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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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Vol. 4

No. 5

MAY 1987

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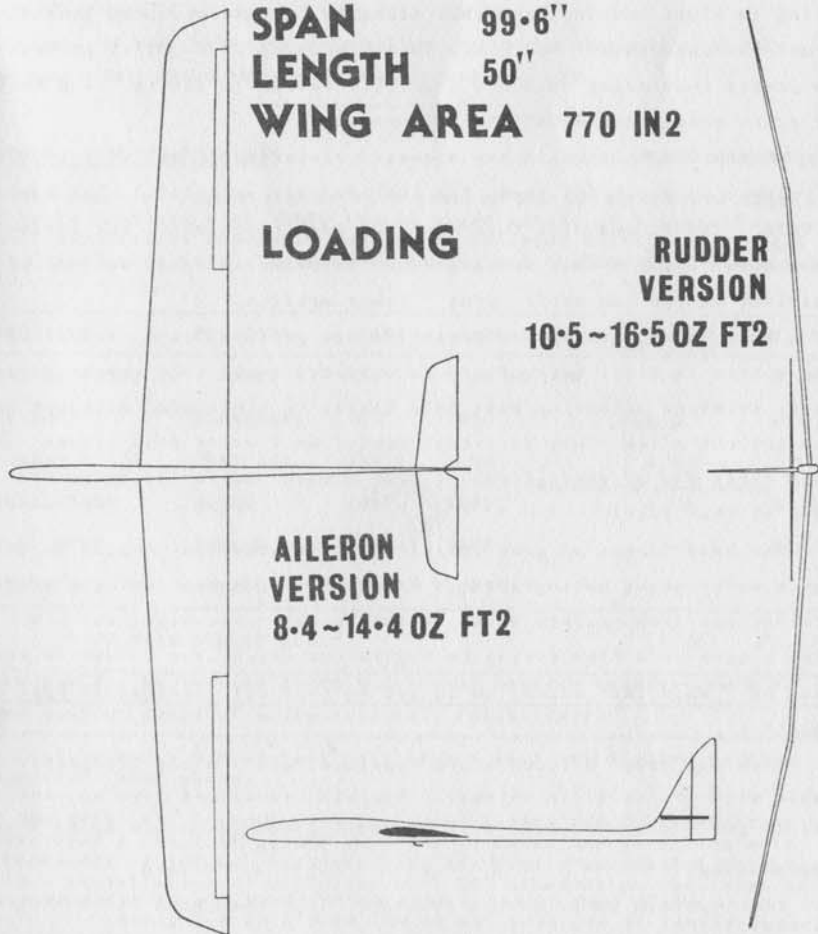
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HI START

There's a lot to talk about this month, so I'll can the b.s. and get right at it. First, you should all know that RCSD will be moving to Payson, Arizona, just as soon as we can sell our home here in Peterborough. Peggy and I have already been out there to pick out a new home and place a down payment on it! I've always wanted to live on "Easy Street", and - by golly - it looks as if I may make it after all! The corner of Easy Street and Chateau Circle is where the house is located.

Don't worry about missed issues or anything, we'll be on time as usual as long as the Post Office continues to do its job. I've had a few complaints about the March issue not being received on time. You ought to know that it did go out on time from here, so the problem has to be either at your end or somewhere in between here and there.

The SCALE ISSUE has drawn many favorable comments, and (as yet) no unfavorable ones. It seems there are any number of would-be scale modelers out there in glider land, but many of them think that scale soaring is slope soaring, and that scale sailplanes are not good for thermal soaring. WRONG! Not true. In an upcoming issue, I'll present some pretty convincing evidence that this belief is faulty. And that many scale models are GREAT thermal soarers.

Harry Finch is beginning a series of fantastic articles in his new column, so watch for them. The introductory article(s) will appear in THIS issue, and will then continue each month until the series is finished. I don't want to spoil the surprise for you, so just be as patient as you can until your issue arrives.

Most of us here in New Hampshire are getting "cabin fever" because winter is still here. Piles of unmelted snow, cold weather, and lack of evidence of Spring have held flying to a minimum, although some of us got out a few times in recent weeks. As I write this column, it is the first day of spring! Hah! I wish someone would inform Mother Nature of that fact!

We have dozens of good articles and information ---plus as many or more outstanding photographs to bring to you in the coming months. Contributions from readers have reached an all-time high, and I'm having a heck of a time trying to figure out which ones to run in each issue. As I said last month, we'll get to them all eventually. Just be patient.

You may have noticed a new typeface, and I'm not altogether pleased with it, as it is so small. The old typewriter gave up, and I had to get a new one. Bear with me until I can get a new Daisy Wheel. Happy Soaring

Jim

*Know anyone who'd like to buy a home where there are no sales or state income taxes? If so, send 'em to me! Mine's up for grabs.

LETTERS FROM READERS:

JIM THOMAS wrote concerning the Hi Start editorial in the February '87 issue, and offered further information.

"I just read your opening column in the Feb. '87 RCSD and thought perhaps my chemistry background might be of some benefit in helping you cope with your allergic reactions to the 'chemicals' (glues) that are a necessity in modelling.

"You mention that a '3M mask' helped some, but not for long. Without more info, I would guess that you had a dust mask designed only for particulate matter; i.e. balsa dust, mists, etc. If this is the case, these masks are useless for chemical vapor which passes through dust masks. Since you are probably allergic to vapors and contact, I recommend that you: 1.) do all your sanding with at least a dust mask; 2.) That you use a chemical respirator (see list below), wear gloves and long-sleeved shirts for all painting, gluing or anything using organic compounds (epoxy, CA, paint solvents, etc.); 3.) I suggest the following items available to you from SARGENT WELCH (NJ OFFICE 201-376-7050) A LABORATORY SUPPLY COMPANY:

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"Best wishes and luck in building, (signed) Jim Thomas"

Jim, thanks for your letter and the excellent information that will be of help to me and many others facing the same or similar problems...JHG.

OH MY GOSH, HERE WE GO AGAIN.....ERNIE CURRINGTON

"I have just joined the British Association of RC Soarers (BARCS) ...not to be confused with WOOFs (World Organization of F.Liars)!... and their first-class quarterly newsletter contains details of typical British 'aeroplanes'(sic). Looking at these, and the 'Too Many Fitta Sagitta' we get:

AIRCRAFT	DESIGNER	SPAN	AREA	tail arm/ avg. chord	VOL.COEFF.
SILVER GHOST IV	HALEY	150"	1320 SQ. IN.	4.0	0.39
CALYPSO 7	BLANCHARD	100"	783	4.2	0.43
OPTIMIST	FRANCIES	177"	1498	4.4	0.42
ANDALUSIAN	DAWES	184"	1883	4.06	0.34
O.D. OPEN	THORPE	128"	1080	3.84	0.42
SAGITTA XC	RENAUD	173"	2147	3.0	0.35

ROOT MEAN SQUAREVALUE: (4.10) (0.41)

Tail arm divided by average chord = distance between quarter-chord of wing and quarter chord of horizontal tail (stabilizer)

Volume Coefficient = Horizontal tail area x tail arm divided by wing area x average wing chord.

"The Brits fly in very turbulent conditions, and I believe they have developed a breed of glider to cater to this, and give them more of a 'hands-off' airplane. Incidentally, the highly-successful Silver Ghost is a rudder/elevator sailplane with 2 1/2° dihedral on the inner panels of the polyhedral wing, and a +7° dihedral on the outer panels...

"There are three factors that will give hands-off flying in pitch: general static longitudinal stability; moment of inertia (or radius of gyration); and the aerodynamic damping contribution of the stabilizer.

1. The general static longitudinal stability is related to the tail volume coefficient...note the difference between their sailplanes and the Sagitta XC (and the Andalusian...JHG).

2. A high value for the moment of inertia provides a 'reluctance' to respond to a disturbance as well as a reluctance to recover from a disturbance; and a long fuselage with large tail area achieves a high value.

3. there seems to be little difference in the length of the tail arm in terms of wing-chord widths between the British designs and the North American ones.

4. A large stab on a long arm will provide a lot of 'damping'. Maybe Max Chernoff, who I believe is a dynamicist, could comment?

By the way, did you know that a dynamicist is an engineer who calculates properties to seven significant places using data with an accuracy of +/- 50% , and an aerodynamicist assumes everything but the responsibility!?

"Anyway, I am a long tail-arm man, and when I get around to building my L'Hirondelle again, it will have a tail-arm/wing chord of 4.0 and a Tail volume coefficient of 0.4"

"All the best (signed) Ernie"

Okay, Ernie, you've said enough here to keep the ball rolling for another year at least! However, I note in the data table that there is some discrepancy between the British values, as well; i.e. Silver Ghost and Andalusian Vol. Coefficients, for example. However the r.m.s. values are pretty typical...JHG

The trend among some designers of F3b sailplanes seems to be a very small stabilizer area (because the drag contribution of a large tailplane is nearly equal to that of the fuselage!). Then, the tail arm is lengthened to produce a suitable tail volume coefficient for dynamic stability. With long tail arms, however, you have to be careful to control weight in the tail so as not to have to add too much nose weight to achieve static longitudinal stability (balance)...JHG

D.N. Penton wrote from DeQuincy, Louisiana, as follows(letter reproduction shown):

Dear Jim:

"I was intrigued by Andy Lennon's comments in the April 1985 issue".

I have no problems with Andy's definitions however there appears to be a conflict between the following statements:

- (1) "To balance the nose down pitch produced by the CG location ahead of the NP the horizontal tailplane must exert a down load"
- (2) "Full-scale airplanes do not employ lifting tailplanes because, when flaps are deployed, the resulting increase in wing CL and downwash could convert the upward tail lift to downward lift and create serious instability".

