

# R/C Soaring Digest

March, 1992
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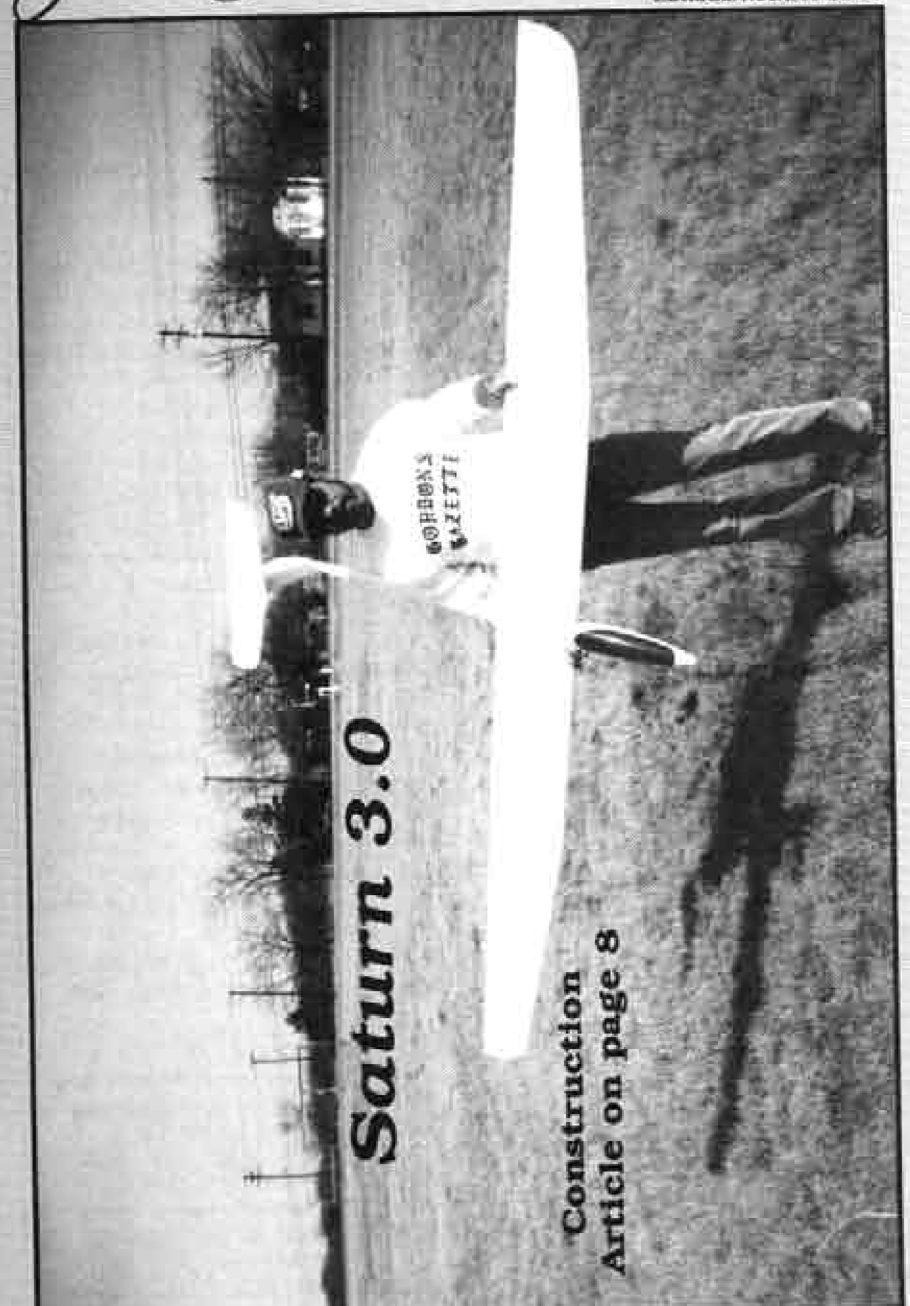
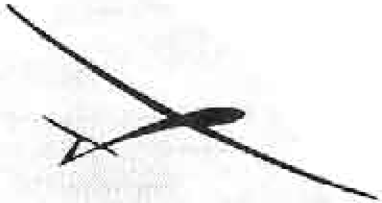


# R/C Soaring Digest

*A publication for the R/C sailplane enthusiast!*

## Advertiser Index



### Special Interest Groups



## Table of Contents



### Other Sections




*R/C Soaring Digest (RCSD)* is a reader-written monthly publication for the R/C sailplane enthusiast and has been published since January, 1984. It is dedicated to sharing technical and educational information. All material submitted must be exclusive and original and not infringe upon the copyrights of others. It is the policy of *RCSD* to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of all articles, model designs, press & news releases, etc. are the opinion of the author and may not necessarily reflect those of *RCSD*. We encourage anyone who wishes to obtain additional information to contact the author. *RCSD* was founded by Jim Gray, lecturer and technical consultant. He can be reached at: 210 East Chateau Circle, Payson, AZ 85541; (602) 474-5015.

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## The Soaring Site

This issue of *R/C Soaring Digest* will be mailed from California. Your next issue will most likely be mailed from a post office just northeast of the Dallas area in Texas. While we do not have a firm commitment on a house in Texas at the time of this writing, our house in California is in escrow with the closing date scheduled for March 5. As we get closer to the deadline, we hope to finalize things on each end. This issue may contain a last minute insert; postcard notification is still planned.

The post office, of course, will be forwarding mail to the new post office box, just as soon as we can tell them the number. However, this will cause some delay and probable confusion due to the amount of mail currently received. Hence, the reason for getting the new address out as quickly as possible.

The telephones will be disconnected on March 5th and we do not know if there will be a referral number available on that date. It will take three days to drive down and probably 2 more for the van to arrive. So, the earliest we can get the phones on line, with a little luck is March 10th. For those of you with Federal Express or U.P.S. deliveries for the April issue, send them to Gordon Jones; his address and phone number are with his column. Please remember that Gordon won't have any records, so he won't be able to help you on subscription questions.

We want to thank all of you in advance for your patience and a special thanks to those of you wishing us luck via your phone calls or notes. Hopefully, all will go as smoothly as possible!

**Happy Flying, Jerry & Judy**

### Looking for a Pen Pal

(The following request is from Brian Tinkler and his ad is in the classified section.)

"I would like to place an ad in your classified section. My ad is to a pen pal in England. I understand that RC soaring is big in England and would like to develop a friendship with someone in England with interests similar to mine. My wife and I talk about a trip to England some day (no immediate plans), so I figure the best way to see the sites I'm interested in (slope soaring) is to develop a pen pal relationship with a fellow slope soarer.

"I'm 37, live in Orange County (home of Disneyland), fly mostly slope ships at Bluff Cove (Torrance), Pt. Fermin (San Pedro), Buck Cove (Newport) and any other slope I can find. I'm not into the high-start scene, although I do belong to the local club (Harbor Soaring Society) and they do a lot of high-start flying.

"I have also found some interest in electric flight. It's a nice diversion when there is no lift. I built an OLimpic II and mounted an Astro Flight 05/geared in the nose. It does O.K. I'm thinking of upgrading the plane to a 3 meter Gnome some time soon. The wings on the OLectric II (my rename) flutter when you get it into any serious speed runs.

"Anyhow, I have digressed enough. If you would, please place an ad in your classified requesting a pen pal. If you have any subscribers in England already that you could recommend, I would appreciate their address." ■

### Aero Towing in Australia

John Berry of Malvern, Victoria, Australia has written to say, "I enclose a photo of my recent project with aero towing. The model is a Piper Pawnee PA 25-150 and the scale is 1/4 giving a wing span of 9'01/2", length of 6', weight 26 lbs., motor Zenoah 62 cc fitted with a pull starter and a 22" X 10" carbon fiber propellor. The tow release is fitted to the top of the canopy and the servos are Futaba S134s. The fuel tank is 1 liter capacity and allows about 45 minutes of flying. The Pawnee works extremely well as a tug and is capable of towing up 1/3 scale models weighing up to 25 lbs. such as an Elfe S4 and a Golden Eagle. It is also slow flying enough to tow up the smaller models, as well. Aero towing is considerably safer than winch launching for the larger scale models. The only problems we have had to date is to mow the grass short enough to avoid catching wing tips of the gliders on launch. At a recent full scale vintage glider regatta, we were able to fly our scale models at the same site and time as the full size. At one stage, we had a 1/3 scale Golden Eagle and a 1/4 scale Olympia 2b flying with their full-size counterparts. You could hardly pick the difference between the full-size and the models in the air."



## Getting Young People Into the Hobby

...by Lee Murray
Appleton, Wisconsin

Our club is having some success in getting young people into the hobby, and I thought that I would share some of the things that probably account for the success that we are having. The list would include:

- An annual model static competition and auction held during the first weekend in March. We have several classifications including Scale, Sport, Big Bird, Sailplane, and Plastic Model. The public votes for their favorite in each category. March is about the time when people want to get outside and do something. The event is well advertised, (newspapers, TV, bank lobbies, cable "barker" channel, plus fliers distributed by the members to bulletin boards at work, etc. Following the auction the membership is usually increased by 5-10 people.
- Videos and books purchased by the club are placed in public libraries. *Model Aviation* is also provided to the Appleton Library.
- We have an Introduction to the Valley Aero Modelers which recommends what power trainers, gliders and radios are recommended to get started, what is involved with club membership, our rules, their responsibilities and the activities of the club.
- We participate in joint training programs and model shows at the Experimental Aircraft Association, EAA, museum and at a local tech school.
- Our members give talks to schools, and service organizations about the hobby and show models and photographs or tapes.
- Contests where the public is invited and signs are placed to attract the public to see our events.
- We have invited the local papers to do specials on our members in the "Leisure" section of our papers. There are usually several pictures in color. This may be possible in large cities, but it does bring new people out to the club meetings.
- We have monthly training sessions before each club meeting. Members are usually solicited into sharing something that they do well. The session starts at 6:15 and run to 7:00 when the regular meeting starts. The speakers often run well over into the meeting but nobody minds since it is more fun than the meeting. ■

# on the Wing

B²

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One of the strangest sights imaginable is that of a plank type tailless sailplane cruising serenely overhead. How do these sailplanes, looking for all the world like boards, manage to fly? And why are they so stable?

To begin, let's look at a common and unsophisticated airfoil, the Clark Y.

The Clark Y, in addition to being capable of providing a large amount of lift, has a negative pitching moment. Due to the shape of its camber line, shown in Fig. 1, it tries to pitch forward as it moves through the air. The Clark Y will therefore tumble in flight unless provided with a sufficiently strong stabilizing force. This stablizing force can be provided by a conventional horizontal tail (horizontal stabilizer). (See figure 2.)

Neglecting the effects of downwash off the wing, but recognizing the need to hold the wing at a somewhat positive angle to the oncoming air, the stabilizer must be set at a negative angle in relation to the wing.

If we move the stabilizer closer to the trailing edge of the wing we will find we need to make the stabilizer larger and / or increase its negative angle in order to produce the same stabilizing effect. Taken to the extreme, with the stabilizer trailing edge matching the wing's trailing edge, we would see something like Figure 3.

The resulting section, the Clark YS, is an inherently stable airfoil because, contrary to what occurs with a normally cambered section, the center of pressure moves forward as the angle of attack decreases, and more rearward as it increases. This is due to the shape of the camber line. Notice the camber line crosses the mean chord line at the 75% chord point. Sections with greater camber will require more reflex in order to be made sufficiently stable.

The neutral point (aerodynamic center) is that point about which all aerodynamic forces are assumed to act. For a conventional tailed aircraft, computation of the neutral point must take into account both the wing planform and the planform and location of the horizontal stabilizer. The neutral point of a plank is at very near 25% of the mean chord.

In trimming our plank, we place the CG ahead of the neutral point, thus producing a constant nose down force. The airfoil is dynamically stable when the CG is placed at the point where the nose down force is exactly balanced by the aerodynamic downforce produced by the reflex in gliding flight. (See figure 4.)

Finding the proper CG location is not difficult, it just requires some experimentation. Too far forward and the elevator will need to be trimmed to a slightly raised position; too far aft and the plank will be very pitch sensitive. The latter situation occurs because the CG is too close to the neutral point. The same thing happens with conventional tailed aircraft. Once the CG's proper location is found it will remain constant.

The plank's marvelous stability is now easy to figure out. If the airfoil's speed slows, the forward CG overpowers the aerodynamic downforce of the reflex, thus increasing the speed in response. Traveling too fast, the reflex forces the leading edge up, increasing both drag and the effects of gravity. Since the plank is short coupled these corrective responses occur very rapidly. No wonder planks make such wonderful free



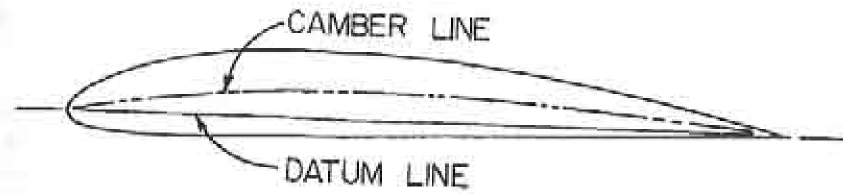



**Figure 1**

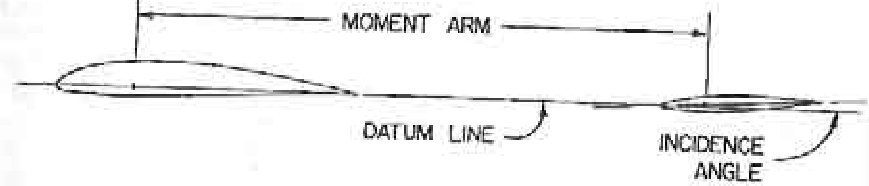



**Figure 2**

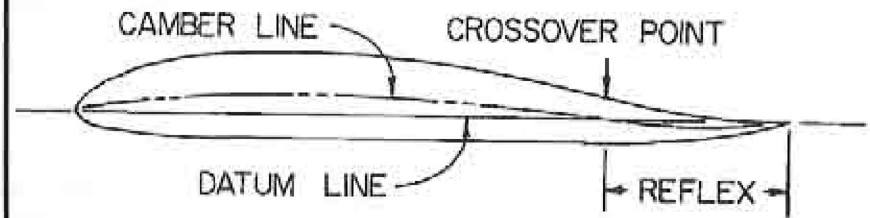



**Figure 3**

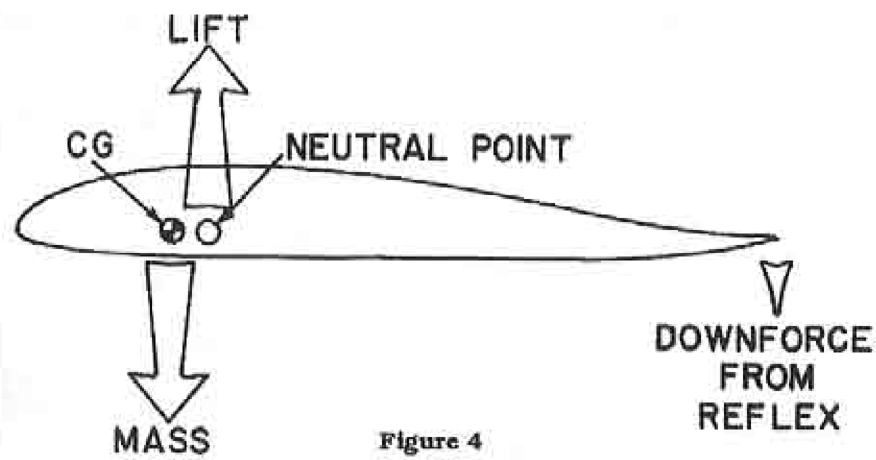



**Figure 4**

flight 'ships and RC trainers.

Reflexed sections, however, are not capable of producing large amounts of lift. The downforce which makes their stability possible is directly counter to the lift generated, and the reflex creates substantial drag. A plank's sink rate is therefore greater than we'd like to see and its speed range is relatively narrow. But for some reason planks generally thermal quite well and often steer themselves into the rising warm air.

What can be done to improve the performance of plank designs? Reduce the amount of reflex to lower drag, increase lift, and allow a more rearward CG. The critical part of this manipulation is maintaining enough reflex to keep the CG in front of the neutral point while retaining a comfortable margin of stability. It is imperative that the CG be kept in front of the neutral point (the mean 1/4 chord line); an unstable (and unflyable) creation results otherwise.

As planks are very easy to build, perhaps some of you may wish to experiment with reducing the pitching moment to a minimum. Let us know what you discover!

### For further reading


Bates, Ken; "Windlord". The construction article for this fine performing plank was published in the March, 1978 issue of *Model Aviation*. The article includes a wonderful explanation of plank stability, both in the air and on tow. This is highly recommended reading.

