

**THE VINTAGE SAILPLANE ASSOCIATION**

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

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R/C  
*Soaring*  
DIGEST

Vol. 4 No. 7&8 Aug-Sept

**Double Issue**

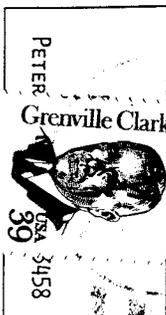
**Acres of Scale!**

MIMIMOA

WING SPAN	17.00m
LENGTH	7.00m
WING AREA	19.00m <sup>2</sup>
ASPECT RATIO	15.2:1
EMPTY WEIGHT	216.00kg
GROSS WEIGHT	350.00kg
WING LOADING	18.42kg/m <sup>2</sup>
STALLING SPEED	60.00km/h
MAXIMUM SPEED	220.00km/h
SINK RATE @63km/h	0.65m/sec
AIRFOIL (MOD)	Gö. 681

PHOTO  
FRANK SMITH'S  
"MOATZAGOTL" IN 1/4 SCALE

RC Soaring Digest  
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FORWARDING POSTAGE GUARANTEED

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The Keystone R/C Club continues a proud tradition

## EIGHTH ANNUAL KRC

# Electric Fly

SEPTEMBER 19-20, 1987

SAT. 9:00 AM to 6:00 PM

SUN. 9:00 AM to 3:00 PM

## Buc-Le Aerosportsmen Flying Field

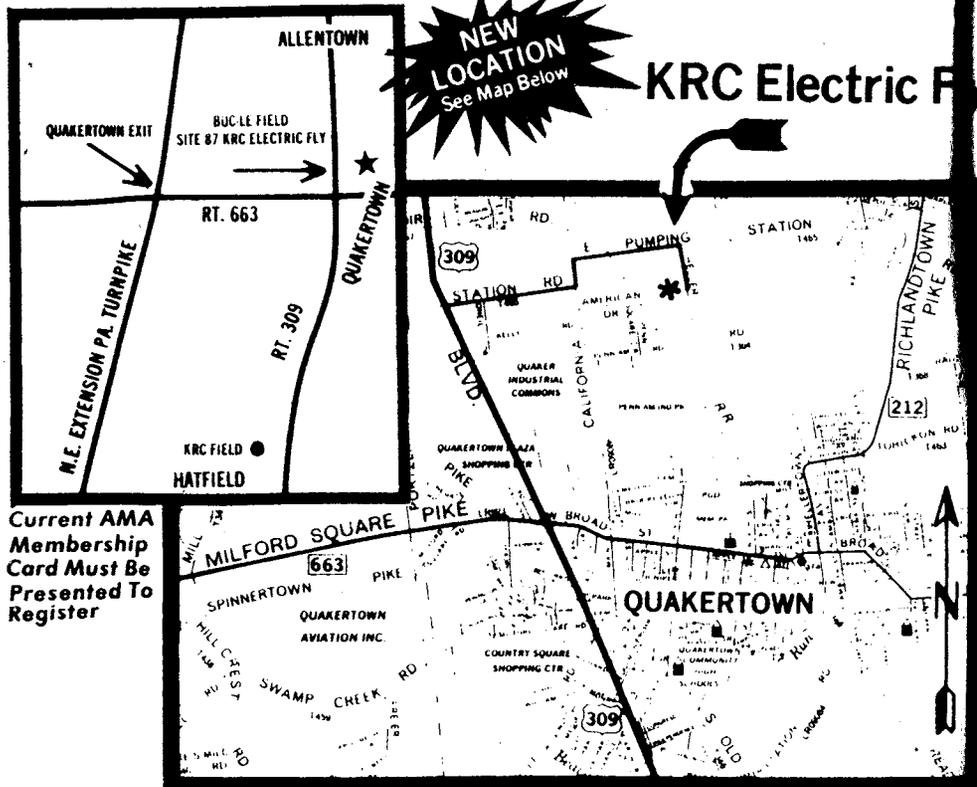
Heller Rd. Quakertown, Pa.

### ACTIVITIES INCLUDE

Daily Cash Award For "ALL UP LAST DOWN" (This event opened to all NICAD powered aircraft)

Daily Awards for Best Looking, Most Aerobic

Daily Raffle of fine Electric Merchandise



Current AMA Membership Card Must Be Presented To Register

Due to the growth of this event, KRC members felt we needed a bigger field to hold the Electric Fly on. We therefore with gratuitous permission from the Buc-Le Aerosportsmen have moved this event from our field to theirs. The field is bigger and more important it has more open space to fly over. The field is located 20 minutes (approx. 10 miles) North of our field.

Welcome to the second SCALE ISSUE of RC SOARING DIGEST...or, perhaps more correctly stated, the second issue covering SCALE MODEL sailplanes! I'm sure you would like to hear that the first scale issue (March 1987) was popular, as indeed it was; in fact, one of the most popular issues ever printed! Therefore, we're doing the SECOND SCALE ISSUE to satisfy the demand for more information, and to use some of the hundreds of photos we've received from dedicated scale modelers all over the world.

HI START

In last month's issue I promised you an extra-large double issue: August and September, to cover the period of moving to Arizona and settling into our new home. What better, then, to make this SECOND SCALE ISSUE the biggest ever in our brief history of publishing RCSD. Many of you have ordered back issues after finding out that RCSD has been published since January 1984, and as a consequence, some years are nearly depleted. For example, I think we have only a few months of 1984 left; about 10 months of 1985; 11 months of 1986 and all of 1987 to date.

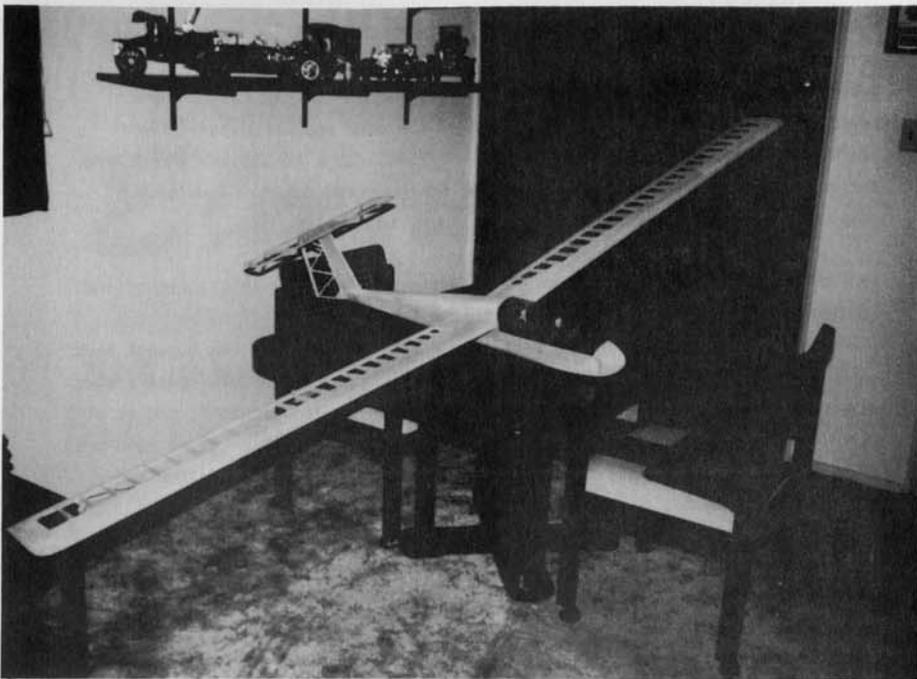
The planning, construction and flying of scale sailplanes represents a larger-than-usual effort on the part of the dedicated modeler. Collection of documentation, drawing of plans to the correct scale, and last but not least the construction of the model. Usually this effort is rewarded by the end result: a possible win or place at a scale meet, and really fine flying characteristics coupled with unexcelled appearance in the air. This is particularly true of vintage scale models, typical of those flown in the 1930's and '40's...and to some extent those flown in the '50's as hold-overs from pre-War times.

There is no real consensus concerning "vintage" or what constitutes a vintage glider or sailplane, although the Vintage Sailplane Association in Lovettsville, Virginia considers any sailplane constructed before about 1955 to be vintage. There is some discussion underway to classify sailplanes and gliders as Antique, Vintage, Classic and Modern -- but here, again, there isn't any hard and fast rule employed by all countries throughout the world.

For those engaged in the research necessary to produce a winning scale model glider or sailplane, I'd like to recommend that you join VSA (see ad on back cover this issue) or the corresponding association in Great Britain whose address is: The Vintage Gliding Club (VGC) c/o Chris Wills, "Wings", The Street Ewelme, Oxon., England; or c/o Robin Traves, "Rose View" Marden Road, Staplehurst, Kent, England. Last, but by no means least, is the (US) National Sailplane Museum (NSM) Harris Hill, RFD#3, Elmira, New York 14901.

These are all magnificent sources of information, and will prove to be a big help to all of those who seek documentation for their projects. I look forward to being "swamped" once more with letters, photos, comments and source information from all of you who enjoy and approve the SCALE issues. Thanks for all your help and interest. I'm looking forward to our next and THIRD scale issue.

Happy soaring,



BOB CARTWRIGHT'S T-53 SLINGSBY IN BEFORE

THE T-53 STORY.....Bob Cartwright\*

Back in the first scale issue, Bob Cartwright sent in some photos of his scale model of the Slingsby T-49B CAPSTAN two-seat training sailplane built and flown in England. The model turned out to be an excellent performer as well as a great looker. Here's Bob again to tell you about his T-53. You might want to write to him.

"The Slingsby T-49B appeared in the April 1984 issue of RC Modeler, designed and built by M. Hollison. The specs are: Span:- 107-3/4", Wing area:- 800 Square Inches; Fuselage length:- 52"; Stabilizer length:- 30". Flat-bottom airfoil, coupled rudder and ailerons, and spoilers.

"Compared with my other ships, it's a bit difficult to say, as my other sailplanes are 'bent-wing birds'...but it does real well as long as I keep the speed up. If I slow it down too much, it will drop a wing on me, and I don't have much time with ailerons.

"There are only two other scale ships in our club, and the T-49 stays right with them. The T-53 is coming right along, and I'm down to the final sanding and some small details to finish. I still haven't found any documentation for it...I wrote to Sean Walbank, but I still haven't heard from him (as of January 4th 1987...JHG) I also wrote to the Vintage Sailplane Association and obtained from them the name of a fellow in Massachusetts who owns a full-size T-53, but I haven't heard from him yet.

"By the way, I have a 13-foot MONSTER on one of Jerry Slates' CONTENDER fuselages (Viking Models USA - see ad in RCSD...JHG) and it is a great flier. I accomplished my second 1-hour thermal flight with it and will go for my Level IV goal and return with it as soon as the weather is better. I intend to write to Jerry Slates and let him know about our field here; it is a 300-acre sod farm about ten miles out of town."

Editor's comment: The next letter we received from Bob contained a couple of nice photos of the T-53 (see pix in this issue) and he says:

"Well, the T-53 is finished except for a license number. It has been too windy to attempt flying it...maybe this weekend! The original article and plans came from the March 1973 RCM, which I obtained from them. A friend of mine had the mag (with construction article...JHG). I have covered it as per plans drawn by Bob Andris (Andrus?) but I still haven't



AND AFTER VIEWS. SHIP HAS SWEEP- FORWARD WINGS.

found anything to document the model. I have obtained a copy of the April 1970 issue of SOARING magazine (Journal of the Soaring Society of America.. JHG) but the photo is black & white, and does not match Mr. Andris' plans. I'll let you know how it flies when we get some decent weather (signed) Bob C."

Editor's notes:

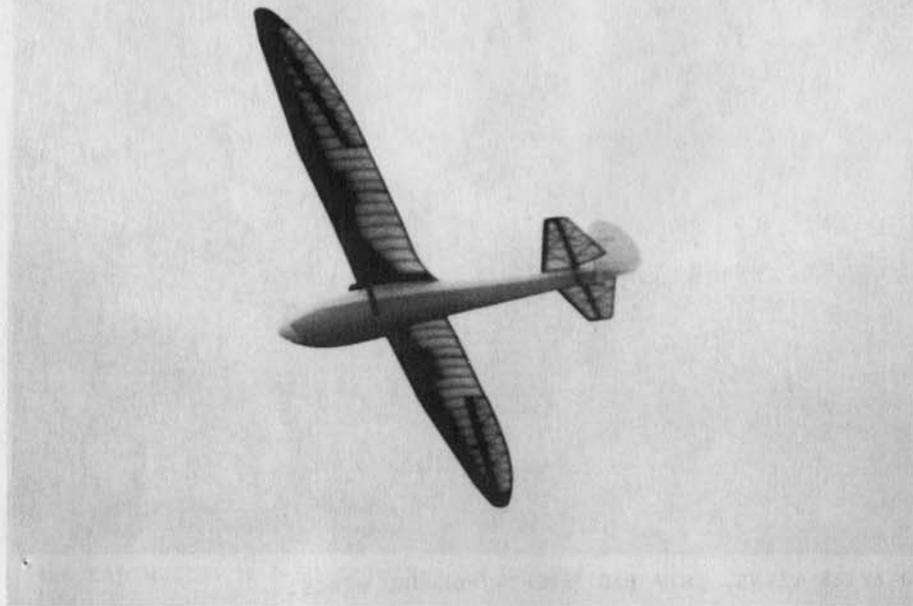
Subsequently RCSD received another letter from Bob which says:

"I've put just one flight on the T-53 last Saturday. The wing rods are flexing too much, so I'm going to harden them this week. The flight was short because the wings flexed so much that I got off the winch; I was scared! I'll let you know how I progress with it. (signed) Bob C."