Further, regarding statement (1), simple statics for stable level flight would require an up load on the stab as long as the CG is behind the wing AC (still ahead of airplane NP).

Regarding statement (2), the choice of section does not determine the load (up/down) on the stab - only its ability to carry that load.

One other issue is in regard to the following statement:

"Further movement of the CG aft of the NP results in instability unless compensation is introduced...."

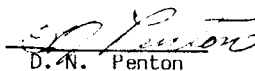
In my opinion this would have been correct if he had left off "unless compensation is introduced". The NP is a limiting point to CG somewhat like the speed of light is to velocity. The closer the CG gets to the NP the hairier things get. When the CG coincides with the NP it would better be described as neutrally unstable (instead of "neutral stability") because neither man nor computer can fly the beast.

The situation is somewhat analogous to the weather vane. If you move the hinge point far enough aft it will point in the reverse direction. If you "add compensation" to get it pointing in the right direction you have moved the neutral point.

Airplanes like the F16 and X29 are described as having negative stability, however this is a matter of definition - a play of words. All well trimmed pattern airplanes have the CG in this same range and they fly super even with a remote pilot.

In determining the NP, relative lifting efficiencies (size, planform, etc) of the flying surfaces will need to be considered.

Yours very truly,



STABILITY AND CONTROL.....DAVE FRASER

A letter from Dave takes the author, editor and publisher to task for some erroneous pronouncements in a previous issue of RCSD regarding tail moments and such. Rightly so, too, because I KNOW better but somehow failed to DO better...JHG.

Dear Jim:

Since I was one of the "named accused" in your introduction to Bruce Abell's comments concerning the "too short tail moment" I suppose I ought to reply.

First, however, I think we ought to get out terms straight. We can have too small a tail moment, or too small a tail volume ratio or too short a tail arm, but not too short a tail moment. Pardon me for picking nits, but if you want to understand the subject you should understand the terms.

Second, from the standpoint of stability the length of the tail arm is not meaningful by itself. It is the product of the tail arm and the stabilizer area divided by the product of the area of the wing and the wing chord (a "volume" divided by a "volume") that is meaningful. In some texts this is quite logically referred to as the tail volume ratio, or simply the tail volume. In others it is expressed as the ratio of the area of the wing to the stabilizer taken with the distances of their aerodynamic centers from the c.g. But no matter how one expresses it, the point is that there is no particular stability advantage to a short arm with lots of area against a long arm with a small area - it is the product that counts for stability.

Third, a particular arrangement or volume ratio produces a particular stability for only one position of the c.g. Take the airplane and reposition the c.g. and you can change the stability any way you want; forward to increase and backwards to decrease it. You can usually take an unstable airplane and simply move the c.g. forward and it will be stable. Or vice versa. You don't have to increase the tail arm or the stab area, altho you can do that provided you leave the c.g. in the same place.

In order to demonstrate the point I built my Sagitta XC with only two thirds the stab area called for on the plans, but with all the other dimensions exactly the same. If we are to believe the "increase the tail moment" fans I should have a disaster on my hands - I went the wrong way. In

fact, I have a perfectly fine airplane that has flown a full seven minutes in a gentle thermal without touching the controls. In fact I set the transmitter on the ground and walked away from it. When I pointed to the airplane and the transmitter from about 50 yards away certain people simply shook their head in disbelief, but there it was. It is also the same airplane that came in second in the "Dash for Cash" cross country race in Ontario loaded to 13 pounds in a twenty mph wind. Talk about a lead sled. (It normally flies at 8 lb.) I have had others comment on how stable the plane was and how well it flew. I think some people regard it as magic, but it's simply that I moved the c.g. forward from the position on the plans to compensate for the smaller tail volume. I have also flown XC's built the normal way and, simply put, there is no difference in the way they fly compared to mine because their c.g. is further back, yielding the same stability.

The other point that these advocates seem to forget is that in order to lengthen the tail arm you have to add material way rearward of the c.g. and move the tail back, and that inevitably cancels some or all of the stability effects of the tail volume increase unless you add weight in the nose. What you get then is a heavier airplane operating at higher wing loading that, surprise, surprise, flies more smoothly. You also get an airplane that's more likely to snap off the rear of the overlong fuselage on a bad landing.

Bruce talks about changing the tail arm by 2 1/2 inches and curing a squirrely airplane. Great, but why not try moving the c.g. forward instead? Any lightly loaded airplane that you heavily ballast will be squirrely unless the stab throw is reduced. One of the reasons power guys fly with dual rate on the ailerons and elevator is because our sticks give us no force feedback and we therefore tend to overcontrol at high speed. This is especially true with stabilators (all-moving stabilizers) since they have virtually no force gradient, which means that even the servo experiences no increase in load with speed.

The problem with a touchy sailplane is usually not a lack of stability but rather that control sensitivity increases as the square of the speed. Fly twice as fast and the airplane responds four times as quickly. If Bruce rebuilt the fuselage I'll give you money other things got changed in the process, and one of them was probably the elevator throw or the c.g. position.

Of course a long-coupled airplane will usually be less responsive than a short-coupled one, but the reason is the greater longitudinal inertia. The same effect can be achieved by adding weight at the tail and the nose (keeping the c.g. in the same place, of course) without repositioning the stab. But why bother? Simply reduce the elevator (stabilator) throw and/or use dual rate.

Some time ago I wrote a paper that explains most of this, and if any of the subscribers would like a copy they should send me a postcard and I'll be happy to send them a copy. Anyone who can understand a little math will have no trouble understanding the subject. Alternately take the time to read and understand the standard texts on the subject.

Keep up the good work, Jim, it's a great publication. Regards David B. Fraser

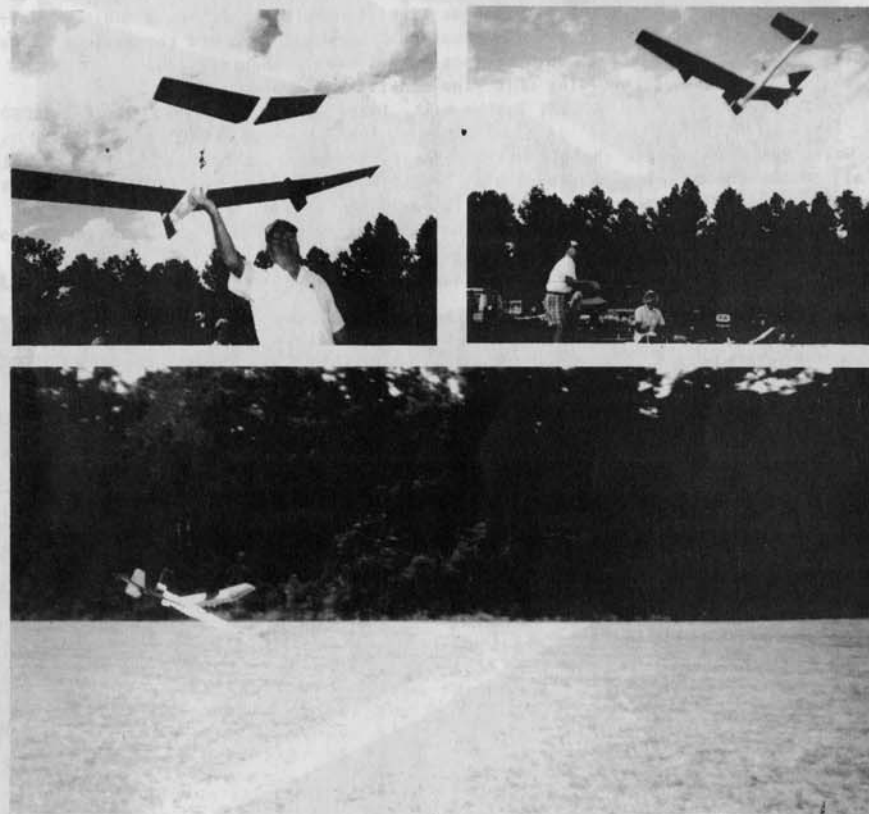
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Bud Moore of Winter Park, Florida sent along some extremely interesting photos of his scale models (flown at the Tangerine Contest in Orlando over Thanksgiving '86) and a remarkable series of photos of his canard called "Weird One" I think I get the joke, Bud...because the spelling of Weird seems backwards to me...but then what do I know? Nuttin'!

If any of you guys out there want to mess around with canards, or have done, let me know what the results have been, I'm not convinced that canards are for gliders in spite of Burt Rutan and his SOLITAIRE...JIM.



BUD HAS THIS TO SAY:

"Note the small statue of a horse sitting on top of the fuselage of WEIRD ONE. I landed off-field one day, and when I went to the adjacent pasture to retrieve my bird, a horse was standing on one wing tip, licking the Monokote! The Club presented me with this statuette, and he rides the thermals on every flight -- got one 15-minute flight with him aboard, too!