Jones, Dave and Western Plan Service. Catalog, $3.00 refundable, is a great resource for the plank enthusiast. Numerous plans, plus coordinates for the CJ series of airfoils, are available from Western Plan Service. The address is 5621 Michelle Drive, Torrance, CA 90503.

Lichte, Dipl.-Ing. Martin; "Nurflugelmodelle". Chapter 3 talks extensively about the design of stable airfoils and includes a simple method for determining an airfoil's pitching moment. A number of diagrams and examples assist with comprehension. German text, published by VTH.

Simons, Martin; "Model Aircraft Aerodynamics". Includes an easily understood explanation of the neutral point concept in Chapter 11, Trim and Stability. Argus Books, England.

Werner, Reinhard H.; "Nurflugelsegler Ferngesteurt". This book covers a wide variety of plank designs through 3-views and German text. Discusses movable CG, airfoils, control systems, and other topics. Published by Neckar-Verlag, Klosterring 1, 7730 Villingen-Schwenningen, Germany. ■





# LEAGUE of SILENT FLIGHT 1992 NATIONAL CHAMPIONSHIPS

## JULY 18-25......VINCENNES, IN.

EVENT SCHEDULE

SAT. JULY 18......CROSS COUNTRY
SUN. JULY 19......F3B *
MON. JULY 20......SMT *
TUE. JULY 21......HAND LAUNCH
WED. JULY 22......2 METER
THU. JULY 23......STANDARD
FRI. JULY 24......UNLIMITED
SAT. JULY 25......F3J

SCALE WILL BE FLOWN TUESDAY & WEDNESDAY EVENING AT O'NEIL AIRPORT.
Thermal events will be flown man-on-man. * *May enter only one.*
ALL 50 CHANNELS WILL BE USED....THERE IS AN 8 ENTRY PER CHANNEL LIMIT.
1991 APPROVED RADIO EQUIPMENT REQUIRED...TRANSMITTERS WILL BE CHECKED.

****************************************************************

ENTRY FORM

NAME____________________________ PH.__________

ADDRESS__________________________ AGE__________

CITY/STATE/ZIP__________________________________

AMA#________ LSF#________ LEVEL___ (LSF membership not required to enter)

F3B/SMT HL 2 MTR STD UNLIM F3J SCALE

FREQ. ___ ___ ___ ___ ___ ___ ___ ___
limit of 8 entries per frequency in each event (1 in XC)

ENTRY FEE; $20.00 per event ($12.00 for JR./SR) JR____ SR.____ OPEN____
Entry after June 1, 1992 include $10.00 late registration fee, entry deadline-June 31,1992.
It is preferred that the same frequency be used in all your entries, although it is not required. AMA-RCMA GOLD STICKER required on all transmitters.

\# EVENTS ENTERED________ TOTAL ENTRY FEE ENCLOSED________
SEND ENTRY TO: MIKE STUMP 607 WASHINGTON ST. CADILLAC, MI. 49601

## Winch Line ...by Gordon Jones

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

### Saturn 3.0

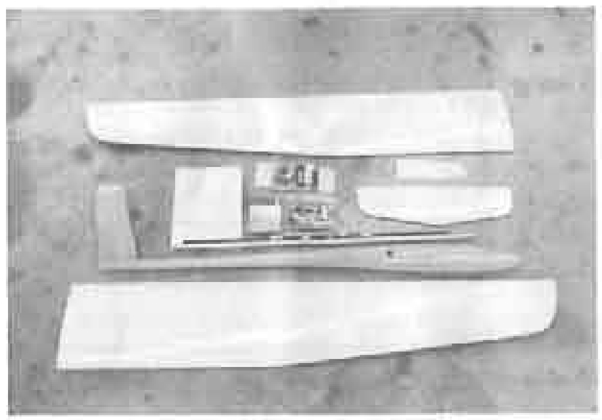
The Saturn 3.0 is an all fiberglass unlimited class high performance sailplane designed to provide the flyer with a craft that will perform in the Sportsman Multi-Task and AMA thermal events. Layne/Urwyler (L/U) wanted a definite European flair to the aircraft and along with a somewhat scale look. I thought it was an Electra E-1 look-a-like at first glance. Saturn shares both the high performance design and strength of some F3B sailplanes. One look at the Saturn makes one feel that he is looking at one of the European designs, and this is intentional.

With the European looks it also was designed with European competition parameters in mind. Saturn comes with the HQ 2.5/9 airfoil that delivers both speed and thermal ranges that have sent several fliers to the World Champs. A double tapered wing planform ala Epsilon with a straight center section and poly tips gives the HQ a nice easy touch for control. The wing is vacuum bagged around 2 lb density extruded styrene foam cores which come with your choice of three color combinations (white/white, white/black, or white/red). The stab and rudder are vacuum bagged fiberglass as well and are light yet strong. Add the one piece fiberglass fuselage, reinforced with Spectra, and the design is complete. Well, enough of the advertising; on to the airplane.

### The Kit

The Saturn 3.0 kit comes about as complete as you could ask; even the hinging tape is included. The glass bagged wings are of excellent workmanship. The fuselage at first looks quite rough; this is the result of using a polyester mold; don't let that put you off. It is very strong and fairly light. As with the wing the stab and rudder are already bagged and precolored. The kit is sent with the molded stabilizer rocker assembly (ala, Epsilon) installed in the fuselage.

A couple of nice touches that L/U have given this kit are a sheet of glassed plywood (pre-colored even) for the wing servo covers and control horns. This is a slick idea and results in a thin hard material that will withstand a lot. The other items found inside the box include: Molex connectors for the wing servo wiring plus the wire, carbon fiber and aluminium pushrod material (The end plugs are already cut and drilled.), a sturdy towhook and every connector required for control installation. In addition, L/U has pre-constructed a carbon fiber bellcrank that rides on a block for installation in the fin. (Again, ala European designs.)



All in all this is one complete box. They have taken time to put everything in that the builder will need without having to run to the hobby shop every day for something new. For those who don't have the time to build or are afraid of cutting out the ailerons and flaps, you can get the Saturn with the flaps and ailerons already cut out for a few bucks more. And if you want to get one ready for radio installation, that option is available on a time permitting basis.

### Construction

This obviously is not a construction article per se as there is not a great deal of construction involved. I will pass along the basic assembly procedures and what I did to get the airplane in the air. It did present an opportunity to try a couple of new techniques and get a first hand look at some techniques I have seen used.

I started by cutting out the flaps and ailerons on my trusty bandsaw. I first masked off and marked the cut lines on both the top and bottom of the wing panels. I then set up a fence and, after cutting the end cuts of the control surfaces, I cut the flaps and ailerons out. If you do not have a bandsaw or access to one, the flaps and ailerons can be cut out using a razor saw or even an X-acto knife using a straight edge. I then set the saw at the aileron angle as depicted in the building instructions and cut these out. Next came the leading edge angle in the flaps for reflex. Once this was complete I gave the control surfaces a light sanding with a long block to take out any irregularities.

The next item on the agenda was the servo wells. These are pre-marked on the wing panels which makes things easy. I first masked off the servo area and then got out my Dremel tool and a cutting wheel. With the Dremel I cut out the wing skin over each servo well. After I had finished that I measured the depth of the servo well with a pin and inserted a router bit in the Dremel tool to the proper depth. This is a neat way to cut out the foam and have a flat servo well base when you are done. Care must be taken to properly measure the servo well so that you don't go through the wing skin.

Once the servo wells were open I used an X-acto knife and cut out a trough for the servo cover rails along the sides of the servo wells. I then cut the provided spruce strips into the proper length rails and epoxied these into the servo wells leaving half of the rail sticking out past the edge of the servo well cut openings. The next step was to measure and cut the servo well covers/servo plates. Again these are cut from the glass laminated plywood to conform to the size of the servo well cut outs. Once a proper fit was achieved I cut out the opening for the servo arms in each of the servo well covers. I then drilled a hole in each corner of the servo well covers for the hold down screws.

The next step was to cut out the aileron and flap control horns from the glass laminated plywood. (This is a really good idea as it is just the right thickness and very sturdy.) I measured the servo locations and marked the location on the control surfaces. I then made the cut outs and installed the control horns and, with the servos laying in the servo wells, verified the alignment.

Next, it was time to sit on the back patio for a while with a batch of sand paper and sand the leading edges of the wing and stab. This does not take that long, but care must be taken if you have never worked with glass bagged wings before. Use 220 grit paper and round the leading edges to shape while flaring in the top and bottom layer of glass. Finish the sanding with some 400 or 600 grit and you are done with the wing. It goes pretty quickly and I think I spent about an hour total on this operation. If you are apprehensive, start with the stab to get a feel for the techniques.

With the wing finished I started on the fuselage. The first step was to do all the preparation for painting. (You can fly it without the paint, but I wanted some color.) I set up the pre-fitted servo tray for the servos I would use and a switch. I then installed the servo tray. Next came the bellcrank assembly; I first marked a line down the front of the wood block to match the angle of the leading edge of the fin and cut that out. Next I made a template off the plans for the curvature of the wood block and marked the top of the block. With about five minutes of sander time I had the block fit in the front of the fin at the approximated location shown in the instructions. I then made up the pushrods for the rudder and elevator and bellcrank to rocker assembly. With the servo tray in place you can judge the distances and have a near perfect pushrod in a hurry. With the pushrods attached, I epoxied the bellcrank assembly in place in the fin.

While the bellcrank was drying I cut the control horn for the rudder and measured the horn location. I then cut out the horn slot in the rudder and epoxied it in place. I then installed the fin stiffner in the rear of the fin and the towhook. Hey, we're just about done. All that was really left was to install the hold down wire in the canopy and we were ready to paint.

I shot a coat of primer and was rewarded with a good looking fuselage and canopy ready for paint. Next came a coat of Cessna white that matched the wing almost perfectly. This was actually unintentional as it was one of two choices of white in the cubbard. My theory on covering has changed over the years and I now rate my finish quality in feet (It looked like a good five foot finish). Joe Wurtz has the right idea about finishing.

**Radio Installation and Setup**

With everything completed it was time for radio installation and programming of my newest JR X-347. I installed the servos in the wing after making sure they were all centered and set up the control rods for each surface at the proper angle. I then put in the elevator and rudder servos along with the switch. It was time to balance this beast; I started by balancing the wing panels to be sure they were of equal weight. This is sometimes forgotten, but it is important. I then selected 5/8" to the rear of the center of the wing rod tube as a safe first flight location and this proved to be pretty good. The towhook had also been installed at this location so that everything matched.

The all up weight when I finished was 83 ounces for the initial trim flights. While the target weight was 78 ounces I was not really concerned as the HQ family of airfoils likes weight. Some folks remain ballasted all season long even in light air with the Quabeck. So if you get one of these birds don't be alarmed if you are a tad heavy as I was. Oh yes, I have knocked some of that weight off and there is more to come.

With my trusty X347 in hand I set the ailerons at 1/2" up and 1/4" down, and the flaps 1/4" up and 90 degrees down. For the crow I dialed in 25% up aileron (about 1/4") and about 25% down on the elevator compensation. Rudder throw ended up at 3/4" each way and this works well. The JR makes programming and setup easy, and is a dream to fly.

The stab is initially set by installing the wing and blocking up the airplane until the wing has 5/16" positive incidence from the leading to trailing edge. Then set the stabilizer at neutral. After flying mine I would suggest that if you are a little nose heavy on the first flights you might want to add a little bit of up to this formula.

**Flying**

Now for the good stuff, FLYING. With all the rain and some snow that we have had in Texas since November it is amazing that I got a decent day at long last. Decent equates to not raining or snowing, and the wind not blowing 75 miles an hour. After I put the Saturn together I made a couple of test glides without breaking the airplane and everything seemed pretty well centered. I did have to increase the stab angle a little due to the CG location but not all that much.

The first launch on the winch was interesting to say the least but it had nothing to do with the airplane; it's called launching on a test flight downwind. This provided an instant test of the wing joiner assembly with a pedal to the metal launch right off the bat. I didn't get that much altitude but it was enough for initial trimming. I had to add a little more up due to the CG location and a bit of right to obtain straight flight. Initial dive tests proved that my CG was well forward but not unreasonable. I then checked out the crow and the stall characteristics; the crow was right on and the stall was extremely gentle and more of a forward flop as opposed to a real stall.

This calmed me down a bit and I proceeded to try to find some lift so I could see how Saturn reacted to light lift. After finding a low level bubble I worked my way back up to about half of launch height without much effort. I was impressed as I am admittedly not a diehard fan of the HQ airfoils. As with other Quabeck airfoils the name of the game is to keep the plane moving in light lift and make the turns as flat as possible. The results are worth learning the technique. If you are really low you can stand this puppy on a wing tip without any trouble and really crank up the speed in a small thermal.

Landing the Saturn is very predictable; it slows way down even with it being a little heavy. Again there was no tendency to stall or do anything strange at all. My only problem was again self-induced by having too much elevator compensation on the initial test flight. I remedied that little problem and have not had any trouble since.

Since the initial test flights I have tried full trailing edge camber for launch and thermaling, and whether you use full trailing edge or just flaps for thermaling both ways work equally as well. That is the nice thing about the JR X347; you can dial in the trailing edge movement you want at one program setting as opposed to several settings in the other computer radios. That is one of the reasons I have gone to JR, I'm lazy and these guys have thought of the easy ways to efficiently program functionality.

In conclusion, the Saturn 3.0 is a dream to fly and will be very competitive even in my hands. When I get some more flights on it and the CG even further back I have a feeling this bird will really smoke. Others who fly the HQ airfoil regularly use a more rearward CG than on other airfoils. I have yet to try speed and distance tasks but I feel these will fall in line with the other flight characteristics. The Saturn is a good solid airplane and, with the all the pre-fabrication, easy to put together in a hurry. I would estimate about 20 hours total time from start to finish.

If you are interested in further information on the Saturn give me a call or call Layne/Urwyler (209) 529-8457. Or look at the December issue of *RCSD* for a good description of the design and additional pictures. This is a neat airplane, and one I believe you will find to your liking. ■

# *Flying in Wind and Weather*

...By Martin Simons



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South Australia 5069

### Stability

In flight the simple cases used above for descriptive purposes, are rare. Almost always, turbulence will strike partly from one side or the other, and partly from below or above. It is also likely, in an atmosphere with rotating vortices of various sizes, for a model to be affected more on one side than the other. Sailplane pilots, for instance, often recognise a thermal by noting one wing of the model being pushed up or down. (The pilot then usually makes the sailplane turn the other way and, with luck, fly into the thermal.) To describe every possible case would require a much longer article and it is doubtful if every possibility would be covered even then.

It is seen, however, that the model responds to all kinds of turbulence in very much the same way. The initial equilibrium having been upset the stable model will oscillate nose up and nose down and probably also laterally, from side to side, trying to damp out the motion, but usually never quite succeeding before another disturbance comes along (Figure 9). The flight path is undulating and, near the ground, this can be dangerous. It might seem therefore, that a stable sailplane, with the centre of gravity forward of the neutral point (aerodynamic centre) is more likely to give trouble in rough air, than one which does not react in this way. Unfortunately the reverse is true. The up and down undulations of a stable sailplane in rough air, are predictable and have a regular rhythm which the pilot soon learns to recognise. If the oscillations are not damped down sufficiently quickly by the aircraft itself, they can be easily smoothed out, with a little practice.

An unstable or neutrally stable aircraft, with the centre of gravity too far aft, is totally unpredictable. Once upset, the sailplane itself will exaggerate the effect (Figure 10). A very small fluctuation in airspeed, which a stable model would rectify almost at once by itself, causes a severe pitch immediately to an extreme attitude before the pilot can possibly react. A tiny gust will produce a big nose up pitch and a 'hammerhead' stall before the pilot can prevent it. The subsequent dive becomes vertical or beyond vertical dive without warning. A neutrally stable model, with the centre of gravity actually at the aerodynamic centre (wing and tail together), will be very little better than an unstable one, since it will pitch up and down in a random fashion in response to every small aerial variation and will demand constant actions by the pilot even to retain a semblance of normal flight.

As the centre of gravity of a sailplane, or aeroplane, is moved back, reducing stability, the elevator control becomes increasingly sensitive. The model becomes very 'twitchy', and in an extreme case, uncontrollable, because the slightest touch will cause it to pitch wildly. Such marginal stability is very likely to produce serious problems.

It is possible to move the centre of gravity so far forward that the model becomes too stable: the elevator then hardly has any influence at all. This is less dangerous than having an over sensitive control, but can be very troublesome. Adequate elevator power is very necessary when making turns or circling a sailplane, and when flaring out for a smooth landing. A compromise is necessary, but it is certainly better to have a model which is slightly too stable, than one which is verging on uncontrollability.

Much has been written about stability.