Editor's note:

Since then, I haven't heard from Bob about it, but it may have attended the SCALE UPRISING as this is being written, and may well have done well in the meet. That will be mentioned in a future issue, as the meet is not yet fully reported at the time of writing. However, a couple of interesting comments from Martin Simons who says that the original T-53 was not an entirely satisfactory replacement for the T-49, its predecessor. The main reason being that it was heavy and awkward, having been constructed of aluminum instead of wood and fabric as was the T-49B. Apparently the flight characteristics were not as pleasant or the performance as good as that of the T-49B CAPSTAN. The wing sweep-forward was done to facilitate the instructor's view from the back seat, because the T-53 was a tandem two-seater, whereas the T-49 was almost a full side-by-side configuration, with slight stagger to the seating, making it a very pleasant machine for instruction and also a good soaring bird. This is a case where modern materials and design are not always better than the earlier machines' materials and design.

Concerning documentation of the T-53, a good point is raised. It is not only necessary to duplicate a type in scale modelling, but it is also necessary to duplicate a specific aircraft for which such items as markings, color, and other particular and perhaps peculiar features distinguish it from other machines of its type. Thus, you have to do a lot more research than merely construct a plane according to plans and finish it in a manner that seems typical to you...JHG.



KIRBY KITE I IN FLIGHT OVER LONG MYND - YORKSHIRE

ONE-QUARTER SCALE KIRBY KITE I.....JOHN WATKINS

"As long as I have known of the Kirby Kite, I have regarded it as the most aesthetically appealing of all vintage gliders. Imagine my delight when attending the 1985 VGC rally at Long Mynd, there were three!

"Ted Hull's BGA 394 was the one I chose to photograph extensively after assisting many 2-man hand launches from the Mynd's west face.

"An accurate three-view drawing was acquired and plans prepared for a 1/4 scale version. Ted Hull's glider was a great inspiration and helped by providing some of the detail I had missed.

FUSELAGE

"The fuselage is constructed on a hard balsa crutch using 1/8" balsa half formers and 1/8" sheet balsa planking. **SHEETING** is strictly the word, as the rear end - being straight-lined - is covered in three pieces: 1 top and 2 sides, saving all that heavy glue. After careful preparation it was then simply covered with white Solartex. Fuselage formers which show on the surface of the ply (starved-horse look on the full-size machine...JHG) were simulated by using strips of ironed-on Solartex under the main covering.

WINGS

"The wings presented their own difficulties with compound-curve trailing edges in the form of root sweep-back and gull effect. After careful thought, the wing spar was firstly constructed over the plan, gluing in the forward ribs and false leading edge strip. The remaining rear portion of the ribs were added with the wing in the inverted position, chocking up the preformed spruce trailing edge to fit and glue in. The rest was simple, but a close watch was kept to prevent built-in warps from creeping in.

TAIL

"The tail was purely a matter of keeping the weight down by using a basic structure of extremely light quarter-grain 1/2" balsa sheet; (knew I'd find a use for it someday!). The rudder is an outline of wound balsa strip - shades of free-flight days! (John means laminated strips formed to the outline and pinned over the plans until the glue

has cured...JHG). All surfaces are covered with natural white Solartex, using Balsaloc on the undercambered ribs and other necessary areas to increase adhesion.

FINISHING

"Following the full-size practice, the wing and tail open structure was masked and sprayed white on top of the covering. Two hours of masking equalled two minutes of spraying!

RADIO

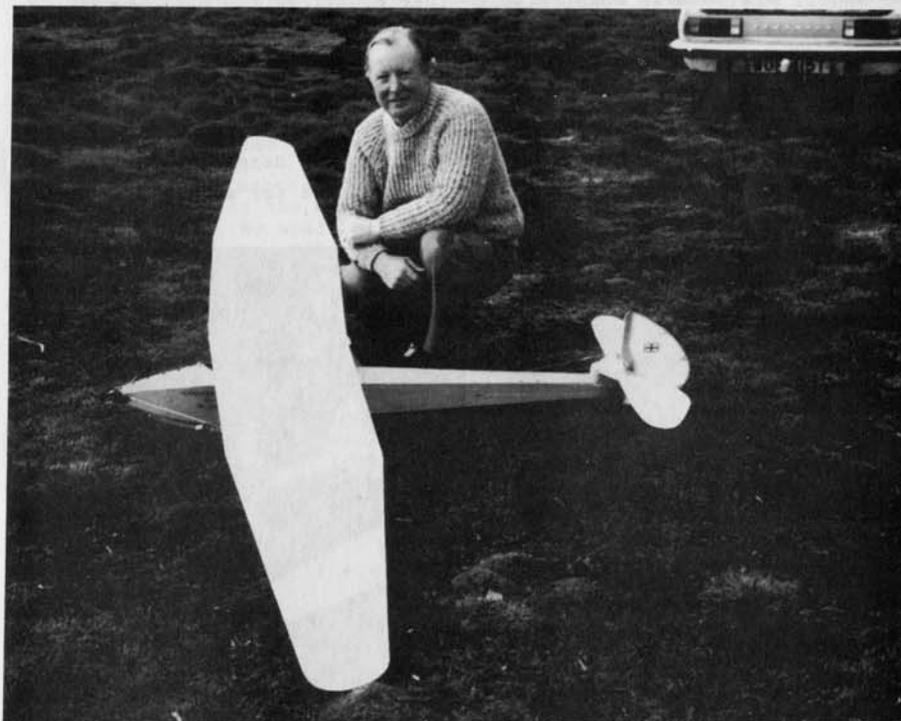
"A Futaba flight pack: Receiver, 500 mAh Nicad batteries, and four servos were fitted as far forwards as possible (due to the long tail and very short nose arms...JHG). The CG positioned close to the balance point, bringing the weight to 7½ pounds and giving a wing loading of 10½ ounces per square foot...and we were ready to go.

FLYING

"The first flight was against a 15 mph wind, and the model just held its own with full down elevator. This proved to be quite an unfair test as although rigging angles had been carefully monitored, adding much more weight became a danger of pushing the CG in front of the wing! This is the result of using the scale Göttingen 535 wing section with a flat-plate tail. The trim has now been sorted out, and the KITE is sheer relaxation to fly, albeit a bit sluggish in winds above 10 mph. She tows up predictably well in the lightest winds and thermals willingly. This is a glider that seems more at home on the flat than on the slope, when showing up its graceful lines and structure in the sunshine. Aero tow facilities are now fitted, but not yet proven. I don't foresee any problem, so am waiting for the opportunity to arise.

Editor's note:

"Jack" Watkins has sent several letters describing some of the scale modelling activities in England, and he has furnished some beautiful photographs, a couple of which are included in this issue.



JOHN WATKINS POSES WITH HIS 1/4-SCALE MODEL OF THE CRESTED WREN

FINAL REMARKS

"BEFORE I MISS THE POINT, The KITE BGA 394 was built in 1935 and belonged at one time to Amy Johnson (who gained fame with her husband by flying the DeHavilland racer from London to Melbourne that year...JHG). The current owner is Ted Hull who also owns the Moswey 3 Swiss sailplane. I have no photos of the Moswey (but I sent him a couple taken at Dunstable in 1978 during a trip to England...JHG). Keith Thomas in UK has built a beautiful 1/4-scale version of it - all yellow. He has recently moved house, but Cliff Charlesworth should know his address if you want further details..

"The only photos of the Kite I have at present are are a bit sub-standard, and no opportunity to take in-flight shots."

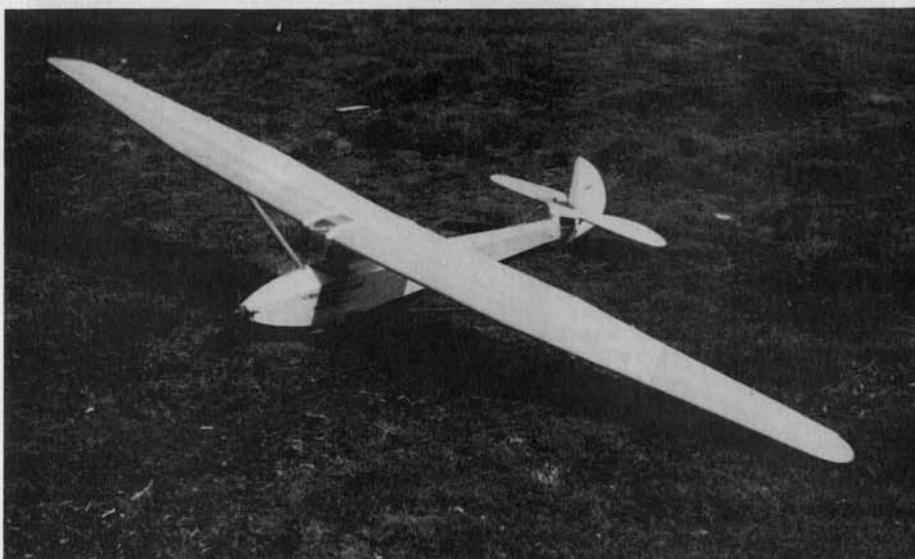
Editor's Comment:

For those who may wish to correspond with John Watkins about his Kirby Kite, or about any other scale matters, his address is: **58, Hopton Crescent, Lyndale Park, Wednesfield, Wolverhampton, WV11 3JQ, England.**

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UPDATE FROM JOHN WATKINS.....LETTERS

"I've just sent a 4-page write up, photos, etc., of my latest creation -- the CRESTED WREN --(to another magazine) the building and finishing of which is my reason for not writing sooner...I got it finished in time for a scale get-together with Cliff and some other mates at White Horse Hill last March. She flew magnificently, although I say it myself, especially in wintery and windy conditions. Last weekend I flew it at my home slope, Long Mynd, and darned nearly lost it overhead in a booming thermal. No brakes makes for a long descent! Just under one hour!



BILL MANUEL'S DESIGN - CRESTED WREN IN 1/4 SCALE - 1930'S VINTAGE

"I expect you may have heard (yes, indeed...JHG) that Cliff Charlesworth is 'doing' an OLY 2B at 1/4 Scale. I provided a few photos for him of the full-size 2B belonging to a friend of mine, Mike Goff. I enclose some negatives of this version and another mentioned in my last letter. (I made prints from these negatives, in color, and have them for future reference...JHG.).

"The address of the Vintage Gliding Club is: **Chris Wills, 'Wings', the Street, Ewelme, Oxon, England; or Robin Traves, 'Rose View', Marden Road, Staplehurst, Kent, England.** The VGC has no resident airfield, but rely on British and Continental Clubs to host them for their meets. A well-worth organization to belong to, full of useful and interesting information (about vintage sailplanes...JHG). There is also the matter of getting a closer relationship and understanding between modellers and full-size aircraft owners, especially when they know you want to 'do' their glider."

"Cliff Charlesworth has a super article in a recent Radiomodeller (English publication) devoted mainly to his 1/4-Scale LO-100.

"I wrote to Bill Manuel last week (designer of the Crested Wren back in the early 1930's, and who is still alive and active by the way at age 80+...JHG) enclosing a photo of my model of the Crested Wren. He's 84 and writes a spritely line. I bet he could tell a tale or two. (Incidentally, from information obtained from Martin Simons just this week, Bill Manuel has built a full-size Crested Wren from memory some 50 years after the original!...JHG).

"Ted Hull is interested in obtaining information as to the whereabouts of any Kirby Kites that (may) still exist in the States. He says that BGA 316 owned before the War by Amy Johnson, was impressed for service by the RAF (presumably for early RADAR tests...JHG) and after demobilization went to the USA as N37190. Could you confirm? (I'm trying...JHG).

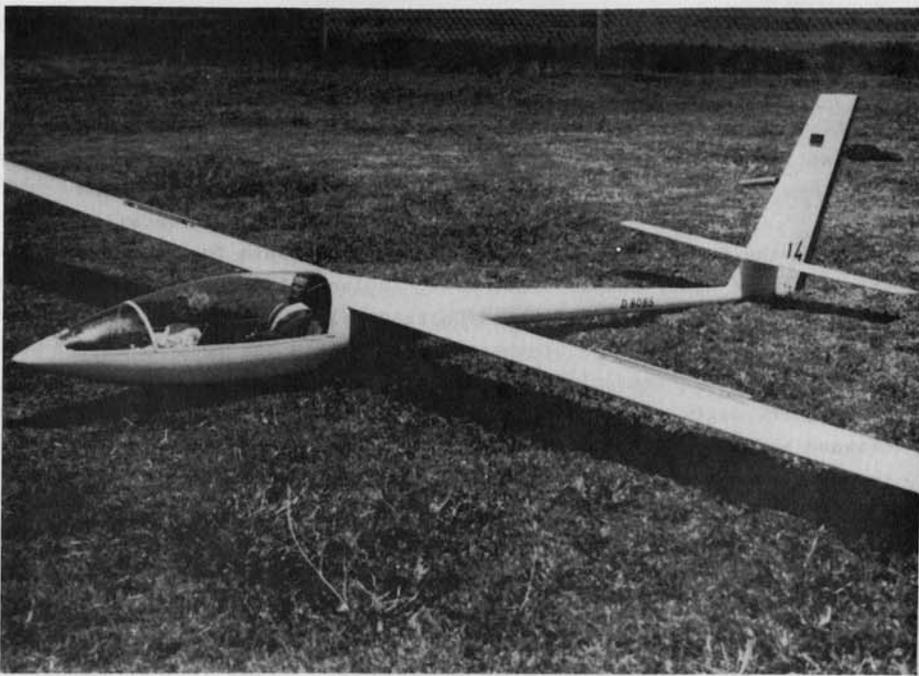
"He also mentions a photo he has of Kite NC28800, painted red, and holder of the women's distance record by Ginny Bennis Schweizer. It did 97 miles. We would be grateful of any information you might obtain, Jim. You see, the Kite Owners Association hasbeen formed in this country, so you can appreciate their keenness. Whilst on the subject of favors, have you any pics, negs, etc. of the Olympic ORLIK (Polish entry in the hoped-for 1940 Olympics, aborted by WWII...JHG) as depicted in Martin Simons' super book? One exists in the US belonging to Paul MacCready, I believe. (Note: Paul MacCready is former World Champion soaring pilot, and winner of the Kremer prizes for his Gossamer Condor and ohter man-powered craft...JHG.; I think the ORLIK is now in possession of another person, and is flight-ready in a private hangar...JHG). It would make a GREAT 1/4-scaler.