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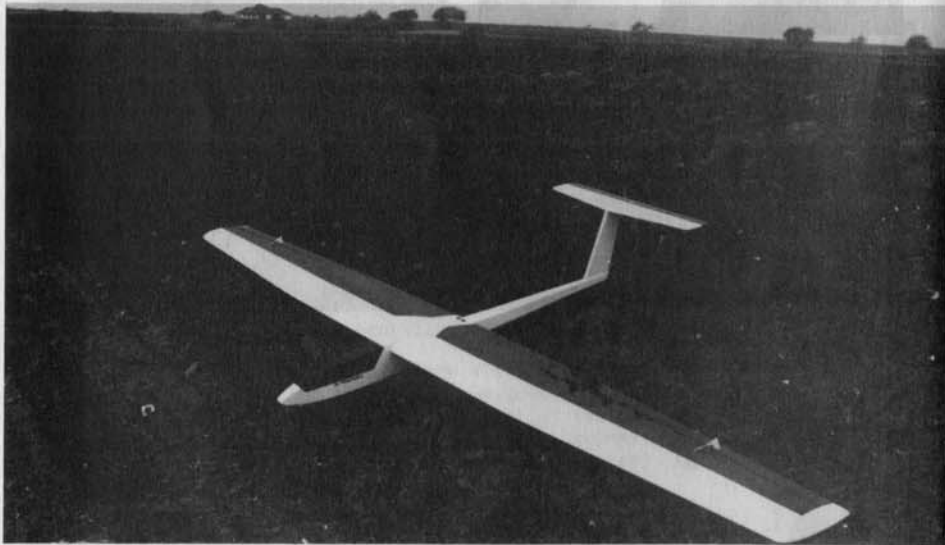
MORE LETTERS.....

THIS IS FROM BEN TRAPNELL, CORPUS CHRISTI, TX:

"Dear Jim: I'm enclosing a picture of my BOBCAT (BOB MARTIN R/C MODELS) just finished for a possible product review in R/C REPORT. It's not 'high tech' by any standpoint, but it is an excellent way for novice glider guiders to get into ailerons. I called Katie Martin with a few suggestions. The plans (construction manual) lists the rudder as an option for advanced pilots. In my opinion anybody building this kit should include the rudder as the ailerons are virtually ineffective when landing. If you keep the speed up to keep them working, you just go skidding across the landing spot! It would also help to keep the BOBCAT in those tight thermals, as it has a habit of falling out in steep turns. It seems to me that RCSD is slanted toward the serious glider-guider, but if you care to, I would mention that (above comments...JHG) to anyone who might be thinking of building this fine model.

"As I just received my PRODIGY in the mail, I was glad to see two reviews in RCSD."

Well, Ben I appreciate the picture and the fine comments that are bound to be helpful to all BOBCAT builders-owners. There will be a Product Review of the BOBCAT in a forthcoming issue of RCSD, courtesy of Dave Williams, Albuquerque, NM. Dave is hoping to encourage one of his daughters to build the kit for two reasons: to encourage her to become interested in RC soaring, and to see how easy/difficult the kit would be for a beginner to put together. On both counts, I heartily approve of Dave's approach...JHG

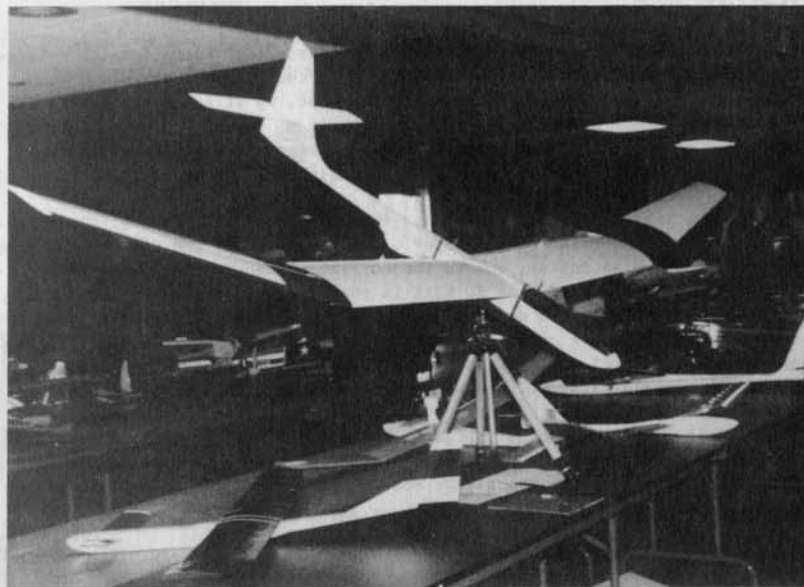


LETTER FROM LEE.....Lee Murray

"My sailplane design which appeared in the April and May 1984 issues of RCSD has finally been built, and took first place in the sailplane division at the club's static show. (Congrat's, Lee...JHG). I'm now waiting for the sod to get nice and soft before I give it the first hand launch. As you may recall, the construction is balsa-sheeted foam. The span is 143" and the area is about 1500 square inches. The wing loading came out right on the targeted light loading of 8.5 ounces per square foot. I have a recording barograph, and I've ordered a slightly smaller Edmund Scientific altimeter for altitude record attempts. Jack Hiner has given me some help with this project as well. Here is a photo of the model. Note the Canard HLG on the table next to it; it was built by Colin Hildebrandt, a Junior member in our club. He took second place in the judging, although it's only his second HLG canard design.

Best wishes (signed) Lee Murray"

Thanks again, Lee, for sharing good information with us. Congratulations to both you and Colin. I'm waiting to hear about the first flights and more about the record attempt. Let us know how it goes...Jim.



By the way, what did you name your new bird, Lee?

NOTICE FROM DOWN UNDER.....KOOKABURRA TECHNICAL PUB'S.

IT SEEMS THAT I HAVE MISINFORMED EVERYONE ABOUT THE PRICE OF THE MARTIN SIMONS BOOK : "THE WORLD'S VINTAGE SAILPLANES" PUBLISHED BY KOOKABURRA. THE CORRECTION IS **GOOD NEWS**. HERE'S MANAGING DIRECTOR GEOFF PENTLAND TO TELL YOU ABOUT IT./

"THE WORLD'S VINTAGE SAILPLANES 1908-45" is published by Kookaburra Technical Publications, Pty., Ltd., PO Box 648 Dandenong 3175, Victoria Australia. Available **ONLY** direct from the publishers. Please send a bank authorized check or Money Order for US \$40. This covers the book, postage, and a very attractive full-color vintage sailplanes wall chart which makes an interesting display item."

The good news is that this is \$8.00 less than the price earlier announced in RCSD. So, if you've been holding off ordering, you needn't do so any longer.

Geoff continues in his letter: "I also greatly enjoyed the special scale issue of RCSD and am sure you will find increasing support for including more material on the vintage sailplane theme, although naturally one has to be fair to other glider-guiders too. The Chicago S.O.A.R. club is an encouraging sign. To take up Cliff Charlesworth's theme, Australian scale modelers have long been astonished at the present lack of interest in scale sailplanes in the USA when you have so much going for you over there!

"As you probably know, the world's first serious 1/4 R/C scale sailplane originated here around 25 years ago; so, in terms of pioneering, Australian modelers have certainly been far from idle. although activities here have been little publicized. In point of fact R/C vintage sailplanes of the scale variety started to take off here as long as six years ago, again predating the current UK enthusiasm by several years. I thought this might help to set the record straight for your personal interest! No big deal, but the contribution of Aussie modelers is often overlooked in countries with many times our population. Kindest regards (signed) Geoff Pentland, Manager." Geoff, we appreciate your remarks and corrections. As a matter of fact, I am also guilty of failing to mention some of the scale pioneers here in the USA. I'm thinking of Dale Willoughby, Jerry Nelson, Phil Kraft and others who have been building scale R/C sailplanes as long ago as 1960! ...JHG.

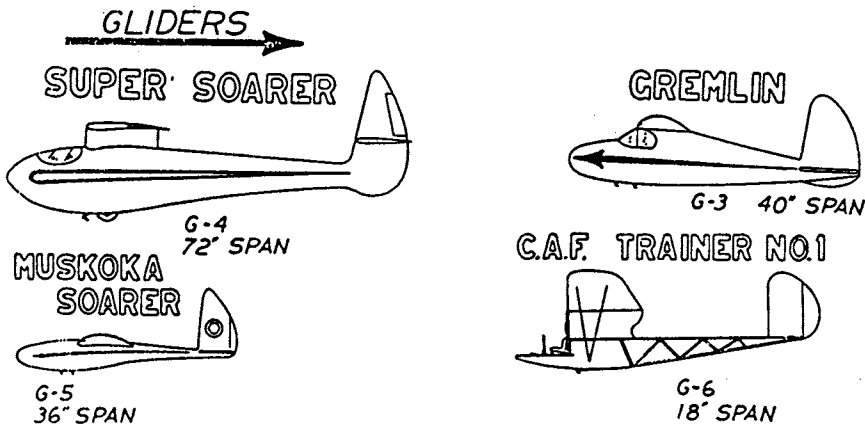
"DEAR JIM: I have come across a company in Canada*that is re-issuing a large number of old printwood kits formerly made in the 30's and 40's. I understand that they are using the original stamps for printing the wood, so it seems that these are 'CLASSIC' kits even though manufactured today.

"Models that might interest RCSD readers are the first kits kisted in their catalog--all gliders: a 72" Super Soarer; a 40" Gremlin; a 36" Muskoka Soarer; and an 18" C.A.F. Trainer No. 1.

"Prices are very reasonable. In order, the above are C\$20 for the free-flight version; C\$32 for the RC version of the Super Soarer; C\$10; C\$8; and C\$5 for the rest, plus shipping. The Canadian dollar, due to the current exchange rate, makes these models a BARGAIN. There are more than 80 kits in the list (see copies of the catalog pages enclosed). Nearly all were designed for rubber power, but the smaller ones could be CO2 powered, and the larger ones by electric motor or Internal Combustion engine. (I'm thinking a small diesel would be fantastic...JHG). Sizes range from 12" to 54" span (for the power scale kits) ...the latter size being a Catalina flying boat. A friend of mine had one of the latter when I was a child; it was quite magnificent, with "stringers all over the place". I plan to build one and power it by a diesel or electric motor. (I wonder how it would be for slope soaring as a power scale slope soarer? I mention details of the non-glider models for the benefit of any glider guiders who might like to try something different for a change.