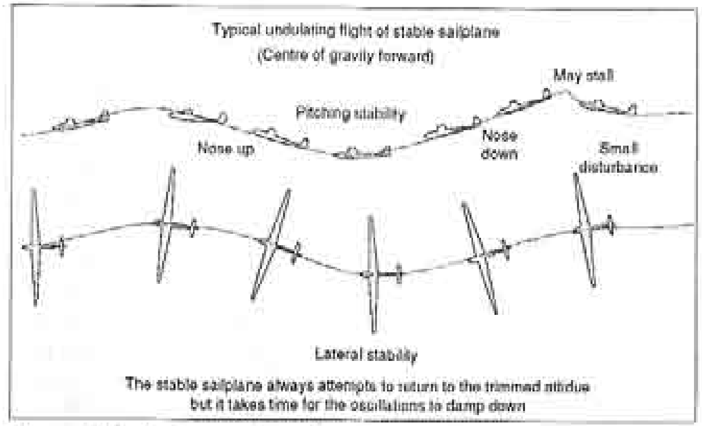



**Figure 9 Typical reactions of stable sailplane**

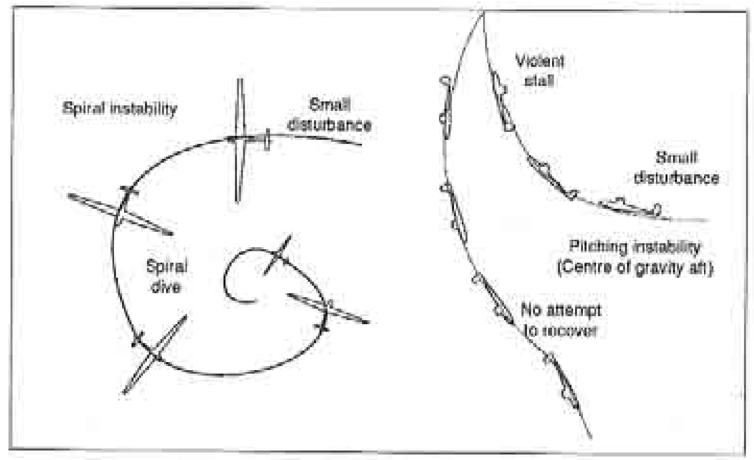



**Figure 10 Unstable reactions**

What is sometimes obscured by the treatises, is that anyone can increase or decrease the stability of a model, on the flying field, at any time, by adding or subtracting trimming weight in the nose. If the elevator seems too sensitive and the model does not handle smoothly, add some weight in front. A little adjustment may then be necessary, perhaps a few turns of the screw on the elevator control rod, to give a fraction more up elevator in level flight. If the extra nose weight seems to produce too sluggish an elevator response, take some of it out and adjust the pushrod length the other way. There isn't much more to stability in pitch, than that.

### Pilot Induced Oscillations

Recognising that the sailplane has started pitching up and down in rough air, the pilot will attempt to smooth the flight out. However, attempting to correct small deviations from the desired flight path can easily produce pilot induced oscillations (PIO), making things far worse, and very quickly.

A small pitching motion is noticed. There is a slight delay caused by the pilot's reaction time, before the elevator is moved. In this brief interval the stable model will already have begun to make the correction automatically. The pilot's effort may come just a fraction late, at the instant when the model is already beginning to swing back. The control action then brings about a more violent pitch than required, worse than the original small deviation (Imagine trying to stop a pendulum swinging by catching it at an extreme position but, through clumsiness and bad timing, giving it a push on its new swing). The pilot sees the model pitch again, and again reacts a little late, when the stability is already beginning to take effect, and the whole sequence quickly gets out of hand, the model moving violently up and down as the pilot furiously 'pumps' the stick. As usual, if near the ground, a crash is likely, and it is not the rough air but the pilot, who is really to blame.

As mentioned, a stable model does not instantly restore any disturbance to its flight, but it oscillates with a definite, regular rhythm. Its motions may be anticipated and any control movements required can be timed to assist the damping. Once this is realised, the pilot learns to let the sailplane fly itself most of the time, and even in rough air, quite small corrective stick movements are usually enough.

**Thermal detection**

All these reactions are of special significance to thermal soaring gliders. Rigging with centre of gravity forward for improved stability does not mean the sailplane simply charges ahead on a rigid track, through any upcurrents and out the other side without giving any sign to the pilot. When it enters a thermal, or the margins of one, the model will pitch visibly and begin the normal, rhythmic behavior. The pilot, if looking out for it, realises that the model has entered disturbed air and, hoping that this is a thermal and not merely random turbulence, will begin to search for the core. There is of course no guarantee.

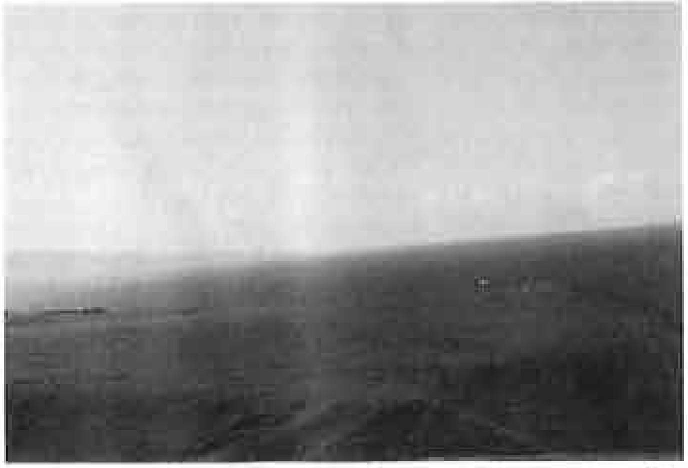
If lift is found, once established in it, and trimmed for a steady rate of turn, the model's stability helps to maintain a smooth and truly circular flight path relative to the thermal, and the model will climb. Thermals are internally turbulent to some extent, although once well established in the core of one, the air tends to smooth out and a stable sailplane will circle accurately, even with hands off the controls altogether for considerable periods.

Some model sailplane pilots claim that a 'twitchy' glider verging on instability, with the centre of gravity aft, gives a clearer indication when entering a thermal. Personal taste has some influence in this matter. The very first initial reaction of the model is much the same but if not very stable, the first small deviation tends to become exaggerated because the model's automatic correction is feebler and slower. The rhythm of the phugoids is slower. The resulting pitching motions are therefore larger, and even an inexperienced pilot will notice them. While such motions may indeed signal that something is going on, height and position in the thermal may be lost. The model sometimes stalls out of the upcurrent entirely. Even if this does not happen the 'twitchy' sailplane is hard to control in the circling flight that follows and will not settle down in a smooth, climbing pattern without constant attention. It takes a very skilful pilot to keep control and maintain the smooth, continuous turning flight thereafter, with numerous small, juggling control movements. Another pilot, rigging the sailplane with the centre of gravity further forward, might receive less obvious signals on encountering the thermal but can then rely more on the model's natural tendency to maintain its trimmed attitude.

**Airspeed, airspeed, airspeed!**

In rough air, variations of airspeed and angle of attack are inevitable. It is therefore best to trim for somewhat faster flight than normally used on calm days. This gives a greater margin above the stall and quicker control response if an emergency arises. Since the greatest danger to a model is loss of control near the ground, and turbulence also is most severe low down, it probably does not need to be emphasised that flying low and slow on a rough day is very dangerous. Faster trim is required at all stages of the circuit before landing, until the moment of touchdown. This requirement is even more emphasised in what follows. ■





***Kahakuloa Head Flying Site***

## *Maui Report*

...by Peter Marshall
Langley BC, Canada

Yes, I am happy to report that soaring is alive and well on Maui. Leanne and I jetted into the Islands in early December, with a just finished, 2 meter Salto in the overhead bin. The 76" Carry-On Sailplane in a soft case, fit perfectly, and was no trouble during the trip.

The first hint of Slope Soaring came while visiting the Hobby Shop in Kahalui, Maui's only city. Dominating the ceiling, was a HUGE P-51D Mustang (1/4 Scale), with a span of 100 inches! I did a double-take on the P-51, then a triple-take, HEY! No engine, no prop, air scoops blanked off, this monster is a slope soarer!?! The 51 had a "SOLD" sticker on it for $200 bucks. I took the builder's phone number, bought my ZAP, and left thinking, this could be FUN!

I called Dennis Brittain, the builder of the "MOTHER OF ALL P-51s", and he invited me to come flying with the Maui Gang the following Saturday morning, 11am at Kahakuloa Head. I also called Dale Collier (holder of many slope records: Duration 12 hrs 08 mins, Distance 248 km closed course, etc.); we chatted for awhile and I received instructions on finding the slope. Take High-

*Dennis Brittain sets up a Royal .049 P-51.*

*Dennis Brittain's 72 in. scale P-51 with spinner removed and Super 8 camera mounted with lens poking thru nose. He is standing in landing area.*

way 34 past Waihee on Maui's north shore and park on the side of the road between the 13 and 14 mile markers. Dale said the slope would be pretty obvious, a huge pasture with cows, electric fences, on the edge of a 350 ft. cliff.

The week seemed to drag on a bit as I followed my wife around in a feeding frenzy of shopping, and sun tanning on the beach. Well, OK, it was fun sorta, but the Trades blew 15 to 25 every day, and all that wind just got wasted! Finally, Saturday morning arrived, loaded the Salto in the car and off we flew up the winding, twisting road to Kahakuloa. After about 4 or 5 "SLOW DOWNs" from my wife, we pulled in behind the parked cars; the Mustang was panting. (Those Budget 5 liter Mustangs really go!)

Dale and Dennis (Mr. P-51) were already there, as well as Dale's son Mathew, Tom and Ed, all locals. Dale introduced us to the guys and a couple of them remembered me from a few years back. Mathew promptly launched a Coyote which developed radio problems immediately and POW, one Coyote scratched for the day.

Dale decided that the Cliff God needed a sacrifice, so he and Mathew launched a free flight Wanderer (no radio). Well, the Cliff God rejected the sacrifice and the Wanderer did a huge wingover, and landed perfectly, in 25 knots of wind! They relaunched, and the cliff did accept the Wanderer, sort of. Pieces of Wanderer kept whipping up over the edge of the cliff all day, startling everyone!

The Maui Gang all flew Power Scale Warbirds by "Slope Scale" (Brian Laird, California), and all the planes were about 20 oz./sq.ft. Dale launched a P-51 painted up in Red colors, and soon there was a Zero, ME109, and a Spitfire all in camo paint, zipping around dogfighting, rolling, looping. Could this be Paradise? Standing in the bright sunlight, clean soft Trades ruffling the hair, deep blue ocean streaked with whitecaps below, ankle deep in emerald green turf, watching full camo Warbirds playing like Swallows. Hovering motionless one moment, accelerating off into rolling zoom climbs the next, the little fighters chased each others tails all over the sky.

About this point, my right thumb began to get very twitchy. My new Salto sat glistening and trembling on the grass, with Heidi (she used to be a Barbie Doll) waiting impatiently in the cockpit for a launch. Ed Walker volunteered for this duty, and simply hurled the little Sailplane through the rotor at the cliff edge, and into the lift. Salto responded by emulating a Maple-seed helicopter, and flat-spun upwards for about 10 ft., finally auto-rotating down to land at my feet. After another self-rejecting launch attempt, I persuaded Ed to walk down over the crest about 30 ft., and simply place Salto in the airstream. This he did, and Salto flew, climbing vertically to about 300 ft in less than a minute!! This cliff has powerful lift, extending far out to sea and far behind in the landing zone, as I was later to discover.

Well, it soon became evident that Salto was seriously tail-heavy, manifested by it's tendency to spin at a twitch of the stick. This condition was aggravated by excessive elevator throws. "LANDING AT KAHAKULOA IS SIMPLE" coached Dale. "Start downwind at 30 ft., extend until almost running out of altitude (field rises gently behind cliff for half-mile), execute a short base-leg, then fly final at 15 ft. or less, punching through 4 or 5 bands of rotor until touch-down. The Salto, at 17 oz./sq. ft., simply would not touch down and shrieked past at Warp Speed back into the Mega-Lift Zone, again and again. Finally, on the 14th circuit or so, some change in the rotor pattern pushed Salto down into the soft green turf! WHEW! Even Heidi looked relieved!

An ounce of noseweight and reduced elevator throw transformed Salto into a smooth flyin' bird and true to its name, this plane is just a loopin' fool. (Salto is German for Loop.) The Wingeron (twist wing) roll control system provides Mega roll authority, even at near zero airspeeds, and with no differential, axial rolls delight the pilot. How I love those long shrieking dives, the smooth pull to the horizontal, then up, up, into that delirious blue, arcing over ever so slowly into that perfect loop, the slow pull back to the horizon, then using all that speed and energy to finish with a slow roll!! Ahhh Yes, I can almost hear it now.

*This is a "before" type insurance shot just in case, as were the other beach shots.*

Hey, this Maui Report is getting a bit long. I won't get to tell you about Dennis flying a 75 in., P-51 with a movie camera in the nose, or the little 48 in., span Royal P-51 that got slammed by the rotor. Or the thermal field on Mt. Haleakala called Poli Poli Park where they only hand launch, but rest assured, that Slopin' is alive and well in Maui.

Anybody wishing for a contact number in Maui? Slope or Thermal?

Dale Collier, 110 Kamehamenui, Kula, Hi 96790; (808) 878-1334

Dennis Brittain, 347 south Alu Rd., Wailuku, Hi 96793; 244-5310

Ted Willet, Star Rt. 7, Hana, Hi 96713; 248-7093

James Martin, 183 Alalani, Puklani, Hi 96788; 572-9378 ■

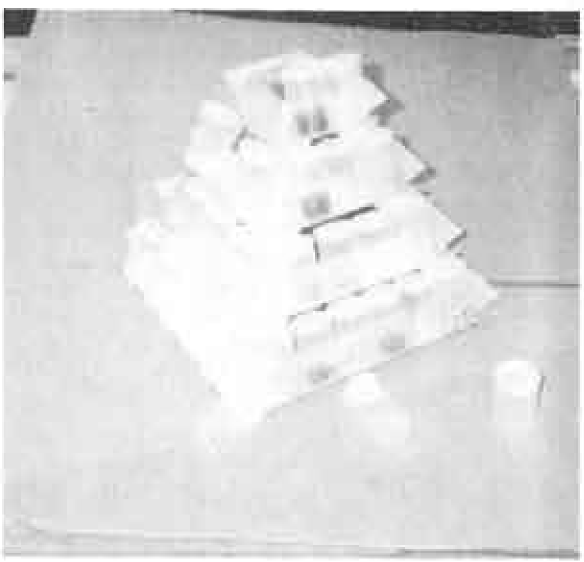
*Heidi's getting a bit steamed up in Salto on the beach.*

# *Building a Holder for Small Parts*

...by Gene Frame
Middleburg, Florida

Fujicolor 135 film canisters are transparent and make great small parts holders. One Hour Photo processing labs throw these in the trash. The lab in my neighborhood was nice enough to save them for me.

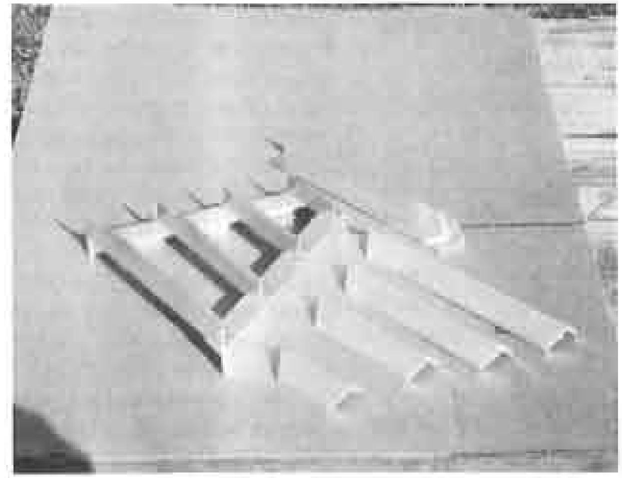
To build a nice little, 9" X 9" X 9", rack to hold 60 FUJI cannisters, start with 2 pieces of aluminum angle 1X1X1/8 by 6 ft. long. Tape together and cut two pieces at a time (4 corner post 9 1/2", 4 bottom shelves 9", 4 second shelves 7", 4 third shelves 5", and 4 top shelves 3").

