sailplane of pleasing appearance, and River of Air, one of the best expositions of soaring flight I have ever read. Dave is also a pilot of consummate skill, and had this to say in Thermals - newsletter of the Rocky Mountain Soaring Association:

"1. Drift with lift. Thermals tend to blow along with the wind.

2. Stay with what you've got. Low thermals have down air nearby.

3. There ain't no zero lift. A weak low thermal will always grow. If you're not sinking, there's some lift. If you are sinking, move someplace else - fast.

4. Don't leave a thermal and come back straight upwind. Sink holes follow thermals. Strong lift will usually have strong sink nearby, and vice versa.

5. Fuselage angle indicates rising or sinking air. A rearward c.g. will make the fuse a more sensitive barometer of up or down air; also, more sensitive to stalling - which must be avoided. Thermals will tend to push the plane outwards - so turn b ack against a lift-induced turn to get into the core. Establish where the core is by making a couple of passes through the lift. (Some pilots do a figure-eight for this...JHG). Once circling in lift, notice which side of the circle is better and drift that way.

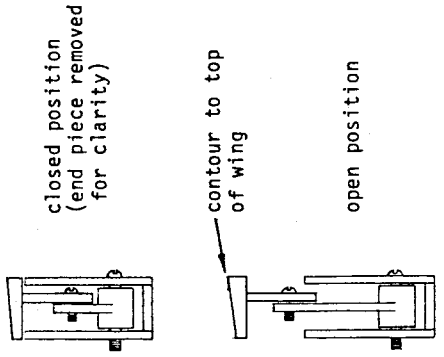
6. Develop a minute sensitivity to air quality. Lift comes through in cycles. Hot spots for thermals and ridge-type lift tend to stay put for a period of time. A thermal passing through as you launch can often be caught up with downwind. A sudden wind shift usually indicates a thermal nearby - the wind on the ground blows toward the thermal.

7. Learn to use ballast. Wing loading translates into flying speed. The trick is to add enough ballast to achieve good glidespeed without handicapping ship in weak lift or making it too hard to land. If the wind is strong enough to use ballast, flying downwind is usually bad."

Thanks, Dave. A lot of readers are going to thank you for this info. I've used all of these tricks, and more, in flying sailplanes. All of us can benefit by being aware of them and thinking about them.

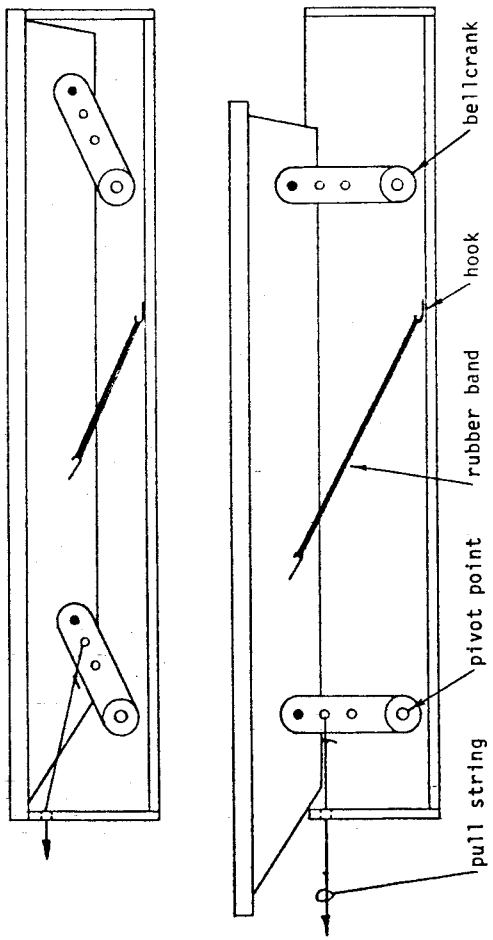
VERTICAL BLADE SPOILER

by BOB SEALY



BILL OF MATERIALS

1. 1/16" C-grain balsa for box
2. 1/8" light balsa for spoiler cap
3. Four 90 degree bellcranks
4. Four 2-56 X 1/2" machine screws
5. Four 2-56 X 1/4" machine screws
6. Four small dress hooks
7. Two small rubber bands
8. Spoiler cable
9. about one hour of time



1. Build all parts entirely out of balsa.
2. Clip one arm off of each 90 degree bellcrank.
3. Machine screws thru center of bellcrank are just for pivot points.
4. Spoiler blade is attached to bellcranks by screwing machine screws into bellcrank. Cast hole in bellcrank may have to be slightly enlarged.

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