Tel. 416-

* EASY BUILT MODELS, 15 ONTARIO STREET, GRIMSBY, ONTARIO, L3M 3G8, CANADA. 945-0053

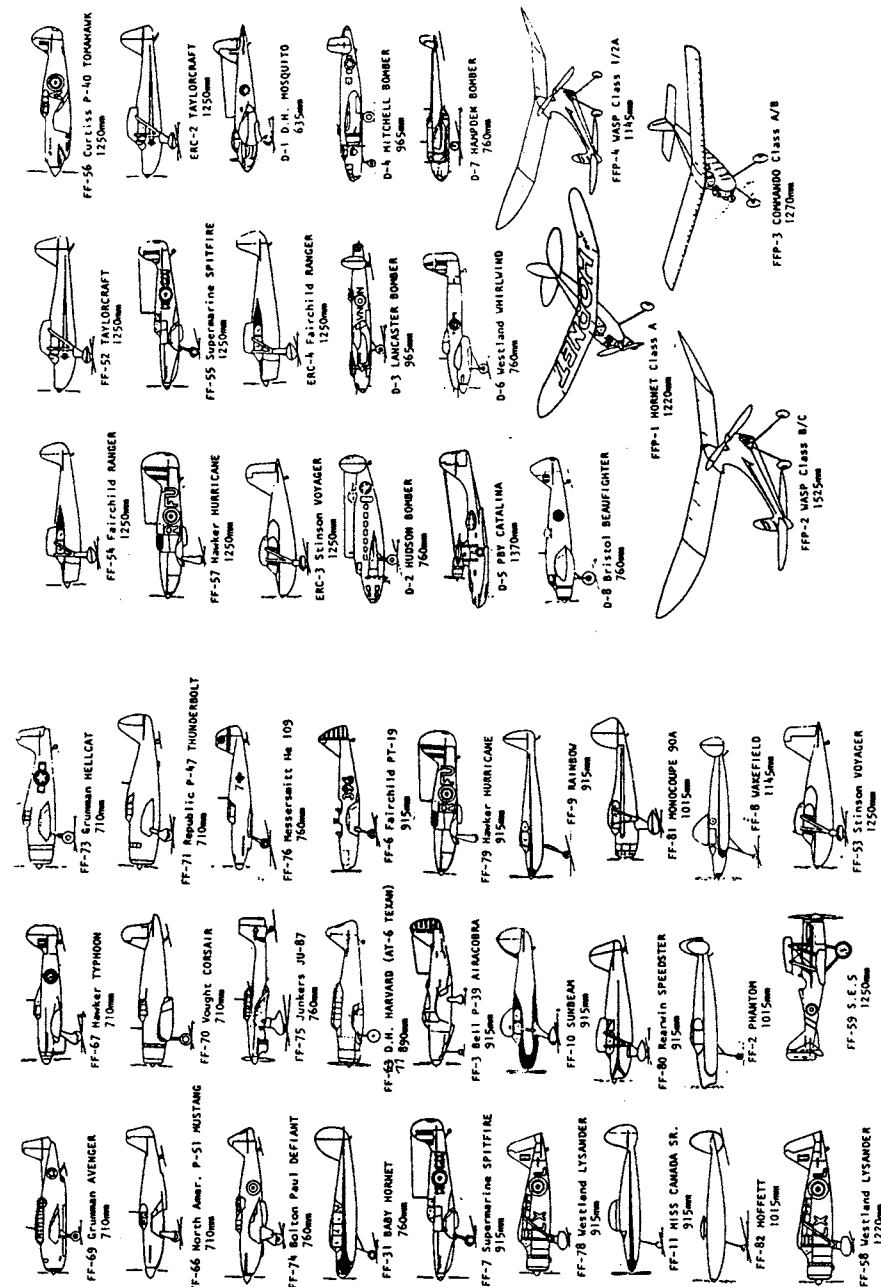


"I guess most of your readers launch by winch, slope or high-start, but those who might like to try an electric motor on a pylon might look into the availability in the US of the motor and battery unit used in Kyosho's new electric models. AMONG OTHERS, IT IS USED TO POWER THEIR 1500mm (60") MELODY GLIDER. The motor is called an AP29 - "280"-size, but is custom-made for Kyosho as an aircraft motor, with an armature specially wound for the required characteristics. It turns its special 6-4 prop at about 10,000 rpm on its 6-volt, 450 mAh NiCad pack. The latter can be quick-charged using its dedicated charger (operates from a 12-volt car battery). There is also a cut-off relay unit that switches the motor off when the battery still has power to run the receiver; so a single battery pack can be used,

" Iwon't quote the prices, but they are not unreasonable here in Japan, and it seems that Japanese-made goods are often cheaper in the US than in Japan. The parts numbers are: AP-29 motor: 1929; 6V-450mAh Nicad pack: 2205; quick-charger: 2365; 'auto-cut relay': BR-12; propellers: BR-9; (there is also a pylon unit, but I don't have its number. You might check with your local hobby dealer on that. My guess is

that companies which sell Kyosho's motor- pylon gliders and small electric airplanes ('Petit Breezin' series) have, or can order them.

"Best regards (signed) Ian"



Ian, all of us here at RCSD, and our readers thank you for this excellent information. For example, I've had an idea for some time in connection with a powered scale slope soarer - jet version. Why not power a small scale jet with a mini-ducted fan motor

Pivot Kit Review

The Pivot is produced by Dodgson Designs up in Bothell, Washington. It is a hand launch type glider available in either 60" or 72" wingspan. As the name implies, it has pivoting wings which makes it rather unique. Kit price is \$75.00 direct from the manufacturer. If the price seems a bit steep for a HL kit, please keep in mind that Dodgsons' kits are notorious for their quality and completeness. The Pivot is no exception. You quite literally need only glue, covering, and a radio to complete the plane.

My kit arrived via UPS in great shape. Everything was well packaged to prevent damage. The fiberglass fuselage and canopy come packed in their own box. Long wood parts are rubber banded together and small wood parts and hardware items are in individual bags. The plans are rolled and are extremely detailed. They are beautiful and are my favorite part of any Dodgson kit. A 17 page instruction booklet is included, too. It has the list of materials, building directions, test flying notes, general flying hints, and repair instructions should your Pivot ever get pranged. It is packed full of information and should be read several times before construction begins.

I think some potential "Pivoters" are scared off when they find out the Pivot is not stick built. I've heard comments like, "Its got foam.....and glass.....too complicated.....resin is yucky" on and on. The truth is that it is really quite simple to build. My first one (60") took about 2 weeks of evenings and my latest ("72") even less. No sweat. With this in mind I will try to give you a brief resume' on how it goes together, along with a couple of hints to make it "easier". Here goes.

The fuselage goes together in 5 basic steps:

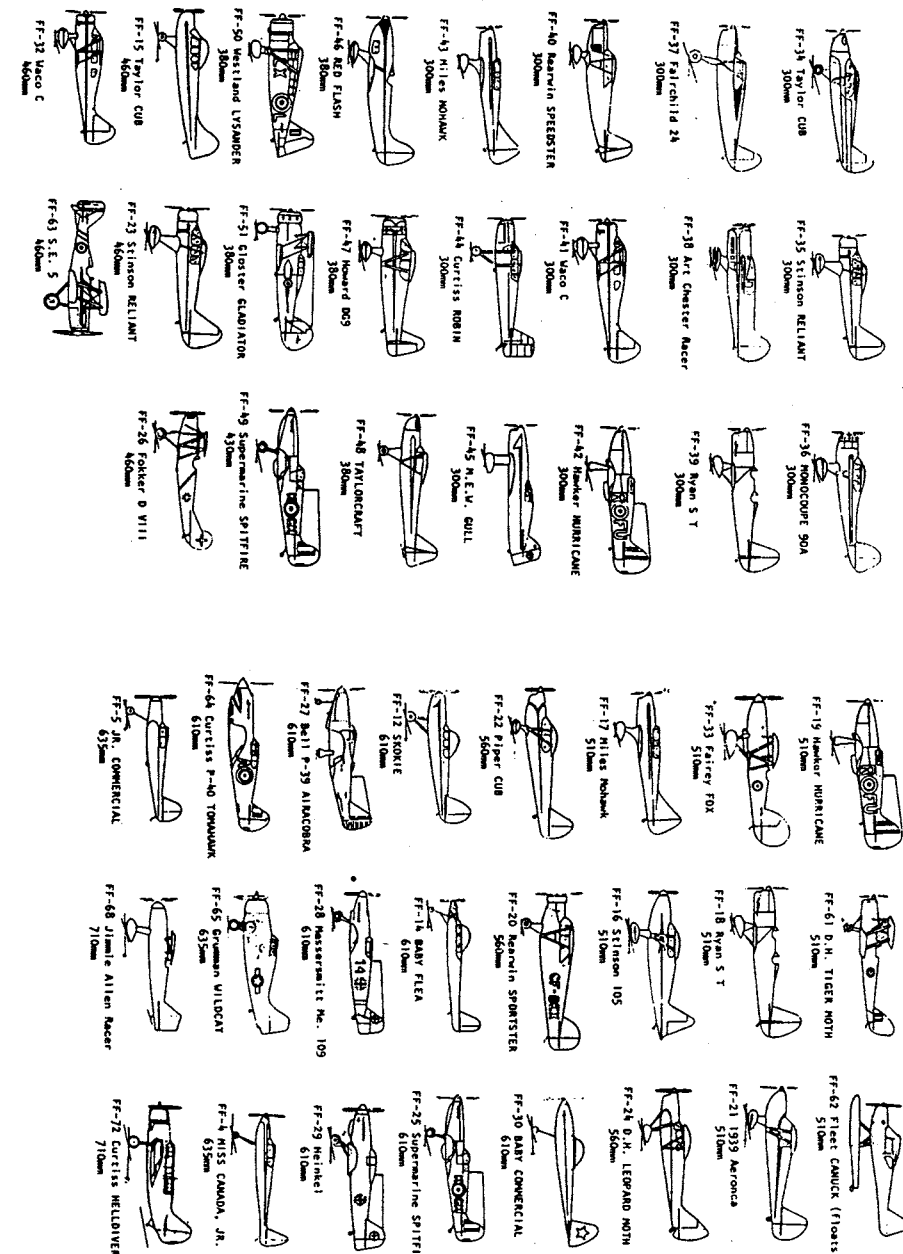
1. Gluing structural members in place
2. Installing pushrods, servo rails, towhook block
3. Top decking and noseblock
4. Wing tube, fitting canopy and hatch
5. Radio gear and wingeron linkage