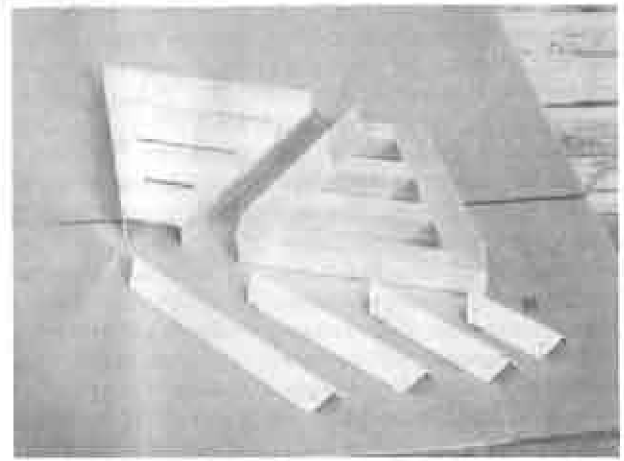


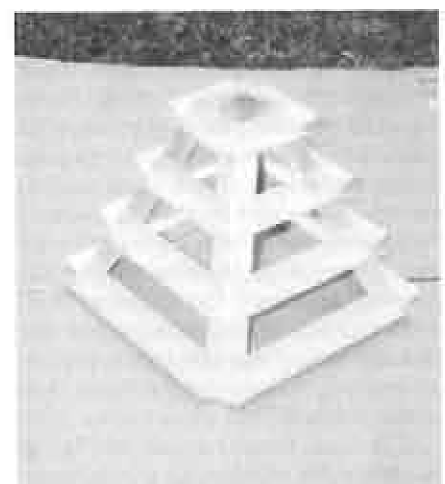
Build two end pieces first. Then install the top and bottom shelves on the other two sides by clamping and springing the corner post into alignment. Add the rest of the shelves.

Mine sits atop plastic storage drawers which are mounted on a lazy susan. ■









# CG, Elevator Trim and Decalage

## Part 2 - The Practice

...by Frank Deis
Colorado Springs, CO
Pikes Peak Soaring Society (PPSS)


(This three part series originally appeared in the Journal of the Pikes Peak Soaring Society, *The Spoiler*, and is reprinted with the permission of Frank Deis.)

Now that we kind of understand the theory (from part 1), it is time to actually set the CG and decalage.

There are two different ways to get the airplane trimmed in pitch depending on whether it has a fixed stabilizer with an elevator or an all flying stabilator. If it has a stabilizer/elevator configuration, set the angle between the fixed horizontal stabilizer and the wing cord (the line through the center of the leading edge radius and the trailing edge - not the same as the bottom of the wing) between 1 and 3 degrees, pick a CG position around 33% of the mean cord (This is not the same as the root cord, it is the average wing cord which depends on the planform shape leading and trailing edge sweep angles, etc.), and test fly the sailplane until the elevator trim is set for level flight. When trimmed, see if the elevator is parallel to the fixed stabilizer. If you find up elevator trim is required, move the CG back a little and try again. If down trim is required, move the CG forward. Keep moving the CG and test, flying until the elevator is parallel to the stab. When you get there you are in trim. You may want to try this for two or three other decalage settings to make sure you find the setting that maximizes performance. (i.e., is closest to minimum sink or maximum L/D.)

If the sailplane has an all flying stabilator the problem is a little more difficult. Pick a CG position and test fly the sailplane to get the elevator trim setting for level flight. Measure the resulting decalage angle with an incidence meter (I use a home made one that works just fine and some commercial ones are available, also.), and compare it to the 1 to 3 degree angle you are seeking. If it is greater, move the CG aft. If it is less, move the CG forward. Now, test fly again. Repeat this process until the decalage is where you want it.

### The Dive Test

You may have heard of the "dive test" as a way of testing the pitch trim. I don't know who originated it but Lemond Payne introduced me to it in 1973 as a peculiar property of the LEGIONAIR 140. I thought it only worked on LEGIONAIRS, but I quickly learned that it works on most sailplanes. I use it most of the time because:

1) It is a quick and simple way of checking the CG and decalage settings.
2) It doesn't require all of that measuring.
3) It gets you pretty close to the right answer.

The test is simple:

- Test fly the sailplane off a winch or high start to get plenty of altitude.
- Set the elevator trim for level flight.
- Nose the sailplane over into about a 45 degree dive and let go of the controls for 5 to 10 seconds.
- Then resume level flight. (Don't let it crash!)

If the sailplane pulls out of the dive and into a stall, the CG is too far forward. If the dive steepens, the CG is too far back. Move the CG accordingly to correct the dive or stall, re-trim the elevator and re-try the dive test. You are looking for the CG position where the sailplane starts to pull out and then goes into a steeper dive. (See Figure 4.) The Falcon 880 is the only sailplane I have ever had that didn't

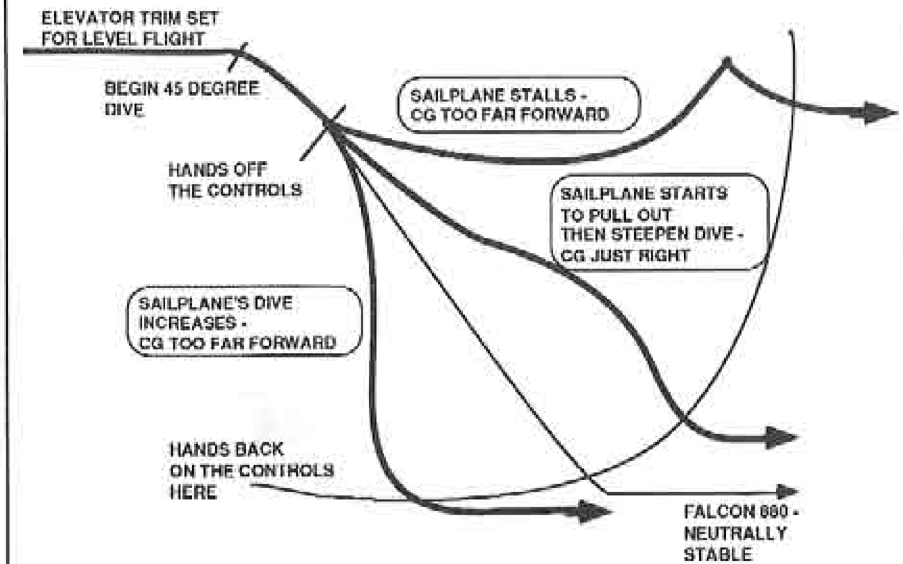



**FIGURE 4 WHAT TO LOOK FOR IN THE DIVE TEST**

do this. When trimmed to my liking, it just continues in a straight line in whatever direction I point it (i.e., it is neutrally stable).

In practice the dive test works very well. So well, in fact, that it can often be used as the exclusive method of establishing the pitch trim settings. I have never seen a sailplane I thought was properly trimmed that would not pass the dive test. It worries me however that I know of no theory for why this test should produce either a max L/D or minimum sink rate trim condition. (For the reasons discussed later, I assume the dive test finds the max L/D trim point.) So, I still measure the decalage when I am done just to make sure it came out within reason. Your sailplane just might be the first exception.

If the dive test is used to trim a sailplane with an all flying stabilator, when it passes the test it is trimmed. If, however the sailplane has a stabilizer/elevator configuration, there is another step to perform. After passing the dive test, check to see if the elevator is parallel to the stabilizer. If it is not, adjust the decalage angle by shimming the wing or stabilizer a little (1/32 - 1/16 inch shims are typical) and re-run the dive test procedure until you pass again. Repeat the elevator check. You are not done until the elevator and the stabilizer are parallel when you pass the dive test. It is very important to go through this last step because it minimizes the drag generated by the stabilizer as is discussed in more detail below. When you are done, it is a good idea to measure the decalage to make sure you are at or near the angle you expected.

Some of you may be a little queasy about changing the decalage angle on a sailplane that uses a fixed horizontal stabilizer and elevator combination, but there is no need to worry. A 1/32 shim under the trailing edge of the wing with

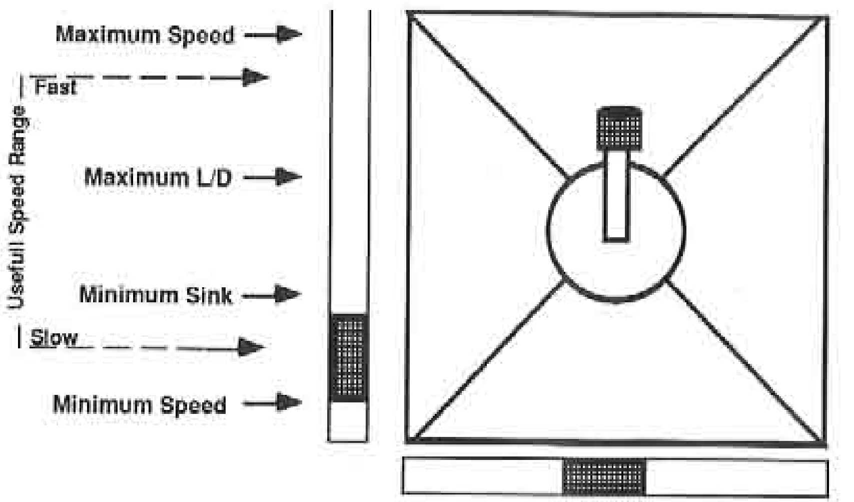



**FIGURE 5 LOCATING THE KEY TRIM SETTINGS ON THE ELEVATOR TRIM LEVER**

a 7 inch cord only changes the decalage by a quarter degree (the change is even less for wider wings) and that won't give you any big surprises. So, forge ahead! The decalage angle very nearly determines the performance of your sailplane. Kit manufacturers usually put in too much decalage because they don't want new pilots to have handling problems. (The Gentle Lady, oddly enough, is the exception - it has too little decalage.) I don't think you should trust decalage selection to anyone but yourself. When you get the performance you want using the shims, carefully cut the wing or horizontal stabilizer saddle to make the fix permanent. If the sailplane uses a stabilator, don't worry about any of this.

Inexperienced pilots may not be comfortable with the feel of a sailplane trimmed in pitch as I have described above. There is a good reason for this; the sailplane has little if any tendency to pull out of a dive by itself. It turns out that moving the CG aft to get better performance also reduces the pitch stability which can make new pilots very uneasy. If this happens to you, leave the CG forward and increase the decalage angle a little. Fly the sailplane this way until your skill increases to the point that you need the extra performance and are comfortable with the reduced stability that accompanies it. Then, ease the CG back and reduce the decalage a little at a time. It is more important to have fun and take your sailplane home in one piece than to trim for maximum performance.

Now that the sailplane is trimmed presumably for maximum L/D, you can locate the other key pitch trim settings. Put an incidence meter on the horizontal stabilizer, switch on the transmitter and the sailplane, set the elevator trim lever to the position you found in the dive test, and note the incidence meter reading. Move the elevator trim lever to increase the decalage (up trim) 3 or 4 degrees. This should be the trim setting for minimum sink rate, so note the trim lever position. Increase the up elevator trim another 3 to 4 degrees and note the trim lever setting again - this should be the setting for minimum speed flight (i.e., just on the verge of a stall). Now go back to the maximum L/D setting and move the trim lever to get 4 to 6 degrees of additional down trim. This should be the maximum speed setting so note the trim position again. The last step is to locate the upper and lower trim settings that bound the useful speed range. They correspond to decalage settings -2 to -3 degrees down from the maximum L/D trim position and 3 to 4 degrees up from the maximum L/D trim position. It is useful to count "clicks" on the elevator trim lever between these positions so that you can find them by feel instead of looking down to the transmitter when you want to change trim.

This is about all you can do on the ground. Now it is time to go to the flying field, try this stuff out and see if it does what you expect.

In part 3 we will talk about using these newly located trim settings. ■

## THE FIRST SOARER

...by Graham Woods © 1992
"Merchistoun, Moat Lane, Priestwood
Great Missenden, Bucks HP16 9BT, England

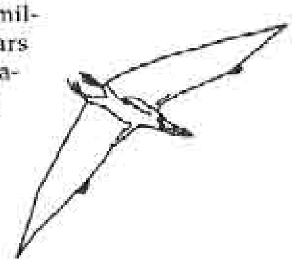
This vintage glider wasn't very pretty but it was quite large by our standards, with a span of 6.95 metres, 22 ft. more or less. It was light too, for its size, at 16.6 kg. The wing area of 4.92 sq.m. gave it a very light loading at 35.9 g/sq.dm. (That's 10 ounces per square foot to you imperialists.)

## AERODYNAMICS...

It was a tail-less glider, you might even say a flying wing; its 10.5:1 aspect ratio undercambered wing had a best L/D of 18.5 flying at 8.2 m/sec (Re: $3.2 \times 10^5$) and a minimum sink of 0.42 m/sec.

Its wing spar was made of thin, hollow, tapering calcium phosphate tubes which, at the same time, formed the leading edge of its wing. It was **designed** primarily for cliff soaring and regularly flew over the sea. It was able to soar in thermals over the warm, 24°C, tropical sea and perhaps use the *slope* lift from the ocean swell. Its low flying speed and light winds of the period meant that it could not do any Dynamic soaring.

There were quite a few of them around when there were no polar ice-caps and we really were a part of Europe, and North America was drowning under a great shallow sea of low-life. No, I'm not talking about the late twentieth century, I'm talking about some few millions of years ago, the Cretaceous period of our prehistory.



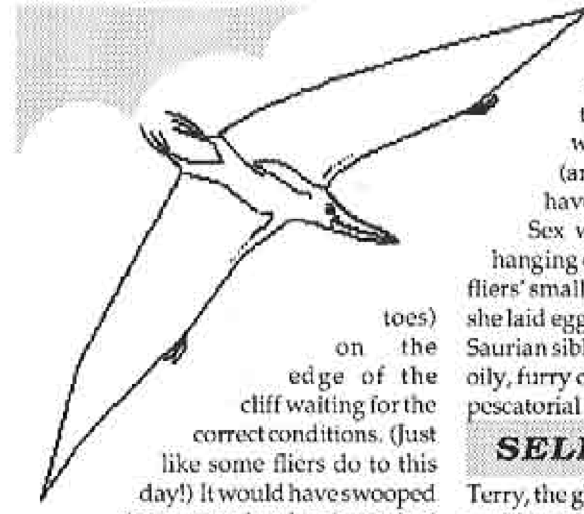
***Pteranodon ingens*** was a real glider and, although it could articulate its wings at nine different places, it could also *lock* its wings at the 'shoulder' in the gliding position.

With a minimum sinking speed of only 0.42 m/sec it only needed to extract 68 watts (16.6 kg x 9.81 m $sec^{-2}$ x 0.42 m $sec^{-1}$) of energy, from thermal or slope lift, to enable this *monster* to maintain level flight. It *could* flap its wings but its flight muscles could only just supply 98 watts (or 78w @ 80% eff.). Such a low flying speed (17 mph) made headway difficult in any wind more than 8 m/sec.


Inadvertent landing on the water was not recommended; poor flapping performance meant a 'water start' *a la windsurf*. Here, floating easily, pteranodon would have been a sitting duck (if they'd existed) in its most vulnerable position. Just imagine 22+ feet of humerus, radius and ulna, then carpals and four long fingers all strung out in a line with a 0.3 mm. membrane from fingertip to ankle, delicately held out on the crest of a wave ready for take-off with prehistoric ***jaws-o-saurs*** type creatures snapping all around. One would imagine that flying was constrained when there was too much wind, not enough wind or it wasn't *'on the slope'* and that *'landing out'* was just as dangerous 40 million years ago as it is today.

## LIFESTYLE...

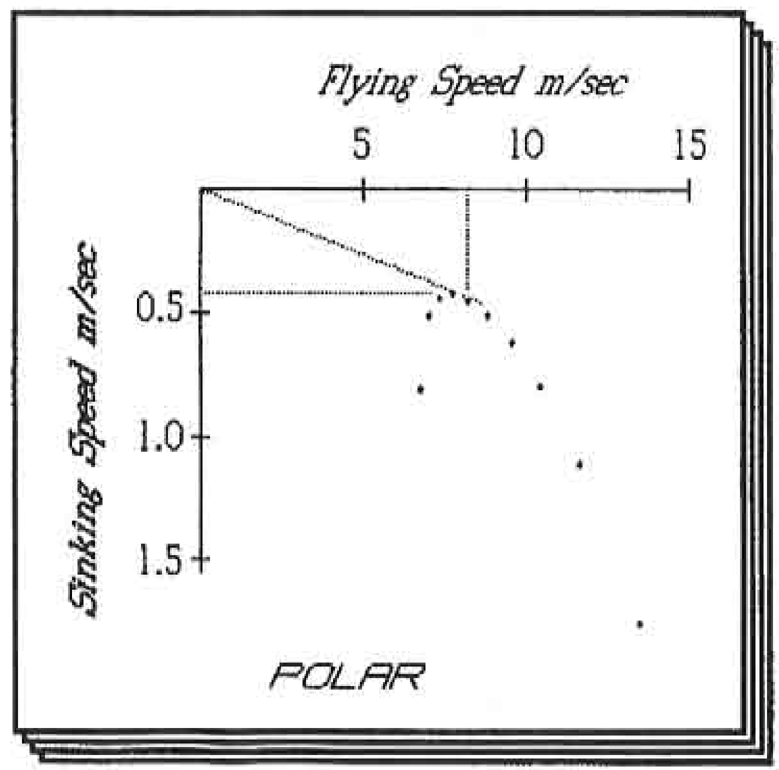
Our first glider would have spent much of its time hanging about (literally by his toes) on the edge of the cliff waiting for the correct conditions. (Just like some fliers do to this day!) It would have swooped down to sea level and snatched a *primaeval plaice* while still on the wing, perhaps storing it in its pelican-like throat pouch or swallowing it whole since it had no teeth, and probably had indigestion!