"I did a marathon cross-country with the Crested Wren trying to shake it out of a thermal. I tell you it was mighty high. When in the blue, it looked like a fluorescent light strip with its clear-doped fabric flying surfaces (see flight photo enclosed). I winch towed it a week ago and she went up with no trouble at all -- next thing is AEROTOWING!" (Signed) John."

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Editor's note:

The Kirby Kite, the Olympia 2B, and the Polish ORLIK, along with the Ross-Stephens ZANONIA, have long been favorites of mine for possible scale modelling. I had not been aware of the CRESTED WREN, however, and John's mention of it caused further research and comment. Martin Simons says that it was an excellent flier in the full-size version, although obviously primitive by today's standards. It is also a great soarer in 1/4 scale, as seen from John's letters. RCSD hopes you will enjoy the accompanying photos of the cute little bird. 7



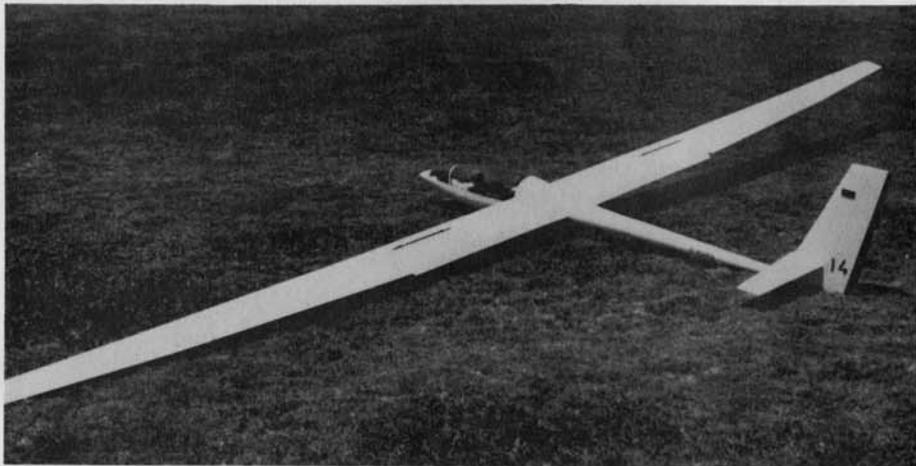
JANTAR I by RAY MCGOWN

MORE LETTERS ABOUT SCALE

Kevin Webb, 335 Shockley Road, Auburn, California 95603, writes:

"Dear Jim: I just received the Scale issue of RC Soaring Digest and I really enjoyed it.

"Enclosed are (pictures of) two beautiful ships from our area. The JANTAR I was built by Ray McGown of Napa, California, and the other was built by Rich Spicer (member US F3b World Championships Team-1987). Rich built his SB-10 from scratch like everything else he does. Sixteen-foot span, and I believe the stab area is only 6½% or exact scale, and the airfoil is the original used on the full-size SB-10! I would suggest writing Rich for a feature article. If you saw his SYNERGY F3b design, you know it is quality."

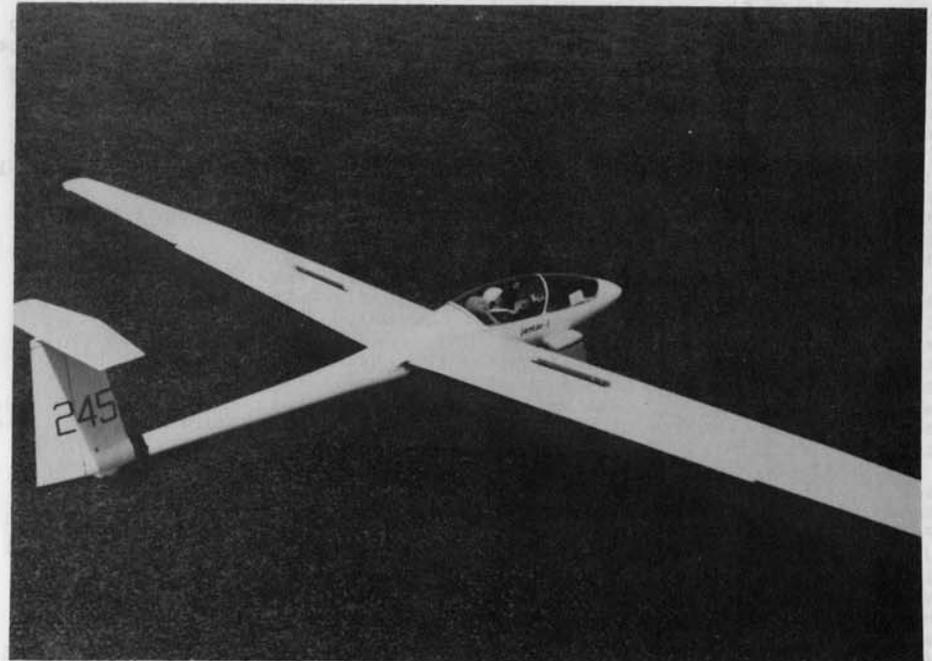


Jantar during ROG lift-off

Comments by Editor:

Yes, Kevin, I agree. However, I have not written him about an article because of his deep involvement in, and total commitment to, the 1987 F3b Championships as member of the US team. Rich has been building and flying SYNERGY I and II, and has had very little time for any other activity. RCSD wishes the Team every success, and may write sometime after the dust has settled to ask for a feature. I'd really hope that one or more of the Team would write their accounts of the World Championship for us...Jim.

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SB-10 by RICH SPICER



"NERVOUS" FRANK SMITH AWAITS FIRST FLIGHT OF "MOATZAGOTL"

MORE LETTERS FROM ENTHUSIASTS AROUND THE WORLD.....

Frank Smith, 4/270 Werrigal Road, Burwood, Victoria, Australia 3125, writes (and sends photos) as follows:

"DEAR JIM: About some six weeks ago, my very good correspondent friend - John Watkins - in the U.K. very kindly sent me your copy of RC Soaring Digest - March 1987 Scale Issue, which I might add I have found most rewarding indeed. This was a fine issue, and I am most grateful to John for sending me same.

"Apart from the features on the U.K. scale models in this issue, I found the articles on the 1-26B, Flat Top LK-10A, and the Slingsby T-49B most interesting also...very nice to see this sort of thing published. I for one would like to see more put into print on, say, Vintage Scale RC Gliders and Sailplanes from the USA. I feel that there just does not seem to be enough coming out of the USA in the regular (Commercial) publications. The UK monthly RC magazines seem to keep one up to date on what's new re scale gliders, etc., and also FMT in Germany seem to feature scale and semi-scale in their magazine as well.

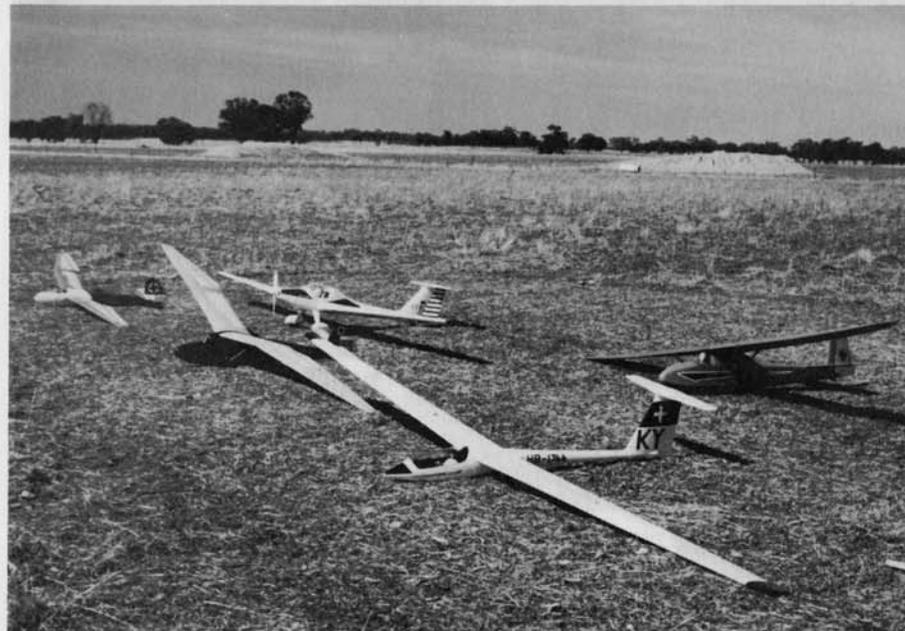
"I am mainly interested in Vintage sailplanes and in building models of same. Over the past 10 to 12 years, I would hate to guess just how many different models I have built. Currently, I have some 8 scale models of various types, and am working on a 1/4-scale Bowlus BABY ALBATROSS, but this is at least two months away from finishing.

"With this note I enclose some photos for you, both in colour and black & white, and these show some of my scale models. About 2 years ago I built a 1/4-scale model of the German SG-38 SCHULGLEITER, and have in all that time only one really successful flight with it...and that was late last year. It lasted for about ten minutes from a slope site. The b&w prints were made at that time. The colour view of the SG-38, along with the nice assistant, was shot in January this year at our club meeting, but on that day because of poor lift on the slope face I did not risk flying the SCHULGLEITER.

"In photo #1, you can see a very nervous yours truly only a few seconds from launching his new 1/5-scale Grunau 7 'MOATZAGOTL' (4-METER SPAN, 8-POUNDS ALL-UP WEIGHT) on its maiden flight back in January 1987. Photos 2 & 3 show my semi-scale GO 3 MINIMOA built from one of the old Jim Ealy kits (see cover, this issue...JHG) several years ago, but rebuilt last year and updated with a new set of wings, scale dihedral, scale size stabilizer and new rudder also. Since that photo was taken, I fitted a new scale cockpit canopy. By the way, this model flies like a dream, is a beautiful thermal machine, and also 'fab' as a slope soarer. It weighs in at just 2 ounces over five pounds. In photo 3 you will see both my MINIMOA and MOATZAGOTL, plus my 1/4-scale GRUNAU BABY II built from Cliff Charlesworth plans about three years ago...and still a fine flying model!

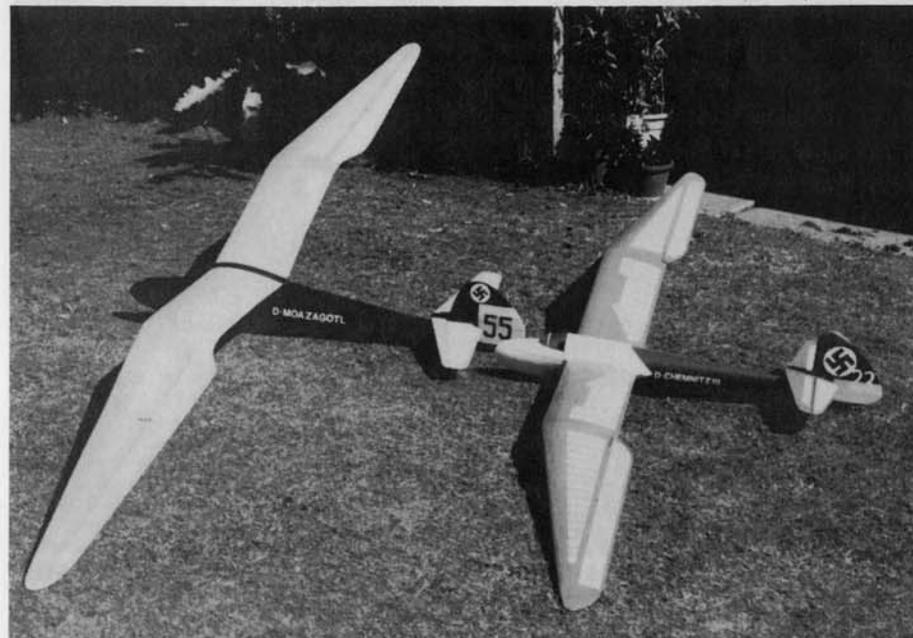
"The other models in this pic are that of an ASW-22 and Grob 109 built by fellow club mates at a recent scale meeting held over here.

"Anyway, Jim, I hope that you and your readers find the few enclosed views of some interest...and if I can assist in any way, please feel free to contact me. I am always happy to help out where I can. Kindest regards from (signed) Frank Smith."



GLIDER GAGGLE INCLUDES "MINIMOA", "MOATZAGOTL", GROB 109; GRUNAU BABY II; ASW-22 (F. SMITH).

(F.SMITH)



LOVELY "MOATZAGOTL" IN 1/4 SCALE POSES WITH "MINIMOA" IN 1/5 SCALE



LOVELY FEMALE ASSISTANT POSES WITH SG-38 "SCHULGLEITER" (F. SMITH)



NOTE "FLAG" ABOVE WING SHOWING TRAINING AIRCRAFT NUMBER OF SG-38

Editor's Comments:

What beautiful models, Frank! My readers and I surely appreciate your sharing some of your "pride and joy" models. You can bet that RCSD will take advantage of your kind offer to help out. In fact, by the time you read this, I will have asked you in my letter to help out a lot...such as writing a scale column for us as your time may permit. At the very least, we welcome your views and comments on the Aussie Scale Scene. As a matter of interest, Martin Simons visited us recently with his wife and sister-in-law, spending a few days to chat and sightsee. He mentioned the excellent craft displayed in your scale models, and also mentioned that the MINIMOJA in particular is an elegant and stable scale flier. At one time I had nearly completed a "MINI" of my own but never finished it, as I felt it was going to be too heavy. The idea was to carve a blue foam fuselage and "skin" it with balsa, afterwards removing the foam. Never finished it, sad to say.