I use resin for everything except the rear deck (titebond) and the noseblock and stab platform (thick CA). You will use clothespins and masking tape rather than pins on most everything. When installing F4 fuse doublers and F12 spruce longerons use clothespins as clamps. Suspending the fuse upside down on the nose and tail will allow the extra resin to puddle against the wood parts and the weight of the clamps will help keep the fuse straight. Don't lay it on its side, it might banana on you. The glass cloth "bandaids" between F4 and F6 ARE necessary! Excess resin is not extra strength, just extra weight.

The wings go together in 4 steps and can be done in a couple,3 evenings. Very simple:

1. Prep cores. Be sure to trim root to match plans
2. Build and install spar system, glass cloth reinforcing
3. Wing sheeting and L.E.
4. Fit wing to fuse. Dowel supports for wingeron actuator bearings and hook eye wing retainers. Ply root ribs

I use thick CA for the spars and ply webs except by the brass tubes where 5 min. epoxy is used. Titebond is used for the spar to foam joint. The skins are attached with transfer tape. The last 1/4" of the T.E. is done with titebond as follows: Sheet wing bottom, bevel last 1/2" of the T.E. to a knife-edge, coat with glue, coat last 1/4" of top sheet T.E. with glue also, let dry 1 to 2 hours, sheet top of wing lining up top sheet T.E. flush



driven by one of the Kyosho AP-29 motors? It would make a fantastic machine in my opinion. Considering that the 450 mAh pack is so light and small, and mini radio gear being what it is in size and weight, I feel that a reasonably-sized sloper jet with about a 48" to 60" span would really be fantastic. I visualize a molded foam model (maybe with styrene sheet high-impact plastic over the foam) whose fuselage is split down the middle. The ducted-fan unit, electric motor and battery pack would be set into a molded-in "nest". Radio would take up another compartment. Hey, guys: who will be the first to build one? For slope or field in small spaces, these would be great!

JHG

with bottom sheet T.E., use hot iron to iron the T.E. sheets together. This method will keep those thin trailing edges pretty darn straight. Many thanks to Craig Robinson for sharing this "secret". Ballast tubes are not really necessary unless you plan on sloping in winds greater than 25-30 mph. *I never use mine.*

The feathers are all sheet and can be made removable. I chose to attach mine permanently in both cases. The parts and directions are included for those who wish to remove their tails. So with all the major components constructed it is time to sand the wings, tail, and other exposed wood with progressively finer grades of paper, ending with the familiar 600 variety. Using only 50 grit tends to promote a turbulent type of flow over the wings and is not particularly desirable, as I've found out from past experience! Anyway, hit it with attack rag and you is ready to cover. Or cover and paint if that is your pleasure. My 60" Pivot is covered entirely with Flitekote, fuse and all. The 72" Pivot was covered also, but with some Black Baron film. Both worked quite well. The Baron stuff is more tear resistant, while the Flitekote goes over the glass a little easier. Dodgson recommends paint on the glass. I prefer the mylar. It is lighter, faster, cheaper, and is easier for me to grip than a painted surface. My fingers always slip on those slick lacquer finishes! If you do decide to cover the glass, use low heat and be careful. Don't write me nasty letters if you cook your Pivot! If in doubt, paint.

I used micro servoes, receivers, and 225 mah packs in both Pivots. Both weigh 20 oz. The 60" Pivot has ballast tubes, towhook, and was originally fully glassed on the fuse and painted. It weighed 25 oz. I know I said it weighed 23 oz. (Dec. 86' RCSD) I was guessing and I was wrong! Anyway, dad bonked it, I acquired it, rebuilt it, now it weighs 20 oz. Achieving the advertised weights should be no problem with a 100 mah pack and careful building. Control throws measured at the T.E. of the respective surfaces are: Wingerons- 1/2" up, 3/16" down.

Stab- 3/8" up and down

Rudder- 1/2" right and left measured at the bottom of the rudder.

I haven't got a clue where my CG is. Since both my Pivots have had the decalage reduced by dropping the back of the stab 1/16" my CG setting won't mean much anyway. Having already discussed my thoughts on CG and decalage in a previous article, I won't



go into it here. I don't personally recommend this mod as it makes the plane faster and more sensitive at a given weight. It is also harder to get trimmed properly. Stick to Dodgson's instructions and the Pivot is both a pussycat and a tiger, all rolled into one.

Before tossing your new Pivot, keep in mind that this is a clean machine and will want to fly a little faster than a normal HLG. Not alot, just a little. Toss it a couple of times to make sure that everything is in the ballpark. If you find that you need a little aileron trim to make it fly straight, stop now and adjust the wingerons and recenter the rudder. Gorilla launching a Pivot that is badly out of rig could cause some nasty things to happen! Once it is properly rigged you are ready for mega launch. I use a half dozen running steps and a real hard whipping type throw. This produces consistent 40- 45 foot launches with an occasional one a little higher if I hit it just right. My experience with the Pivot has shown that milking the climb has no advantages. I knock it over with a little extra airspeed to insure I transition at cruise speed. New Pivoters should keep up the speed until thoroughly familiar with the flight characteristics. I am finding that my most efficient turns happen by rolling in with careful and authoritative use of the wingerons followed by gentle use of the elevator. Opposite or top aileron will be needed at times to keep the turn from winding up as will judicious amounts of up elevator in steeper turns. Restraint must be used so you don't over fly the plane. I know banging away on the controls really makes the Pivot look like its carving up the air but it just kills performance. The Pivot is not a hands off or bang, bang on the controls gas bag type plane. It demands a smooth, precise, and attentive style of flying to get maximum performance out of it. Does this mean that the Pivot is skittish and hard to fly? Heavens no! Quite the contrary. Both the 60" and 72" Pivot are smooth and predictable with no bad habits. It is gentle, almost loving as it nurses the energy from the bosom of a small thermal. With a nudge of down trim it is a tiger, doing rolls, loops, and snaps as it seeks to escape the confines of its electronic brain. A nudge of up and it returns to a slow floating glide; graceful, quiet. The pilot can call up these individual personalities with a small movement of the stick. Very nice indeed.

I've winched, hi-started, hand launched, and sloped my Pivots with equal success. They handle the light lift or wind of thermal flying with ease. Roaring around on the slope at 70 mph in 20 or 30 mph winds is no problem either. Yes it is fun on the slope but it is, in my opinion, first and foremost a thermal glider. Thermaling allows you to utilize all of the performance potential designed into the plane.

So how would I describe or rate the Pivot? Well, it is always exciting and challenging to fly. And as a go anywhere, fly any air type of plane, I believe it to be without peer. It is what soaring is all about: FUN! I can't think of any higher praise. Everybody should have one. Happy Pivoting.

Wanted: RIDE TO NATS: New England area to 87 Nats and return. Willing to share gas, tolls and lodging expenses as well as driving. Contact: Tyson Sawyer, Silver Ranch Airpark, Jaffrey, New Hampshire 03452
Phone: (603)532-8870

SLOPE SCENE

Let us open discussion on the general subject of building small slope gliders. I mean real small sized planes well under 30 inch span with sleek fuselages.

Space get real close inside the fuse. Wing loadings tend to get higher. Weight of every component must be scrutinized.

This month we will consider the opportunity to reduce the weight of the radio components and to eliminate the necessity to remove batteries for charging.

I have experimented with several types of "On Off Switches" and external charging jacks. I nearly gave up on the subject until I stumbled on a very neat enclosed jack at Radio Shack. The most important features of this particular jack are: It is fully enclosed and the internal contacts are loaded with coil springs as opposed to the common bent reed type. This set up provides all the functions of On Off switch, external battery checking and charging.

I have used this particular set up on my last nine gliders and have not had any malfunctions at all. However, I do want to warn you severely on one potential problem and that is: BE SURE THE PLUG IS INSERTED ALL THE WAY IN. If you insert the plug half way in, the battery will be in direct short and will burn up.