Suitable flying/nesting sites must have been few and far between (bare cliff top facing the prevailing NE wind) and jealously guarded (aren't they always) and would have forced Terry to be sociable. Sex would have been performed hanging on the cliff edge! and the lady fliers' small pelvic opening indicates that she laid eggs rather than had live young. Saurian siblings would have clung to her oily, furry chest and been fed on a diet of pescatorial *petits fours*.

## SELF CONTROL...

Terry, the glider, shouldn't have had any problems landing since he had a large airbrake: the crest blade (680 X 30 mm) on the back of his head with which, by turning sideways, could control his angle of descent for landing. Control in pitch



was probably by a combination of moving his CG -as hang gliders- head movement and a fore and aft movement of the outer wing. Roll control was probably down to wing twist and, in the case of yaw, not so much *left hand down a bit* but left leg down a bit, since the wing membrane was attached here and any leg movement would have altered the wing geometry.

His wing spar was a miracle of biomechanical engineering; all fossil specimens showing a wall thickness of not much more than 1 mm. at the root, where the humerus meets the glenoid cavity (shoulder joint), down to 0.5 mm. at the wing (fourth finger) tip with internal struts for strengthening.

Such fine bones were necessary for Terry's very low wing loading, but apparently strong enough to withstand heavy, awkward landings and turns pulling maybe up to 3 g. A very bad landing would certainly have meant *curtains* for Terry, one way or another, not to mention being embarrassed in front of his contemporaries in the colony on the cliff (as always). So, careful flying *and* landing would have been the order of the day. Mind you, this would have been taken care of by *Natural Selection*, I suppose?

Climatic change was responsible for Terry's demise, as the temperature differentiation between poles and equator increased so did the mean windspeed. Pity, had he developed an RG or HQ section we might still be flying with him, today.

Strange to think that if we considered the arm, leg and head movements of a sky diver and then some of the construction (light, hollow, thin walled leading edge tubes and stretched fabric) and control techniques of hang gliders and windsurfers, we might come up with something like ***Pteranodon Ingens***.

So, what's new after so many millions of years, apart from anthropomorphism, that is? You tell me...

Reference: BIOMECHANICS OF PTERANODON by C.D. Bramwell & G.R. Whitfield, Phil. Trans. Royal Society, London. B.267, pp.503-581 (1974) ■

# Chuperosa

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

There are times when I do not want to fly my electric plane or to spend the time setting up a winch. So, I fly my hand launch sailplane. Having only one hand launch, I decided to get a back up plane, but not the same one. Not knowing what to get, I called Sal at Northeast Sailplane Products. Sal highly recommended the Chuperosa. As it turned out, this was a good choice. Choosing the plane was easy. Choosing the airfoil was a little more difficult.

There are three airfoils available for the Chuperosa and each can be built either as an aileron or a polyhedral. The three airfoils are E214, an SD4061 and an SD 7037. The same three airfoils are also available in a two meter wingspan. Because I wanted a hand launch for contest work, I couldn't use the two meter version. And because I wanted to keep it light, I did not want to use the aileron version. That still left me with the decision as to which airfoil to use. More phone calls to Sal. Sal helped me, but I still wasn't sure. He then mentioned that wing kits are available and at a very reasonable price. A great idea. I could, with a little more work and expense, have one plane with three different wings. I received a kit with the SD7037 and a wing kit for the E214 and the SD4061. What I found was very interesting.

The E214 is by far the slowest of the three. I believe it gives the greatest lift in light conditions. It does not work well



when the wind picks up. The E214 makes a great airfoil for early morning or late afternoon light lift. This is when I use the E214. It also will not launch as high. Next I tried the SD4061 and found this to be a much better airfoil when there is some lift and when the wind is lightly blowing. It will also launch higher than the E214. Last, I tried the SD7037. This turned out to be the best all around airfoil. The SD7037 has a low sink rate and yet thermals well. You can also get a good high launch. If I find very light lift I use the E214, but if there is good lift or it gets a little windy, I use the SD7037. I really do not know if I need the SD4061. I asked Sal about the SD4061 and he said that the SD4061 may be dropped from the Chuperosa kit in favor of the SD7037.

Having to make three wings may seem like a lot of work, but it really isn't. The quality of the wing kit is excellent. Everything you need is included. In fact, the whole kit is excellent. The wood is very light and complete and the hardware package is complete. The plans are very good and show both the aileron and polyhedral version. The instruction manual is also very complete and has lots of pictures to help in building the Chuperosa.

Construction is straight forward and with the help of the graphic instruction manual and plans it would be hard not to end up with a good looking and flying plane.

In constructing the Chuperosa, I found two things that are not normally found on sailplanes. One I liked, and the other I didn't. The first is the wing holddown bolt. There is only one in the center of the wing. This works very well. More than once I have touched a wing tip on landing. All that happened was that the wing pivoted on the center bolt. I've done the same on a plane with the normal pin in the front and a rear bolt hold down, and I usually end up with a damaged fuselage.

The second thing is the fuselage. The rear of the fuselage is made of balsa stick construction similar to an old timer. I don't know how much, if any, weight this saved and it takes longer to build. If I had to build another Chuperosa, I would make new fuselage sides out of 1/16 balsa and a 1/64 ply doubler from the nose to the trailing edge of the wing.

If you are looking for a good flying hand launch, and want the option of different airfoils, call Northeast Sailplane Products at 802-658-9482.

**Good flying!** ■

# *Modifications to a Legend*

...Pancho Morris
Mesquite, Texas

*The Airtronics Legend has become a very popular sailplane. There have been several built and flown in this area and all have looked good and flown very well.*

I came home from work one evening to find a Legend kit in my dining room. I had won it in the U.S. Soaring Team raffle. After some thought, not much, I decided to break my rule of not building kits or designs that other people are flying. This was too good a plane to pass up and, for $10, the price was right.

After seeing and hearing of wing dowels breaking on landing and launch, I decided to go to a bolt in the front and the back. I had also heard of and witnessed wing fluttering. I decided to fully sheet the bottom of the wing. The amount of area left unsheeted was so small that I felt the weight gain would be small, but the strength would be much better.

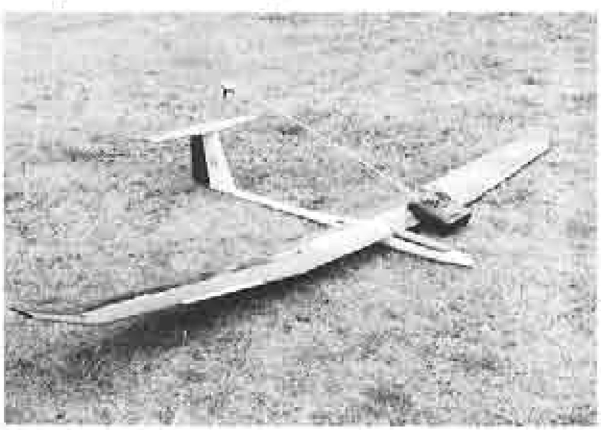
I wanted to tie the front wing bolt block to the spar for strength. The front side of the spar is directly over the forward end of the plywood towhook plate.

The kit comes with a thick balsa forward rib block that is sandwiched between two plywood ribs to accept the wing dowel. I made the spar side half of this block out of basswood and left the front balsa. This block did not come all the way to the top of the rib so that the head of the bolt would be recessed into the wing. This was epoxied to the spar and glassed to the spar, top, bottom and sides. The hole is drilled to accept a 1/4 - 20 bolt.

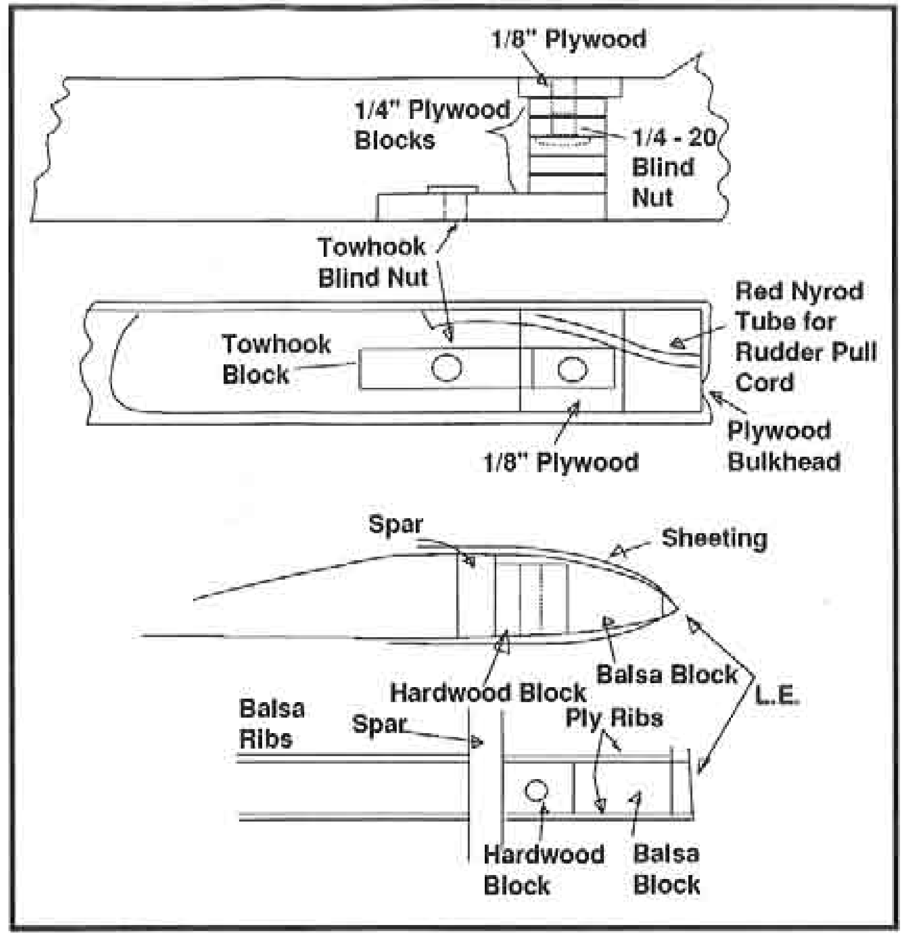
A block is built up from the towhook plate using squares of 1/4" plywood. I used the plywood because it was handy and it made it easy to bury the 1/4 - 20 blind nut in the middle. This block was glassed to the fuselage on all sides and front and back. A 1/8" plywood plate was epoxied across the fuselage. It was epoxied to the sides of the fuselage and to the plywood block. It was glassed from the underside to the fuselage sides. The top of this plate should be flush with the fuselage sides so that it will support the wing when the bolt is tightened. Build it up, if necessary, with plywood or hardwood.

I used two stainless steel bolts front and back. I figure if I hit hard enough to break a nylon bolt, something else will probably break anyway, and I don't want to lose the plane on launch due to a brittle or weak nylon bolt.

Besides sheeting the bottom of the wing, I made a few other minor modifications. I used Sullivan's Kevlar cables for the rudder drive. Since the wing hold down block was in the way of the pull cable, I used a piece of red nyrod tubing, supplied with Kevlar, to route the line from the side of the fuselage into the hole in the forward bulkhead. I hinged the ailerons on the top of the wing rather than the bottom as shown. I don't understand the reason for hinging them on the bottom, the top seems more logical.








The horns and pushrods are still on top as this does keep them off the ground. I made my own plywood control horns for all moving surfaces. I did not like the look of the nylon backplates sticking out of the surface. It looks draggy and not as neat.

My Legend with the Infinity 600A radio with a 1200 mah pack and 141 servos on the flaps and 401 servos on the ailerons came in at 82 oz. This seems to be in line with most that I have seen even with my modifications. The kit was an absolute JOY to build! Airtronics kits are THE CREAM OF THE CROP and this kit is no exception. The instructions are fantastic leaving almost nothing to the imagination. This kit would not be for a first time builder, but with the quality of the instructions and materials, a person with a little experience should have no trouble.

The Infinity 600A radio is a beautiful match for the plane. It will not do everything a Vision will do, but it does everything you need to get the most out of this plane. The instruction manual has a page in the back that gives a step by step procedure for setting up the radio for rudder, elevator, aileron and flap sailplane with the crow on the throttle stick and one flap pre-set. This is a real aid to someone who has no experience with a computer radio. The transmitter is much lighter than I had anticipated.

Flying the plane has yielded no surprises, only joys. One of the things that convinced me to build it is that it uses the SD 3021 airfoil which I have been using on my Ehecatl series and have been very happy with. It is slightly heavier than my 100" but with more area, and it has a lighter loading by about 8 oz. I expected it to fly like my other planes and it does. I have trimmed it in my standard color scheme with the Ehecatl logo and it is Ehecatl, The Legend. ■

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## *Shop Hints*


Costa Mesa, California

#### Nose Weights

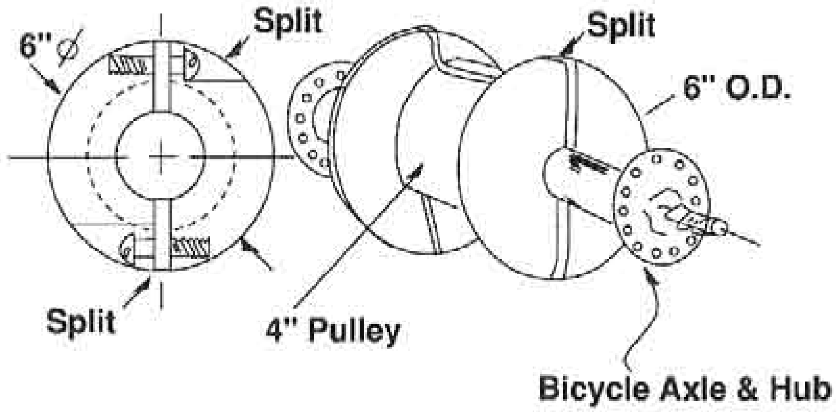
Here is a cheap source of lead weights: tire shops (like Mark C. Bloom, Winston, Sears, etc.). They throw away the used wheel-balance weights. Ask the shop manager to show you where the waste bucket is, as it is usually full of weights of all sizes, from 3/4 inch to 4 inches long. Grab a handful, put them in a plastic bag, pour water into it to wash them and then you have a generous supply of weights. The long weights can be cut into pieces; lead cuts easily with a hack saw. (Short weights are difficult to cut because the spring steel inside is tough.)

#### Repair Material

The next time you are in a Chinese restaurant, ask for chopsticks. Take them home and use them for a variety of purposes: mixing epoxy, wing repair material for spars, or as a skid epoxied under the nose of the fuselage. If the chopsticks are bamboo, they are especially strong.

#### Bearing Failure

If the bearing in the bicycle hub turnaround of the winch line keeps failing, you should replace it with a larger diameter pulley. The hub is so small that, during the average launch, it turns at over 5000 RPM which it was never designed to do. One way to avoid further failures is to mount a larger (say, 4" diameter) aluminum hub over the bicycle hub to reduce the rotational speed. ■

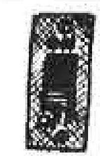



**The Aluminum pulley is made from two halves so it can be mounted.**



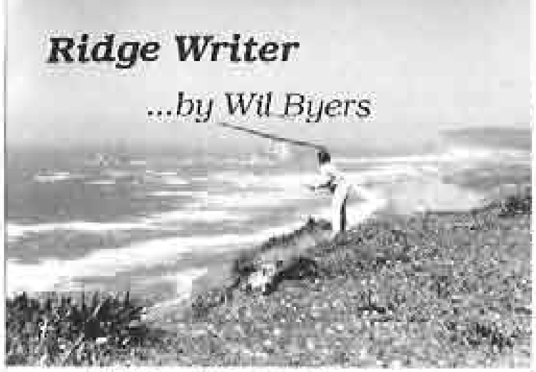
## *Lessons with Buzz*

...by Greg Vasgerdsian


| | |
|---|---|
|  | This distant glider is:<br>A) Circling left in a thermal.<br>B) Circling right in a thermal.<br>C) Flying inverted, and A or B.<br>D) A 747. I lost sight of mine. |
|  | This receiver switch is:<br>A) Off.<br>B) On. I do things backward.<br>C) Who cares. The batteries are dead.<br>D) Let's launch and find out. |
|  | This wing rod is:<br>A) Music wire and can be bent.<br>B) Case hardened steel and will hold up a house.<br>C) Carbon fiber, is light, and will hold up a house.<br>D) The one part of my plane I left at home. |
|  | This feathered friend is:<br>A) Showing me where there's lift.<br>B) About to lead me into sink.<br>C) A peregrine about to attack my glider.<br>D) An R/C flying wing. |
|  | This transmitter is:<br>A) My best friend. You name it; it does it.<br>B) A booby trap for boobies like me.<br>C) On my wish list.<br>D) Controls the brain of my spouse. |

## Ridge Writer

...by Wil Byers



RT. 4 Box 9544, W. Richland, Washington 99352; (509) 627-5224 (7:00 PM - 10:00 PM weekdays, after 9:00 AM weekends)

Piloting model gliders flying in a slope environment requires special piloting skills. All of us slope heads know that, don't we? But, these are skills that are earned only by developing them over time and many hours of flight practice. However, as difficult as guiding these slope ships is, it is not near as difficult as landing them. If fact, landing a remote control slope glider is undoubtedly the most difficult part of flying in this environment. This is due to a number of different factors. These factors include the type of slope, the velocity of the wind and its direction, the kind of model, the size of the landing zone, and the conditions the landing zone offers. So, in this month's column let's examine some proven ways to make a successful landing approach and that difficult touch down.