FRANK SMITH'S SG-38 "SCHULGLEITER" IN FLIGHT OVER AUSSIE DOWNS



COCKPIT (OPEN AIR) OF SG-38 SHOWS DETAIL OF SCALE EFFORT (F. SMITH)

Everett Smiley, 5355 East Brisarwood Circle, Littleton, CO 80122 writes as follows:

"Dear Jim: I enjoyed reading your Scale Soaring issue of RCSD. I also enjoy 'sailplaning' and love to build. I have wanted to build a scale ship for sometime, but I haven't because: 1) Although I have documentation for a PILATUS B-4, I don't have the time to design and draw the plans. Mike Trew's plans (England) somehow don't seem to 'compute' when compared to the factory three-views; 2) Hobby Lobby has what appears to be the best selection of (scale) kits in the US, but where does one obtain scale documentation? 3) Perhaps doing the research is part of the price you pay for 'scale' but some people just don't have the time. 4) Of the plans listed in your Scale Issue (March 1986) only one offers scale documentation (LO-100). What about three-views? 5) Perhaps the new The World's Vintage Sailplanes will solve part of the problem...but is one expected to cut out the appropriate documentation from the book for the AMA presentation?

"If you know of anyone who can help, I would be interested in AMA SCALE documentation, including colors, for: MINIMOIA, SG-38, REIHER, GRUNAU BABY IIB, and scale plans for the PILATUS B-4 (other than Mike Trew or Jim Ealy.

"Thanks for listening. I'm not lazy, but just have NQ time for research. There must be documentation available if our English friends build so many scale models. (signed) Everett Smiley.

#### Editor's comments:

Everett, you have hit just about every nail one can think of right on the proverbial head! However, there are answers to all of your questions...they just take time to discover. For example, the Vintage Glider Club in England, The Vintage Sailplane Association in the USA, The National Soaring Museum, and Scale Model Research (ads for some of these appear in RCSD) can help out tremendously. Even three-views and color photos, etc., etc. can be had. Also, I have made an effort to give the names and addresses of our English friends and others, to facilitate greeting acquainted and sharing information and documentation.

While I do understand time constraints, I think that everyone has time to do what he wants to do...it's just a matter of priority. For example, I work several jobs and several hobbies, but grant you that there's not much time left for sleeping or attending contests. First, I do what has to be done, and then I do what I'd like to do - in order of preference. Saying you "don't have time" means that scale modelling is not on your list of priorities. That, however, is strictly up to you!

"Doing the research" as you put it, is indeed, the "price" you have to pay for excellence at anything you choose to do in whatever field attracts you. So that isn't a valid criticism - just a truism of life. Three-views are not all that hard to find. The Simons book is just one place; ALIANTE by Ferdinando Galéis another; and the OSTIV book printed back in the early 60's is another; and so forth and so on. Try writing the Soaring Society of America, the Gliding Federation of Australia, the British Gliding Association, etc., etc. You will find what you need - eventually. There's that old bugaboo 'time' again!

I agree that there are too few scale model kit suppliers in the USA. I am personally trying to solve that problem by bringing together an overseas kit manufacturer with a US entrepreneur to import some kits in the 1/5th-scale category, and under \$100 delivered, to satisfy the need. They would be stand-off, not museum, scale and they would be excellent fliers. I'm thinking of a scale model of about 100" span or so with good airfoils and simplicity of construction...with scale outlines but capable of being built to AMA scale if the modeller desires, but can also be built just to fly.

Yes, I do know 'anyone' who can help you: our entire readership! The scale modellers in particular among us, are always happy to respond to requests. Also, don't fail to look into Model Builder, Model Aviation, and Model Airplane News...or even Flying Models for help. All of these have published plans, three-views and documentation at one time or another. JUST ASK - that's the key. By the way, RC Modeler is another great source!

Jim Gray

Jack Hiner, 2213 Preentiss Creek, Downers Grove, IL 60516 writes:

(regarding the appearance of his Flat-top LK-10A model in the first SCALE issue):

"The blue LK-10 Flat Top in the picture flew away in 1981! It was a good flying scale bird that was easy to build. Right now, my construction drawings are on loan to a fellow S.O.A.R. member, Jim McIntyre, who is building a ship for the SCALE UPRISING. When Jim finishes his, I'll also build one for the Scale Uprising. MAYBE THIS FALL AND WINTER STEVE MOSKAL CAN MAKE A NICE SET OF CONSTRUCTION PLANS (how about it Steve?...JHG). I have black & white photos taken during construction, so it would not be too difficult to do a construction article. (We're waiting, Jack...JHG).

"I have a number of different pictures of various Flat Top LK-10's - but no other one has the flat upper fuselage sides (very easy to build), and on most others the top of the fuselage is NOT as flat as on N-58085 from the front of the canopy to the tail feathers. Also, the other Flat Tops have real ugly canopies, and that's why I chose N-58085.

"Scale Uprising dates have been changed to new dates of August 1st & 2nd 1987, due to a conflict with the AMA Nat's on the earlier dates planned.

"Question: who does the super 2-views for RCSD? (Our own Bob Rondeau, of Robert W. Rondeau Graphics Design, 73 Main Street, Brattleboro, VT 05301...JHG). Maybe for your Scale Issue you could clean up the Flat Top LK-10A three-view and use it for a two-page RCSD Centerfold pull-out!

In my original drawing of N58085, I made an error in the side view of the fuselage and in the front view. I made the numbers slightly wrong, and the wings had too much taper in the front view, as did the horizontal and vertical stabs."

About the Pratt-Read scale model you mentioned in your recent letter to me: Duane Eisenbeiss (S.O.A.R. member who owned the full-size LK Flat-top) also owned a Pratt-Read. Steve Moskal (another scale modeller you'll hear more about JHG) in the past considered doing a model of the Pratt-Read, but -as for me- it is too complicated: too many strange curves in the fuselage, but it would fly great. Now, the MOSWEY III or IV is a real pretty ship (perhaps my all-time favorite...JHG). The September 1980 SSA calendar picture has a Moswey III with a blown canopy...color yellow overall with a black N379HB on the fuselage side, and a red band with white cross (Swiss markings) on the tail. Maybe someday...

"The Duane Eisenbeiss Flat-Top LK was also a 'double-bubble', but was almost always flown with only the front bubble over the pilot's seat. If you look at the three-view (see March issue RCSD) you will see a hatch behind the canopy which was removed and replaced by another hatch with a second canopy (bubble). This way, a two-place (double-bubble) or single-place version was flown.

"I also have compared the LK-10A Flat-top to the OLYMPIA MEISE. Jerry Nelson is knowledgeable about LK-10's, TG-3's and so on. I had many great talks with Jerry about these sailplanes when he lived in the area. He was also a great help with my cross-country record attempt, weather info and the like. Dan Pruss was also a big help on this flight. Both Jerry and Dan were convinced that you could fly 186 miles (300 kilometers) back in the early '70's when most everyone considered 50 kilometers to 50 miles would be a challenge. It took me until the mid-70's to realize that these two folks knew what they were talking about!

ASW-20  
"Tom Kallevang will fly a German 4-meter/in the SCALE UPRISING. Stan Watson was building a Jack Laister YANKEE DOODLE I designed by him in the 30's when he was a student in college. You are probably familiar with the ship, gull wing and all.

SOME INFO ON MY LK-10 F.T.;

wing construction: similar to the AQUILA GRANDE WITH AILERONS MADE FROM FORMED ELEVATOR STOCK; very simple. Horizontal stab and vertical fin: built up from 3/8" sheet balsa; rudder and elevator carved to airfoil shape -- once again, simple. The fuselage was a 1/8" box with a keel and strip (?) on the bottom with spruce longerons in the corners of the bx...once again, very simple. For the canopy I used a 14" Sig canopy cut down to about 7 - 8" as shown in the drawing. This gives a canopy very close to scale (to the Duane Eisenbeiss Flat-Top LK). Probably wouldn't work on other bubble flat-top LK's due to different shape canopies.

" I didn't use any interior detail or instrument panel since I don't believe there are any points given by the rules for such detail in competition...so why bother? I did not use 'scale' wing attachments. Instead, I used the usual RC sailplane type of wing fastenings for simplicity. Once again - I used Monokote for simplicity!

The ribs are built-up from balsa, and the wing is 119" span. The ship mweighs about 4 pounds ready to fly. In short, it's a scale ship about as easy to build as an AQUILA or SAGITTA...and flies well.

"Just the other day I received some old washed-out photos of Duane's LK-10 F.T. N58085 with the 1950's paint job which was red with N58085 on the wing, as opposed to the vblue fuselage and white numbers on it -- the 1960's paint job. I am changing to the red 1950's paint job on my model. Maybe you could use the blue three-view for the cover (of RCSD) and the red 3-view as a centerfold. Better run, gotta lot to do. (signed) Jack"

Well, readers, as you know the issue didn't turn pout that way due to space requirements, but we did manage to show the 1960's version.

#### NEWS & NOTES:

**MADDY WEISS, WILSHIRE MODEL CENTER, 2836 Santa Monica Boulevard, Santa Monica, CA 90404; Telephone (213) 828-9362 WANTS TO SELL THE BUSINESS.** This is a first-rate foreign and domestic glider hobby store featuring hard-to-find kits and products, especially from Germany but elsewhere as well. The prospective buyer might be from the area, but need not be. The purchaser should be well-acquainted with gliders & sailplanes, preferably an enthusiast. This is an excellent and well-known business in the field. Please contact Mrs. Weiss at the above address. No pen pals, please -- only serious purchasers.

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**KRC ELECTRIC FLY SCHEDULED FOR SEPTEMBER 19-20 AT QUAKERTOWN, PA.**  
SEE ADVERTISEMENT IN THIS ISSUE.

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#### SOURCES OF SCALE SAILPLANE DOCUMENTATION

GERALD MYERS, REDWAY CALIFORNIA wrote to say how much he enjoyed the first Scale Issue, and offers some excellent sources of information for the scale glider modeller.

Janes World Sailplanes and Motor Gliders, Andrew Coates, Flying Books, Ziff-Davis Publishing. ISBN 0-87165-021-51; 8½ x 11 inches, 192 pages; contains 170 glider/sailplane types - one page for each. Specs, b&w photo, great 3-view, plus short written history and status. Inexpensive book contains vintage through late '70's machines. Well worthwhile.

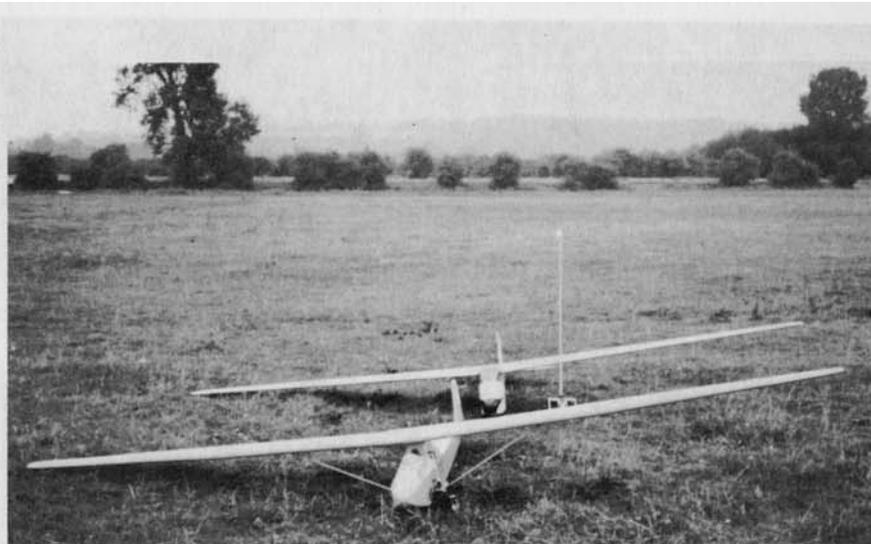
WINNING ON THE WIND. George Moffat. The Soaring Press, Los Altos, CA 1974. Probably out of print. Try Soaring Magazine, Hobbs, NM. Sometimes available in used book stores for as little as \$3. Thirteen three-views. By World Champion pilot. Has history, strategy of competition soaring, etc. Well worth it for the three-views alone...if you can avoid reading!

FIGHTING GLIDERS OF WORLD WAR TWO. James E. Mrazek. St. Martin's Press: 1977. Lists at \$10 but usually available in used books or discounted for as little as \$5.00. Lots of stories, three-views, b&w photos.

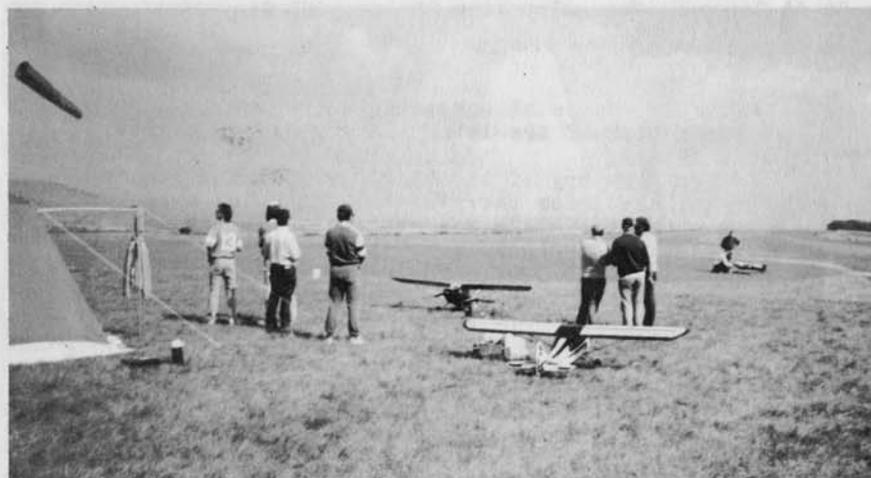
THE WORLD'S VINTAGE SAILPLANES. SIMONS. 1986. Kookaburra Technical Publications, Pty., Ltd., P.O. Box 648, Dandenong 3175, Victoria, Australia. 176 Pages hardbound, 248 photos, 65 color plates, 100 scale drawings. This is THE definitive work on sailplanes from 1908 - 1945. Available direct only from publisher. Inquire price before sending money. Make sure ONLY correct amount is sent, otherwise any excess may be forfeit.