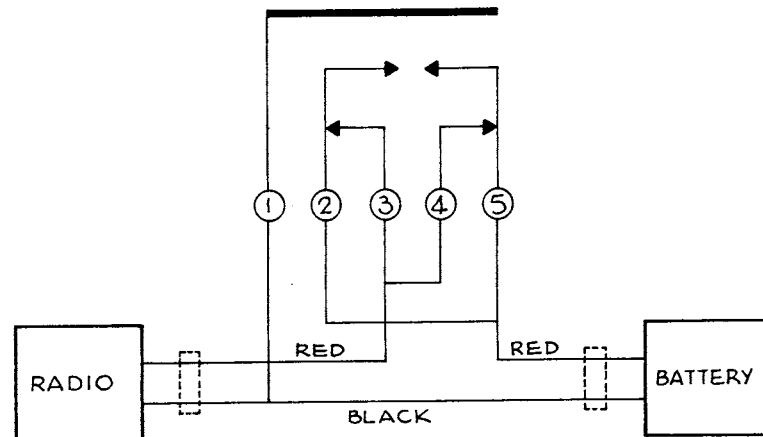
Please note that the potential shorting problem above is accepted in my design in preference to the redundant use of both sets of internal contacts as current carriers, that is, a double electrical path for the very important link between battery and radio is provided.

Back to our basics of weight and size reduction. On most of my real small slope gliders, I remove the receiver from its case. I wire the leads from the battery and the receiver directly to the receiver circuit board and to the battery without any male or female plugs. On Futaba equipment, this saves a total of about seven grams for the two connectors alone and I am convinced that a direct solder

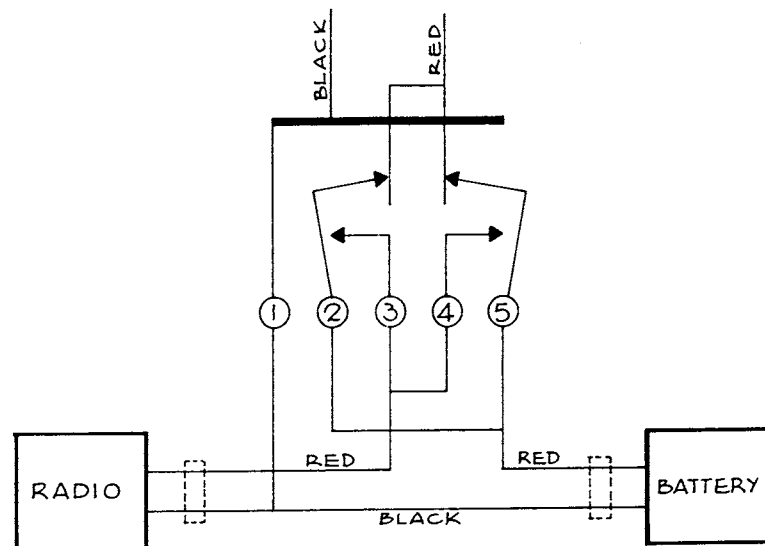
connection is more reliable than a plug. I do, however, continue to use the standard servo plugs.

The Radio Shack parts required are as follows: ARCHER BRAND 3 CONDUCTOR MINI JACKS (2) CLOSED CIRCUIT, CATALOG NUMBER 274-250. STEREO PLUG (2) 3 CONDUCTOR (3.5 M.M.) CATALOG NUMBER 274-284.

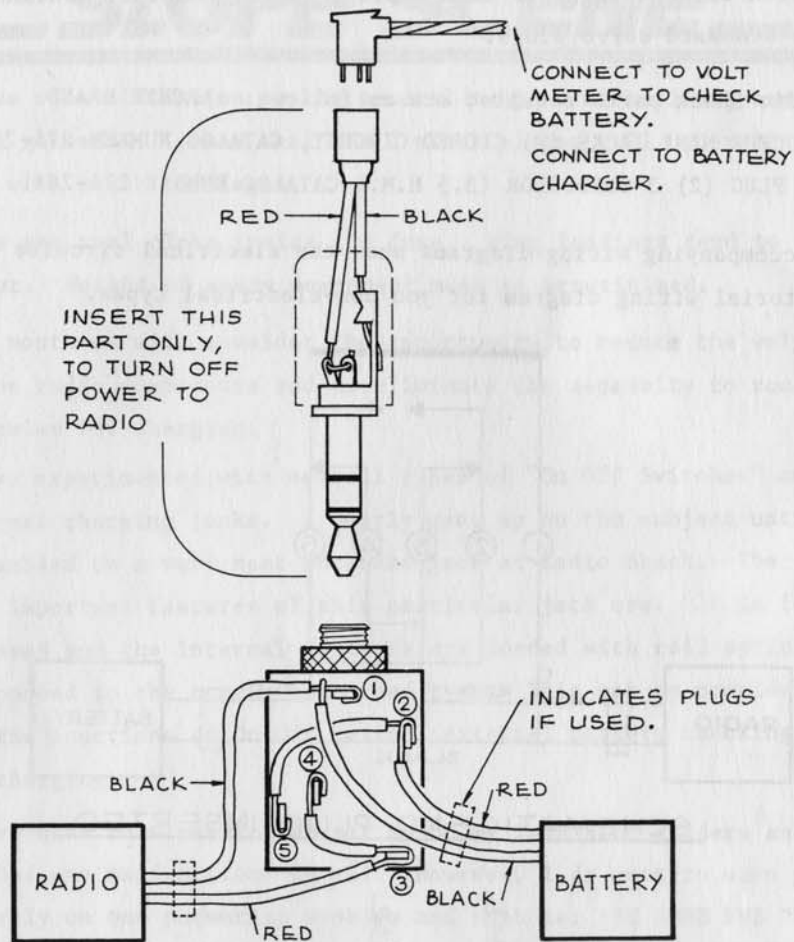
The accompanying wiring diagrams show the electrical circuits and a pictorial wiring diagram for you non-electrical types.



SCHEMATIC - NO PLUG INSERTED



SCHEMATIC - PLUG INSERTED



PICTORIAL WIRING DIAGRAM

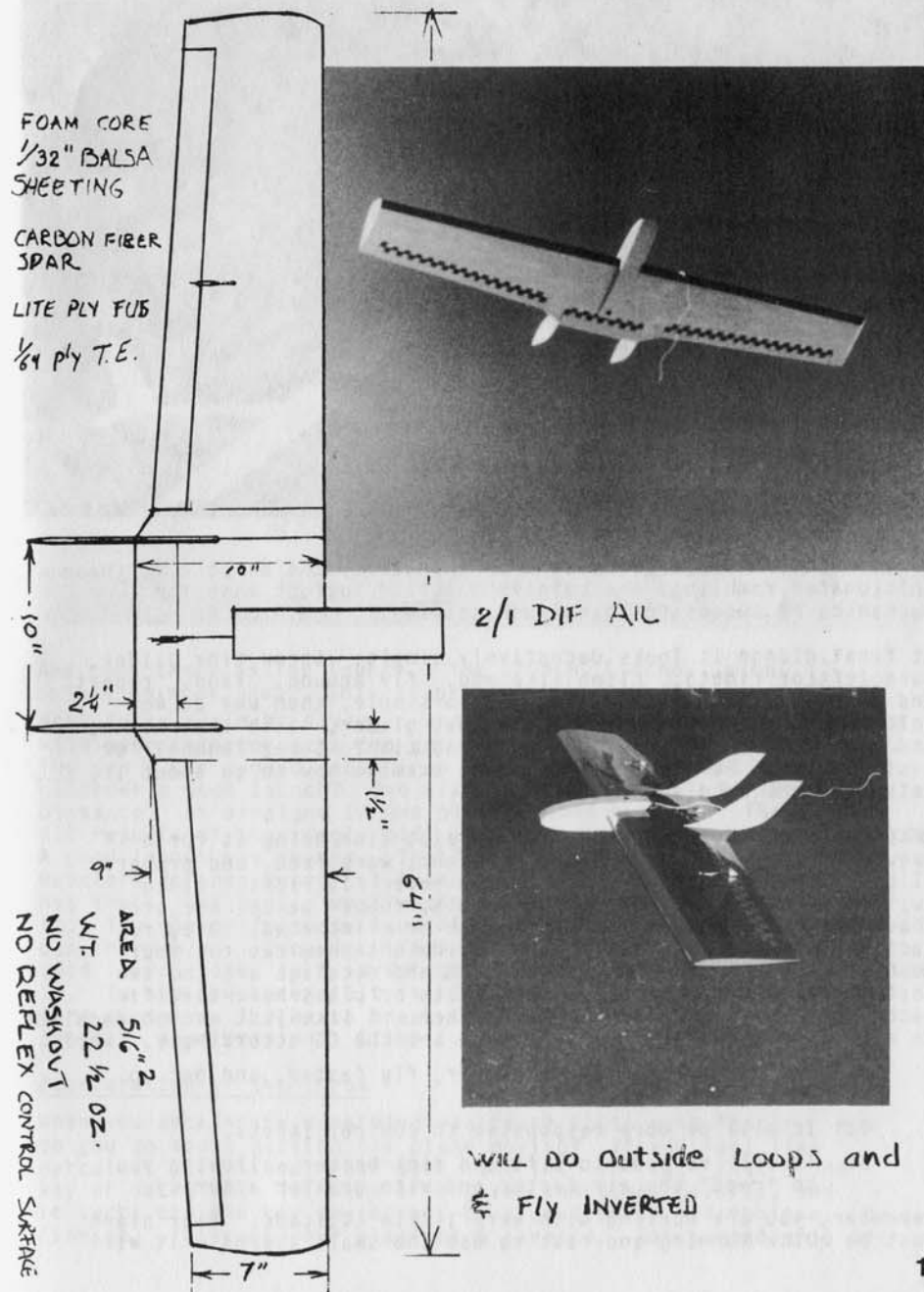
If any of you folks out there have any input for our continued pursuit of the ultimate in size and/or weight reduction, please send it in.