Have you ever noticed a fellow sloper who, upon arrival at the slope site, determines the landing conditions before even unpacking any models and beginning to set up? How many times have you been asked by a slope enthusiast, "What is your landing zone like?" Or have you ever had a new pilot who asked, "Would you explain how to make an approach for landing?" These are questions that we often take for granted after flying a location for some time. However, if you think back to that first landing at a particular hill, the anxiety feelings will probably reemerge. It may take reminiscing about flying in adverse condition and the landing zone that had a rotor so nasty it nearly demolished your slope ship, but most of us can conger up those memories. Maybe you are even one of the many unlucky souls who experienced a crash that resulted from underestimating how difficult the landing was. So, how do we slope soaring buffs land models that sometimes have wing spans in excess of 22 feet or may be loaded to the gills with lead ballast.

**CAREFULLY**, that's how, and by following some type of methodology. Then let's begin by saying, "If you are going to land your model without sustaining damage, you must know both the model and the local conditions." Therefore one should start with an examination of the flying site. This may sound obvious to a veteran sloper, but this preflight check often gets overlooked, unfortunately. It gets overlooked for lots of reasons. Reasons that we will discuss further in this two part series. The reality is, though, that a few extra moments spent examining the site can save airplanes. Airplanes that take many hours to build and cost somewhat more than one might otherwise want to spend.

So, what do you look for when examining a the flying site and its associated landing zone? Well, start by scrutinizing the topography surrounding it. Determine if the hill is smooth or if it is haired over with brush, trees, etc. Study the terrain out in front of the site to see if it lies flat and smooth. Or determine if it will turbulate the air as it approaches the face of the hill. Ask yourself, "How high is this slope and how inclined is the face?" Other features of the terrain will matter also. Things like, "Does the face roll off gently or is the slope such that it is a vertical cliff?" Then also, take time to notice if the face is straight abreast of you. Make a mental note of whether the face wraps around to different direction of the compass.

When assessing the slope's environment it is a good practice to pay close attention to the direction of the wind. Hey, I hear you saying, "That is too obvious." Unfortunately, many times what appears obvious isn't really. So, move about the slope and carefully assess the wind. Use wind drift clues to verify the wind direction. These clues may be such things as birds flying by, or smoke, or dust, or a flag placed on the hill. I have even seen spiders flying by riding on their webs. You may even want to go as far as launching a helium filled balloon to assess the true direction. The important thing about this check is to know the true direction of the wind, because if the wind blows from an undesirable direction it can cause unexpected results. Thus, early evaluation of wind direction can greatly aid your flying and certainly your landing.

Lastly, in your assessment of the site you need to decide where your model will land. Once again this is a critical item on your preflight mental or written checklist. Decide if the model will have to land on the face of the slope, on top, somewhat behind the face, to one side of it, or whatever. You may even be forced to do a bit of cross country work to arrive at a suitable location for landing that model without damage. But, knowing where you are going to land before you launch gives you the option of knowing what to expect and where you will have to go to get there.

While you are busy taking all of this information in, this is a good time to decide what in this flying environment can cause damage to your airplane. Notice the layout of trees, bushes, rocks, building, cars, and most assuredly people. If you can move some of the items that present hazards, without arousing the EPA officer, it is not a bad idea to do so. What you can not move, make a point of remembering it's location. After all, you will definitely want to know where that item was when you start that final approach. (Also, remember this is not your property and therefore think before you act!)

Now if you have completed this preflight evaluation/assessment, it is time to put your model together for some self indulgence. But don't just put it together and thoughtlessly throw it into the winds of fate. Use the information you have gathered to decide if there is anything you can do to raise the survivability odds of your aircraft. Maybe you can add some ballast to increase the penetration of the ship. As well, a little ballast will increase the speed and responsiveness of the model, responsiveness that you just may need when piloting the model to a landing. It will also assist it in punching through any rotor that might exist in the landing zones. Additionally, pay attention to such items as the model's center of gravity (CG). A poorly placed CG can mean a model that handles poorly also. Other items to look for when assembling the models are the control throws. If you have forgotten to change a dual rate or are flying the ship with a different program configuration than previously established, you will want to change those before launching. It may even be that your batteries are not carrying a full charge and your flying time is limited which, if not adhered to, will certainly alter the way you land.

Most importantly, stop and check to see if anything can be done to make your model more suited to flying in this environment. Things such as carry ballast, installing flaps, or adding ailerons all change the way any model handles. So, the extra time spent doing some analysis is worth many more hours that could otherwise be spent at the building bench, should you opt to ignore it. A friend once said, "I'm rarely ever the first pilot to launch my model, but I'm usually the last one flying." And, as I've witnessed over the years, those who care for their models and prepare for the conditions are the ones who get both the most hours on them and the least time in repair.

Next month we'll get to the nitty gritty of how to make an approach and a landing. ■

# *Camperdown*

## *January 25th - 27th 1992*

...by Martin Simons, Australia

Every model sailplane slope soaring enthusiast imagines the perfect site, with good slopes facing every possible wind direction, access to clear launching and landing areas, and the promise of a steady breeze every day. The thought might cross such a fanatic's mind that the circular explosion crater of an extinct volcano, about 4 km across, near enough to an ocean for regular sea breezes but in a low rainfall zone, would provide all these topographical and climatological features.

Add to this recipe a well equipped caravan and camping site at the summit of the most favoured slope. Include a pleasant country town within five minutes drive, with snack bars, pubs, restaurants and motels for those who have not spent all their money on radio gear. What more could be dreamed of?

Almost all these features are to be found in the state of Victoria, Australia, an hour's drive west of Melbourne. This is Camperdown, and for years past the model sailplane fraternity, led and organised by the enthusiastic Victorian Association of Radio Model Soarers (VARMS), have made an annual pilgrimage to this delectable place on the Australia Day long weekend holiday. The distance from Adelaide is 680 km, but the roads are good, traffic light and the drive takes only 7 to 8 hours, so some manage it every year. Sydney and Canberra are too far, Brisbane and Perth are a continent away. Hobart is over the sea. Are there any other places in Australia? Not many, and not very big.

The ancient volcano blew three huge holes in the ground within recent geological time, that is, tens of thousands of years ago. The craters filled up partly with water and the surrounding ridges have been eroded. Two of the crater lakes join up to make one shaped like a rough figure 8, the third stands alone with a narrow neck of lowland separating it from the others. The water in all is salty, since there is no surface outlet. Evaporation alone keeps the levels down.

There are small areas of scrubby forest on the slopes, some very rocky spots, and one or two reluctant landowners, but there really is a site for every possible wind and although the mornings can sometimes be calm, the wind does blow almost every day without fail. It does rain in the winter and they have had snow in the town once or twice this century, or so the locals say. Even in summer the nights can be chilly, as we found this year, clustered round the camp fire.

I do not know how many people turned up, but there were at least 100, including some families, at Sunday dinner in one of the pubs. Others came and went during the weekend, staying to fly for a few hours. Almost everyone seemed to have brought three or four sailplanes, ranging from large scale models like John Gottschalk's magnificent 5 metre Swiss Elfe S3 and Col Collyer's 1/3rd scale Golden Eagle, down to minimal two channel lightweights, and everything between. There were experimental aircraft, flying wings and deltas, dedicated aerobatic models, a few F3B or F3F models, two scale aerobatic models (Rob Goldman's splendid LO 100 and Frank Smith's lovely Habicht), and every other variety of model sailplane imaginable Some electrics flew for the first couple of hours on Saturday morning when the wind was very light. There was even a power flying contingent at the town racecourse offering aero tows for those who needed them. (Not a winch or bungee to be seen.)

VARMS write up a programme for each day, though it is of the loosest kind. Certain hours are reserved for scale models, other times for fast, timed speed runs, others for general flying, oddities, etc. Nothing stops the scale models or the oddities joining in the general flying or even the speed runs if they feel that way. (At least one Ka 6 did.) There is, perforce, an informal rule (which I found out about only after I had broken it) about numbers of models in the air at one time. There was only one mid air collision, which left one model badly broken and the Golden Eagle with an injured wing, but safely landed.

The atmosphere was relaxed and cheerful throughout, no-one had to score points, no-one was expected to fly if the urge was lacking or if the weather wasn't right. Most of the time it was perfect, although the landing area for the particular slope used this weekend, is rather awkward. An almost invisible power line caught one unwary person, someone span in, several made rather heavy arrivals.

The lift was cyclic sometimes. When the wind was light the models all gained height, which was attributed to thermals moving in from across the lake. It was easy to work these and drift back behind the slope, gaining height all the time. But things changed very rapidly. A chilly wind would rush in but the slope lift seemed to vanish, bringing everyone down. Presumably each thermal produced a corresponding area of sink which, temporarily, blotted out the slope lift. One or two models landed down at the base of the slope, but none in the water.

There were also some notable low saves.

At the final dinner there were simple prizes distributed to almost everyone who had done anything the least bit noticeable. Since the bottles of wine distributed in this way were not from the superior vineyards of South Australia, our contingent thought the best thing to do with them was to get rid of them as quickly as possible, in the obvious way. NSW wine isn't all that bad, actually.

Camperdown was worth the journey for the South Australian group. We shall return!

### Scale Thermal Soaring at Waikerie

Some years ago I had the idea that scale model sailplanes were too often designed only for slope soaring. People did not expect to launch them over flat ground to soar in thermals. I suggested that a scale thermal soaring competition might encourage a change in attitude and, in the long run, some improvements in scale sailplane design.

In 1990, with support from my club, the Southern Soaring League, the Waikerie thermal soaring scale meeting was planned. It proved to be a considerable success. About fifty excellent scale models arrived for judging and flying. They came from Victoria and one even from Tasmania. Another meeting was held in 1991, with similar numbers. This year will be the third of what we hope will become a regular annual meeting. The dates are 29th February 1st March. We still rely mostly on South Australian and Victorian participants but we are hoping that the idea will catch on elsewhere and lead to a general increase in the sport of thermal soaring scale sailplanes.

Waikerie is a small fruit growing town on the River Murray about 160 km from Adelaide in South Australia. The aerodrome is used by the Waikerie Gliding Club, which has extensive accommodation and catering facilities, caravan park, workshops, and a swimming pool. The WGC turn the site over to us completely for the weekend, a great privilege for which we remain very grateful. Passenger flights in the club sailplanes are available when the models are all down. The town itself provides almost everything else that might be needed.

The competition is divided into two classes. It was thought that models of modern, fibre-reinforced plastic sailplanes, ought not to be judged against models of the older, wooden and fabric prototypes. We have, therefore, two classes, vintage and modern. Any model of a non-plastic sailplane can be entered in the vintage class, which is stretching a point but seems to meet with general approval.

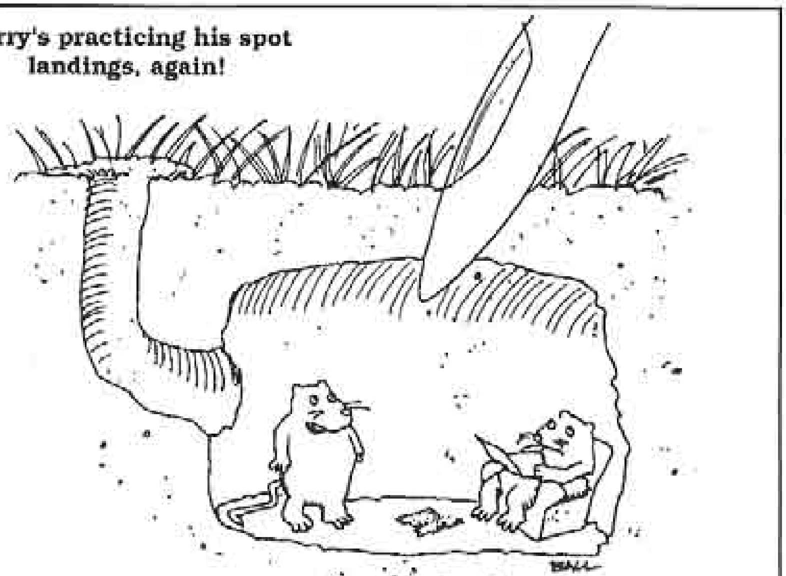
The competition has two aspects, 'stand off' scale judging for accuracy, and soaring. At the end, the scale marks are adjusted to 1000 for the winner and the rest pro rata, and the flying scores are averaged and similarly scaled to 1000 points, so the maximum possible score is 2000, half for scale, half for soaring. The flying tasks are roughly similar to those used for F3J competition, a ten minute flight with landing in a very large circle. Pilots are not required to launch within the same 'slot', however. The rounds last 90 minutes. Within this period the pilot chooses the time for launching, so this choice becomes part of the contest. Only one launch per round is allowed but an immediate re-light may be done if the first flight is aborted within two minutes. There has never, yet, been a mid air collision.

Our first contest was restricted to hand tow and winch launching with generous but limited line lengths. Aero towing is also allowed now. This has created many difficulties, some of which will be overcome this year by the use of electronic height sensing devices in the tugs, which will prevent the models being launched to enormous altitudes and thus ruining the chances of victory for line launched models. The height measuring devices are being built by Mike Borgelt, who is well known as a supplier of instruments for full scale sailplanes.

We are still experimenting with the rules and it is certain that there will be changes in format in future years. Various possibilities exist. We may decide to launch all by aero tow, or perhaps the modern class will be by aero tow and the old timers by winch. The competitive aspect of the flying does not appeal to everyone, so this may be eliminated in favour of a scale judging followed by a qualifying flight and general fun flying thereafter.

The main thing is to have fun, and that we have achieved. ■

**Harry's practicing his spot landings, again!**



Alan Ball
Boston, Massachusetts

## R/C Soaring Resources

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

### Seminars & Workshops

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

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

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

### Reference Material

Madison Area Radio Control Society (M.A.R.C.S.) *National Sailplane Symposium Proceedings*, 2 day conference, on the subject and direction of soaring. 1983 for $9.00, 1984 for $9.00, 1985 for $11.00, 1986 for $10.00, 1987 for $10.00, 1988 for $11.00, 1989 for $12.00. Delivery in U.S.A.is $3.00 per copy. Outside U.S.A. is $6.00 per copy. Set of 8 sent UPS in U.S.A. for $75.00. Walt Seaborg, 1517 Forest Glen Road, Oregon, WI. 53575

### BBS

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

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

Reference listings of *RCSD* articles & advertisers from January, 1984. Database files from a free 24 hour a day BBS. 8-N-1 Bear's Cave, (414) 727-1605, Neenah, Wisconsin, U.S.A., System Operator: Andrew Meyer

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

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

### Contacts & Special Interest Groups

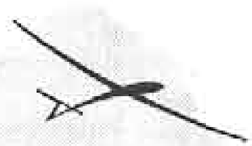
California - California Slope Racers, John Dvorak, 1638 Farringdon Court, San Jose, California 95127 U.S.A., (408) 259-4205.

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

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

Texas - Texas Soaring Conference (Texas, Oklahoma, New Mexico, Louisiana, Arkansas), Gordon Jones (Contact), 214 Sunflower Drive, Garland, Texas 75041 U.S.A., (214) 840-8116.