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For Sale or Swap: Airtronics CS7PS 7 channel single stick radio in like new condition. Expo Dual Rates, C.A.R., E.P.A., T.T.A. Direct Servo Control & Batt Test. Flapperon & Elevon Boards included. \$175. or swap for Airtronics CS Series radio. R. Rondeau, (802) 257-5748



SLINGSBY PREFECT AND MO-13 IN LINE ASTERN



CLUB TUGS AT READY TO BEGIN GLIDER LAUNCHING



HUTTER H-17 IN FLIGHT - CLIFF CHARLESWORTH



Waco CG-4A Cargo Glider - Invasion Stripes (US Army Air Force) with TG-3 in background; Woody Blanchard

Dear Jim,

Please excuse me for being so remiss in answering your thoughtful letter of the 16th of December--no excuse, really--just laziness!

I got my copy of the February RCSD in today's mail, and thanks, also, for carrying the Tangerine article.

Our photo coverage was extremely limited, and I took the only black and whites. I do the scoring for the entire contest with a HP-15 programmable calculator--programs courtesy of Dr. Ed Granger--and I just did not have the time to compute, post, fly and take pictures.

I am enclosing a potpourri of assorted color and black and white, and you need no return any of them. I have attached annotations on the backs.

Weather here has been odd--good during the week, and shitty on weekends, so activity has been at a minimum--even in Bright, Sunny, Warm ??? Florida.

We are having a club against club contest against the Pinellas-Pasco Pelicans sometime in March--John Gunsaulus called me two nights ago and issued the challenge. We have a continuing trophy we compete for against them--for nearly 12 years, now. John will bring Carl Raichle, Bob Wilkosz, Junior Nat's Champion Rusty Smith, Malcolm Smith, Ed Berton and probably Walt Good and Kale Harden. I'll try to get B. & W. photos of that.

I had a nice letter from Steve Moskal and a photo of his 1-26--Sure hope he publishes the plans, soon! I see Carstens is still advertising the 72 inch 1-26, although they told me many months ago that they could not even find the master in their files????

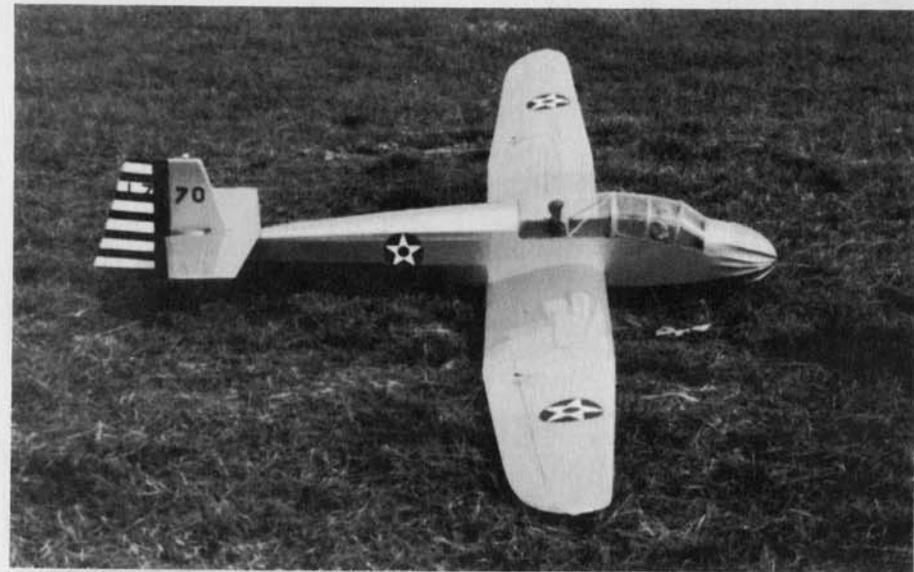
Thanks, again, for the nice letter and the coverage of the Tangerine, and for putting out one swell publication! I really look forward to my Digest each and every month!

Happy Soaring! Bud Moore

3670 Periwinkle Drive, Winter Park, FL 32792



Schweizer TG-3 Side View - Military training Colors  
(US Army Air Force ) Bud Moore

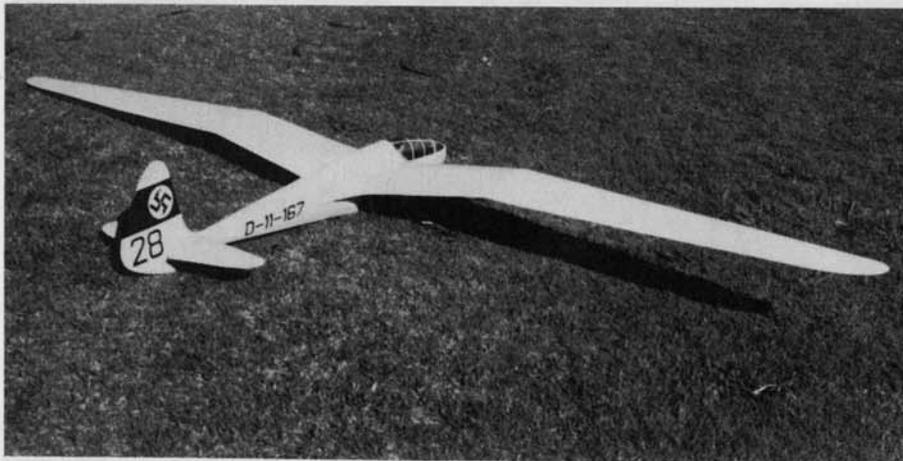


Schweizer TG-3 Side View - Military Training Colors (alternate  
- US Naval Aviation); Tom Beckman

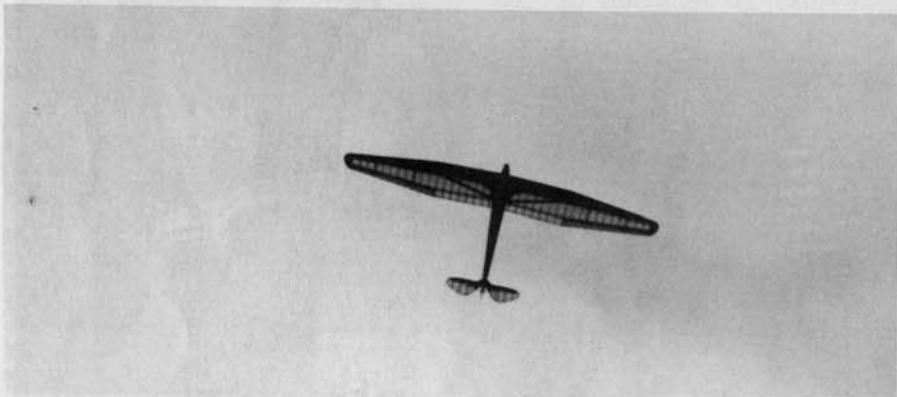
**"R/C REPORT" Magazine, P.O. Box 1706, Huntsville, AL 35807**

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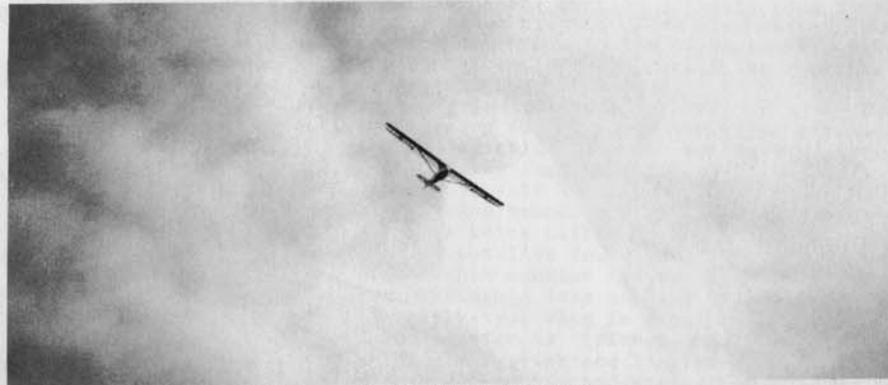
DFS "REIHER" KLAUS KRICK KIT FROM HOBBY LOBBY (BRUCE ABELL)



CRTESTED WREN AGAINST THE CLEAR BLUE SKY SHOWS STRUCTURE  
Frank Smith Photo.



SCHLEICHER ASK-13 TWO-PLACE, READY FOR HOOKUP CLIFF CHARLESWORTH



HUTTER H-17 IN FLIGHT - CLIFF CHARLESWORTH



LO 100 Landing - Charlesworth photo



JAN SCOTT'S "MINIMO" AS MODELLED BY DON GOUGHNOUR, JR. SHIP FLIES  
REGULARLY AT LOVETTSVILLE, VA. SITE OF VINTAGE SAILPLANE ASSOC.

(RICH BORDER)



A SUPERMARINE TYPE 525. WEIGHS 14 OZ., INCLUDING 2. OZ. OF BALANCE

POWER SCALE SLOPE SOARERS.....Ron Raymond\*

For over 10 years Ron Raymond has been perfecting his techniques for designing and building a unique line of SCALE jet models. These are now capable of containing present-day compact radio guidance equipment and still maintaining wing loadings of less than 10 ounces per square foot.

Ron's jets are modelled after the jets of the 1950's because, according to him, they are more attractive and interesting from an aesthetic standpoint, and they turn out to be better fliers as well.

Here's a recent letter from Ron explaining his ideas and his rationale for these "SKYSHAPES" or "SHIPSHAPES" ... JHG.

"THE SCALE MODEL SOARERS SEEM ENCOURAGING. The fad has taken off in England where the wind conditions are much more vigorous than they are for U.S. thermal soaring. You've no doubt seen the April 1987 edition of RC Modeler. Alan Hulme of the 'POWER SCALE SOARING ASSOCIATION' (England) reports that his members prefer models a little larger than mine, and like to fly in 'gale force winds'.

"Some of those depicted in RC Modeler do, however, seem to fall into my 'one-meter' class. This is something I'd like to get started for several reasons:

- 1.) 'One-Meter' refers to the longer dimension-wing span or fuselage length-excluding any tail surface overhang. This size makes transportation easier than with the larger types.
- 2.) Balsa comes in 3-foot and 4-foot sheets. Balsa reinforcements do not need splicing when this size is maintained.
- 3.) The planes are lightweight enough to be hand-launched -- or thrown with a spear thrower (Atlatl) yet big enough for commonly available light-weight radio gear: no need to buy the really expensive stuff.
- 4.) Construction methods are simplified and reinforcements are kept to a minimum. Repairs are simple and quick.
- 5.) Mail-order sale of kits is possible. Size/weight of affordable dimensions makes kits that could perhaps sell for only \$20 - \$25, and certainly under \$50 in my opinion, although they have not been costed out exactly...rather than two to three times that price for present-day kits.

"I've enclosed photographs of two of the first completed one-meter 'planes, plus an additional smaller example of the '525' Supermarine scale jet.

"The SEAMASTER has a vacuum-formed canopy section ('though this does not show well in the photograph) of clear plastic. I've also carved forms for the canopies of the other models for use with the 'Formicator'. All models will have clear canopies, so the builder can detail the cockpits or paint the canopies as in the Metcalf Models PHANTOM.

"The prototypes seen by you and Ty Sawyer were quite flimsy -- in fact, ideas only. They had no internal bracing at all. I've beefed-up subsequent types, yet kept things simple. (See sketch). I've also worked out a way to print the foam parts directly onto the foam itself, and have rigged up a transformewr control box for a 115-Volt AC to 12-volt DC wire foam cutter for the blue-foam wing cores. The Metcalf PHANTOM and the Japanese slope soarers recently imported use a thick Clark-Y type airfoil. They no-doubt know what they are doing -- but I've found that smaller catapult-launched versions fly better with a thin section for a speed advantage (and without appreciable or even noticeable loss of lift...JHG) -- even with light-weight models. The Jedelsky-type wing is proof of this idea.

"I'm convinced that the tailless design is 'tricky' but challenging and of great potential. I built both 1/2-meter and 1-meter experimental models catapulted with slingshot tubing to try and erase the embarrassing display of the DeHavilland DH-108 that we had in New Hampshire. I have since concluded that the New Hampshire version had a warped wing! Both of these recent examples fly surprisingly well. The larger one has a solid foam wing core covered with lightweight paper stock back to the main spar area. This provides a tough, light and stiff wing -- yet costs very little. The one-meter span model just referred to weighs only 8 to 9 ounce without radio but including nose balance weight! It flies fast and flat. I figure the area is about 290 square inches. (Note: if you install a small airborne flight pack, the weight would only be about 15 ounces, or about 7 to 8 ounces per square foot, putting it into the thermal soaring category!...JHG)



RON RAYMOND HOLDS ALOFT HIS BEAUTIFUL "SEAMASTER" POWER SCALE SLOPE SOARING DESIGN. WEIGHINF BUT OUNCES, THIS EXAMPLE OF FOAM AND PAPER IS RUGGED ENOUGH TO FLY THERMAL OR SLOPE WITH LIGHT-WEIGHT AIRBORNE FLIGHT PACKS. WEIGHS 7½ OUNCES! TAIL SURFACE A BIT SMALL AND WING AREA MAY BE ON THE LOW SIDE...SHOULD BE GOOD FLIER NONETHELESS.