In a couple of months or so, I would like to start a multi part series of articles about a simple vacuum forming machine which can be built and used by the average modeler. If you have any input on this subject, send it to me right away. Don't worry about your presentation, I am happy to edit and make drawings as necessary.

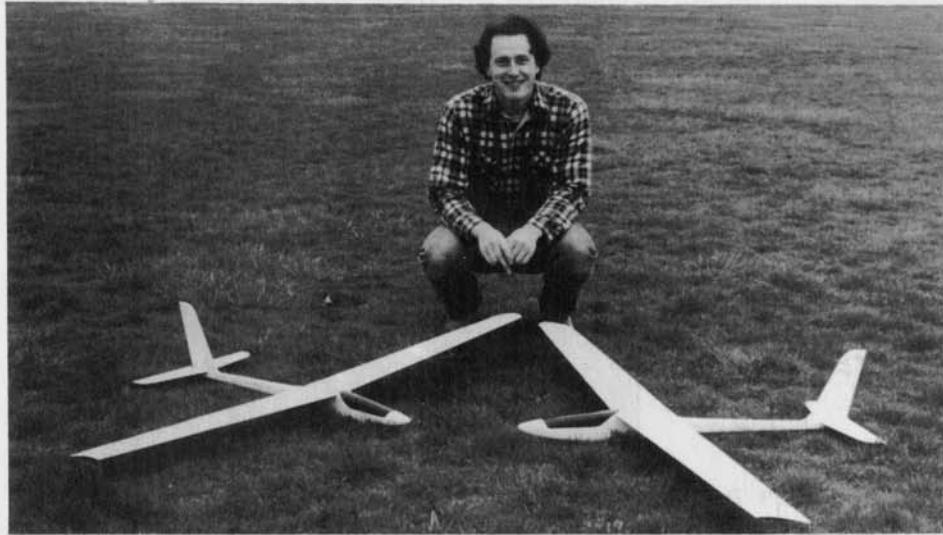
Pray for strong wind in the right direction.

HARRY FINCH
1150 N. Armando St.
Anaheim, CA 92806

"I've enclosed pics of my experimental Flying Wing using a NACA 23112-75 airfoil. It needs ballast for 25 mph+ winds, but will fly very well with 7 mph winds...it's a ball! The new version will have wider and longer center sections, and about 10° wing sweep forward and aft. The ship is very fast and maneuverable; faster than my 2-meter plane at 10 1/2 oz. per sq. ft. with reflexed trailing edges. The enclosed drawing shows the version in the photos, but the new one will be as described but not shown. (signed) AL."



ERIC JACKSON is a frequent contributor to RCSD (see his article on the PIVOT in this issue). I thought it appropriate to run these two articles together, not only because Eric wrote both of them, but also because they are related in an almost inseparable way. Read and enjoy!



As you have no doubt gathered from the title, the purpose of these opinionated ramblings are to give a little insight into the mechanics of successful handlaunch soaring.

At first glance it looks deceptively simple; throw tiny glider, turn left[or right], climb like mad, fly around, land, repeat. End of story, turn page. If it is so simple, then why do we hold in awe the guy who can throw that glider, catch that riser, and ride it out of sight? Is he a magician? Super Thumbs? Or just "lucky". Before you vote, lets examine how to go about it. Lets tame the handlaunch glider!

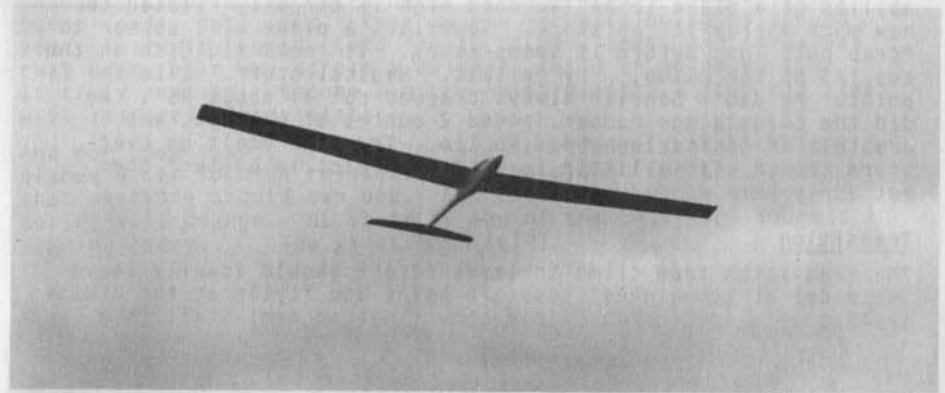
Setting up a model for HL flying is alot like doing it for a regular sailplane. It must be straight, warp free, and properly aligned. A poorly rigged plane will never fly right. Radio switches, antennae, protruding dowels, rubber bands, etc,etc, should all be either inside the plane or eliminated. Drag reduction is super important. An outside antennae can cut your dead air times by as much as 15%! CG and decalage are the two most important things to me. Most kits or plans have specific recommendations. I tend to ignore them. I like just enough decalAGE to make it fly. 1°-2°, no more, and set the CG accordingly. Why?

1. The plane will launch higher, fly faster, and get up on step quicker.
2. It will be more responsive to control inputs.
3. It will respond to lift and sink better, allowing you to "read" the air faster and with greater accuracy.

Remember, you are working with very little altitude. Your plane must be quick turning and fast to use the small thermals it will

encounter. Slow speed performance is not really a consideration since these birds are usually so light they can't help but fly slow. the trick is to make them fly fast. [read- outrun sink]

With everything set up you can fine trim the model. DON'T waste your time trimming it for minimum sink! Your CG/decalage setting with the elevator in neutral should be your cruise setting. Use it for launching and finding thermals. One or two clicks of down will be for outrunning sink, coming back upwind [yes Virginia, thermals live downwind!] and also for launching out, not up, to get to an otherwise "out of reach" thermal. One or two clicks of up trim should give you back your precious minimum sink glide. It should only be used after you have found and cored your thermal or when you inadvertently launch into dung. Don't get married to it. LOW, SLOW, and NO rhyme for a reason. For instance, when you are flying slow and hit sink, you spend too much time wallowing in it. And when you hit lift at low speed, the controls are so sluggish you can't turn into the lift. The combination of airspeed and control throw should produce a plane that will turn the moment you breathe on the sticks. Think turn, it's already turning! Okay? Okay!



And then there is the launch. THE LAUNCH. [echo...echo...] Sounds ominous, huh? This is probably the single biggest reason most folks avoid HL flying. And it's a shame because even people with poor throwing arms can get good launches and great air times. You can't get a good launch you say? Well, just what do you consider a good launch? One with lots of height? Airspeed? Distance? An airplane in one piece? Good guesses. They are all results of the single most important launch ingredient. Energy. A good launch has energy. That's it. Kind of a let down, huh? Websters defines energy as "usable power". Hmmmmmm. Everybody has that. But sadly, most waste it or don't know how to channel it. You see my friends, launching is the one area that EVERYONE can improve on. Even Gorilla Arm the Glider Annihilator! A good launch takes full advantage of your usable power. It exploits it. To see how to exploit it, lets examine the launch a little more closely. I like to break the launch down into 3 distinct phases: Acceleration Climb Transition.

Acceleration or the throw

When you accelerate something you cause it to move faster. How do you go about getting the plane moving? If you feel like Hercules, just stand, rear back, and let 'er rip! That's one way of doing it. Not very effective, sometimes painful, and it lacks the one key ingredient to a good throw. Technique. Or finesse. Think of your plane as a javelin. Get a good grip on

it at the CG, run or trot and THEN throw that sucker! Wow! Hunert percent better! You don't have to throw as hard, you can throw more times, and your plane WILL go higher. Amazing! And your arm will feel alot better at the end of the day. Don't forget to step into the throw. Use your whole body. You shouldn't have to overexert yourself. Go easy until you get the motion down. Practice a smooth run, throw, release motion. Forget brute power. You will find that as you get more comfortable with this technique that the height of your launches will increase a good bit. Think Technique.

The Climb

Upon release, the plane should rotate about 10-15 feet out from you and climb almost vertically. By using the CG/decalage and trim setup mentioned earlier, your plane should do this automatically. Some designs will do it anyway. Concentrate on a smooth, straight climb that requires little, or better yet, no control inputs. Control inputs create drag, kill airspeed, reduce altitude. In short they destroy the planes energy. The ability of a plane to be launched high is directly related to how much energy it can store. Sometimes a plane will appear to "crap out" long before it seems ready. It looks sluggish on the top 1/3 of the climb. Try ballast. Magical stuff. Case in point. My dad's Sunrise always crapped out at about 35'. We did the CG/decalage number, added 2 ounces of ballast, and presto! 40-50 ft. launches. No lie. Try it. Don't go overboard though. "If a little is good then alot is better" does not apply here.

Transition

The transition from climb to level flight should ideally leave the model at its highest possible point and flying at the cruise setting. Transitioning into a slow float or semi-stall is a bad idea for a couple of reasons:

1. You'll have to dive to get up to the cruise speed again and this typically takes more altitude than you gain by stretching your climb.

And most important:

2. Judgement. If you missjudge where the thermal is and transition into sink, you will need that plane on step immediately to get out of there!

Being in the cruise mode allows you to cover the most ground in the shortest possible time. Time is altitude. Mastering the art of a smooth transition is practice, pure and simple.

Contrary to popular belief, handlaunch gliders are not too tricky to fly. They can be touchy, but it's a nice kind of touchy! I really can't tell you how to thermal one, it's like riding a bike. Some hints and rules that have helped me are:

Johnny Bamboo's Law of HL Flying states: "Thermals. I find it, I'm flying in it, I own it. I have right of way!"