Maryland - Baltimore Area Soaring Society, Steve Pasierb (President), 21 Redare Court, Baltimore, Maryland 21234 U.S.A., (410) 661-6641







## F3B/USA

**The Newsletter for the Multi-Task Soaring Enthusiast**

**Subscriptions: $12 / Year / Six Issues**

**Write: F3B/USA**
**Byron Blakeslee**
**3134 Winnebago Drive**
**Sedalia, CO 80135**

**(303) 688-9572**

## LSF

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

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

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

Youareinvitedtojointhe
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Forinformation,Contact:
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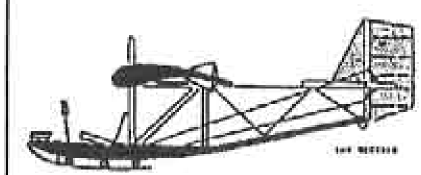
**RobertMassmann**
**282JodieLane**
**Wilmington,OH45177**
**(513)382-4612**

## T.W.I.T.T.

### (The Wing Is The Thing)

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

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



### The Vintage Sailplane Association

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

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

# NEW PRODUCTS

The information in this column has been derived from manufacturers press releases or other material submitted by a manufacturer about their product. The appearance of any product in this column does not constitute an endorsement of the product by the *R/C Soaring Digest.*

### Sailplane Gift Basket

...from Mother & Daughter Originals

As the wife of a flying enthusiast, I understand how difficult it is sometimes to find a nice gift for the husband whose hobby is flying model airplanes. Being in the gift basket business for the past year and a half has lead my daughter and I to what we believe is a great gift for those "fly boys" and we wanted to pass it on to you.

We have a specially designed sailplane-filled gift basket we call "Flight Line" that includes cheese, crackers, smokehouse almonds, beef jerky, peanuts, a mini chip clip, and the ever needed stop watch. They can take this basket right to the flying field with them and not go hungry for several hours. "Flight Line" makes a wonderful gift for either birthdays, Father's Day, Grandparent's Day, anniversary gift, etc.

This novelty sailplane-shaped basket measures 15"X14"X2" and can be used again and again for serving chips or crackers, or he can hang it in his workroom.

If we can help you with your gift giving, please give us a call anytime. We work from my home in Garland and we are always happy to answer questions about our baskets and talk with flyers or their wives.

Mother & Daughter Originals, P.O. Box 476821, Garland, Texas 75047-6821; or call Peggy Jones at (214) 840-8116. ■



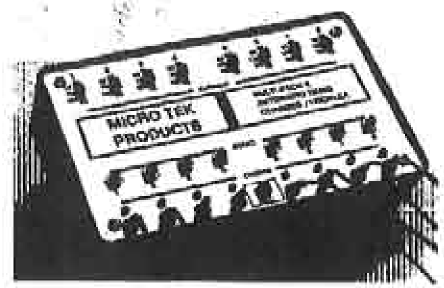


### MULTI-PACK II & FIELD CHARGER

...from Micro Tek Products

The **MULTI-PACK II** is a fully automatic charger that can charge up to 8 battery packs at one time. These could be any combination of transmitter and receiver packs. Normally, it would be configured to charge 4 receiver and 4 transmitter packs. The time of charge is set to 15 hours and after this time will automatically reduce to a trickle charge mode. The current is switch selectable to 50, 70, 120, or 180 mA's and is controlled by means of constant current regulation. The trickle current is also set by this switch and will automatically be equal to .01C. This is accomplished by pulsing the selected charge current at a 100/1 duty cycle. LED indicators are provided for each output to show if charge current is flowing. They also indicate the mode that the charger is in. Separate start buttons are provided for each output to start the charge cycle. When a battery pack is connected it starts out in the trickle mode until start is pressed. Each output is separately timed and can be reset to trickle at any time. The trickle mode uses a pulse technique for efficient topping of charge and can be left indefinitely.

$129.95 with Futaba plugs
$95.00 W/O plugs

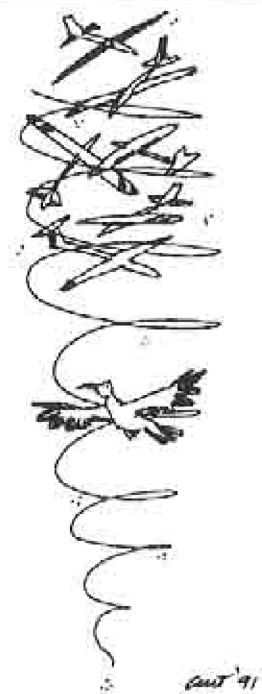




**FIELD CHARGER**: Fast charger powered from your car cigarette lighter or starter battery. Provides a quick charge for both your transmitter and flight packs. Charge your batteries on your way out to the flying site. Provides enough charge in 15 to 30 minutes to fly 4 or 5 additional flights. Won't fry your batteries. Provides a safe amount of quick charge without reducing the life of your batteries. Automatic shutoff reduces the charge current to the normal overnight rate when batteries approach full charge. Dual LED indicators show status of charger.

$29.95 without plugs, $33.95 with plugs

All prices include 1st class postage in the U.S.A. Michigan residents add 4%. Checks, M.O.'s and COD's accepted. MICRO TEK PRODUCTS, P.O. Box 563, Romeo, MI 48065; (313) 752-3978. ■



# An Electrifying Argument

...by Frank Weston
Manufacturer and Designer
Weston Aerodesign Co.
Arnold, Maryland

Imagine a contest without the need for electric winches. No line breaks, pop-offs, or sandbagging. No hauling heavy batteries, line retrievers and winches. No worry about wind shifts, battery charging or having enough people to operate winches. Imagine a contest where everyone in a flight group launches at the same time into the same air, and where normalization of scores is actually meaningful. What you have imagined is an electric contest.

The purists shudder. The realists begin to nod their heads. Admittedly, a sailplane which attains launch altitude by means of its own motor is a compromise, but the compromise is not as great as you might think. With the methods now available for composite construction of sailplanes, finished weight can easily be 10% less than optimum flying weight. An electric sailplane does not have to have a wing stressed for a winch launch thus the electric airframe can be made even lighter. With these savings a motor and battery can be easily accommodated without exceeding weight necessary for optimum soaring performance. The chart shows some rough comparisons between MERLIN, WACO's Standard class sailplane and the WACO 7-570, our almost equivalent in size electric.

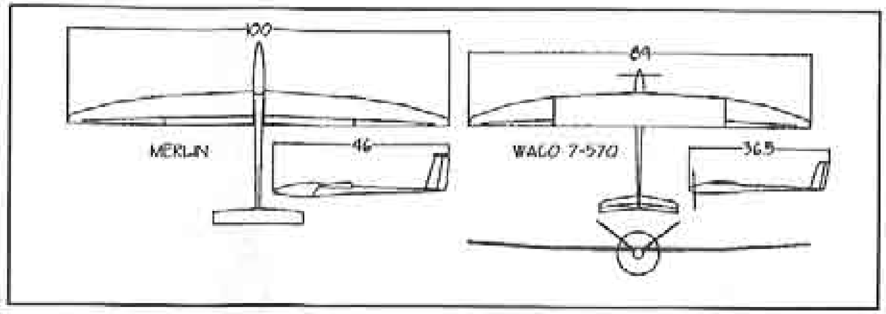
You could, of course, launch with a high-start or hand launch and save the cost of winch and battery, but I'm trying to make a point here. Ready to fly costs includes all components that go airborne: airframe, batteries, receiver, servos, motor, etc. Costs assume both designs built from kits, using top of the line components purchased at mail order prices.

Both ships use the WA001 airfoil, both have about the same minimum sink rate and L/D max. MERLIN controls consist of ailerons, flaps, elevator and rudder. W 7-570 has motor relay, ailerons, and a V-tail. MERLIN controls glide path by means of high drag flaps; W 7-570 uses spoilerons. W 7-570 saves weight by using a solid center section 3-piece wing. The wing is not stressed for a winch launch so a beefy spar system is not necessary. W 7-570 also needs no towhook, fewer internal bulkheads and trays, fewer servos and a lighter radio battery.

Which airplane flies best? MERLIN, but only by the slightest of margins. Which airplane will you fly the most? W 7-570, by a whole lot. Why? Because with the electric, you don't have to waste

| Parameter | MERLIN | WACO 7-570 |
|---|---|---|
| Span | 100 in. | 89 in. |
| Wing Area | 650 sq. in. | 570 sq. in. |
| Air Frame Wt. | 28 oz. | 15 oz. |
| Radio & Battery | 4 oz. | 3 oz. |
| Servos | 6 oz. | 3 oz. |
| Motor | - | 7.5 oz. |
| Motor Battery | - | 8 oz. |
| Prop & Spinner | - | 1 oz. |
| Optimum w/load | 9 oz./sq. ft. | 9 oz./sq. ft. |
| Total Weight | 38 oz. | 37.5 oz. |
| Optimum Flying Wt. | 42 oz. | 37 oz. |
| Ballast Required | 4 oz. | - |
| | Costs | |
| Kit | $180 | $100 |
| Winch & Winch Battery | $355 | |
| Charger & Cable | $60 | $30 |
| Electric Motor Comp. | - | $200 |
| Radio & Servos | $400 | $400 |
| Total Cost to Fly | $995 | $730 |






time setting up and taking down a winch or high start. You can usually get four good climbs (800 ft. +) from one battery charge. On a decent day, that's about all you need to do a solid hour of air time. Figure setting up and taking down the winch takes 20 minutes, and each launch and recovery takes 5 minutes. In an hour, I can get only 25 minutes of air time with MERLIN, and that's assuming the wind doesn't shift and the line doesn't break. If you're sold, keep reading. You will find interesting technical info. If not, turn to the next article, I'll never convince you.

If you are interested enough to read further, you might be wondering, since WACO makes both designs and since they both finish out at the same weight, why does the electric have totally different dimensions? Good question. The answer is long but worth understanding. In our brief experience with electric, we have learned two important rules. They are:

1. Climb performance is directly proportional to the ratio of power over weight. We have observed that best attainable rate of climb in feet per second (at an acceptable amperage) is about equal to 210 times the number of cells divided by the all-up weight in ounces. This is strictly a rule-of-thumb, and there are other factors, but assuming the plane has wings and flies, they are relatively unimportant, at least in the going-up department.

2. Given a decent motor and prop, power is a direct function of the battery voltage. The more cells, the more power. Because of system resistance, you can only get the juice (amps) out of a pack so quick. Power is the product of amps, volts and efficiency. With seven cells, about the best you can ever do is 200 to 300 watts. How this power gets turned into thrust is a big secret, and the difference between a good prop and the wrong prop is very, very significant.

Since we want to sell W 7-570, and since 7-cell duration (45 seconds or less motor run with a typical task of 8 minutes) is what 90% of all electric interest and competition consists of, W 7-570 is a 7-cell design. Using the rules above, and some knowledge we have of sailplanes, the basic parameters for a 7-cell ship can be easily determined.

The givens include:

- The weight of a good 7-cell motor, battery, and radio gear at about 21.5 oz.
- 9.5 oz. per sq. ft. wing loading is optimal for soaring in this size range.
- An adequate structure with composite construction will yield about .25 sq. ft. of wing area per ounce of airframe, or in other words, one sq. ft. of wing area will require about 4 oz. of wing and fuselage. (This is another thumb rule.)

Here are the equations:

a. 9.5 oz./sq. ft. wing loading = total wt./wing area

b. Total weight = component weight + airframe weight

c. Wing area = .25*airframe weight

Combining a, b, and c:

d. 9.5 = (21.5 + airframe wt.)/(airframe wt. * .25)

Solving for airframe weight:

Airframe wt. = 15.58 oz.

Solving c for wing area:

Wing area = 15.58*.25 sq. ft. = 561 sq. in.

So, W 7-570 should have about 561 sq. in. of wing area and weigh about 37 oz. all up. We can't build quite as good as we analyze, so the actual prototype weighs 37.5 oz. and has 570 sq. in. of wing, which is close enough.

We can now calculate what the climb performance should be:

Vs = 210*7/37.5 = 39.2 fps

With a 45 second motor run (the max allowed in 7-cell duration), we should be able to climb to over 1700 ft. Actual performance appears to be very close to this. Just in case you are wondering, 1700 feet is about three and a half times a good winch launch height, and not quite specked out.

There are good reasons why other elements of the W 7-570 design are different from those of MERLIN. For example: Why the V-tail? First, V-tails are very sexy. Second, since an electric usually has plenty of nose weight, we can afford to add a little weight to the tail, and I like the idea of servos placed right next to control surfaces. With a T or cruciform tail, it would be very difficult to put elevator and rudder servos in the vertical fin. With a V-tail, one servo fits nicely into each fin. So, W 7-570 is a V-tail with one servo in each fin.

Why use a different fuselage? To get best performance out of an electric, all electric power components should be placed as close together as possible to give shorter wire runs and less mass located at a distance from the CG. The easiest way to get at centrally located components is by putting them under a bolt-on wing.

The 89 inch wing span of W 7-570 is built in three pieces, and no spar or wing rod are required. A three piece wing saves a lot of weight - a three oz. wing rod for starters. Since all components go in and out under the wing, the weight of a canopy or nose cone is also saved.

The W 7-570 planform and other elements of the design are dictated by well recognized aerodynamic principles which we will not go into here. Suffice it to say that the similarities as well as the differences with MERLIN are quite obvious. The point being, however, that a good electric design is quite different from a good sailplane design. You are making a mistake if you expect optimum electric performance from a converted sailplane.

I love soaring and sailplanes, and I will never give up on pure sailplanes; but, there is a lot to be said in favor of electrics. I really believe that they will come to be the most popular element of the sport within the next few years. If you haven't tried one, give serious consideration to doing so. Avoid heavy designs which will disappoint you with poor soaring performance. Try an electric contest - you will be pleasantly surprised. ■

## *Hundred Minute Club*

...by Bob Johnson
Fond du Lac, Wisconsin

("Several Wisconsin soaring groups have a "**100 minute club**" where participants get awards for each 100 minutes of flight time logged.")

### Purpose

The purpose of the Hundred Minute Club is to promote the flying of radio-controlled model sailplanes in a friendly, non-competitive environment.

### Membership

Membership in the Hundred Minute Club is open to anyone who operates a radio-controlled model sailplane in accordance with the AMA Safety Guidelines and the rules set forth below.

### Rules

1. Launch by hi-start, winch or hand tow. No power pods, towing aloft by a powered plane or operation from a slope soaring site.
2. Timing begins when the model releases from the tow line, or the pilot has the transmitter in his possession and the model under his control.
3. Timing stops when the model touches the ground, any object in contact with the ground, disappears from sight behind any natural or man-made obstruction or possession of the transmitter is relinquished.
4. The flight must be witnessed and attested to by another sailplane pilot who is participating in the Hundred Minute Club program.
5. Times shall be recorded in minutes and seconds and will be rounded down to the next lowest whole second.
6. Flying shall be on a once-a-week basis at a time agreed upon by the persons participating. A flying session shall not exceed 3.Ø hours in duration. It is strongly suggested that flying be done in the evening with sessions not beginning before 6:ØØ pm local time.
7. All flight times shall be recorded on a Hundred Minute Club Official Score Sheet.
8. The following MINIMUM times must be attained for a flight to be official:

| Cum. Time | Min. Flight Time |
|---|---|
| Ø -1ØØ minutes | 1.Ø minutes |
| 1Ø1 - 2ØØ minutes | 2.Ø minutes |
| 2Ø1 - 3ØØ minutes | 3.Ø minutes |
| 3Ø1 - 4ØØ minutes | 4.Ø minutes |
| 4Ø1 - 5ØØ minutes | 5.Ø minutes |

   After 5ØØ minutes of flight time have been accumulated, all flights must be at least 5.Ø minutes duration to be official.
9. The Hundred Minute Club shall fly on a weekly basis from June 1 through August 31.

### Some comments about our rules:

#### Purpose

We experimented with mini-contests and several variations of what is contained in our present rules. The most success was realized when we flew against the clock rather than against one-another.

#### Membership

Even though we all belong, membership in the AMA is not required. On several occasions we've had a beginner show up eager to fly. Requiring membership in the AMA before they can participate has the tendency to drive beginners away. The purpose and function of the AMA is explained and eventually they all join.

#### Rules

1. Most of the time we launch using a hi-start. Occasionally we will set up a winch. Towing aloft and power pods can give an unfair launch height advantage.

2. We made a provision so that if a beginner was not comfortable with a hi-start, an experienced pilot could launch for him. Timing begins when the pilot is given the transmitter. After a few flights, they gain confidence and launch themselves.



**HUNDRED MINUTE CLUB**
**Official Score Sheet**

Name ____________________

| DATE | FLIGHT TIME | CUMULATIVE TIME | LANDING (I/O) | TOTAL LANDINGS | ATTEST |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

SHEET NUMBER ________

3. Once again, for the beginner landing can be a difficult task. An experienced pilot will land the plane if he does not feel comfortable. Timing stops when the pilot relinquishes the transmitter. Eventually, they all learn to land without assistance.

4. Everyone is on the honor system. Sometimes we time ourselves and another person then attests the time. Occasionally, someone will come out only to time and shoot the breeze for a while.

5. Rounding down makes for some interesting flights. On several occasions I've had a flight of 4 minutes 59.9 seconds and received the raspberries for not having made the required time.

6. We designated Wednesday evening as Hundred Minute Club night. Starting at 6:ØØ p.m. gives working people an opportunity to grab a bite to eat before flying. Flying continues until dark or we decide that we've had enough.