"The last obstacle I faced was to procure decals of the proper (scale) size, and I've found a great source that can provide them in 1", 2", 3" and 4" diameters, (roundels) and 2" diameter "Stars and Bars" for the U.S. Navy planes.

"I've taken a CANBERRA into the local hobby shop for assistance in radio installation. The owner has a radio we can experiment with. We'll put it up on a high start and see what happens. I'd like to get together with y ou and look into the matter of things like butterfly tails, wing-

lock systems, access hatches and the like. Ty Sawyer with his imaginations and experience would be of invaluable assistance.

"The CANBERRA with its wide-chord wing has a lot of area for a one-meter design -- very close to the Low Aspect Ratio Sailplane (L.A.R.S.) mentioned in an earlier issue of RCSD. It has a 36" span and weighs 2½ pounds and the builder says it flies well from a high start. However, my CANBERRA should weigh less than half that!

"A one-meter span model of the VICTOR glides quite impressively. (Note: the VICTOR, THE VULCAN and the VALIANT formed the backbone of the U.K. A-bomber fleet, and they are all very beautiful designs, especially my favorite, the VULCAN by AVRO,...JHG).

I've tested it recklessly by hand-launching into some fierce cross winds, and though, it has sometimes cart-wheeled the new construction method has held up with only minor damage to the finish.

"I've built one of the twin-boom DeHavilland 110 models, but it was excessively heavy due to some blunders in its initial design and construction... a problem now solved. The booms, rudders and stabilator are now built as one rigid unit. I hinge the booms at a point just inside the wing trailing edge and actuate the whole unit with one servo for pitch. This makes alignment rigid and simple, but requires a small gap of only 2mm: in boom tops and bottoms -- a gap that is covered with very light and thin sheet rubber. This has not been flown yet, but it looks very promising. I'll let you know how it works out.



ANOTHER VIEW OF THE "SEAMASTER" A JET-POWERED SEAPLANE OF THE 1950'S THAT NEVER GOT INTO PRODUCTION.



BEAUTIFUL TWIN-JET SWEEP-WING PSSS MACHINE SUITABLE FOR SLOPE OR THERMAL SOARING, DEPENDING ON THE SIZE AND AREA. CAN BE BUILT IN ONE-METER OR HALF-METER SIZES, BUT IS ALSO AMENABLE TO 1½-METER SIZE.

"As you are well aware, much of the pleasure of these 1950 designs stems from their aesthetically pleasing, yet SCALE, lines when executed as models. If limited to one-meter longest dimension, the builder would have a choice of high-aspect ratio models like the U-2 (really a sailplane in its full-size form) or the SEAMASTER; or the lower aspect ratio machines like the COUGAR, SUPERMARINE 525; or delta-wing tailless designs, and just deltas like the JAVELIN, VIGGEN, et al. The best competitive fliers will be found by balancing the trade-offs of weight, area, sweep-back, etc.

"I am looking forward to going into production of these foam flyers and hope that someone who reads this brief discourse will be tempted to write to me with some positive suggestions as to financing my operation. (Signed) Ron Raymond" \* 408 Harvey Drive #6, Bloomington, IN 47401

## PRECISION FOAM CORES

Basic sizes and Custom Panels

Basic sizes:	Tip panels
Center panels 48" long by 8" cord	tapers (2 sizes)
" " " 8½" "	9" to 5" x 24"
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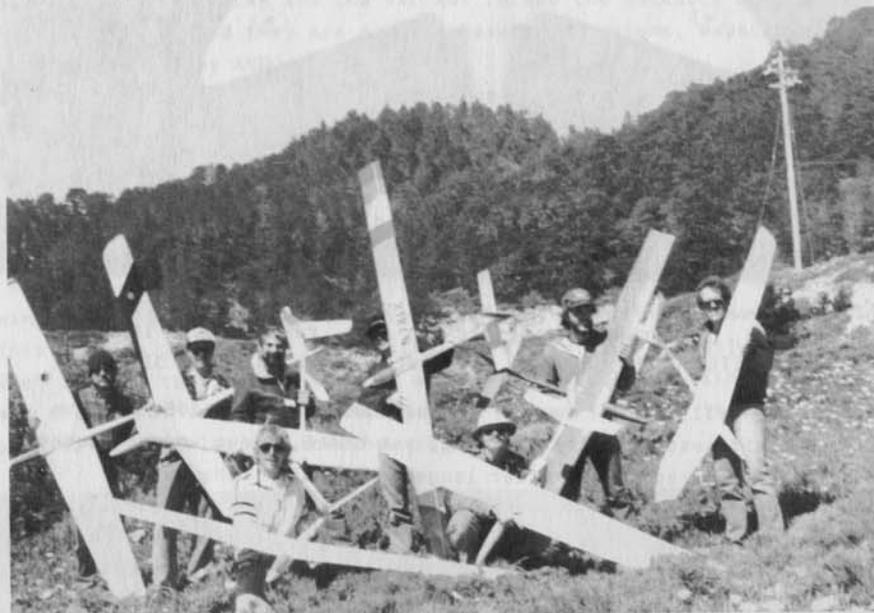
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# SLOPE SCENE

INTERNATIONAL SLOPE RACE  
May 2 & 3, 1987 Davenport, California

Harry Finch,

This is an annual event, started in 1968. It's organized by the South Bay Sourcing Society and this years C.D. was President George Paige. This years event was sponsored by AIRTRONICS.



L to R: Dave Castetter, Steve Hales, Ron Vann, Steve Drake, Cassey Goeller, Joe Wurtz, Tom Copp and Tom Stone. Photo by J. Dvorak

A very well organized event and a real neat one to attend for the competitor and spectator alike. Snack bar, porta potties, beautiful scenery, and flying excitement. Real professional; technical check in, lap flaggers, timers, anamometers, and enthusiastic helpful workers.

The International Slope Race seems to be an enduring one having been held for nineteen years. I had a couple of conversations with Ken Willard, R. C. Modelers "Sunday Flier", and learned that he has competed in every one of these races. Ken was well prepared and flew very well.

Most of the gliders flown were above two meters in span. The event rules allow up to 24 ounces per square foot loading or a maximum total weight of eleven pounds. Needless to say, they fly damned fast.



C.D. George Paige with anemometer



Winning Team: Sam Shiller, Dave Castetter, Tom Stone, Ron Vann.  
Dvorak Photo

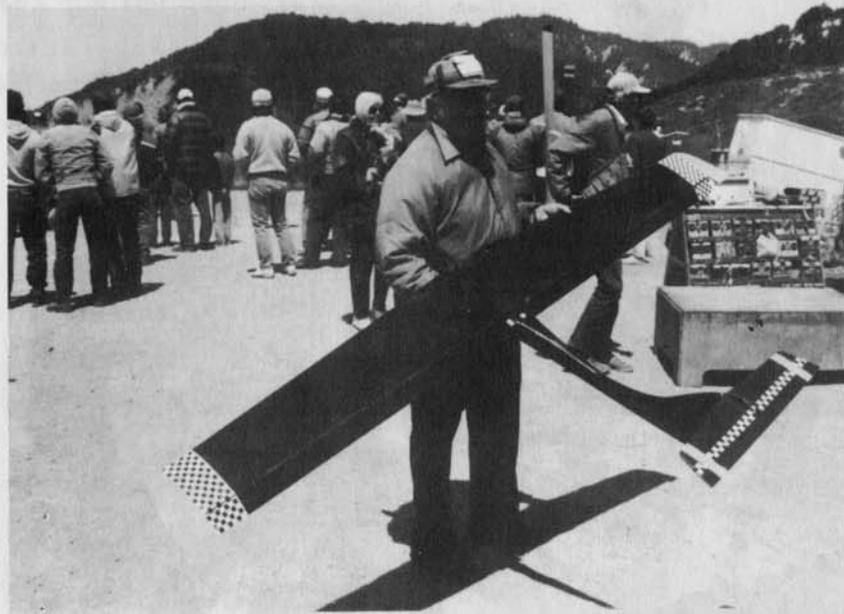


Joe & Jan Wurtz with first place trophy. Photo by John Dvorak

## THE RESULTS

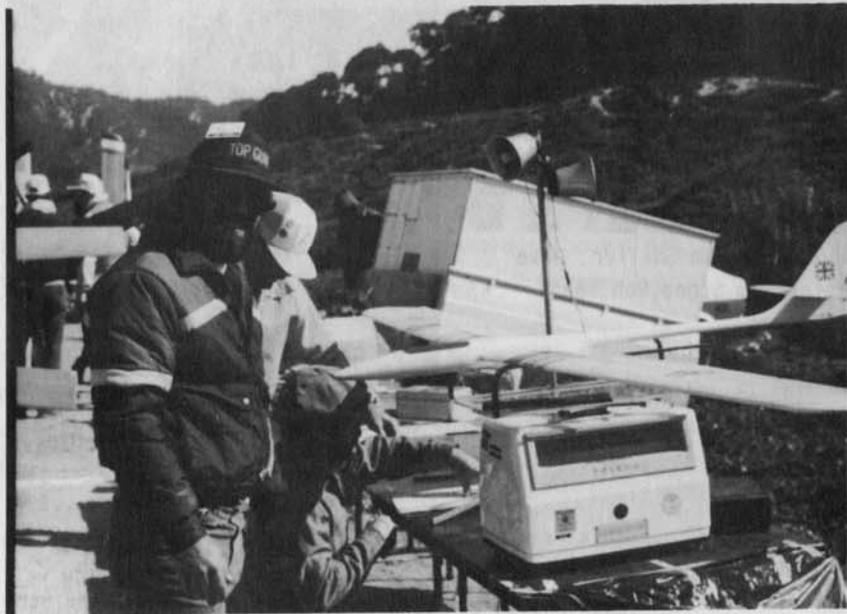
Individual competition: 1st Joe Wurtz, 2nd Ron Vann, 3rd Tom Copp, 4th Casey Goeller, 5th Steve Drake, 6th Steve Hales, 7th Dave Castetter, and 8th Tom Stone.

Team competition: 1st "Gut N Fast Team"; Sam Shiller, Dave Castetter, Tom Stone, and Ron Vann.



Ken Willard at check-in. Finch Photo

Technical inspection



Harry Finch Photo 1150 N. Armando St. Anaheim, CA 92806

By Harry Finch

This month we will go into more detail about the making of tooling. Please review Part Two in particular as this is a continuation.

To make simple tooling for a form such as a canopy, you can use an existing part as a mold. Just fill it with a good grade of casting plaster. After it hardens, remove the original part, patch any imperfections and sand the back flat.

Before beginning the actual forming, let's talk a little about buck bases and frames.

In general, the most practical tooling shape will be male. A male tool is of a projecting shape, while a female tool is of a cavity shape. Many pieces of tooling will involve some male and some female features, but for the most part it will be easier to form the needed part over a male tool by the technique of stretching the heated plastic over the outside of the male tool instead of trying to draw it down into a female cavity because of the limited amount of vacuum pressure available.

When making the forming tool, you have to consider "draft angles" because the formed plastic part must be able to slip easily off the tool when you're finished. A Draft angle merely means that the male tool or plug does not meet the base at right angles, but at a slight angle somewhat greater than 90° in order to be able to remove the finished part without difficulty.

The amount of detail you can put into a particular piece of tooling, and expect the part to be distinctly formed, varies with the thickness of the plastic sheet you use, the temperature (hence the elasticity of the plastic), and the vacuum pressure available.

I have made several shapes of fuselage halves for pod-and-boom type gliders using .060" thick high-impact styrene sheet, and have been rewarded with excellent results and fine detail. When you use .080" thick plastic sheet, the fine detail will begin to be lost.

The form tooling can be made from a wide variety of materials, but I usually employ soft wood such as pine or basswood. For most fuselages, I like to use high-quality plywood, and you will be able to find some very usable scraps of birch plywood, for example, at your local cabinet shop or furniture shop.

When you make form tooling for symmetrical parts of the type most of us find on our airplanes, a very useful trick is to start out with two pieces of plywood cut to the outline profile of the wanted part. Then, you apply a contact adhesive such as 3M 77 to the surface of the wood and sandwich a piece of newspaper in between the wooden blocks. The paper sandwich then becomes the exact centerline of the form block. When you have finished sculpting the form, take a large knife blade and split the two pieces of wood along the paper sandwich interface. You will get two identical and perfectly matched halves right at the paper centerline.

#### MATERIALS SELECTION

You can select materials from a very broad range of different types of plastic having various thicknesses. I'll give you some basic directions to start with, but you should plan on doing some experimenting on your own. To some degree, it will come down to trying what's available to you. Would you please share what you learn with the rest of us?

For small to moderate sized parts, I have been using .060 high-impact styrene sheet. I usually buy this material in a black color, and it usually comes smooth on one side and stipple textured on the other. If you have a choice, ask for "vacuum-forming grade". I strongly recommend that you begin with high-impact styrene as it is the easiest material I know of to form. Now, let's just walk through the steps involved in forming a small fuselage from .060" high-impact styrene sheet.

#### THINGS YOU'LL NEED BEFORE YOU START:

- A. Plastic sheet stock cut to the size of the frame.
- B. The "frame" into which you'll insert the plastic for heating.
- C. A pair of "riser blocks" which you'll place in the oven to support the frame during heating. These should be about 5 inches high and about the length of your frame width.
- D. Your vacuum table.
- E. The forming buck and buck base which you place onto the table over the venturi hole.
- F. A pair of insulating gloves.
- G. A variety of small sticks which you may need to push down around the perimeter of the part to be formed in order to form fully a stubborn part.
- H. Some liquid dish detergent to be used as a mold release agent. Spread a light coat of detergent onto the entire upper surface of the buck.