In other words, don't let other fliers crowd you out of your thermal. Makes sense to me! But then again, I'm a selfish guy too.....

Thermals at low altitude are generally very intense. They will try to toss a plane out at all times. Keep the airspeed up until you "break out". [get above 100'] You will have to almost continually hold some rudder or aileron to maintain the turn. Don't try to flatten out the turn too much or too soon. Fast and tight is the answer. [Don't touch that one Jim!]

Stick with the thermal. No matter how low or how small. Even if it goes downwind, ride it.

When in a contest and you have your max, don't just spiral down and land. Kick out of the lift a little and cover some sky looking for your next ride. When you fly through the lift, pour in the down stick so as not to show everybody else where it is!

Use the other planes. If nobody is doing any good, try a different part of the field. Unless there is someone standing above their plane with a Hoover, you can almost always do better flying in some different air.

And for the real sneaky, "disguise" your lift. I like to use down trim or fly out of the strongest part of the lift to fool everybody into thinking I ain't got much air. Then when they throw, I tighten my turns and drift downwind with my "bad air"! I know, I know! It's cold, and immoral. But it works! I like it! I like it!

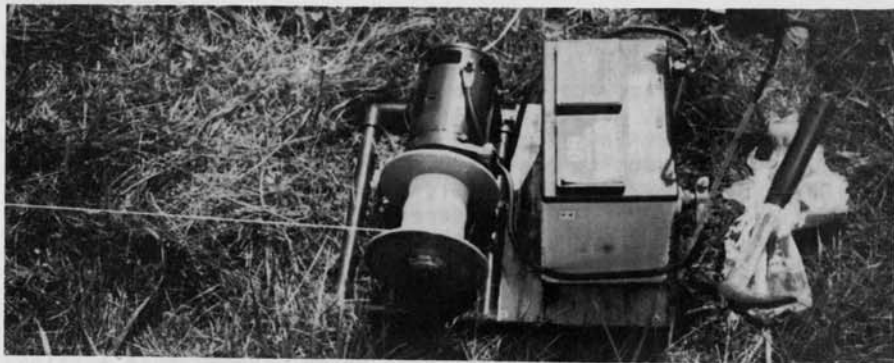
Last and most important. Get in tune with the air. See wind changes, temperature difference, clouds, birds, insects, air-borne seeds, dust, etc. Keep an eye on whats going on around you. The warm fronts, cold fronts, highs, lows, and tornadoes that work their way across a baseball feild in an hours time is truly amazing. Become a micro-meteorologist. Your air times will improve. Dramatically.

And for gosh sakes, be sure to have some fun! These little planes offer so much relaxation and enjoyment for the dollar that everyone should own one. Get one! Your whole outlook on soaing will change. HL is truly one of the best kept secrets in soaring today. See ya at the field!



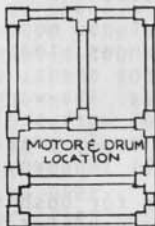
STILL ANOTHER GOOD WINCH FOR ABOUT \$100.....KENNETH MOORE*

"Here's a winch I built for approximately \$100...and it would have probably been more if I had to purchase the winch drum. Okay, the winch base is 3/4" electrical PVC. It takes a full 20-foot length, assorted 'T's & elbows, a hack saw, PVC cement, a flat surface such as a cement walkway, a garage floor, or a porch does fine to keep the frame flat. Note: don't use the accelerator on joints that need to be manhandled!



BILL OF MATERIALS - WINCH:

- 1 Ea. 20' length of electrical PVC pipe 3/4" diameter.
- 4 Ea. 90° elbows 3/4" " "
- 6 Ea. 'T's " " "
- 1 Ea. 1/8" x 1" flate bar stock (steel) - from hardware store
- 1 Ea. small can PVC cement - do not get accelerator
- 1 Rule - convenient graduations
- 1 Ea. hacksaw
- about 2 hour's time
- 1 Ea. scrap piece 1/4" plywood (top of packing crate works fine).
- 2 Ea. 1/4" round - for winch hold-down rods
- 1 Ea. 1956 long-shaft Ford starter motor (junk yard)
- 1 Ea. winch drum
- 1 Ea. Roll - 160# test line - Daveey Systems
- Misc. swivels, flag, etc. - Davey Systems
- 6 Ea. flat-head wood screws (for battery tray)
- 4 Ea. 1/4 - 20 flat-head screws 1 1/2" long for motor mount to frame
- 1 Ea. Foot Pedal - Radio Shack
- 1 Ea. "Panic Switch" turns off power
- 1 Ea. duplex receptacle & connector
- 1 Ea. three-prong duplex plug
- 1 Ea. six-foot to 10-foot long extension cord
- 1 Ea. 12-volt solenoid



BILL OF MATERIALS - TURNAROUND:

- 1 Pc. 1/2" Rod; 2 - 2 1/2 Ft. long; grind one end to a point
- 1 Pc. 4" x 5" x 1/8" flat plate
- 2 Pc. 2" x 3" x 1/8" flat plate
- 2 Ea. 3" muffler clamps with locknuts
- 1 Ea. aluminum bicycle hub
- You're home free at this point.

"I've been using this winch now for a couple of years with absolutely no problems. I have had one foot pedal afilure on launch in the "ON" position. This is no problem if you have a shut-off, or "panic" switch in your system like I have in mine."

Note:

We set up all our foot pedals and pedal-to-winch connections exactly alike so that we can switch units back and forth if we have switch or pedal failure. I have found that even tho' the Radio Shack foot pedal is light weight (micro switch) it will still last a full season of flying before failure. We just replace them yearly.

* Kenneth Moore, 707 Star Route 28, #418, Milford, OH 45150
Cincinnati Soaring Society

THE SOARING SPIRIT OF DAN PRUSS WILL BE WITH US IN 1987, AS S.O.A.R. CONTINUES THE TRADITION AND ANNOUNCES ITS GREAT RACE XI. SCALE WILL BE INCLUDED AS IN 1986, USING AMA SPORT SCALE RULES.

TEAMS WISHING TO ENTER SCALE SHALL USE THEIR ASSIGNED FREQUENCY, WHICH WILL BE THE ONE GIVEN AT PRE-REGISTRATION.

S.O.A.R. WILL AGAIN RECOGNIZE THE TEAM WHICH BEST EXEMPLIFIES PROFESSIONALISM IN OUR SPORT. THIS WILL AGAIN TAKE INTO ACCOUNT TEAM APPEARANCE, FINISH AND APPEARANCE OF MODELS ENTERED, CHASE VEHICLES AND SAFETY FEATURES WITH REGARD TO OCCUPANTS, AND TEAM SPORTSMANSHIP.

PRIZES WILL INCLUDE CASH, PLAQUES, AND TROPHIES.

AFTER A RECENT TOUR OF THE GREAT RACE COURSE BY TWO S.O.A.R. MEMBERS USING A FREQUENCY SCANNER, IT HAS BEEN DETERMINED THAT CHANNEL 52, (72.830), CANNOT BE USED FOR THE GREAT RACE, AND THE COURSE HAS BEEN SHORTENED TO ELIMINATE A SERIOUS INTERFERENCE PROBLEM.

WE HOPE YOU CAN BE A PART OF THIS EXCITING EVENT. IN THE MEANTIME, GOOD LIFT FOR ALL OF 1987.

THE MEMBERS OF S.O.A.R.

Central Ontario Glider Group,

DASH FOR CASH '87
2nd. International F 3 H



C.O.G.G. is pleased to announce that our 7th. annual cross country contest known as the Dash for Cash has been accepted by the FAI as an International Contest.

As you are aware, before F3H becomes a World Championship event there has to be at least 6 FAI sanctioned International contests with at least 2 countries competing where the rules are fully tested.

S.O.A.R.

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NEW FROM VIKING MODELS USA

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FACCTOR - DASSEL-LIKE F3B SAILPLANE; INCLUDES FUSELAGE, HATCH, AND PLANS. MAKES UP INTO 83" SPAN OR 2-M SPAN FOR 2 OR 3 CHANNELS. USES E-193 AIRFOIL. \$45 PLUS \$5 S&H.



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CALLISTO - EPOXY-KEVLAR FUSELAGE. NO PLANS. \$45 + \$5 S&H (UPS)



NIMBUS II - COMING SOON. 1/5TH SCALE. 154" SPAN, WORTMANN 'FOIL. FIBERGLASS FUSELAGE, CANOPY & PLANS. \$60 PLUS \$15 S&H. T-TAIL

SAILPLANE STANDS - 1" x 8" PINE, SCREWED TOGETHER. RUBBER FEET IN EACH CORNER AND A BIT OF CARPET IN THE REST AREA. CAN BE CUSTOM-CUT TO FIT YOUR OWN GLIDER, BUT USUALLY ONE SIZE FITS ALL. CAN BE USED AS SMALL FIELD BOX. HOOKS ON ENDS FOR RUBBER BAND HOLD-DOWNS WHILE TRANSPORTING.

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DASH FOR CASH '87 (continued)...

We would like to see Dan Pruss's dream of F3H eventually becoming a World Championship event realized.

This will be the second International F3H contest to be held - the first was in South Africa in 1895 won by Larry Jolly from U.S.A.

With the Canadian Nationals being run immediately after the Dash for Cash anyone coming our way will have a full week of flying.

The dates are as follows:

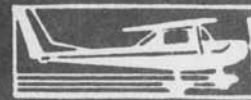
DASH for CASH	July 16th. 17th.	Practice.
C.D. Jack Nunn	July 18th. 19th. 20th.	Contest
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