7. Everyone is given a score sheet. It is reduced in size so that two will fit on an 8 1/2 x 11 sheet and is printed on card stock. The scoresheet contains a column where landings can be recorded. We tried for a while, but a landing task never caught on.

8. We decided to stop increasing the duration required for a flight to be official at 5ØØ minutes. Wisconsin evenings are not famous for their thermal activity. Several of us have gone a month or more without recording an official flight.

9. We decided that June through August was adequate. The evenings are still rather cool in May and by September the days are getting rather short, making it difficult for some to participate.

The Hundred Minute Club was organized to give a purpose to our flying. To that extent, it has served us well. Without a goal, people get bored after a few weeks. Everyone is trying to accumulate minutes. We have been in existence since 1984 and are still going strong.

Every year or so I threaten to design a decal that can be placed on the participants sailplane. So far, they have only been idle threats. Maybe this year!

The rules were tailored to fit our needs. The KISS (Keep It Simple, Stupid) principle was used extensively in their development. Modelers in Florida or California will likely have a different environment than what exists in Wisconsin. Feel free to make modifications to suit your needs. If you have questions, comments or suggestions, please feel free to contact me at the following address: Bob Johnson, 453 Roosevelt St., Fond du Lac, WI 54935; 414-922-6705. ■



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## *LSF National R/C Soaring Championships*

...A Press Release from Mike Stump

The league of Silent Flight will be hosting their National Soaring Championships July 18-25, 1992 in Vincennes, IN...Vincennes and nearby Lawrenceville IL have hosted the last two AMA NATS. With the central location in the U.S. and excellent weather in this time frame, as well as great community support, this local was chosen for this first of what LSF hopes to become an annual event.

Championships in 9 different categories of R/C Soaring will take place during this week along with time for great fellowship and sharing with others involved in this wonderful activity.

Lodging should be plentiful within 5 miles of the contest sites and is very affordable with most rooms available in past years for between $30 - $40 per night. There are also good camping facilities nearby and we are working on obtaining dorm rooms at U.I.-Vincennes.

All 50 frequencies will be used with a limit of 8 entries per frequency in each event. Join us in Vincennes for this new direction in crowning R/C Soaring's National Champions and a week-long gathering of soaring devotees.

For further details and an entry form send a stamped, self addressed envelope to Mike Stump, 607 Washington Street, Cadillac, MI 49601.

### New LSF Executive Board

As we move into 1992, the LSF also takes on a new look with a new executive board. If you were waiting for a ballot, it was never sent. Outgoing President Bob Steele made the decision to name the only slate nominated as the incoming Board as an election is costly to the organization. The new LSF officers are all from Michigan and are: President Mike Stump, V.P. Jack lafret, Treas. Cal Posthuma, Sec. Dave Corven.

Many thanks should go out to Bob Steele for his efforts over the past year in bringing day to day operations back into the hands of the Exec. Board. The result of this will be much shorter turn around for the level vouchers and increased communications at all times. Once again our thanks, Bob. ■







### Schedule of Special Events

| Date | Event | Location | Contact |
|---|---|---|---|
| Mar. 15 | Hand Launch | Irvine, CA | Scott Smith (714) 651-8488 |
| Mar. 21-22 | 4TH Annual Masters of Soaring | Covina, CA D (818) 915-5441 | Pete Olson E (714) 597-2095 |
| May 16-17 | Electric Contest | Memphis, TN | Bob Sowder (901) 757-5536 |
| May 16-17 | CSS May Memorial Contest | Cincinnati, OH | Chuck Lohre (513) 731-3429 |
| May 29-31 | Mid Columbia Scale Int. Fun Fly | Richland, WA | Roy (509) 525-7066 Gene (509) 457-9017 |
| June 7 | 9th Annual Hand Launch | Riverside, CA (After 6:00 P.M.) | Ian Douglas (714) 621-2522 |
| June 13/14 | S.O.A.R. Great Race | Osewego, IL | Lee Sheets (708) 748-8934 |
| June 27-28 | MASS-NASF Mid-South Soaring Championships | Memphis, TN | Bob Sowder (901) 757-5536 |
| July 18-19 | CSS Mid-Summer Contests | Cincinnati, OH | Chuck Lohre (513) 731-3429 |
| July 18-25 | LSF R/C Soaring National Championships | Vincennes, IN | Mike Stump (616) 775-7445 |
| July 25/26 | World Inter-Glide 92 | Fairlop, London | Les Sparkes 81-505-0191 |
| Aug. 22 | MASS Soaring Unlimited | Memphis, TN | Bob Sowder (901) 757-5536 |
| Oct. 3-4 | CSS Pumpkin Fly | Cincinnati, OH | Chuck Lohre (513) 731-3429 |

### *Classified Advertising Policy*

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

## For Sale - Business

**SAILPLANE DESIGNER'S + DRAG REDUCTION & STRUCTURES HANDBOOKS**, $7.95 each. Size/locate stable components, many low ReyNmbr airfoils via breaking Eppler's code, define speed/glide slope, design wing structure, drag reduction techniques. Eric Lister, 2214 Regina Dr., Clarksburg, MD 20871.

Find a good home for your "mature" models, excess radio gear, parts and accessories. List them free with **CLASSIFIEDS.** Sailplanes, Electric, slope ships and anything that helps them fly. Send your list with asking price, name, address, phone #, to: SILENT FLIGHT CLASSIFIEDS, 329 Little Ave., Ridgeway, PA 15853; (814) 772-4851. Subscriptions are $9.00/year or $1.00/issue.

CUSTOM - **FOAM CORES**, VACUUM BAGGING and **MACHINED** WINCH DRUMS. A B.A.T. special - foam Legend wing cores stock & custom. Airfoils avail. Selig, Selig-Donovan & others. Basic Aircraft Tech, Bob Harman, (801) 571-6406, 10424 Golden Willow Dr., Sandy, Utah 84070.

**GREETING CARDS**, humorous, assortment package in groups of 10 for the sailplane enthusiast. We have a card to fit any occasion. Send $10.95 plus $1.00 postage (CA residents please add 7.75% tax) to Curt Nehring, SOAR TOONS, 469 N Central Ave. Ste. #261, Upland, CA 91786; (714) 920-1261. Please allow 3 - 4 weeks for delivery.

## For Sale - Personal

MODEL Sailplane Clearance: 4 meter DISCUS - "KRAUSE", incl. wing servos, ready to fly...$595.00; 4 meter LS4 - "ROWING", all glass, ready to fly, Liscomb retract, incl. wing servos...$899.00; 1/4 scale ASW 20 - "WIK", all glass, ready to fly, Liscomb retract...$899.00; ASW 22, 6.25 meter - "FIBERGLASS FLUGEL", all glass, new kit w/retract or ail. mixer...$1450.00; LS4, nearly 1/2 scale! 8 meters (26') wing span! Unbelievable German craftsmanship, brand new kit, flying wt. approx. 40 lb. Entire airframe in gleaming white...$2700.00; LS4, nearly 1/2 scale fuselage, canopy frame, canopy, beautiful white gel-coat, brand new...$950.00; DG 500 - "THERMOFLUG", 3.5 meters, beautiful scale 2 seater, ready to fly...$345.00. Some prices flexible. All prices cash & carry. All models brand new or like brand new. Call Dan Troxell (714) 831-8013 CA.

Dodgson SABER, excellent condition, JR servos, RCD receiver, Airtronics Mod 7 channel radio, wing bag, field charger...$800.00 firm. Call Ray Cindric after 5 PM EST, (215) 579-1576 PA.

1972 Astroflight ASW - 17, 134", NIB...$125.00; SAGITTA 900, NIB...$70.00. Ed Athey, 1002 Stewart Ct., Azle, TX 76020.

Dodgson WINDSONG kit with LOVESONG upgrade, NIB...$175.00 ppd; Davey Systems PROPHET 2M kit, NIB...$38.00 ppd. Call or write Kevin Thomas, 508 W. Main St., Ligonier, PA 15658; (412) 238-2749.

AXLE from Sailplanes International, 2 meter wingeron slope plane, fiberglass fuselage, foam wings already sheeted w/obechi veneer, standard radio gear, no mixing required, NIB...$165.00. Call Kevin (619) 549-4589 CA, leave message.



NOVA slope racer, built, flown, in good condition. Call Brian for details at (714) 661-1774 CA.

1/4 scale 4 meter ASK-18 built from Charlesworth plans and finished in a beautiful green and white color scheme to match the full scale. Includes Futaba 7AUF radio w/aero tow release servo in the nose. All this for just $1100.00 RTF. For more info., contact Gary Brokaw, 2615 S. Cherry, Spokane, WA 99216; (509) 928-8416.

## Wanted

An original Don Clark Airborne THERMALSNIFFLER, in operating condition, must be in the high F.M. band (i.e., + -148 MHZ. Bill Pettigrew (514) 283-9643, 9-5, Montreal, Canada.

PEN PAL in England. Interested in corresponding with fellow slope soaring enthusiast. My name is Brian Tinkler ("Tink") and I fly the coast of Southern California (Los Angles). My mailing address is: Brian Tinkler, 15831 Bowie Street, Westminster, CA 92683, U.S.A.

Seeking Kirk Kreigh, former A.M.A. No. 70614, formerly of Dover, Delaware, designer of unusual plank flying wing sailplane that placed first in Jr. - Sr. Unlimited category June 26, 1977 Dover Mosquitos contest. Photo and story in Nov., 1977 *Model Airplane News*. Anyone knowing where he can be reached, please contact Jason Wentworth, 3081 NW 4th Terrace, Miami, FL 33125; (305) 642-8992.

## *The Joy of True Competitive Soaring*

...by Daniel Danrich
Temple City, California

Competition is found in almost every aspect of life. It is the foundation of our sport and our personal lives as well. We are continually concerned with who is the fastest, the smartest, the best builder, the most skilled pilot. Among us there is constant striving to be more correct, more original, more devout than anyone else. Even the best of friends try to outdo each other in their acquired skills.

When we compete without thinking to win, valuing everyone's efforts equally, competition can be a very positive motivating force. It can teach us to appreciate our abilities more deeply and it can lead us to an appreciation and a greater respect for the capabilities of others as well. Unfortunately, because competition is the road to success and power in our sport of soaring, it is usually used to gain selfish aims. Instead of competing with others, we compete against them. When competition becomes combat, it loses its power to inspire, and becomes instead a form of pressure which creates disharmony in our sport, upsetting the true nature in the joy of soaring. As we compete with one another to succeed, we widen the distance between ourselves and others. We become so intent on our quest for achievement that it becomes easy to ignore the feelings and hopes of those around us. We become willing to manipulate others to prove we are better than they are, and soon the aspirations and efforts of even our friends are undermined. The enmity and suspicion that result from competing in this way can create barriers between ourselves and others that are beyond our ability to overcome. The urge to win causes us to focus on the negative rather than the positive qualities of those around us so that we will appear more successful; we learn to point out the failings of others to make ourselves look superior. But what is the cost of this pattern? Do we benefit in the long run from treating others like this? Are we really better than they are, or are we standing on false ground? Though we may laugh at others, if we faced ourselves honestly, what would we have to laugh at?

When we lose touch in this way we are cut off from the satisfying feelings that come from sharing. Caught up in the fascination and excitement aroused by winning, we begin to depend on the thrill of the moment to fulfill us, sometimes even risking our safety in reckless actions to achieve these moments. As our desire to win becomes stronger, competition becomes an end in itself and takes the place of meaningful action. We seek more specialized areas of endeavor - electric, old-timers, handlaunch, slope - where we will be sure to win, thus creating grounds for even narrower rivalries. We lose the opportunity to share with others, and we lose interest in things outside our sphere. The energy that we could be using to develop a healthy attitude in our sport is directed instead into petty jealousies and we become increasingly alienated from openness and cooperation, from the real source of true competition. Neither our sport nor our friendships can be truly satisfying.

Competition can become so ingrained in our attitude that we believe it co be a natural quality, but actually we learn it at home, at school at our work. We teach it to our children, pushing them to compete because we want them to be more successful than we have been. This pressure to succeed, however, often only teaches us to fear failure, a fear which gradually undermines our self-confidence and actually prevents us from succeeding. Perhaps we compete because we believe it will stimulate true motivation. But motivation that emphasizes success alone cannot encourage the well-integrated development of our deepest abilities. In order to succeed, we focus only on our known skills and talents, and thus limit our wider potential. As long as we meet with success, everything is fine. But if we fail, the disappointment can shatter our confidence and strongly affect the continuing joy of soaring. As long as competition causes us to exploit our abilities, genuine accomplishment becomes blocked by frustration and failure. If we were to emphasize cooperation rather than competition, we would naturally feel more secure, more confident in our abilities, and we would have less need to win at the expense of others. But we cling to familiar ways; we compete believing that this is the accepted way to do things, no matter what the consequences may be.

When we examine the role of competition in our sport and the effect it has on our lives, we can see how it is often our fears and disappointments that spur us to compete. It is useful to take the time to look back over past contests, considering the different forms of competition that you have entered into. How much pressure was there on you to win? Were you afraid of failing? Remember how you felt when you won, and when you lost. When you won, did you care about those who lost? When you see how competition has affected you, you can understand that others have the same feelings you have experienced. You will see that competition usually causes discomfort for everyone involved. You can use this insight to develop more of a caring attitude for others and for yourself.

It is not easy, however, to give up the glow of success and ego-gratification, even if we know it is superficial and short-lived. But if we are genuinely concerned with our personal growth and with finding ways to improve our sport of soaring, then we must apply this concern to all our relationships with other club members and outsiders as well. As we learn to treat others with more respect, and as we learn to be more honest with ourselves, competing to win loses its hold on us. It falls away before our growing strength, defeated by understanding and sharing. As we learn more about the real joy of soaring competition, we come closer to the source of its true values. Those around us respond to our skills and knowledge with openness and appreciation, and instead of competing to win we can help each other to become our best.

We can enjoy our successes in soaring and find fulfillment in healthy competition if we balance the pleasure of success with a willingness to appreciate and learn from our failures as well. This means that when we do the best we can, even if we fail, we can be grateful for the experience, for it can reveal to us where we can improve our abilities. Rather than approaching a contest as something of major importance, we can look on it with humility and allow it to teach us to know ourselves better. We no longer have to fear failure, for we can see that the worst outcome is not failure but our disappointment in ourselves.

When we relieve the pressure caused by disappointment and fear of failure, soaring becomes rich and fulfilling by the way in which it builds our character. There is no reason to allow such pressure to shape our sport; we can learn instead to enjoy and compete cooperatively. Our sport will be smoother, more meaningful and rewarding. Our sense of satisfaction in soaring will deepen and we can share our appreciation with others. As we influence others to support one another, we will find our own appreciation growing stronger, and our understanding and skillfulness more profound.

Just as competition encourages more competition, so cooperation inspires friendships and caring in those who feel it and receive it. When we see all those as friends in a mutual search for fulfillment, we share in the richness of the soaring experience. When all of us work together rather than competing in useless and narrow ways, the possibilities for genuine support and caring in the great sport of soaring are infinite. ■

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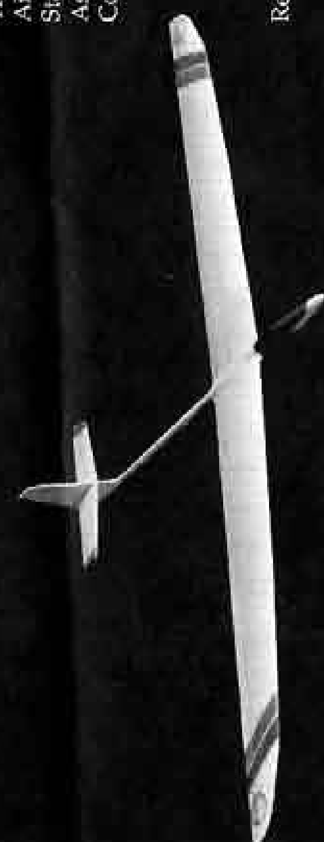
# MODI 900

## COMPETITION COMPOSITE SAILPLANES



**SPECIFICATIONS**

Type: Unlimited Class Sailplane
Wingspan: 116 inches
Wing Area: 949.21 square inches
Fuselage Length: 50 inches
Weight: 83 ounces
Wing Loading: 12.29 ounces per square foot
Root Chord: 10 inches
Tip Chord: 3.6 inches
Airfoil: RG-15 or SD3021, aluminum shaft hinges
Stab Airfoil: SD8020
Aspect Ratio: 13.1 : 1
Construction: Fuselage: Fiberglass & Kevlar.
Wings: Vacuum Bagged, Blue IB Foam, Uniweb Carbon Fiber Cloth, & Fiberglass; Triple Taper Planform.
Wing Rod: 1/2" Solid Carbon Fiber Rod, Sheathed in Brass.

Retail Price: $595

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The Name: Modi comes from Germanic and Teutonic mythology. Thor, the god of the sky had a son named Modi, a personification of his mighty strength.