- I. An assistant who will be on hand for the first few practice runs.
- J. The oven. For styrene material, let's start out by pre-heating the oven to about 300°F.

#### FORMING THE FIRST PART:

1. Preheat the oven to about 300°F.
  2. Place the sheet of styrene plastic in the frame.
  3. Place the frame on top of the riser blocks in the oven.
  4. Watch everything very carefully, as the plastic sheet will begin to sag as it heats. Don't let it sag down and touch any part of the oven or rack as it will ruin the material.
  5. Take the heated plastic sheet out of the oven with your gloved hands.
  6. Then, place the frame down over the forming buck and push down firmly so that it seals around the perimeter of the buck.
- You can probably tell at this point if the plastic sheet is heated enough to form properly. If it doesn't seem elastic enough, just put it back into the oven to reheat. On the other hand, you can always tell if you have heated the material too much because the surface will "craze" and bubble. **No good.** Now have your assistant turn on the vacuum for you, and you should see the material drawn down tightly against the contours of the tooling. **Time is of the essence here, as the plastic material will begin cooling very quickly.** The oven and vacuum table must be right next to each other so that the transfer of the frame from the oven to the table doesn't take more than **2 or 3 seconds!**
7. If the part does not form fully, a variety of factors may be the possible cause:

Not enough heat, not enough vacuum, not enough extra material around the perimeter to draw from, etc., etc.

You just have to learn by experiment and analysis of the problem, learning as you go until you get it right. I don't have all the answers, and I still learn something useful on every new part that I form with this technique.\*

8. Turn off the vacuum motor as soon as the part has cooled...approximately 30 seconds.
9. You're now ready to repeat these steps on the next part to be formed.

\* Here's a little hint for you: Sometimes you can use your shrink-film heat gun to apply a little extra heat in a particular spot while the vacuum motor is still running, to get the part to form properly.

#### FINISHING AND TRIMMING THE FORMED PART:

We now have our finely-formed parts which need to be trimmed to the proper line, which ought to be visible on the inside of the part. The riser block that you put under the buck (refer to details in Part Four), being of a constant height of about 1/4" will allow you to trim the part to an exact, constant depth. I have a small saw blade mounted on a mandrel that I put into the chuck of my drill press, and set it to a height above the table that is slightly below the part line. You can trim the part by hand with a pair of scissors, with a razor saw, with a band saw, or even a table saw, but I like my method for excellent and reproducible results. It makes the trimming operation quick and accurate. Plan to save any flat pieces trimmed away from the part, as they can be used for joining strips, etc.

I leave about 1/32" of material below the trim line after cutting so that I can final-sand it to the line for an exact, smooth fit between the fuselage halves.

#### JOINING THE TWO HALVES:

Now we are faced with the task of joining the formed fuselage halves. Many good chemical-weld type glues are available for styrene, but I seem to have better results as follows: I use "FLEX ZAP" to "tack" the halves carefully together. Work carefully until you get the two parts aligned correctly all around. Then I take 1/2"-wide strips of the plastic sheet obtained from the trimming operation and use them to reinforce the seam line from the inside. As a final step, sand the outside seam line with 100-grit paper to start and finish with 200-grit. Then, I take a piece of clean rag and dip a small corner into M.E.K. (Methyl Ethyl ketone) and wipe it over the sanded surface. Be careful with this step, as M.E.K. "melts" the styrene and causes the plastic to flow...resulting in a shiny, new surface.

#### FORMING CANOPIES:

Let's talk a little about forming canopies. Ask your industrial plastic material supplier for some P.E.T.G. plastic film in a .010" to .030" thickness. This material is easy to form and is very impact resistant and strong. You may also want to try some polycarbonate film because it makes a great finished product, but is much more difficult to form. You can also try acetate/butyrate materials.

#### PRECAUTIONS

When using solvents such as M.E.K., or even when forming these plastics we've mentioned, it's always best to use a chemical breather mask for protecting your breathing apparatus. When heated, styrene gives off a gas called styrene monomer,

which can be quite unpleasant to some people and even harmful to others. M.E.K. is DANGEROUS, and MUST be used with extreme care. DO NOT EVER GET IT IN YOUR EYES, and always avoid breathing it. Plastics are wonderfully versatile materials and can make a difficult task quite easy producing excellent and attractive parts. ..but they require caution during forming and joining, especially when heating, as the fumes can be quite toxic. That is not to say you should avoid using them; not at all. Just be cautious and careful, and you'll be rewarded with some magnificent parts that you never thought it possible to make.

#### FUTURE DISCUSSIONS AND PROJECTS:

In upcoming months I'll try to provide more information about materials selection and forming methods. Please send me your own experiences so that we can share them with others who will be forming plastic parts. That way, we can all progress together. Let's have some FUN with these projects.

#### EDITOR'S COMMENTS:

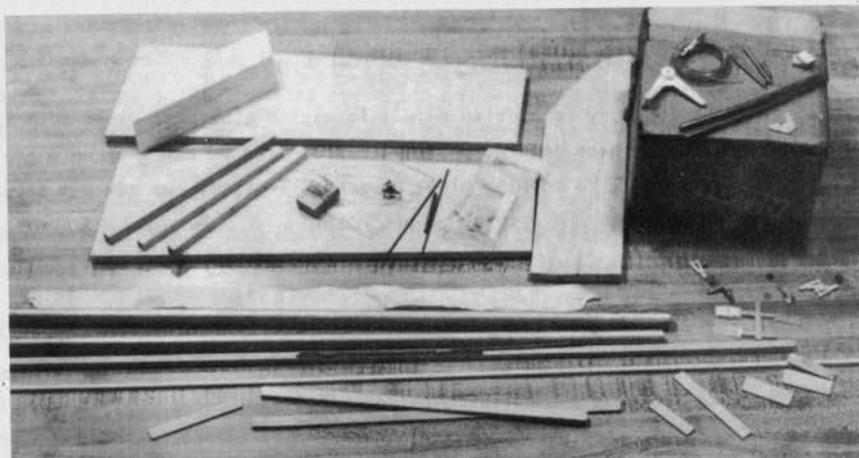
Based upon my own experience with plastic materials used in the home shop, I can vouch for the fact that most women (mothers, sisters, daughters, etc.) absolutely DESPISE the odors associated with plastics, whether they be epoxies, styrenes, ketones, CA's, or other "noxious" materials. Therefore, it is my own personal recommendation that the use of these materials be confined to the workshop or garage. As far as my wife is concerned, the home oven is a NO-NO for these purposes. Therefore, I have two plans: short-term and long-term. The short term plan is to use the oven when she is away from the house...making sure to remove all evidence of the work before she returns. The long-term plan is to make or buy my own oven. In fact, you can build a suitable oven using infra-red heat lamps for providing the needed temperatures for forming parts from plastic materials. Alternatively, you might be able to find a junk stove at the dump -- a stove whose oven is intact and workable with only minor repair or cleaning. That can be installed in your shop or garage.

I've watched the experts vacuum-form very large canopies from methyl methacrylate material (Plexiglass™ or Perspex™) for full-size airplanes and gliders. The technique described by author Harry Finch in this series of articles is very similar to the one used for the larger aircraft. The major necessary ingredient is the operator who has experience gained by lots and lots of practice.

One final comment: whenever you use methods requiring heat and ovens, please be sure to have a dry-chemical fire extinguisher at hand "just in case". Work safe and play safe.

### Algebra-3 Meter.....Kit Review Bob Rondeau

The first thing I noticed about this kit was the great box! It's a big beauty with double thick sides and blocks of foam glued here and there for a precise fit of all the various parts. The obiche covered wing panels (2 center and 2 tips) are nested perfectly in their beds and the sleek glass fuse rests in a neat cradle with foam supports to protect it's shiny white finish. The rest of the wood and hardware is suitably bundled and bagged to avoid warps and confusion.



Lots of hardware is supplied with this kit. Ballast tubes, rudder cables & fittings, wing rods, pushrods & horns, tow hook, hinges. Upper left is stab & rudder blanks, wing tips,servo rails.

The plans on the other hand were the only dissapointment. Included on 2 smallish sheets were a variety of assembly details reduced to whatever scale would fit them on the sheet. The margins were taken up with a patchwork of typewritten copy single spaced describing every variation of Algebra you could build.

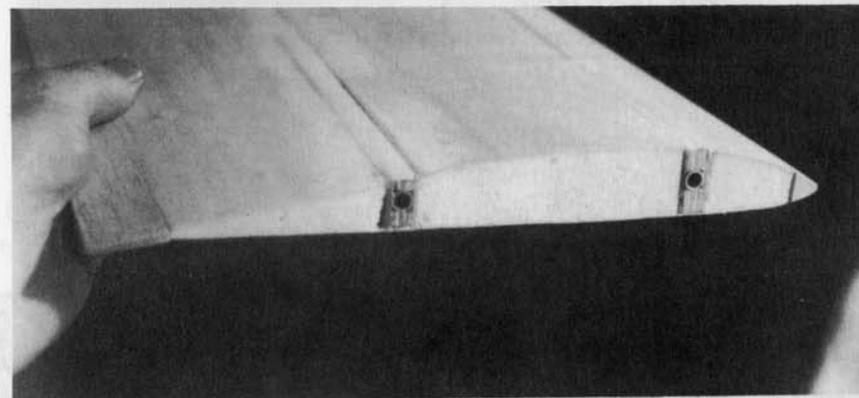
Laying the pieces out I began to realize that this was a different sort of kit than your typical big American thermal ship. The high aspect ratio wing panels mate into a continuous taper wing of 125 inches. The fuselage is down right skinny compared to Windsongs and Aquilas! I'm used to - and the nose sticks out more than a foot in front of the wing!

The fin is just a triangular affair that seems more like a fairing to a proper fin and it ties into a humungus solid balsa rudder. The all flying stab is likewise huge and solid balsa. All woods are of excellant quality and weight but the stab and rudder are simple outline blanks and must be sanded to shape.

Wing attachment is again of the European school with 2 sturdy 5mm steel rods, pre-bent with a vertical web-type spar of 1/8" ply at each rod. This type of spar system seems to work well with pre-sheeted wings as the projecting spar can be planed and sanded flush with the wing surface after gluing.

The inboard leading edges are what appears to be solid obechi stock and the outboard L.E. is balsa. Trailing edges are balsa. After gluing these on with Titebond I proceeded to sand the separate panels to shape. I was determined to take my time and get the best airfoil I could with my primitive skills. After cutting the rough shape with new 100 grit garnet paper I made some templates and checked the foil. Still way off- the T.E. was becoming feathery out at the edges and bending under the sanding block. I trimmed off 1/8th" and filled the low spots with a light spackel. Now with 220 paper I continued sanding with light orbital strokes. This type of surface (Thin,hard vaneer transitioning to soft balsa) is tricky to sand to a smooth contour.

After several evenings of sanding, filling and then sanding some more I arrived at a smooth even airfoil that curved gracefully to a sharp straight trailing edge. The L.E was shaped with a special sanding block that I made from a 1/4" bull nose router bit and final smoothing was done by carefully pulling 3" wide strips of old 400 grit paper over the edge while angling it along the span.

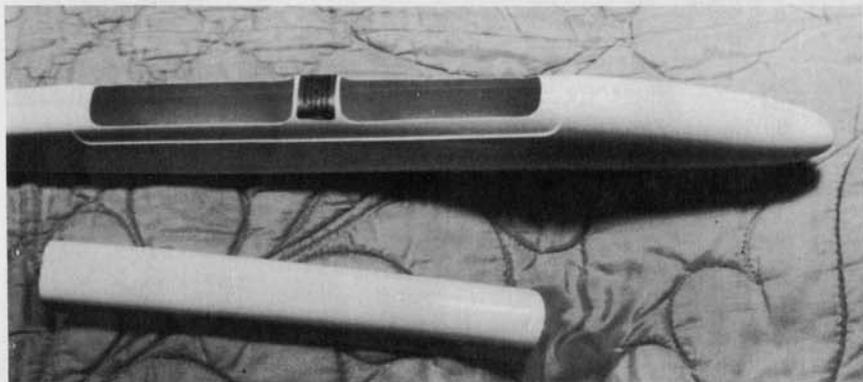


Pre-sheeted wing root with wing tubes,spars installed, before root rib & final sanding.

The instruction sheets outline a straight winged aileron version as well as the polyhedral version. I opted for the poly version as I had several aileron planes in my fleet and I was lacking a large poly glider for light lift and wind. I should also mention here that the kit I recieved from Jim Gray for this review contained the Eppler 392 section and not the Selig S3021 that they are now providing with some kits.

The polyhedral joint is a "sand,glue and glass tape" affair but I had some problem achieving a strong joint with this method as the final sanding broke the glass tape right at the joint. My solution was to lay the poly joint on my table saw (spanwise) and cut a short spar slot at the joint. With the addition of a 1/8" ply dihedral brace I felt more secure with the joint.

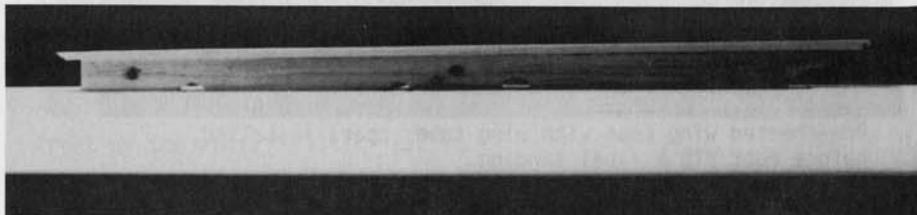
The ballast tubes supplied were rather thick walled aluminum and 24" long. These were to be jigged paralel and screwed into the root end. I lacked the confidence to pull this off without popping through the sheeting so I cut down the length to 18" and filed teeth in one end of an un-cut tube. this precaution and the recommended jig worked fine and I saved 3/4 oz on the dry weight. By substituting lead for the recommended steel rod ballast I can still achieve the 16.5 oz ballasted wing loading.



Sharp glass fuse features matched canopy with a very clean fit.

The plan shows conventional spoiler installation with an external horn and cable tubes routed forward to the leading edge and in to the root. I decided that vertical blade spoilers would allow a neater installation with a straight tube bored directly to the root for actuation.

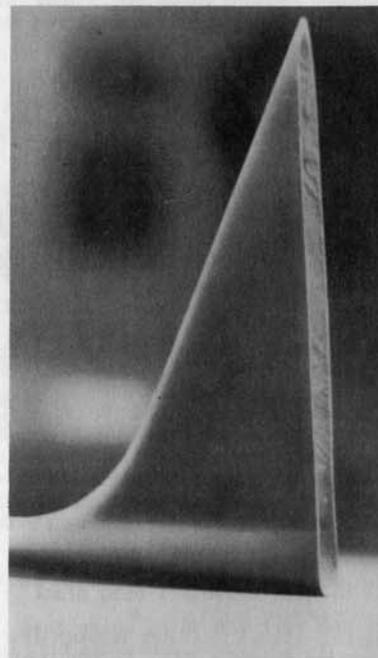
After all this cutting and boring I began to wonder about the value of pre-sheeted foam wings. With the aileron version there would be even more cuts and channels in the sheeting. I gave up any thoughts of a clear natural wood finish.



10" balsa-ply vertical blade spoilers proved easier to install in pre-sheeted wing.

The plan outlined a conventional rudder-fin hinge with flat hinges but I opted for a tighter concentric fit using robart hinge points. This was accom-

plished by first rounding the rudder L.E. and then mating a 1/2"x1/2" light balsa stick to it with a sanding dowel. Holes were then drilled and filed to accomodate the hinge points and the assembly was tested for free movement. With the forward half of the hinge point glued into the stick I mortised the stick into the open end of the fin. Final shaping was done by sanding the joint to contour and covering with a light glass tape. The result was a light, smooth rudder hinge.



The all-flying stab connection is the conventional 2 wire connection and the only modification I made was to extend the bearing tube into the stab root. I also elected to glue each wire into an opposing stab half and apply some friction bends. I also drilled large lightening holes in the rudder and stab behind the high point of the airfoil.

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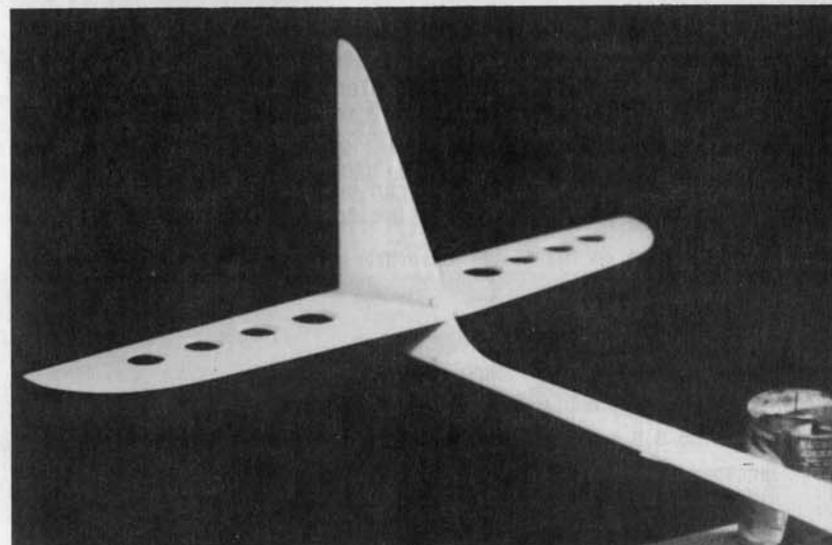
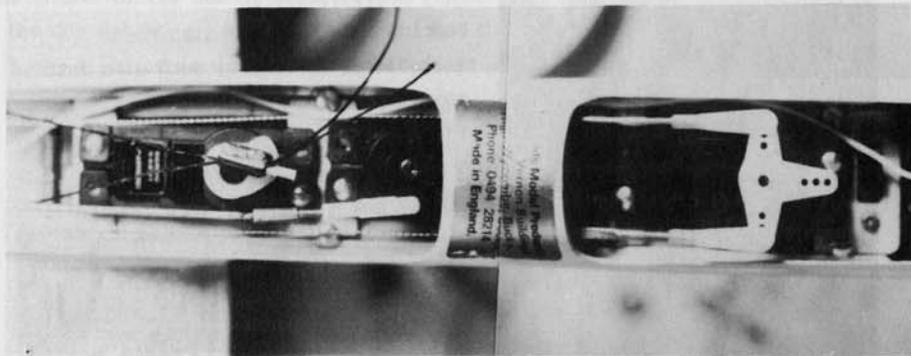


photo shows lightening holes in stab-not cut in rudder yet, gapless rudder hinge is hard to see in photo.

The radio gear went in without a hitch with the 3 standard size servos, RX and 500 mAh battery well ahead of the forward spar. The rudder cables supplied are a complete set-up with adapters attached to the servo end and even crimping tubes supplied. Elevator P.R. is a 1/4"sq balsa stick and is very solid. The spoiler is actuated by strings that loop through a brass tube on the servo wheel and secured with a toothpick type peg. I use thin CA on the string for added stiffness. This helps hold the adjustment. The antenna was taped to a 1/8" by 1/16" balsa strip and poked down the fuse. this seems to be the lightest and simplest system to deal with it.



Algebra Servo arrangement-L to R spoiler, elevator, rudder.

With everything assembled the Algebra 3 meter is large lanky sailplane but everything is solid and there are no rattles. Balance is almost perfect and I will try the first flight with less than 1 oz. of nose weight. I used Black Baron low temp covering on the flying surfaces and left the shiny white fuse un-painted. The finished all-up weight of this algebra came out at 61 1/2 oz. 2 1/2 oz. above the advertised weight of 59 oz.

My overall impressions of the kit are that it is a quality kit for the experienced builder although I think the plans could be improved. A beefy, straight wing rod please the American market. The fuse is well made and needs little work although the proportions are as non-scale -like as any I've seen - long nose moment, short tail moment. The pre-sheeted wings do save time in the long run but if you haven't used this type of construction before take time to think it through.

Next time I will report on The flight characteristics and will have some photos of the whole thing.

The Algebra 3 Meter, as well as a whole series of kits based on the Algebra are available from Dick Edmonds Model Supplies, Unit 20 Vernon Buildings, Westborne Street, High Wycombe, Bucks England HP11 2PX Phone: 0494 28214 To date there is no U.S. importer but I hear Dick is looking for some trustworthy bloke to represent his Algebra line as well as his other fine sailplane and electric kits and accessories.

#### CLARK SMILEY'S METHOD FOR WING FINISHING

Clark is a restorer of antique aircraft (among many other of his talents and interests) and he's an excellent model builder, too. In a recent conversation, he passed along this information about wing covering and finishing.

1. Epoxy the balsa sheet to the foam cores, using slow epoxy (45-minute to 2-hour). Thin the epoxy and/or heat it a bit for easy flow and apply to both surfaces. Squeegee it off, leaving just a film. Don't "glop" it on in the first place!

Weight the skins until the epoxy is cured. Leaving them in the foam beds helps, but protect the beds with film plastic to prevent gluing the cores and sheets to the beds.

use about 50% thinner to 50% dope. Before it has dried, place a covering of half-ounce, three-quarter ounce, or one-ounce fiberglass cloth to the doped sheet. Immediately smooth it out by hand and apply another coat of dope with a brush, working it into the fiberglass. The dope can't attack the foam because it has been protected by the epoxy and the balsa sheet.

4. Sand lightly after the dope has dried, and prepare for final finish. Wipe the surface clean and dry.

5. Using Krylon<sup>tm</sup> spray from a can or "spray bomb", put a light mist or tack coat on the surface; --do not let it completely dry. Follow the tack coat with a wet coat of paint. It will stick okay. A little practice on something you don't care about will help you get the feel.\*

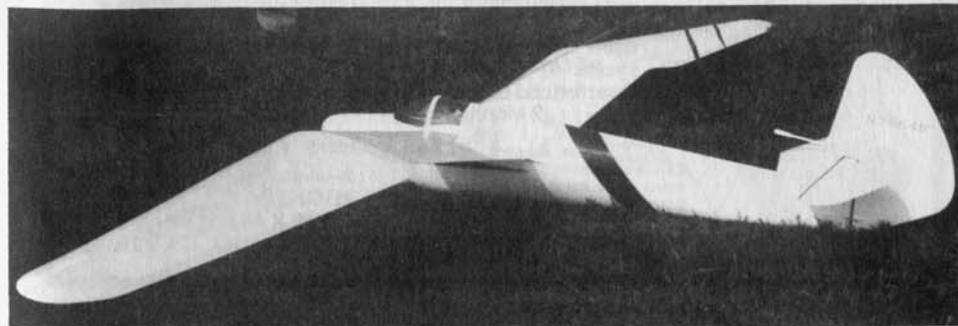
6. After several coats of finish have been applied, fill a container such as a bucket with warm water and a couple of drops of dish-washing detergent. Now, take a piece of 320-grit "finishing" paper and dip it in the water. Sand the painted surface, maintaining the paper as wet as you can, until the surface feels satiny smooth. Wipe the surface dry and clean with an old Turkish towel or soft diaper cloth.

7. Apply one final coat of Krylon clear spray. Your wing will be smooth and beautiful.

8. During subsequent flying and handling, your wing will get a lot of dust, fingerprints, sweat, and other contamination on it. To clean it, use a cloth saturated with 70% rubbing alcohol, wiping down the surface. Buff it dry with a clean piece of towel or diaper. Like new again! This works on Monokote or other shrink-film covering, too.

\* If you have a spray gun, you can use that instead of the spray can...but Clark says the spray can is cheaper and easier in the long run, unless you are a master with the gun and have one at hand that you use constantly for other projects. Using dope for the finish will result in a much lighter wing as compared with using epoxy finish, enamels, etc. Krylon is a spraying lacquer.

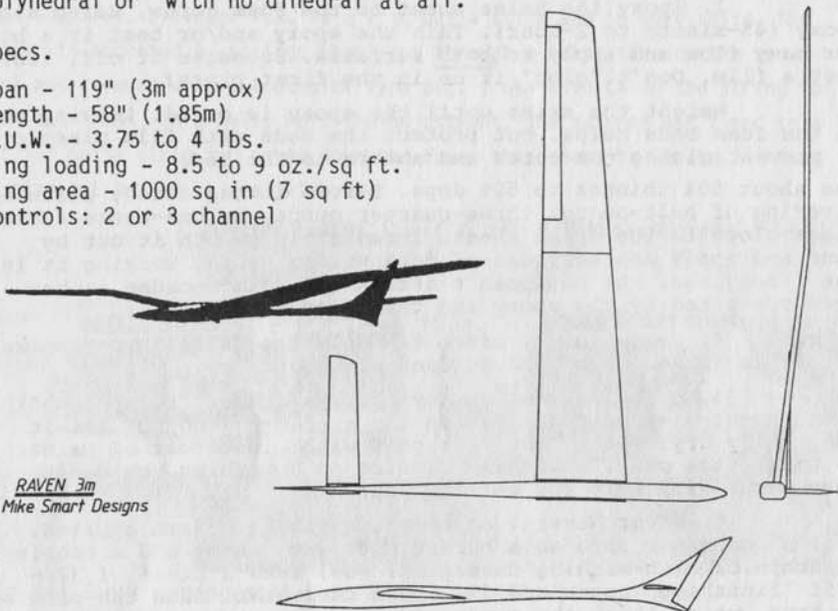
---- oo0oo ----



Jerry Slates has some new plans from Mike Smart that look pretty interesting. The **Raven 3m** is the latest addition to the Raven family and it has a strong family resemblance. This one features a gull-wing plan form but can be built as a "V" dihedral, polyhedral or with no dihedral at all.

Specs.

Span - 119" (3m approx)  
 Length - 58" (1.85m)  
 A.U.W. - 3.75 to 4 lbs.  
 Wing loading - 8.5 to 9 oz./sq ft.  
 Wing area - 1000 sq in (7 sq ft)  
 Controls: 2 or 3 channel

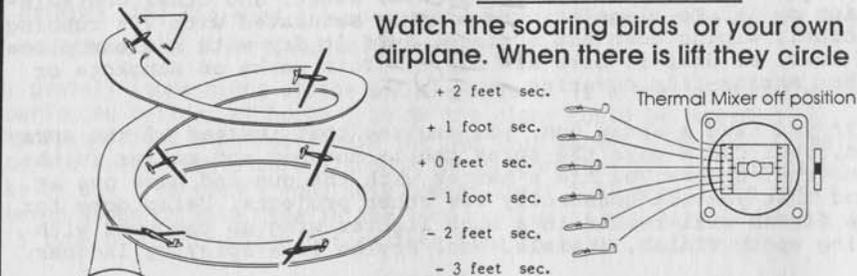


RAVEN 3m  
 © Mike Smart Designs

The plan price is \$12.95 and Jerry says he will pay the shipping.

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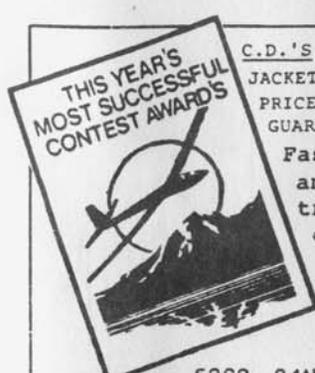
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